

PROJECT MANUAL



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CONSTRUCTION
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DOCUMENT 00 60 00 - PROJECT FORMS

PART 1 - GENERAL

1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS

- A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:
1. AIA Document A101, "Standard Form of Agreement between Owner and Contractor, Stipulated Sum."
 - a. The General Conditions for Project are specified in Document 00 72 00.
 - b. Supplementary Conditions are specified in Document 00 73 00.

1.2 ADMINISTRATIVE FORMS

- A. Copies of AIA standard forms may be obtained from the American Institute of Architects; <http://www.aia.org/contractdocs/purchase/index.htm>; docspurchases@aia.org; (800) 942-7732.
- B. Pre-Construction Forms:
1. Form of Certificate of Insurance: AIA Document G715, "Supplemental Attachment for ACORD Certificate of Insurance 25-S."
- C. Information and Modification Forms: Attached at the end of this Section.
1. Submittal Transmittal. (Referenced in Section 01 33 00)
 2. Data Transfer Agreement. (Referenced in Section 01 33 00)
 3. Subcontractors and Major Material Suppliers List. (Referenced in Section 01 33 00)
 4. Requests for Interpretation (RFI). (Referenced in Section 01 26 13)
 5. Substitution Request. (Referenced in Section 01 25 00)
 6. Bulletin. (Referenced in Section 01 26 00)
 7. Change Order Form. (Referenced in Section 01 26 00)
 8. Punch List. (Referenced in Section 01 77 00)
 9. Certificate of Substantial Completion. (Referenced in Section 01 77 00)
- D. Payment Forms:
1. Schedule of Values Form: AIA Document G703, "Continuation Sheet."
 2. Payment Application: AIA Document G702/703, "Application and Certificate for Payment and Continuation Sheet."
 3. Form of Contractor's Affidavit: AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 4. Form of Affidavit of Release of Liens: AIA Document G706A, "Contractor's Affidavit

of Payment of Release of Liens."

E. Waste Management Forms:

1. Waste Management Plan Summary. (Referenced in Section 01 74 19)
2. Waste Management Report. (Referenced in Section 01 74 19)

END OF DOCUMENT 00 60 00

SECTION 00 72 00 – GENERAL CONDITIONS

PART 1 - GENERAL

- 1.1 General Conditions of the Contract for Construction, AIA Document A201, 2007 Edition, hereinafter referred to as General Conditions, are hereby made a part of this Specification.**
- 1.2 The Contractor is hereby specifically directed, as a condition of the Contract, to acquaint himself with the Articles contained therein, and to notify and apprise all Subcontractors and any other parties to the Contract of, and bind them to, its conditions.**
- 1.3 No contractual adjustments shall be due as a result of failure on the part of the Contractor, Subcontractors or other parties to the Contract to fully acquaint themselves with the General Conditions.**
- 1.4 The General Conditions of the Contract may be amended by Supplementary Conditions.**
- 1.5 The provisions of the General and Supplementary Conditions when included and Division 01, General Requirements, apply to the Work specified in each Section of the Specifications.**
- 1.6 Where conflicts occur concerning the Architect's duties and responsibilities between the General Conditions and the Agreement between the Owner and Architect, the Agreement shall take precedence.**
- 1.7 If not otherwise included in the Owner Contractor Agreement or specifically included in the bidding documents, the Contractor shall obtain the Owner's insurance requirements prior to submitting a bid.**

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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SECTION 00 73 00 - SUPPLEMENTARY CONDITIONS

AIA Document A201-2007, in its entirety, shall constitute the General Conditions of the Contract for Construction (the "General Conditions"). These Supplementary Conditions of the Contract for Construction ("Supplementary Conditions") are attached to and made a part of the Contract Documents and are intended to modify and/or supplement the General Conditions. Capitalized terms used herein but not defined herein shall have the same meanings as in the General Conditions.

PART 1 - GENERAL

1.1 ARTICLE 1 GENERAL PROVISIONS

- A. Subparagraph 1.1.9 – Other Definitions: Add the following new Subparagraph 1.1.9 as follows:

1. **1.1.9 OTHER DEFINITIONS**

- a. .1 "As required" shall mean as required by regulatory bodies, by referenced standards, by existing conditions, by generally accepted construction practice, or by the Contract Documents.
- b. .2 "By Others" refers to work that is not part of the Contract.
- c. .3 "By Owner" refers to work that will be performed by Owner or Owner's agents at Owner's cost.
- d. .4 "Equal", "accepted equal", and "approved equal" shall mean as accepted, in writing, by Architect as being of equivalent quality, utility, and appearance.
- e. .5 "Furnish" means supply only, do not install.
- f. .6 "Install" means install only, do not furnish.
- g. .7 "Provide" means furnish and install.

- B. Subparagraph 1.2.2: Add the following new wording to the end of Subparagraph 1.2.2:

- 1. Documents prepared by entities other than Architect or its consultants may be included with documents prepared by Architect or its consultants for convenience in pricing, bidding, permit application, construction or other purposes. The inclusion of such documents not prepared by the Architect or its consultants within the Contract Documents shall not imply that Architect has reviewed, approved or is responsible for the accuracy or completeness of such documents.

- C. Paragraph 1.5 – Ownership and Use of Drawings, Specifications and Other Instruments of Service: Add the following new subparagraph 1.5.3:

1. **§1.5.3** In the event of any unauthorized use, reuse, transfer or modification of the Drawings, Specifications or other documents by Contractor, any lower tier contractor or material supplier, or other person or entity under Contractor's direct or indirect employ, Contractor agrees to indemnify, defend and hold Owner, Architect, their officers, directors, shareholders, employees, agents, and consultants harmless from and against any and all claims, liabilities, suits, demands, losses, damages, costs and expenses, including, but not limited to, reasonable attorneys' fees and all legal expenses and fees incurred through appeal, and all interest thereon, accruing to or resulting from any and all persons, firms, or any other legal entities on account of any damages or losses to property or persons, including, but not limited to, injuries or death or economic losses arising out of such unauthorized use, reuse, transfer or modification, except where Architect is found to be solely liable as between the parties hereto as well as between any other persons, firms or other legal entities for such damages or losses by a court or forum of competent jurisdiction.

D. Subparagraph 1.6 – Transmission of Data in Digital Form: Add the following sentence at the end of Subparagraph 1.6:

1. Any electronic transfer of Drawings, Specifications or other documents ("Data") by the Architect to the Contractor shall be subject to the terms of the Architect's standard Data Transfer Agreement, which shall be executed by the Contractor.

1.2 ARTICLE 3 CONTRACTOR

A. Subparagraph 3.2.1: Add the following new sentence to the end of Subparagraph 3.2.1:

1. Additionally, Contractor acknowledges and agrees that the information contained in the Contract Documents is adequate and sufficient for completion of the Work.

B. Subparagraph 3.2.4: Revise the second sentence of Subparagraph 3.2.4 to read as follows:

1. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, or reasonably should have recognized any errors, inconsistencies, omissions or nonconformity and failed to do so, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations.

C. Subparagraph 3.2.5: Add the following new Subparagraph 3.2.5:

1. **§3.2.5** In the event of conflicts or discrepancies among the Contract Documents, the following order of precedence shall govern: (1) Amendments and revisions (such as change orders), with those of later date taking precedence over those of earlier date; (2) the Agreement; (3) the Supplementary Conditions; (4) the General Conditions; (5) Drawings and Specifications. Drawings shall govern Specifications for quantity and location, and Specifications shall govern Drawings for quality and performance. In case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

- D. Subparagraph 3.4.2: Add the following new text to the end of Subparagraph 3.4.2:
1. Any requests for substitution shall be made in a timely manner and in full compliance with all Contract requirements. By making a request for substitution, Contractor: (1) represents that the Contractor has investigated the proposed substitute product and determined that it is equal to or superior in all respects to that specified; (2) represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified; (3) certifies that the cost data presented is complete and includes all related costs under this Contract except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and (4) will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
- E. Subparagraph 3.7.3: Modify Subparagraph 3.7.3 as follows:
1. **§3.7.3** If the Contractor performs Work ~~knowing it to be~~ which Contractor knows or should know is contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.
- F. Subparagraph 3.9.1: Add the following new text to the end of Subparagraph 3.9.1:
1. The superintendent shall be approved by Owner and shall not be replaced without Owner's prior approval. The superintendent shall be familiar with the job site, the Contract Documents, and all applicable rules, regulations and requirements of all authorities having jurisdiction over the Work or the site.
- G. Subparagraph 3.10.1: Add the following to the end of Subparagraph 3.10.1:
1. Such schedule shall be a computer generated critical path method (CPM) schedule showing at a minimum: (1) the early and late start time for each major construction activity; (2) all "critical path" activities and their duration; (3) late order dates for all long lead time materials and equipment; and (4) critical Owner decision dates.
- H. Subparagraph 3.10.4: Add the following new Subparagraph 3.10.4:
1. **§3.10.4** Failure of Contractor to submit or keep current the construction schedule and submittals schedule as required by the conditions of the Work, shall be grounds for withholding of payments due Contractor by Owner, until such schedules are provided.
- I. Subparagraph 3.11: Modify the first sentence of Subparagraph 3.11 as follows:
1. The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals, as well as one copy of the approved permit set.

- J. Subparagraph 3.12.6: Add the following text to the end of Subparagraph 3.12.6:
1. Incomplete, uncoordinated or incorrect Shop Drawings and other submittals shall be returned to Contractor who shall be held responsible for all time delays and extra costs of review or handling by Architect or Owner, because of such submittals being incomplete, uncoordinated or incorrect.
- K. Subparagraph 3.12.7: Modify Subparagraph 3.12.7 as follows:
1. **3.12.7** The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved reviewed and returned by the Architect.
- L. Subparagraph 3.12.8: Modify Subparagraph 3.12.8 as follows:
1. **3.12.8** The Work shall be in accordance with approved Architect-reviewed submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval review of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval review thereof. If more than one submittal review stamp (Architect's and one or more of its consultants' stamp) appears on a submittal, the most stringent action and notations thereon shall apply. Signature on a submittal review stamp by the Architect or a consultant does not imply that it has reviewed Work not within its professional discipline or scope of services.
- M. Subparagraph 3.12.10: Modify the second to last sentence of Subparagraph 3.12.10 as follows:
1. Pursuant to this Subparagraph 3.12.10, the Architect will review, ~~approve~~ or take ~~other~~ appropriate action on submittals only for the limited purpose of checking for conformance with ~~information given~~ and the visual and aesthetic design concept expressed in the Contract Documents.
- N. Subparagraph 3.18.1: Revise Subparagraph 3.18.1 as follows:

1. **§3.18.1** To the fullest extent permitted by law the Contractor shall indemnify, defend and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, liabilities, suits, demands, damages, losses, costs and expenses, including, but not limited to reasonable attorneys' fees, and all legal expenses, and fees incurred through appeal, and all interest thereon, arising out of or resulting from the performance of the Work, provided that such claim, damage, loss or expenses is attributable to bodily injury, sickness, disease or death or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Paragraph 3.18.
- O. Paragraph 3.19: Add the following new Paragraph 3.19:
1. **§3.19 DESIGN/BUILD**
 - a. **§3.19.1** If Contractor provides and/or retains its subcontractors or others to provide Design/Build Work for specified portions of the Project, Contractor shall be responsible directly to Owner for those portions of the Project, including but not limited to: (1) preparing engineering and other drawings and specifications for all components of the Design/Build portion(s) of the Work, (2) complying with Project requirements and space limitations, (3) coordinating and interfacing with other trades and consultants, and (4) obtaining approvals from authorities having jurisdiction over the Project. Contractor, its subcontractor(s) or their design professional(s) shall be the Professional(s) of Record for their portion(s) of the Design/Build Work.
 - b. **§3.19.2** Architect shall have no responsibility for the design, installation or performance of Design/Build portions of the Project including but not limited to reviewing such designs and/or Work and/or certifying the payment applications for the same. Architect's services in connection with any Design/Build work shall be limited to checking such designs for general conformance to major space limitations and the visual and aesthetic design concept as expressed in the Contract Documents. Such checking by Architect of more than two proposals for the same Design/Build portion of the Project shall be compensated as Additional Services.
 - c. **§3.19.3** When the Contract Documents or authorities having jurisdiction over the Project require certificates or statements of performance characteristics of materials, systems or equipment, or professional seals, calculations, or other certificates or statements regarding such Design/Build portions of the Project, Owner will require Contractor to provide them, and Owner and Architect will be entitled to rely on them to establish that the designs, materials, systems, equipment and such Work will meet the performance criteria required by the Contract Documents.

1.3 ARTICLE 4 ARCHITECT

- A. Subparagraph 4.2.2: In the first sentence of this Subparagraph 4.2.2, replace the words "appropriate to the stage of the construction, or as otherwise agreed with the Owner" with the words "necessary in the judgment of Architect or as otherwise agreed by Owner and Architect in writing".
- B. Subparagraph 4.2.3: Add the following text to the end of Subparagraph 4.2.3:
1. Architect's duties shall not extend to the receipt, inspection and acceptance on behalf of Owner or Contractor of materials, furniture, furnishings and equipment at the time of their delivery to the premises or installation. Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of Architect in Architect's administration of the Contract for Construction, or by tests, inspections or approvals required or performed by persons other than Contractor. If Architect recommends procedures, either directly or by reference to standards or manufacturers' recommendations, Contractor shall adopt such recommendations as its own, or inform Architect if exception is taken to such procedures, and may utilize or propose alternative procedures that Contractor will warrant as fulfilling the intent of the Contract Documents.
- C. Subparagraph 4.2.4: Add the following text to the end of Subparagraph 4.2.4:
1. Should any direct communications become necessary, copies of the communications shall be promptly forwarded to the proper party or parties as set forth in this Subparagraph 4.2.4.
- D. Subparagraph 4.2.5: Modify Subparagraph 4.2.5 as follows:
1. **4.2.5** Based on Architect's on-site evaluations and the data comprising of the Contractor's Applications for Payment, the Architect will review and certify, to the best of its knowledge, information and belief, the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the amounts due- the Contractor is entitled to payment of the amount certified and will issue Certificates for Payment in such amounts.
- E. Subparagraph 4.2.7: Modify the first sentence of Subparagraph 4.2.7 as follows:
1. Architect will review and approve or take other appropriate action upon, the Contractor's submittals required by the Contract Documents, such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the visual and aesthetic design concept expressed in the Contract Documents.

1.4 ARTICLE 8 TIME

- A. Subparagraph 8.3.1: Starting on the fourth line of Subparagraph 8.3.1, delete the words, "pending mediation and arbitration; or by other causes which the Architect determines may justify delay" and add the following text at the end of Subparagraph 8.3.1: "A time extension shall be Contractor's sole remedy and there shall be no compensation for any such delays other than those resulting from the active interference of Architect, Owner or their employees or agents."

1.5 ARTICLE 9 PAYMENTS AND COMPLETION

- A. Subparagraph 9.4.2: Add the following text to the end of Subparagraph 9.4.2:
1. Further, Architect shall not be obligated to issue any Certificate for Payment covering work by Design/Build contractors or subcontractors, work by Owner's separate contractors, or other work for which Architect is not providing full services.
- B. Subparagraph 9.5.1.8: Add the following new Subparagraph 9.5.1.8:
1. **.8** rejection or non-acceptance of Work by any governmental agency having jurisdiction.
- C. Subparagraph 9.6.4: Add the following text to the end of Subparagraph 9.6.4:
1. At the Owner's sole discretion, payments may be made by check jointly payable to Contractor, its Subcontractor or supplier, and any applicable labor union trust fund.
- D. Subparagraph 9.8.1: Modify this Subparagraph 9.8.1 as follows:
1. **9.8.1** Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents and all required final inspections and permits have been obtained so that the Owner can occupy or utilize the Work for its intended use, subject only to completion of minor items (punch list).
- E. Subparagraph 9.8.3: Add the following text to the end of Subparagraph 9.8.3:
1. If upon this subsequent inspection, Contractor has not yet completed the Work, and further field reviews by Architect are required, Contractor shall be responsible to Owner for any additional cost to Owner of further reviews by Architect.
- F. Subparagraph 9.8.4: Add the following text to the end of Subparagraph 9.8.4:
1. In the absence of such certificate, the date of Substantial Completion shall be in accordance with Subparagraph 9.8.1.
- G. Subparagraph 9.9.3: Add the following text to the end of Subparagraph 9.9.3:
1. , nor shall it start the guarantee or warranty period.

1.6 ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

A. §10.3 HAZARDOUS MATERIALS

1. Subparagraph 10.3.1: Modify Subparagraph 10.3.1 as follows:

- a. **§10.3.1** The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials, including but not limited to asbestos or polychlorinated biphenyl (PCB) , lead-based paints or any other potentially toxic or hazardous contaminants, materials, pollutants which for the purpose of this Article 10 means solid, liquid, gaseous, or thermal irritant or contaminant, including smoke, vapor, soot, fumes, acids, alkalis, chemicals and wastes. Prior to commencement of the Work, Contractor shall require manufacturers of all materials and equipment for the Work to provide certifications, warranties or statements that such materials or equipment (1) are free of injurious amounts of hazardous materials or (2) contains specific amounts of hazardous materials, and provide recommendations regarding handling of such. Such certifications, warranties or statements shall be in writing in a form acceptable to Owner, and shall be forwarded by Contractor to Owner. If the manufacturer states that a material or equipment contains injurious amounts of hazardous materials, Owner shall be afforded adequate and timely opportunity to order that other materials be substituted without causing delay to the Project. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

B. Subparagraph 10.3.6: Modify Subparagraph 10.3.6 as follows:

1. **§ 10.3.6** If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred, provided the Contractor has complied fully with its obligations under Subparagraph 10.3.1.

1.7 ARTICLE 11 INSURANCE AND BONDS

A. Subparagraph 11.1.5: Add the following new Subparagraph 11.1.5:

1. **§11.1.5** If Contractor fails to secure and maintain the required insurance, Owner shall have the right (but not the obligation) to secure same in the name and for the account of Contractor, in which event Contractor shall pay the cost thereof and shall furnish upon demand all information that may be required in connection therewith.

- B. Subparagraph 11.3.1.4: Add the following text to the end of this Subparagraph 11.3.1.4:
1. It shall not, however, cover Contractor's equipment, machinery or tools.
- C. Subparagraph 11.3.3: Add the following text to the end of Subparagraph 11.3.3:
1. , to the extent Owner's insurance covers such losses.

1.8 ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

- A. Subparagraph 12.1.1: Modify Subparagraph 12.1.1 as follows:
1. **§12.1.1** If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, or to requirements of any public authority having jurisdiction over the Work, it must, if required in writing by the Architect or Owner, be uncovered for the Architect's or Owner's or public authority's examination and be replaced at the Contractor's expense and without change in the Contract Time.

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SECTION 01 10 00 SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section addresses:
1. Work covered by Contract Documents.
 2. Special insurance.
 3. Codes and Standards.
 4. Work by others under other contracts.
 5. Owner furnished products.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to all Sections. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.
- C. Conflicts or discrepancies among the Contract Documents shall be resolved in the following order of priority:
1. Amendments and revisions (such as Change Orders) of later date take precedence over those of earlier date;
 2. the Agreement;
 3. the Supplementary Conditions;
 4. The General Conditions;
 5. Drawings and Specifications; Drawings govern Specifications for quantity and location. Specifications govern Drawings for quality and performance. In case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The complete construction of interior and exterior improvements for Unum Group.
1. Project Location: Building HO2, 2211 Congress St, Portland, ME, 04102
 2. Owner: Unum Group
- B. Program Manager: Jones Lang Lasalle (JLL) is the Program Manager for this Project to serve as an advisor to Owner and to provide assistance in administering the Contract for Construction between Owner and Construction Manager, according to a separate contract between Owner and Program Manager.

- C. Construction Manager: Consigli Construction Co., Inc. is Construction Manager for this Project and is Project's Constructor. In Divisions 01 through 49 Specifications, the terms "Construction Manager" and "Contractor" are synonymous.

1.3 SPECIAL INSURANCE

- A. Contractor's Commercial General Liability insurance shall contain no exclusion that would deny coverage for any claim arising out of or contributed to by any fungus, mildew, mold, or resulting allergens. If such exclusion exists and cannot be removed by endorsement, Contractor shall submit proof of coverage for fungus, mildew, mold, or resulting allergens under a Pollution Legal Liability or Contractor's Pollution Liability policy.

1.4 WORK UNDER OTHER CONTRACTS

- A. Separate Contract: Owner will award separate contracts for performance of certain construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract. These contracts will include the following:
1. Fixtures, furnishings, and equipment to the extent not identified in the Contract Documents.
 2. Furnishing of light fixtures and lighting controls. Installation of provided fixtures and lighting control systems by Construction Manager.
 3. Furnishing of carpet floor finishes. Installation of provided materials by Construction Manager.
- B. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, and without interfering with or delaying work under this Contract.

1.5 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish furniture and equipment in work areas and items defined in the contract documents. The Work includes providing support systems to receive Owner's equipment and making plumbing, mechanical, and electrical connections.
1. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.
 2. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
 3. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
 4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
 5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.

6. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
7. Contractor shall review Shop Drawings, Product Data, and Samples and return them noting discrepancies or anticipated problems in use of product. Examples of discrepancies or problems include, but are not limited to, coordination issues.
8. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
9. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
10. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.

1.6 PERMITS

- A. Contractor shall secure and pay for all permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required.
- B. If required by governmental authority, Owner will make application for permits and licenses using forms obtained and prepared by the Contractor and with all costs paid by the Contractor.

1.7 TAXES

- A. Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted at the time Bids are received, whether or not yet effective.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

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SECTION 01 14 00 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 USE OF PREMISES

- A. Access: At all times, provide the Architect and the Owner's representatives, easy and safe access to the Work wherever it is in preparation and progress. Provide such access so Architect may perform its functions.
- B. Use of Site: Confine operations at the site to areas permitted by law, ordinances, permits, and the Contract Documents and do not unreasonably encumber the Site with materials or equipment.
- C. Owner's Rules: Conform at all times to the Owner's requirements for protection of plant, materials, equipment, and noise levels. A copy of the Owner's rules will be furnished upon written request from the Owner.
- D. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - 1. Schedule deliveries to minimize use of driveways and entrances.
 - 2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor air intakes.

1.2 OCCUPANCY REQUIREMENTS DURING CONSTRUCTION

- A. Full Owner Occupancy: Owner will occupy the site during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations.
 - 1. Schedule use of premises for Work and coordinate construction operations with the Owner to allow for Owner occupancy of the Ground Floor of HO2.
 - 2. Perform the Work during normal business hours only upon approval of the Owner.
 - 3. Perform selective work after business hours or at such times as approved by Owner. Selective work includes, but is not limited to concrete saw cutting, hammer drilling, nailing, and similar work, which may cause noise, dust, or odors, thereby disturbing occupants.
 - 4. Keep premises orderly, clean and with a minimum of obstruction and inconvenience to the occupants.
 - 5. Limit use of site to areas designated unless otherwise allowed by Owner in writing.

6. Relocate stored products that interfere with public access, operations of the Owner or separate contractor. If necessary, obtain and pay for additional storage or work areas needed for operations.

1.3 OCCUPANCY REQUIREMENTS PRIOR TO SUBSTANTIAL COMPLETION

- A. Partial Owner Occupancy: Owner reserves the right to occupy and to place and install equipment in completed areas of the site, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of incomplete portions of the Work, nor shall it relieve the Contractor of its responsibility for completion of the Work in accordance with the Contract Documents.
 1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of the site.
 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of the site.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 14 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed for certain work that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project. Amount of alternate prices shall include cost of coordination, cost of overhead and profit, and cost of modifications or adjustments to adjacent work due to integration of alternate.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included in Part 3 below. Specification Sections contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

Alternate No. 1: Existing Bathroom Renovations: Perform selective demolition and renovate existing bathrooms as defined in the contract documents.

Alternate No. 2: Existing Egress Stairs: Perform selective demolition and provide hold open devices at existing stair doors, new finishes, and new lighting as defined in the contract documents.

END OF SECTION 01 23 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

- A. Architect may issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on form included following Part 3.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 5 days unless otherwise provided in the General Conditions after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - b. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals (Change Order Requests): If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

3. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 4. Comply with requirements in Section 01 60 00 "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use Gensler "Bulletin," selecting Architect's Request for Contractor's Proposal", on form included following Part 3.

1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on Gensler "Change Order" form included following Part 3.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 26 13 – REQUESTS FOR INTERPRETATION (RFI'S)

PART 1 GENERAL

2.1 REQUEST(S) FOR INTERPRETATION (RFI'S)

1.1 General: A Request for Interpretation (RFI) is a Contractor initiated, Architect formatted, written instrument related to the execution of the Work that is addressed to the Architect. The RFI shall be used by the Contractor as the means for it to ask questions related to the Work; subject to the conditions contained within this article.

- A. An RFI which fails to conform to the requirements stated herein, (i.e, is incomplete or contains numerous errors) shall be returned to the Contractor for its completion/rectification without benefit of the Architect's response, in addition, no adjustments for Contract Time or Contract Sum shall be granted for an RFI failing to conform to the requirements stated herein.
- B. The Owner reserves the right to assess the Contractor for the cost (based on time and materials) of an RFI response performed by the Architect, and any of it's consultants, which is deemed by the Owner and the Architect as being frivolous or unnecessary (i.e.; the subject of the RFI is addressed in the Contract Documents). Such RFI's shall be removed from the RFI log.
- C. Each RFI shall be submitted with such promptness as to cause no delay in the Contractor's own work and in that of any subcontractor. No adjustments of Contract Time or Contract Sum will be granted because of failure to have an RFI submitted with sufficient time to allow for the orderly processing of a response by the Architect.

1.2 Authorship:

- A. Prior to the commencement of the RFI process, the Contractor shall designate a full time "RFI Manager" whose duties shall include the responsibility for enforcing the Request for Interpretation provisions of this article, to maintain an up-to-date log of all RFI's, advise the Architect, in writing, of the status and disposition of all RFI's at the progress meetings, and be a member of the Contractor's staff. The RFI Manager shall be experienced in administration and supervision of building construction of the type indicated on the contract documents including mechanical and electrical work.
- B. Each RFI shall originate solely from the Contractor's RFI Manager. An RFI submitted to the Architect by an entity, or individual, other than the RFI Manager shall be returned to the Contractor.

1.3 Prohibitions: RFI's shall not be used for the following:

- A. To solicit consideration by the Architect of a "substitution".
- B. To request an adjustment of the Contract time. If the Contractor believes that the response received from the Architect to any RFI warrants adjustment to the Contract time it shall immediately advise the Architect, in writing, upon receipt of the Architect's response.

- C. To request an adjustment of the Contract sum. If the Contractor believes that the response received from the Architect to any RFI warrants adjustment of the Contract sum it shall immediately advise the Architect, in writing, upon receipt of the Architect's response.
- D. To solicit comment clarification(s) of any required submittal or shop drawing review that was transmitted by the Architect to the Contractor.
- E. RFI's shall not be used to transfer coordination responsibility from the Contractor to the Owner or the Architect.

1.4 Procedure:

- A. The Contractor shall submit all RFI's on the form supplied by the Architect.
- B. Each blank on the RFI form shall be filled in.
- C. Each RFI shall be typewritten and shall be forwarded to the Architect in triplicate. Each RFI shall address one subject.
- D. Each RFI shall contain specific reference to the drawing number(s), detail number(s), schedule type(s), bulletin number(s), specification section(s) and paragraph number(s), or other related document(s) which is (are) pertinent to the Contractor's question. The date of each referenced drawing number, bulletin, specification section or other related document shall be identified. In preparing each RFI verify the applicable dimension(s), field conditions, drawing requirements (small through large scale details), and/or specification section requirements pertaining thereto. Prior to submission of the RFI coordinate the nature of the inquiry with the requirements of other sections or trades as related thereto and responses to previous RFI's. Where supplementary sketches are required to clarify an inquiry the Contractor shall attach supplementary sketches, at large scale, illustrative of the inquiry. Sketches shall include sufficient detail, materials, dimensions, thicknesses, assembly, attachments, relation to adjoining work, structural grid references, and all other pertinent data and information for the Architect to make an informed response.
 - 1. The Contractor is encouraged to suggest solution(s) to its inquiries, if applicable. Should the Contractor's solution(s) have an impact on Contract Sum or Contract time it shall be so stated within the RFI.
- E. Each RFI shall be dated and sequentially numbered.
- F. Each RFI shall be reviewed, and signed, by the RFI Manager prior to transmitting to the Architect.
- G. Duration of RFI Response Upon Receipt: 5 business days.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 13

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Request for Interpretation

Gensler

Project

To

Date

Attention

Project Number

From

File

6RFI

Issued By

**Drawing Sheet /
Location**

Subject

Detail

Distribution

**Specifications Page
Number**

This is page

1 of

Problem, Cause and Proposed Solution (attach sketches as necessary)

Effect on Schedule

Effect on Cost

Reply

Reply Needed by

Signature

Date

2101 Webster Street
Suite 2000
Oakland CA 94612
Tel: +1 510.625.7400
Fax: +1 510.625.7499

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SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 DEFINITIONS

- A. (Field) Review: Architect's visits to the site at intervals necessary in the judgment of Architect to become generally familiar with the progress and quality of the Work completed and to determine in general if the Work completed is in accordance with the Contract Documents. Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values at earliest possible date but before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 - a. Break down principal subcontract amounts into separate labor and materials items. Breakdown of subcontractor's schedule of values must be true and accurate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Review:
1. Prior to the 25th day of each month, furnish the Architect with a draft (pencil) copy of the Application for Payment.
 2. Upon receipt of the final Application and Certificate for Payment and other documentation as required by the Architect including the updated Schedule of Values and the updated Construction Schedule, the Architect shall review the documents received to determine if they correspond to the agreements reached during the draft (pencil) copy review. Upon completion of the Architect's review, the Architect shall revise and execute the Applications and Certificate for Payment to correspond to the agreements reached and forward the executed copies to the Owner.
 3. In taking action on the contractor's Application and Certificate for Payment, the Architect will rely on the accuracy and completeness of the information furnished by the contractor and will not be deemed to represent that he has made audits of the supporting data.
 4. Payment will not be made for materials and equipment stored off the site, except at the Owner's discretion and prior approval. When the Application and Certificate for Payment includes material or equipment stored off-site, the Application shall be accompanied by a statement certifying:
 - a. Description of the item(s) being stored.
 - b. Location of the bonded warehouse(s) where materials or equipment is being stored.
 - c. Affidavit of Storage.
 - d. Certificate of Insurance.
 - e. Bill of sale made to Owner stating there will be no additional cost for transportation and delivery of the item(s) being stored.
 - f. Statement certifying that item or any part thereof will not be installed in any construction other than work under this Contract.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Incomplete applications will be returned without action.
1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit notarized waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
 - a. Submit final Application for Payment with or proceeded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors, principal suppliers and fabricators.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Submittals Schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.
 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 10. Report of preconstruction conference.
 11. Certificates of insurance and insurance policies.
 12. Data needed to acquire Owner's insurance coverage(s).
 13. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 1. Evidence of completion of Project closeout requirements, including, but not limited to:
 - a. Transmittal of required Project Record Documents to Owner.
 - b. Evidence of completion of demonstration and training.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims" and AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 5. Evidence that claims have been settled.
 6. Occupancy permits and similar approvals or certifications by governing authorities and franchised services, assuring Owner's full access and use of completed work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project.

1.2 COORDINATION

- A. Coordination: Coordinate construction operations to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.

1.3 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1.4 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Record minutes in writing. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting.
 - 4. Notification: Inform participants 3 days prior to meetings not regularly scheduled.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect. Hold the conference at a convenient location. Conduct the meeting to review responsibilities and personnel assignments.
- C. Preinstallation Conferences and Meetings: Conduct preinstallation conferences and meetings at Project site before each construction activity that requires coordination with other construction.
- D. Progress Meetings: Conduct progress meetings at weekly intervals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work.

1.2 DEFINITIONS

- A. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.3 SUBMITTALS

- A. Submittals Schedule: Within 30 days after the execution of the Agreement between the Owner and the Contractor submit to the Architect and Owner copies of the submittals schedule. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for Architect's final release or approval.
- B. Contractor's Construction Schedule: Submit, for the Owner's and Architect's information, copies of the Contractor's Construction Schedule, large enough to show entire schedule for entire construction period.
- C. Field Condition Reports: Submit copies at time of discovery of differing conditions.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit, for Architect's approval, concurrently with the Contractor's Construction Schedule a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include the following information:
 - 1. Anticipated date of Architect's receipt of submittal.
 - 2. Number of business days allowed for Architect's review of submittal.
 - 3. Specification Section to which submittal relates.
 - 4. Subcontractor, fabricator or supplier responsible for preparing the submittal.
 - 5. Provide blank columns for actual date of submittal, re-submittal, and final-review status.
 - 6. Systems Submittals: Identify submittals for systems such as fire alarms, and sprinklers, on the transmittal and act upon the system singularly as a combined submittal.
- B. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for the Notice of Award to date of Final Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days.
 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Include selection process activities for finishes and products specified by allowances or specified to be selected during the sample review process. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. Startup and Testing Time: Include not less than five (5) days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 2. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Deliveries.
 - g. Installation.
 - h. Tests and inspections.
 - i. Adjusting.
 - j. Startup and placement into final use and operation.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Immediately after being awarded the Contract, prepare and submit, for the Owners and Architect's information, a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule. The schedule shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for the expeditious and practical execution of the Work.
 - 1. Allow a minimum of 10 working days for processing (from date Architect receives submittal until date he sends it back) and sufficient time for proper handling, review, fabrication and delivery.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

2.4 REPORTS

- A. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
 - 4. Give Owner and Architect a minimum of one week's notice of all anticipated revisions to the project schedule.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.

2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

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SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: At Contractor's written request, electronic copies of Drawings of the Contract Drawings and Project Manual will be provided by Architect for Contractor's use in preparing submittals. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to the Contract Documents.
 - 1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.
 - a. The following plot files will be furnished for each appropriate discipline:
 - 1) Floor plans.
 - 2) Reflected ceiling plans.
 - 2. Architect will furnish Contractor one set of digital data files of the Project Manual of the Contract Documents for use in preparing Project record specifications.
 - 3. Provide an executed Data Transfer Agreement form, at the end of this Section, from each subcontractor and sub-subcontractor or supplier.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Promptly submit Shop Drawings, Product Data, and Samples as to cause no delay in the Work. Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. Architect will document on submittal the date of receipt. Submittals delivered to the Architect after 4 pm will be noted as received on the next business day.
1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination. Delaying submittals to facilitate coordination between submittals shall not constitute a delay of the Work nor shall it be the basis for an extension of time.
 2. Sequential Review: Sequential review is a submittal that requires review by more than one design discipline. Where sequential review of submittals by Architect's consultants, Owner, or other parties is required, time shall be allocated to reflect sequential review.
 3. Allow 10 working days for review of each resubmittal.
 4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
- D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 5 inches by 6 inches on label or beside title block to record Architect's review markings.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of Program Manager.
 - f. Name and address of subcontractor.
 - g. Name and address of supplier.
 - h. Name of manufacturer.
 - i. Unique identifier, including revision number. Submittals shall be numbered with a three-digit number, followed by a dash, followed by the Section number, followed by another dash, and ending with a sequential submission number as indicated below. The numbering system shall be retained throughout all revisions.

- 1) Three-Digit Number: Sequential number, beginning with "001", for each submittal transmitted to Architect for each Section.
 - 2) Section Number: Section number where submittal is specified.
 - 3) Submission Number: Use "0" for initial submittal, "1" for first resubmittal, "2" for second resubmittal, and so forth.
- j. 001-061000-0
- k. Number and title of appropriate Specification Section.
 - l. Drawing number and detail references, as appropriate.
 - m. Location(s) where product is to be installed, as appropriate.
 - n. Other necessary identification.
- E. Options: Identify options requiring selection by the Architect.
- F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- G. Additional Paper Copies: Unless corrected copies are required for final submittal due to Architect's observance of noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
 2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
- I. Transmittal Form: Use a transmittal form acceptable to the Architect, and include the form with each submittal. See sample form following Part 3 of this specification.
- J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked "A" or "B" from Architect's action stamp.

- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- L. Use for Construction: Use only final submittals with mark indicating action "A" or "B" taken by Architect in connection with construction.
- M. Substitution requests are not allowed in the form of submittals. Substitution requests must be made in accordance with Division 01 Section, "Product Requirements."

PART 2 - PRODUCTS

2.1 SUBMITTALS PROCEDURES

- A. General: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Action Submittals: Submit three paper copies of each submittal, unless otherwise indicated. Architect will return two copies. Mark up and retain one returned copy as a Project Record Document.
 - 2. Informational Submittals: Submit two paper copies of each submittal, unless otherwise indicated. Architect will not return copies.
 - 3. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
 - 4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Clearly mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's written recommendations.
 - c. Manufacturer's product specifications.
 - d. Manufacturer's installation instructions.
 - e. Standard color charts.

- f. Standard product operating and maintenance manuals.
 - g. Compliance with recognized trade association standards.
 - h. Compliance with recognized testing agency standards.
 - i. Application of testing agency labels and seals.
 - j. Notation of coordination requirements.
 - k. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
- C. Shop Drawings: Prepare and submit Project-specific information, drawn accurately to scale. Do not reproduce, digitally or otherwise, the Contract Documents and submit them as shop drawings. Contractor, subcontractors, suppliers and all other entities shall not use, copy or reproduce title blocks, dimensions, notes, keynotes, symbols schedules or details from Contract Drawings, digital or otherwise. Use of the Contract Drawings shall be limited to reproduction, digitally or otherwise, of the exterior wall layout, interior partition layout, grid lines, doors, and windows. Do not base Shop Drawings on standard printed data.
1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship and attachment to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
- D. Samples: Submit physical units of materials or products.
1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

- a. Number of Samples: Submit one full set[s] of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample set; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
3. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.
4. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
5. Systems Submittals: Identify submittals for systems such as fire alarms, on the transmittal and act upon the system singularly as a combined submittal. If resubmission is required, resubmit entire system submittal.
6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

- a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- E. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for action required.
- F. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- G. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, coordinated, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each properly executed submittal, make marks to indicate corrections or modifications required, and return it. Architect will reject and return submittals not complying with requirements. Architect will stamp each submittal with a stamp and will mark stamp appropriately to indicate action, as follows:
 - 1. A - No Exceptions Taken. No further review of Submittal required.
 - 2. B - Make Corrections as Noted. Incorporate corrections in Work; resubmittal is not required. If Contractor cannot comply with corrections as noted, revise to respond to exceptions and resubmit.
 - 3. C - Revise and Resubmit. Revise as noted & resubmit for further review.

4. D - Resubmit Properly. Submittal not reviewed because it does not contain Contractor's signature indicating its review and approval, and/or is not in proper condition for review. Resubmit.
 5. E - Not Reviewed. Submittal is not required by Contract Documents.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Incomplete submittals are not acceptable, will be considered non-responsive, and will be returned without review.
1. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- E. Submittals not required by the Contract Documents will not be reviewed and may be discarded or returned marked "Not Reviewed."
- F. Substitution items received as product data, shop drawing, or sample submittals required by individual Sections will be returned to Contractor without review. Comply with requirements in Division 01 Section "Product Requirements" for submission of substitution request.

END OF SECTION 01 33 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- B. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- C. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- D. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- E. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- F. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- G. "Provide": Furnish and install, complete and ready for the intended use.
- H. "Installer": Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations. Installers shall be experienced in the operation they are engaged to perform.
- I. "Experienced": Unless otherwise specified in the technical sections when used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- J. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings.

- K. “As Required”: As required by regulatory bodies, by referenced standards, by existing conditions, by generally accepted construction practice or by the Contract Documents. In the event of ambiguity or conflicts, the most stringent requirements shall apply.
- L. “By Others” refers to work that is not a part of the Contract.
- M. “N.I.C.: “Not in Contract” means the work or the item indicated is not a part of the Contract and will be provided by the Owner.
- N. LEED: Leadership in Energy & Environmental Design.

1.2 STANDARDS, REGULATIONS AND CODES

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum..
- D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used, they shall mean the recognized name of the standards and regulations in the following list.

ADAAG	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.access.gpo.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
FS	Federal Specification Available from General Services Administration www.gsa.gov	(202) 619-8925
SCAQMD	South Coast Air Quality Management District	(909) 396-2000

www.aqmd.gov

E. Abbreviations and Acronyms for Industry Standards and Regulations: Where abbreviations and acronyms are used they shall mean the recognized name of the entities in the following list.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AGA	American Gas Association www.aga.org	(202) 824-7000
AHA	American Hardboard Association (now a part of the CPA)	
AIA	American Institute of Architects (The) www.aia.com	(202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International)	(800) 843-2763 (973) 822-1170

	www.asme.org	
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	American Society for Testing and Materials www.astm.org	(610) 832-9500
AWCI	Association of the Wall and Ceiling Industry www.awci.org	(703) 534-8300
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWPA	American Wood-Protection Association www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
CDA	Copper Development Association Inc. www.copper.org	(800) 232-3282 (212) 251-7200
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CPA	Composite Panel Association www.pbmdf.com	(301) 670-0604
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America	(785) 271-0208

www.glasswebsite.com

GS	Green Seal www.greenseal.org	(202) 872-6400
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
ICRI	International Concrete Repair Institute, Inc. www.icri.net	(847) 827-0830
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(877) 464-7732 (702) 567-8150
MFMA	Maple Flooring Manufacturers Association www.maplefloor.org	(888) 480-9138
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890

NFPA	National Fire Protection Association www.nfpa.org	(800) 344-3555 (617) 770-3000
NOFMA	NOFMA: The Wood Flooring Manufacturers Association www.nofma.org	(901) 526-5016
NTMA	National Terrazzo and Mosaic Association, Inc. www.ntma.com	(800) 323-9736 (540) 751-0930
NWWDA	National Wood Window and Door Association (See WDMA)	
PDCA	Painting and Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
SCS	Scientific Certification Systems www.scs-certified.com	(800) Eco-fact (510) 452-8000
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
TCNA	Tile Council of North America, Inc. www.tileusa.com	(864) 646-8453
TIA	Telecommunications Industry Association/Electronic Industries www.tiaonline.org	(703) 907-7700
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
USGBC	U.S. Green Building Council www.usgbc.org	(800) 795-1747

WCLIB West Coast Lumber Inspection Bureau (800) 283-1486
www.wclib.org (503) 639-0651

WWPA Western Wood Products Association (503) 224-3930
www.wwpa.org

F. Federal Government Agencies: Where abbreviations and acronyms are used, they shall mean the recognized name of the entities in the following list.

CPSC Consumer Product Safety Commission (800) 638-2772
www.cpsc.gov (301) 504-7923

DOC Department of Commerce (202) 482-2000
www.commerce.gov

OSHA Occupational Safety & Health Administration (202) 693-1999
www.osha.gov (800) 321-6742

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary facilities and controls.
 - 1. Provide and maintain all temporary facilities and controls necessary for the performance of the Work. Locate and install all temporary facilities and controls where acceptable to the local authorities having jurisdiction and utility owner and remove same and terminate, in a manner suitable to the local authorities having jurisdiction and utility owner, at completion of Work or when otherwise directed. Unless otherwise specified, pay all costs associated with the provision, and maintenance of, temporary facilities and controls including power and water consumed until Substantial Completion.

1.2 PROJECT CONDITIONS

- A. Use of Permanent Utilities: Each permanent utility may be used for construction purposes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

2. Provide adequate capacity at each stage of construction.
- B. Toilet, Water, and Drinking Water Facilities: The Contractor shall make arrangements with the Landlord or Property Manager for use of the existing toilet, water, and drinking water facilities.
- C. Ventilation and Humidity Control: Provide adequate ventilation in enclosed areas throughout construction period required to: facilitate progress of Work; to protect Work and products against dampness and heat; to prevent moisture condensation on surfaces; to provide suitable ambient temperatures for installation and curing of finish materials; to provide adequate ventilating; to meet health regulations for safe working environment; and, to prevent hazardous accumulations of dusts, fumes, mists, vapors or gases in areas occupied during construction. Provide local exhaust ventilating to prevent harmful dispersal of hazardous substances into atmosphere of occupied areas. Dispose of exhaust materials in manner that will not result in harmful exposure to persons or property. Provide ventilating operations at all times for personnel occupying an area, when subject to hazardous accumulations of harmful elements. Continue operation of ventilating system for as long as required after cessation of Work to assure removal of harmful elements.
1. When using permanent ventilation and air conditioning systems for the Work, provide and maintain temporary filters to adequately filter air being distributed through the ductwork and air handling units to the supply outlets; disposable filter shall be placed in front of all exhaust registers to keep construction dirt out of exhaust duct work.
- D. Electric Power and Lighting Service:
1. Provide all installation and equipment for temporary lighting and power. The electrical service shall be of adequate capacity for all construction tools and equipment without overloading the temporary facilities.
 - a. Provide power distribution throughout the site as required to facilitate construction operations. Terminations shall be provided for each voltage supply complete with circuit breakers, disconnect switches and other electrical devices as required to protect the power supply system.
 - b. A temporary lighting system shall be furnished, installed and maintained by the Contractor as required to satisfy the minimum requirements of security and safety. Provide general illumination for the entire project. Provide increased levels of illumination where the work is being installed.
 2. All temporary equipment and wiring for power and lighting shall be in accordance with the applicable provisions of the governing codes and regulations, the NEC, NEMA, and OSHA standards. All temporary power and lighting shall be maintained to give safe working conditions, continuous service, and so as not to pose a threat to the Owner's property. Modify and extend temporary power and lighting systems as the Work progress requires.
- E. Telephone Service: Provide temporary telephone service throughout construction period. Long distance calls shall be paid for by the party making the call. A pay phone is not acceptable.

3.3 TEMPORARY SUPPORT FACILITIES AND PROTECTION

- A. Project Identification and Temporary Signs: No Project identification, signs or advertisements will be permitted on the project site.
- B. Construction Aids: Provide all items, such as lifting devices, all scaffolding, staging, platforms, runways, ladders; and all temporary flooring, as required by the various trades for the proper execution of the Work. Provide such construction aids with proper guys, bracing, guards, railings and other safety devices as required by the governing authorities and OSHA.
- C. Elevator and Loading Dock Usage: The Contractor shall make all arrangements with the Owner for the use of existing elevators as required for transporting material and workmen to the work areas and for the disposal of rubbish and waste materials.
- D. Security: Provide and maintain provisions for closing and locking the site to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- E. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- F. Temporary Fire Protection: Throughout the site, during construction, provide for fire protection and fire prevention in accordance with all applicable Federal, state and local codes and regulations.

3.4 TERMINATION AND REMOVAL

- A. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Remove and dispose of temporary filters. Provide all new filters in heating, ventilation and air conditioning systems.
 - 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 01 Section "Closeout Procedures."

END OF SECTION 01 50 00

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SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following administrative and procedural requirements for the selection of products for use in the Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and product substitutions.

1.2 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents as proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.
- D. Manufacturer's Warranty: A written warranty authored by the manufacturer of its furnished product whose provisions are conveyed by manufacturer directly to Owner.
- E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.3 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form provided at end of Section.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.

- b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, product material content, product manufacture, weight, size, durability, service life, maintenance, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Cost information, including a proposal of change, if any, in the Contract Sum.
 - j. Time value to be added to, or subtracted from, the Contract time of Completion.
 - k. Benefit(s) to the Owner.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation. Architect will notify Contractor of acceptance or rejection of proposed substitution. Substitution requests, if any, shall be submitted so as to allow a reasonable time for their consideration and shall not be justification for delay of the Work.

1.4 QUALITY ASSURANCE

- A. General: All bids shall be based on the products required in the Contract Documents.
- B. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 5. Store products to allow for inspection and measurement of quantity or counting of units.
 6. Store materials in a manner that will not endanger Project structure.
 7. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 8. Protect stored products from damage.
- B. Storage: Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 03 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: Unless custom products or nonstandard options are specified, provide products of both quality and type that have been used successfully in similar situations on equal quality projects.

3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures: Procedures for product selection include the following:

1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.
2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name single manufacturers or sources, provide a product by the manufacturer or from the source named that complies with requirements.
3. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Basis of Design Products: Where paragraphs or subparagraphs titled "Basis of Design Product(s)" are included. Provide either the specified product or a comparable product. Drawings and specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.
6. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches satisfactorily.
 - a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on "substitutions" for selection of a matching product.
7. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.

C. Substitutions: Substitutions will be considered only under one of the following conditions:

1. That the specified product is not available due to lockout, strike, bankruptcy, product discontinuance, Acts of God, and that the proposed product will match or exceed the quality of the specified product while either providing the Owner with a cost savings or expediting the Work.
2. When a warranty of performance is specified and, in the judgment of the Contractor, the specified product will not provide the desired performance.

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PART 3 - EXECUTION (Not Used)

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SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

3.3 CONSTRUCTION LAYOUT

- A. General: The Work to be performed under the Contract Documents shall be laid out solely by the Contractor. Provide and pay for all construction layout work required for the Project. Under no circumstances will the Architect assume any responsibilities for laying out the Work.
 - 1. Verify all dimensions shown on the drawings. Do not scale Drawings to obtain required dimensions. Notify the Architect in writing of any discrepancies found before proceeding or continuing with the Work.

- B. Construction Layout: During the progress of the Work establish additional bench marks, reference lines and reference points and levels at each floor and as otherwise necessary for the guidance and information of each trade and for the field verification of specified construction tolerances. Calculate and measure required dimensions within indicated or recognized tolerances.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- D. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

3.5 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Use cleaning products that are chemically benign per the Green Seal GS-37 standard.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
 - 1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

3.6 STARTING AND ADJUSTING

- A. Start and test equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and or broken glass or reflective surfaces.

END OF SECTION 01 73 00

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching, and selective demolition.

1.2 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.
- C. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- D. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- E. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- F. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

- A. Activity Schedule: Indicate the following:
 - 1. Detailed sequence of alteration and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Locations of proposed dust- and noise-control temporary partitions and means of egress, including for other tenants affected by selective demolition operations.
 - 6. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
 - 7. Means of protection for items to remain and items in paths of ingress and egress, for the removal of waste from building.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
- C. Visual Requirements: Do not alter, cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not alter, cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the aesthetic qualities of the site. Remove and replace construction that has been altered, cut and patched in a visually unsatisfactory manner.

1.5 PROJECT CONDITIONS

- A. Owner will occupy portions of the site immediately adjacent to area where cutting, demolition, and patching work is to be prosecuted. Conduct cutting, demolition, and patching work so Owner's operations will not be disrupted.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Patching Materials: Use patching materials identical to existing materials and which visually match existing adjacent surfaces.

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Comply with the Owner's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during cutting and patching operations.
- B. Temporary Partitions: Erect dustproof partitions to limit spread of dust and dirt during cutting and demolition work. Mop hard surfaced floors, and vacuum carpeted areas, to eliminate tracked dust, cutting, and demolition debris. Dust off ceiling and wall surfaces indicated to remain in areas where cutting and demolition operations have occurred.

- C. Cover and protect fixtures, furnishings, and equipment that are not to be removed in areas where cutting and demolition operations are to be prosecuted.
- D. Do not close or obstruct walkways, passageways, or stairways. Do not store or place materials in passageways, stairs, or other means of egress. Conduct cutting and demolition operations with minimum traffic interference.
- E. Provide adequate fire protection in accordance with local fire department requirements.
- F. Existing Utilities and Services: Before starting work relating to existing utilities and services (electrical, plumbing, HVAC, gas, fire protection, telephone, etc.) that will temporarily discontinue or disrupt service to the existing building, or Owner-occupied spaces, notify the Architect and Owner.
 - 1. Provide at least 72 hours' notice to Architect and Owner, and obtain the Owner's approval in writing before proceeding with this aspect of the Work.
- G. Drilling and Cutting: Before starting work relating to drilling and the cutting of structural members, notify the Architect and Owner. Prior to drilling and cutting of existing structural concrete members locate reinforcing using non-destructive methods, notify the Architect, Owner, and the Landlord or Property Manager where drilling and cutting operations will sever or cut into a portion of the existing reinforcing.
 - 1. Provide at least 72 hours' notice to Architect, Owner, and Landlord or Property Manager, and obtain the Owner's and Landlord's or Property Manager's approval in writing before proceeding with this aspect of the Work.

3.2 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching and demolition work. Proceed with cutting and patching and demolition work at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
 - 2. Remove all debris as the cutting and demolition work progresses in a manner that will prevent spillage or damage to adjacent surfaces, areas in the building, and to the Owner-occupied portions of the existing tenant space. Do not allow debris to accumulate on-site. Transport debris off Owner's property and legally dispose of it per the Construction Waste Management requirements.
 - 3. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, removed materials shall become Contractor's property and shall be removed from Project site.

- B. Cutting and Demolition Work: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, using methods least likely to damage elements retained or adjoining construction.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces.
 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut off projecting anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.
 4. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 5. Mechanical and Electrical Services and Utilities: Cut off ducts, pipe or conduit in walls or partitions to be removed. Cap, or plug and seal remaining portion of ducts, pipe or conduit to provide a watertight closure after cutting.
 6. Removed and Salvaged Items: Remove and transport items to storage area designated by Owner unless otherwise indicated on the Drawings.
 7. Removed and Reinstalled Items: Clean and repair items to functional condition adequate for intended reuse. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
 8. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 2. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 3. Ceilings: Patch, and repair, existing ceilings as necessary to provide an even-plane surface of uniform appearance.
- D. Workmanship: If a wall, or ceiling that has been patched is to be painted, the final 2 coats of paint shall be applied to the entire wall, corner to corner, or the entire ceiling wall to wall.

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END OF SECTION 01 73 29

SECTION 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for waste reduction and for the recycling of non-hazardous, recyclable, construction and demolition debris.
1. Reduce waste by minimizing factors that contribute to waste.
 2. Use reasonable and legal means to divert construction and demolition debris from landfills and incinerators by facilitating their recycling or reuse through a Contractor-developed, construction waste management program.

1.2 DEFINITIONS

- A. Waste Reduction: Construction practices that achieve the most efficient use of resources and materials; uses water efficiently; avoids practices such as over-packaging, improper storage, ordering errors, poor planning, breakage, mishandling and contamination.
- B. Construction and Demolition Debris: Solid wastes arising from demolition or removal, excess or unusable construction materials, packing materials for construction products, and other materials generated on site during the construction process but not incorporated into the Work.
- C. Recyclable Materials: Construction and demolition debris that can be recovered and processed into new products or materials. Recyclable materials include, but are not limited to, the following:
1. Metals: Ferrous (iron, steel, stainless steel, galvanized steel) and non-ferrous (copper, brass, bronze, aluminum) types and containers made from metals such as pails, buckets and beverage cans.
 2. Concrete.
 3. Gypsum wallboard.
 4. Paper products such as generated from field office activities and clean corrugated packaging cardboard.
 5. Wood products, including untreated dimensional lumber, plywood, oriented strand board, hardboard, particleboard and crates and pallets made from wood products.
 6. Carpet and padding.
 7. Plastics and containers made from plastics such as pails, buckets, and beverage bottles.
 8. Copper wiring.
 9. Glass: Glass beverage containers, window and mirror glass.
- D. Non-Recyclable Materials: Construction and demolition debris not capable of being reused or reprocessed, exclusive of the recyclable materials listed above.

- E. Hazardous Materials: Construction and demolition debris that are regulated for disposal by local, city, county, state, or Federal authorities.

1.3 SUBMITTALS

- A. Construction Waste Management Program: Submit the waste management program. The program shall include the following:
1. Identification of Contractor's staff responsible for enforcing construction waste management.
 2. Actions that will be taken to reduce solid waste generation.
 3. Description of the specific methods to be used in recycling/reuse of the various construction and demolition debris generated, including the areas and equipment, to be used for processing, sorting, and temporary storage of debris.
 4. Characterization, including estimated types and quantities of the construction and demolition debris to be generated. Include percentages of recyclable and non-recyclable debris.
 5. List of specific construction and demolition debris materials that will be salvaged for resale, salvaged and reused, or recycled.
 6. Name(s) of landfill and incinerator to be used and the estimated costs for use, for construction and demolition debris that is unable to be recycled or reused.
 7. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used and excess construction materials such as materials exchange networks and Habitat for Humanity.
 8. Identification of local recycling facilities that will accept construction and demolition debris.
 9. Identification of construction and demolition debris that cannot be recycled/reused with an explanation or justification.

1.4 QUALITY ASSURANCE

- A. Waste Management Program: Prepare a program that minimizes waste and diverts construction and demolition debris from landfills and incinerators by facilitating their reuse or recycling. Name the waste material processors who will accept the construction and demolition debris, the condition of the construction and demolition debris required by the waste material processors, the method proposed to provide the construction and demolition debris in suitable condition and in a quantity acceptable to the disposal sites and waste material processors who will receive them, and the impact on the project schedule. The Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to the recycling of waste. Revenues or other savings obtained from sale, reuse, and recycling operations shall accrue to the Contractor.
- B. Disposal Sites and Waste Material Processors: Use only facilities with valid legal permits for disposal, recycling and waste processing issued by the jurisdictions in which they are located.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

**3.1 WASTE MANAGEMENT PROGRAM
IMPLEMENTATION**

- A. Distribution: The Contractor shall distribute copies of the Waste Management Program to the Job Site Foreman, each Subcontractor, the Owner and the Architect.
- B. General: For the duration of the project implement and maintain waste management program. During the prosecution of the Work encourage the practice of efficient waste reduction when sizing, cutting, and installing products and materials.
- C. Transportation: Arrange for the regular collection, transport from the site, and delivery of the construction wastes and debris to the designated recyclers, and waste material processors and disposal sites.
- D. Separation Facilities: The Contractor shall provide on-site instruction of appropriate handling, and recycling, salvage, reuse and return methods to be used by all parties at the appropriate stages of the Project. Provide and designate an on-site area for the separation of construction and demolition debris for reuse and recycling. Locate the area in order that non-recyclable debris will not contaminate materials to be reused or recycled. Provide containers and bins in the designated area to facilitate separation, storage and handling which are clearly and appropriately marked. Cut all items to lengths and sizes to fit within the containers or bins provided. Where there is sufficient quantity of a specific recyclable debris item (for example; salvaged metal doors and frames or duct work), make arrangements for items to be bundled, banded or tied, and stack in a designated location for a special pick-up. Maintain the separation facilities in an orderly condition. Separate construction and demolition debris at the project site by the following method:
 - 1. Co-Mingled Method: All construction and demolition debris is placed into containers or bins and then transported to a recycling facility where recyclable and salvageable materials are removed, sorted, and processed and the remaining waste is transported to a landfill or incinerator.

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SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Submit specific warranties, workmanship bonds, final certifications, and similar documents.
 3. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 4. Prepare and submit Project Record Documents, operation and maintenance manuals, and similar final record information.
 5. Submit test/adjust/balance records.
 6. Complete final cleaning requirements, including touchup painting.
 7. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment.

2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.5 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
1. Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up record prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later, and the locations of those items that need to be located for servicing.

- b. Accurately record information in a readily understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark record prints completely and accurately.
 - e. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - f. Note Change Order numbers, alternate numbers, and similar identification where applicable.
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Clearly mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Note related Change Orders, Record Drawings, and Product Data, where applicable.
- D. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Drawings, where applicable.
- E. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections such as tests and inspections, and inspections by authorities having jurisdiction. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.6 OPERATION AND MAINTENANCE MANUALS

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.

- f. Noise and vibration adjustments.
 - g. Effective energy utilization.
2. Maintenance Data:
- a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
 - i. Cleaning.
 - j. Control sequence.
 - k. Fuels, lubricants, tool, and other related items.
 - l. Identification systems.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties for designated portions of the Work.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period.

PART 2 - PRODUCTS

2.1 MATERIALS (Not Used)

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - b. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.
 - c. Remove debris and surface dust from limited access spaces, including plenums, shafts, and similar spaces.
 - d. Sweep concrete floors broom clean in unoccupied spaces.
 - e. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - f. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - g. Remove labels that are not meant to be permanent.
 - h. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over or remove "UL" and similar labels, including mechanical and electrical nameplates.
 - i. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - j. Replace parts subject to unusual operating conditions.
 - k. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - l. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - m. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - n. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in lighting fixtures to comply with requirements for new fixtures.
 - o. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
 - 2. Section 01 73 00 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner[ready for reuse].
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property [, for environmental protection] [, for dust control] [and] [, for noise control]. Indicate proposed locations and construction of barriers.
- C. Schedule of Selective Demolition Activities: Indicate the following:
 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Use of elevator and stairs.
 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- D. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.8 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Storage or sale of removed items or materials on-site is not permitted.

- D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding.
 - 1. .
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

- E. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
 - 2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Section 01 10 00 "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off indicated utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Section 01 50 00 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain[**fire watch and**] portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition[and cleaned] and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials and dispose of at designated spoil areas on Owner's property.
- D. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

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SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes metal fabrications.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance:

1. Countertop and Vanity Framing: Provide countertop and vanity framing capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections, or of exhibiting excessive deflections in any of the components making up the countertops and vanities:
 - a. All deadloads.
 - b. 500 pound live load placed on the countertop and vanity.
 - c. Deflection at Midspan: $L/1000$ times span or 1/8-inch- whichever is less.
2. Tube Framing for Partial Height Walls: Provide tube framing for partial height walls capable of withstanding a deflection not to exceed $2L/1440$ of the wall height when subjected to a positive and negative pressure of 5 psf .
3. Sliding Woodwork Door Framing: Fabricate and install framing so that, when installed, it is capable of supporting all deadloads and withstanding the live loads imposed on it from the operation of the door.
4. Vertically Folding Operable Partition, Overhead Coiling Grille, All-Glass Entrances and Storefront, Framing: Fabricate and install vertically folding operable partitions, overhead coiling grille, all-glass entrances and storefront, framing so that when installed, it is capable of supporting all deadloads and withstanding the live loads imposed on it from the operation of the vertically folding operable partitions, all-glass entrance doors, and the overhead coiling grilles.

1.3 SUBMITTALS

- A. Shop Drawings: Submit shop drawings including plans, elevations, sections, details of installation, and attachments to other Work.
1. For installed products indicated to comply with performance requirements, include structural analysis data, for information only, signed and sealed by the qualified professional engineer responsible for their preparation.

2. Include plans and elevations at not less than 3/4" to 1'-0" scale, and include details of sections and connections at not less than 3" to 1'-0" scale

1.4 QUALITY ASSURANCE

- A. Fabricator/Installer Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project for a minimum of 5 years, with a record of successful in-service performance, with sufficient production capacity to produce required units without causing delay in the Work.
- B. Manufacturer Qualifications: Manufacturers performing the Work of this Section shall be, during the bidding period as well as during installation, ISO 9001 and ISO 9002 certified or equivalent.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal fabrications that are similar to those indicated for this Project in material, design, and extent.
- D. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- E. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

PART 2 - PRODUCTS

2.1 METALS

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

- B. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.
- C. Ferrous Metals:
1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 2. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500, or hot formed steel tubing complying with ASTM A 501.
 3. Steel Pipe: ASTM A 53, Type S - Seamless, Grade A suitable for close coiling or cold bending, standard weight (Schedule 40) minimum, unless otherwise indicated or required to satisfy performance requirements, black finish.
 4. Slotted Channel Framing: Cold-formed metal channels with continuous slot and with flanged edges returned toward web complying with MFMA-4 and fabricated from steel complying with ASTM A 1008/A 1008M. Width, depth, and metal thickness as required to suit performance requirements.
 5. Iron Castings: ASTM A 47, Grade 32510 (ASTM A 47M, Grade 22010) malleable iron or ASTM A 48, Class 30 (ASTM A 48M, Class 200) gray iron.
 6. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded. Gas welding filler materials shall be selected according to AWS specifications for metal alloy welded. Gas shielded arc welding filler rods and wires shall be selected according to AWS specifications for metal alloy welded. Arc welding electrodes shall be selected according to AWS specifications for metal alloy welded. TIG welding rods shall be selected according to AWS specifications for metal alloy welded.

2.2 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664 and compatible with finish paint systems indicated.
1. 94-258 Series Multi-Prime Fast Dry 2.8 VOC Universal Metal Primer; Pittsburgh Paints.
 2. B50 Z Kem Kromik Universal Primer Fast Dry; Sherwin-Williams Co.
 3. Series 37H Phenolic Alkyd Primer Chem-Prime; Tnemec.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners: Zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941m), Class Fe/Zn 5, of type, grade, and class required by application indicated.
- B. Nonshrink, Nonmetallic Grout: ASTM C 1107/ASTM C 1107M, Grade C (volume control before and after grout hardens), factory-packaged, nonstaining, noncorrosive, nongaseous grout. Products known to comply with the requirements include, but are not limited to, the following:

1. Sika; SikaGrout 212.
2. Master Builder's Division of BASF; Construction Grout, or Embeco 885, Masterflow 555.

2.4 FABRICATION

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
 1. Welded connections may be used where bolted connections are shown.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Weld corners and seams continuously along entire line of contact. Use materials and methods that minimize distortion and develop strength of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended. Arc welding shall conform to AWS specifications. Fusion welding shall conform to AWS specifications. TIG welding shall conform to AWS specifications.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous. Make up threaded connections tight so that threads are entirely concealed.
- E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices and fasteners to secure metal fabrications rigidly in place and to support indicated loads.
- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Miscellaneous Framing and Supports: Provide steel framing and supports indicated and as necessary to complete the Work and which are not a part of the structural framework, including but not limited to framing and supports for vertically folding operable partitions, overhead lobby door frames, accordion folding partitions, operable panel partitions, overhead rolling doors and grilles, sliding doors, countertop and vanities, ceiling hung toilet compartments, projection screens, ceiling hung televisions and cameras, tube framing for partial height walls, CMU partition head supports, mechanical and electrical equipment.
 1. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

2. Fabricate supports for operable partitions by providing continuous steel shapes with attached bearing plates, anchors, and braces as required to sustain imposed loads. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
3. Fabricate supports for vertically folding operable partitions by providing continuous steel shapes with attached bearing plates, anchors, and braces as required to sustain imposed loads. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on vertically folding operable partition Shop Drawings.
4. Fabricate supports for sliding woodwork doors by providing continuous steel shapes with attached bearing plates, anchors, and braces as required to sustain imposed loads. Drill bottom flanges of beams to receive track hanger rods; locate holes where indicated on sliding woodwork door Shop Drawings.
5. Framing for Ceiling Hung Toilet Compartments: Provide framing for ceiling hung toilet compartments, coordinated with the partitions and including provisions for partition anchorage as required to sustain imposed loads and to limit deflections to L/360 between hangers, fabricated from the following.
 - a. Structural Steel Shapes, Plates and Bars: ASTM A36/A36M.
 - b. Modular Structural Framing System: Modular, structural quality steel pre-formed "U" channel framing system with continuous open slot prepared to receive attachment nuts, bolts, straps, threaded rods, beam clamps, hanger rods support brackets and other accessories. Provide manufacturer's standard corrosion resistant finish.

Provide steel rods, 1/2-inch- diameter, spaced not more than 36 inch- on center. Thread rods to receive anchor and stop nuts. Fit hangers with wedge shape washers for full bearing on sloping flanges of support beam.

Coordinate installation with toilet compartment manufacturer's written instructions and recommendations.

6. Countertop and Vanity Framing: Custom fabricate countertop and vanity framing, using steel shapes and plates, and cold finished mild steel bars at exposed conditions, for support framing and plywood, to the thicknesses, sizes and shapes shown, and as required to produce work of adequate strength and durability, without objectionable deflections. Use proven details of fabrication, as required, to achieve proper assembly and alignment of the various components of the Work.
 7. CMU Partition Head Supports: Fabricate supports from 4 x 4 x 1/4 x 36 inch- long structural steel angles. Drill supports a maximum of 12-inch- on center to receive expansion bolts.
- H. Surface Applied Corner Guards: Provide corner guards fabricated from angles of sizes shown, or if not shown, of minimum 4-1/2 x 4-1/2 x 1/4 inch- thick equal leg angles. Drill and countersink legs of angles, for fastening to substrates indicated, with holes spaced 24-inch- on center. Provide corner guard lengths of 42-inch- if not otherwise indicated.

2.5 FINISHES

- A. Finish metal fabrications after assembly. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Shop prime ferrous-metal items.

1. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces by removing oil, grease, and similar contaminants in accordance with SSPC -SP 1 for "Solvent Cleaning," followed with SSPC-SP 3, for "Power Tool Cleaning."
2. Apply a minimum of one coat of shop primer to uncoated surfaces of metal fabrications, except those to be field welded, and those to be embedded in sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1,"[the applicable provisions referenced within BS 7079] for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Provide anchorage devices and fasteners for securing metal fabrications to in-place construction. Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true. Drill holes for bolts to the exact diameter of the bolt. Provide screws threaded full length to the screw head.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Quality of Workmanship:
 - a. At concealed connections: No improvement from mill finish, except preparation necessary for priming is required. Welds are not required to be ground.
 - b. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness, pits, mill marks, nicks, or scratches shows after finishing and contour of welded surface matches that of adjacent surface. Defects and distortions shall not be visible to the eye nor show through painted or polished surfaces.
- D. CMU Partition Head Supports: Unless otherwise indicated place partition head supports on alternate faces of CMU partitions every 72 inch- on center and expansion bolt to underside of structure. Do not bolt to CMU partitions.
- E. Touch up surfaces and finishes after erection. Clean field welds, bolted connections, and abraded areas and touch up paint with the same material as used for shop painting.

END OF SECTION 05 50 00

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes miscellaneous rough carpentry.

1.2 SUBMITTALS

- A. Product Data: Submit product data for each type of process and factory-fabricated product indicated.
 - 1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that materials comply with requirements.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; for lumber and plywood pressure treated with waterborne chemicals place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: Comply with DOC PS 20 "American Softwood Lumber Standard" and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 3. Provide dressed lumber, surfaced four sides (S4S), unless otherwise indicated.
 - 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
 - 5. Lumber Species: Douglas Fir, Mixed U. S. Southern Pin or other wood species as reviewed and acceptable to the Architect, free of sap pockets, bark, checks, holes, loose knots, pitch, shakes, splits, wane and warp, having not greater than the specified moisture content for each type of use (untreated, preservative treated, or fire retardant treated).
- B. Wood Panels:

1. Plywood: Comply with DOC PS 1 "Construction and Industrial Plywood" DOC PS 1 "Construction and Industrial Plywood" for plywood panels.
2. Thickness: As needed to comply with requirements specified but not less than thickness indicated.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Provide chemical fire retardant process tested and labeled by UL with flame spread and smoke developed ratings of 25 or less. Comply with performance requirements in AWPA U1, Use Category UCFA as a minimum for pressure treatment. Size wood before treatment so that minimum cutting will be required after treatment. Kiln dry lumber to a maximum 19% moisture content, kiln dry plywood to a maximum 15% moisture content, after treatment. Treat indicated items and the following:
 1. Wood members required to be treated by Building Code having jurisdiction at the site and wood members specified as fire retardant treated.
- B. Identify fire-retardant-treated wood with appropriate classification marking of UL.

2.3 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber for support or attachment of other construction, including blocking, nailers, and similar members.
- B. For concealed boards, provide lumber in the specified species graded as follows:
 1. No. 2 grade; as defined by the Southern Pine Inspection Bureau (SPIB).

2.4 PANEL PRODUCTS

- A. Concealed Plywood for Countertop Underlayment:
 1. APA Exterior sheathing , in thickness as indicated but not less than 3/4 inch.
- B. Telephone, [Data,][Security,][Stretched Fabric Wall System Artwork Blocking,][Mirror] and Electrical Equipment Backing Panels:
 1. APA, Exposure 1, C-D Plugged, APA, Exposure 1, C-D Plugged, sanded both sides, , fire-retardant treated in thickness indicated or, if not indicated, not less than 15/32 inchthick.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
- B. Power-Driven Fasteners: NES NER-272.
- C. Nails, Wire, Brads, and Staples: Select material, type, size, and finish required for each use.
 - 1. ASTM 1667 for driven fasteners such as nails, spikes and staples.
 - 2. ASTM F 547 for nails used with wood and wood based products.
- D. Wood Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 .
- E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1(ASME B18.2.3.8M).
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ISO898-1, Mechanical Properties, Part I, Bolts, Screws, and Studs, Property Class 4.6; with ASTM A 563 hex nuts (ASTM A 563M hex nuts) and, where indicated, flat washers. complying with ASTM F 436 (ASTM F 436M) .
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

- C. Use fasteners of appropriate type and length. Pre-drill members when necessary to avoid splitting wood.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 PANEL PRODUCT INSTALLATION

- A. General: Comply with applicable recommendations contained in APA Form No. E30V, "APA Engineered Wood Construction Guide," and local utility requirements, if any, for plywood backing panels utilized as indicated. Underlayment and backing mounting panels shall be fabricated of one piece sheets where practicable. Do not use waste ends or scrap pieces to form mounting panels.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Countertop Underlayment: Bolt to miscellaneous steel framing.
 - 2. Plywood Backing Panels: Secure to wall using proper fastening devices for substrates encountered spaced 12 inches on center maximum at perimeter 1/2 inch from corners and three rows of 3 fasteners each in the backerboard field. Countersink fasteners flush with plywood surface. Butt adjacent panels without lapping.

END OF SECTION 06 10 53

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes, but is not limited to, the following items of interior architectural woodwork:
1. Plastic-laminate cabinets.
 2. Plastic-laminate countertops.
 3. Quartz surfacing material countertops.
 4. Wood cabinets.
 5. Closet and utility shelving.
 6. Shop priming of interior woodwork to receive painted finish.
 7. Shop finishing of interior woodwork to receive transparent finish.
- B. Related Sections include:
1. Division 05 Section "Metal Fabrications" for concealed countertop supports.
 2. Division 05 Section "Decorative Metal" for metal trim.
 3. Division 06 Section "Miscellaneous Rough Carpentry" for concealed blocking for millwork items.
 4. Division 06 Section "Wood Railings" for wood railing systems.

1.2 SUBMITTALS

- A. Product Data: Submit product data for each material and product specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
 2. Include submittal of stone sealer manufacturer's recommended methods for application of impregnator and surface protection coatings based on testing of project specific stone countertop materials.
- B. Shop Drawings: Submit shop drawings showing locations of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components. Elevations shall be drawn at a scale of not less than 1/2" = 1'-0" . Details shall be drawn at a scale of not less than 3" = 1'-0"
1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 2. Show locations and sizes of cutouts and holes for plumbing, electrical, computer and telephone equipment and other items installed in architectural woodwork.

3. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.

C. Samples: Submit samples of the following:

1. Five (5) veneer leaves representative of and selected from each flitch to be used for transparent-finished woodwork.
2. Three 12 inch by 12 inch sample sets containing a minimum of 2 or more samples of transparent finished wood-veneer and plastic laminate veneered panel products, fabricated from each core product, for each veneer specified and demonstrating the proposed full range of appearance characteristics to be expected in completed work. Include at least one face-veneer seam in each sample.
3. Lumber and panel products for transparent finish, for each species and cut, finished on one side and one edge. Furnish lumber in 12 inch lengths, furnish panel samples in 12 inch squares.
4. Lumber and panel products with shop-applied opaque finish, for each finish system and color, with exposed surface finished. Furnish lumber in 12 inch lengths, furnish panel samples in 12 inch squares.
5. Thermoset decorative-overlay surfaced panel products, for each type, color, pattern, and surface finish.
6. Solid-surfacing materials, 6 inches square, with specified finish.
7. Cabinet Locks: Three samples of each type.
8. Metal Trim Shapes: Three samples of each type and finish, 12 inches long.
9. Submit samples of each type of door specified showing construction and finishes selected. Samples shall be 12 inch by 12 inch corner section.
10. Submit samples of stainless steel glass rosette cap assemblies in each finish specified.
11. Glass and Acrylic Panels: 12 inches by 12 inches of each type specified.
12. Solid Laminate (Trespa) Flat Panels: Submit three 12 inch by 12 inch sample sets containing a minimum of 2 or more samples of solid laminate panel products, for each finish specified and demonstrating the proposed full range of appearance characteristics to be expected in completed work.
13. Solid Laminate (Trespa) Panel Corner Construction Samples: Submit three minimum 18 inches wide by 18 inches deep by 24 inches high, samples demonstrating the outside corner construction of solid laminate panels. Show vertical-edge corner construction, top, and bottom construction. Include fasteners, reveals and trim closures.
14. Quartz-surfacing materials, 6 inches square, with specified finish.
15. Stone: 12 inches by 12 inches of each species, finished as specified, and finish matching samples on file, and indicative of the entire range.

- D. Maintenance Instructions: Submit maintenance instructions for all countertop materials. Where countertop materials are recommended to be protected with hot pads, provide manufacturers properly sized for the hot equipment designed to be placed thereon.

1.3 QUALITY ASSURANCE

- A. **Single-Source Manufacturing and Installation Responsibility:** Engage a qualified Manufacturer - acceptable to the Architect - to assume undivided responsibility for woodwork specified in this Section, including fabrication, finishing, and installation. The manufacturer shall have had a minimum of 15 years successful experience in the custom fabrication and installation of architectural woodwork comparable to that shown and specified, be a member of the AWI, maintain an organized quality control program, perform its own in-house veneer lay-up work, and who retains facilities with sufficient capacity and quality to produce the required architectural woodwork without causing delay to the Project.
- B. **Quality Standard:** Fabricate and install all architectural woodwork in accordance with the applicable requirements of Architectural Woodwork Standards, 2nd edition, published jointly by AWI, AWMAC, and WI, unless more stringent requirements are specified or shown.
- C. **Fire Performance Characteristics:** Provide materials identical to those tested for the following fire performance characteristics per ASTM test methods indicated by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify treated lumber with classification marking of inspecting and testing organization in the form of separable paper label or, where required by authorities having jurisdiction, of imprint on lumber surfaces that will be concealed from view after installation.
 - 1. **Surface Burning Characteristics for Concealed Blocking, Furring, and Door Subframing:** Not exceeding a flame spread of 25, and smoke developed of 50 when tested per ASTM E 84 for 30 minutes.
 - 2. The fire performance finish requirements for all exposed interior wall and ceiling woodwork (including the paneling but not limited to paneling) substrates in fully sprinklered spaces shall be as follows which has been taken from the IBC [2009] [2012] [2015], Table 803.9. Footnotes to Table 803.9 that are pertinent to the project are also made a part of this specification.

Use Group	Interior Exit Stairways, Exit Ramps, and Exit Passageways	Corridors and Enclosures for Exit Access Stairways, and Exit Access Ramps	Rooms and Enclosed Spaces
A-1, and A-2	Class B	Class B	Class C
A-3	Class B	Class B	Class C
B, E, M, R-1	Class B	Class C	Class C
S	Class C	Class C	Class C

Class B: Flame spread 26-75, smoke developed 0-450 when tested in accordance with ASTM E 84.

Class C: Flame spread 76-200, smoke developed 0-450 when tested in accordance with ASTM E 84.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration. Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions" Article.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify actual dimensions of other construction by accurate field measurements before fabrication of woodwork; and indicate measurements on final Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.6 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

1.7 PRE-INSTALLATION COORDINATION MEETING

- A. Meet at the project site, prior to installation of architectural woodwork, to review the substrate preparation, installation and coordination with other trades, special details and conditions, and other topics related to the architectural woodwork. The preinstallation meeting shall include the Architect, the Contractor, architectural woodworker, and any subcontractors affected by the architectural woodwork installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of the AWS quality standard for each type of woodwork and quality grade specified.
- B. Lumber Standards: Comply with applicable provisions for grading and workmanship of AWS Architectural Woodwork Standards, Section 3 and the requirements shown and specified, where standards conflict the more stringent shall apply. Provide lumber surfaced 4 sides (S4S) and fabricated to profiles shown. All lumber shall be kiln dried to a moisture content of between 6 and 12 percent.
1. Furring, Blocking, Shims: No. 1 Common; Southern Pine.
 2. Door Subframes: No. 1 Common Southern Pine, fire retardant treated to reduce combustibility.
 3. Solid Hardwood for Opaque Finish [(WD##)]: Plain sawn Yellow Poplar, free from checks, splits, sound knots.
 4. Solid Hardwood for Transparent Finish[(WD##)]: Matching each of the Architect's veneer samples; refer to Finish Schedule on the Drawings for each specie.
- C. Wood Veneers:
1. Species, Matching, and Cut for Transparent Finish: Complying with AWS Sections 4 and 5 and the following:
 - a. [(WD##)]Specie and figuring as indicated on the finish schedule, book matched unless otherwise indicated, minimum 5 inch width leaves, complying with HPVA HP-1, Grade AA, matching Architect's sample.
- D. Wood Panel Products:
1. Medium-Density Fiberboard (non-moisture resistant): A sustainable, medium density fiberboard (MDF) panel manufactured from minimum 92 percent preconsumer recycled wood fiber complying with ANSI A208.2 Grade 155 , having a minimum 47 pcf density except that minimum for screw holding capacity on face shall be 300 pounds ; an an ASTM E 84 minimum Class C flame spread rating, minimum 3/4 inch thick, edged and faced as specified, fabricated with binder containing no added urea formaldehyde.
 2. Medium-Density Fiberboard (moisture resistant): A sustainable, moisture-resistant, medium density fiberboard (MDF) panel manufactured from minimum 92 percent preconsumer recycled wood fiber complying with ANSI A208.2, Grade 155 , having a minimum 48 pcf density except that minimum for screw holding capacity on face shall be 325 pounds respectively; [an ASTM E 84] [and complying with the requirements of BS 476, Parts 7, 20 and 22mm or Architect accepted European Norm (EN) Standard equivalent of ASTM E 84]Class C flame spread rating, minimum 3/4 inches thick, edged and faced as specified, fabricated with binder containing no added urea formaldehyde.
 3. Hardboard: ANSI A135.4..

- E. Thermoset Decorative Overlay (Melamine): Particleboard or medium-density fiberboard with surface of thermally fused, melamine-impregnated decorative paper complying with the recommendations of the Composite Panel Association's Technical Bulletin "Laminating Composite Panels."
1. Types: As indicated in the Finish Schedule on the Drawings.
- F. Glass: Clear tempered float glass, complying with ASTM C 1036, Type I, Class 1, Quality q3, and ASTM C 1048 Kind FT, thickness as indicated.
1. Prior to tempering, cut glass to required sizes and profiles as determined by accurate measurement of supporting standoff hole locations.
 2. Hole Cutting: Unless otherwise recommended by the glass manufacturer, comply with the requirements of ASTM C 1048, Article 7.8 for hole placement, minimum hole diameter, and dimensional tolerances of holes and this specification. Unless otherwise recommended by the glass manufacturer locate holes not less than 4 inches from glass edges, hole diameter shall be at least 1/8 inch larger than the shank of the screw fastener and screw sleeve spacers used for the rosette assemblies. Chips and flakes at hole edges shall not be permitted, and the inner surfaces of holes shall be smooth polished to match glass panel edges.
 3. Edge Treatment: All glass edges shall have an arrised edge profile (small bevel of width not exceeding 1/16 inch at an angle of approximately 45 degrees to the surface of the glass) with a polished (surface is reflective in appearance similar to the major surface of glass) surface.
- G. High-Pressure Decorative Laminate(PL##): Complying with NEMA LD 3 for Horizontal General Purpose Grade (HGS) typically and Vertical General Purpose Grade (VGS) where specified. Nominal thickness for HGS and VGS laminates to be 0.048 inches +/- 0.005 inches and 0.028 inches +/- 0.004 inches, respectively. [Alternatively BS EN 438: 2005 (Parts 1-7) "High Pressure Decorative Laminates (HPL) Sheets Based on Thermosetting Resins: Classification and Specifications and BS ISO 13894: 2005 (Parts 1-2) "High Pressure Decorative Laminates-Composite Elements: Test Methods may be used in lieu of NEMA standards.] Where high pressure decorative laminate is indicated to be faced with aluminum, provide aluminum sheet goods specifically made for laminating to vertical MDF and particleboard substrates in sheet thickness of 0.025 inches +/- 0.002 inches .
1. Types: As indicated in the Finish Schedule on the Drawings.
 - a. Provide factory applied protective peel coat to prevent surface damage during fabrication and handling of aluminum faced decorative laminates. Remove protective peel coat after installation in accordance with the manufacturers recommendations. If the film is left in place after installation, exposure to direct sunlight for a prolonged period may cause a paste residue and create other problems.
 2. Backing sheets: Non-decorative, high pressure laminate, NEMA LD3, Grade, types and thickness to match face sheets and equalize pull.

H. Countertop Sealer:

1. Impregnator: Low viscosity, UV resistant, water vapor permeable, impregnator specifically formulated to penetrate stone and grout pore structures without changing the color or sheen of the stone to which it is applied and that provides an invisible barrier of protection from water, dirt, oil, grease, lipstick, wine, and hand cream lotion infiltration.
 - a. Basis of Design Product: S234 Impregnator for factory sealing of stone countertop units, if field finishing stone countertops use S232 Impregnator. Contact HMK Stone Care System, Hallandale, FL. (800) 424-2HMK, (415) 643-5603.
 - b. Lithofin, Lithofin MM Stainstop Impregnator for factory sealing.
 - c. Miracle Adhesives: Miracle 511 Pourous Plus for factory sealing.
2. Surface Protection Coating: No-rinse type, 100 percent natural vegetable soap cleanser, that is pH neutral (pH 7), vapor permeable and compatible with impregnator, and that emulsifies dirt and debris on the stone surface while repelling liquids. Will not change the color or sheen of the stone to which it is applied.
 - a. Basis of Design Product: HMK P324 Liquid Stone Soap No Rinse.
 - b. Lithofin, Surface protection coating complying with the above requirements and recommended by the impregnator manufacturer.
 - c. Miracle Adhesives: Surface protection coating complying with the above requirements and recommended by the impregnator manufacturer.
3. Prepare countertop surfaces to receive sealer in accordance with the countertop sealer manufacturers recommendations. Apply sealers and surface protection coatings in accordance with the countertop sealer manufacturers instructions.

I. Quartz-Surfacing Material[(SS##)]: Provide material that meets or exceeds National Sanitation Foundation 51 Food Zone Compliance standards, consisting of quartz crystals and proprietary binders and manufactured in sheets of specific thicknesses. Quartz surfacing material shall be solid, non-porous, homogeneous, hygienic, renewable, and, when applicable, may feature inconspicuous hygienic seams. Quartz surfacing material shall be free from conspicuous internal strengthening fibers.

1. Products: Subject to compliance with requirements, provide products scheduled on Drawings.

J. Adhesives, General: Use only low emitting VOC adhesives that leave no glue lines on finished surfaces of architectural woodwork. Do not use adhesives that contain urea formaldehyde.

1. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Wood Glues: 30 g/L.
 - b. Contact Adhesives: 250 g/L.

2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- K. Solid Laminate: Solid composite panels fabricated of material specifically designed for casework. All panel surfaces shall be electron beam cured to prevent damage from cleansing agents such as graffiti removers. Surfaces shall offer protection against 10 percent hydrochloric acid, 10 percent phosphoric acid, 30 percent hydrogen peroxide, 25 percent caustic soda, 100 percent paint thinner and 100 percent methyl ethyl ketone without functional or aesthetic damage to the surface. All surfaces and edges shall be non-porous.
1. Core: Solid black.
 2. Physical Properties:
 - a. Modulus of elasticity: 1,500,000-psi minimum.
 - b. Shear strength: 2000-psi minimum.
 - c. Compressive strength: 24,000-psi minimum.
 - d. Weight: 93 lbs. per cubic foot maximum.
 - e. Tensile strength: 13,000-PSI, minimum.
 - f. Flexural strength: 16,000-PSI minimum.
 - g. Surface Impact Resistance: 9 lb.
 - h. Scratch Resistance: 0.8 lb.
 - i. Specific Gravity: 87 lbs. per cubic foot, minimum.
 - j. Dimensional Stability: 0.03 in/ft, maximum.
 - k. Water Absorption: 3 percent by weight, maximum.
 3. Thickness, Products and Manufacturer: Trespa North America, Inc. subsidiary of Trespa International BV, Netherlands; Trespa Virtuon, thickness, colors and surface texture as indicated in the Finish Schedule on the Drawings.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where indicated, use materials impregnated with fire-retardant chemical formulations indicated by a pressure process or other means acceptable to authorities having jurisdiction to produce products with fire-test-response characteristics specified.
1. Do not use treated material that does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective lumber or panel products.
 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
 3. Treat only door subframing, blocking and furring items.

- B. Fire-Retardant-Treated Lumber: Materials impregnated with fire-retardant chemical formulations to comply with AWPA U1, Use Category UCFA. Kiln-dry material after treatment to levels required for untreated woodwork.
- C. Fire-Retardant Particleboard: Panels made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture and complying with fire-test-response characteristics specified.
- D. Fire-Retardant Fiberboard: ANSI A208.2 medium-density fiberboard panels made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture and complying with fire-test-response characteristics specified.

2.3 ACCESSORY MATERIALS

- A. Frameless Concealed Hinges For Cabinet Doors (European Type): Concealed all-metal furniture hinges adaptable or engineered for 35 mm hinge cup boring pattern, with minimum 155 degree opening angle, 3 dimensional hinge having adjustments located in the steel hinge arm, steel or die-cast zinc hinge cups, mounting plates, and plastic insertion dowels to receive hinge screws. Automatic soft closing shall engage only in the last 10 degrees of swing. All hinge pins and linkages shall be hardened. Complying with BHMA A156.9, B01602. Bright nickel finish (US15).
 - 1. Hinge Quantity: Provide hinge quantity as recommended by hinge manufacturer based on cabinet door width, weight, thickness, door material, and hinge cup selection.
 - 2. Metal Furniture Hinge Products and Manufacturers: One of the following:
 - a. Basis of Design: Grass Tiomos Series; Grass America, Inc.; Kernersville, NC.
 - b. Blumotion Series; Blum USA; Stanley, NC.
 - c. Salice; Silencia Series 200.
- B. Hidden Gate Hinges: Full mortised, invisible hinges and specifically manufactured for door thickness indicated and fabricated from high strength plated brass or steel, heavy duty zinc alloy or brass castings, and non-removable riveted hinge pins. Each hinge shall be engineered for smooth performance with laminated link construction supplemented by anti-friction materials that reduce friction for smooth, free hinge operation. Complying with BHMA A156.9, B01501.
 - 1. Hinge Quantity: Provide hinge quantity as recommended by hinge manufacturer based on cabinet door width, weight, thickness, door material, and hinge cup selection.
 - 2. Metal Furniture Hinge Products and Manufacturers: One of the following:
 - a. Basis of Design: "Soss" Hinges; Universal Industrial Products Company, Pioneer, OH.
 - b. Vici Hinges 341.25.xxx; Hafele America; Archdale, NC.
 - c. Soss Hinge 341.07.xxx; Hafele America Co.; Archdale, NC.

- C. Piano Hinges for Library Gate: Continuous type, satin finished stainless steel and complying with BHMA A156.9, B51491.
- D. Wire Pulls: As specified on drawings. .
- E. Catches: Magnetic, complying with BHMA A156.9, B03141 for single doors and B03161 for double doors.
 - 1. For Single Doors: One of the following:
 - a. CD41 Single Magnetic Cabinet Catch; Stanley Commercial Hardware, New Britain, CT.
 - b. 900; Rockwood Manufacturing Company, Rockwood, PA.
 - c. 246.94.701 housing x 246.94.702 counterpiece; Hafele America Co.; Archdale, NC.
 - 2. For Double Doors: One of the following:
 - a. 901; Rockwood Manufacturing Company, Rockwood, PA.
 - b. CD45 Double Magnetic Cabinet Catch; Stanley Commercial Hardware, New Britain, CT.
- F. Cabinet Shelf Rests: Nickel plated brass or steel, or stainless steel, minimum 6 mm diameter shelf support pegs in sockets, complying with BHMA A156.9, B04013. One of the following:
 - 1. Hafele 282.01.701 x 282.50.704; Hafele America, Co., Archdale, NC.
 - 2. K-10S with K-2 Sleeve; Brusso, Inc., New York, NY.
 - 3. 331 Series Flat Top Shelf Support Pin with 325 Series Insert Grommet; Knappe and Vogt, Grand Rapids, MI.
- G. Closet Rods and Flanges: 1-1/2 inches) diameter, satin finished chrome plated steel or satin finished stainless steel with matching end flanges.
- H. Adjustable Shelf Standards and Brackets for Wall-Hung Open-Shelving:
 - 1. Standards: Model No. 87ANO Extra Heavy Duty 87-187 Series; [24 inch] [36 inch] [48 inch] [60 inch] [72 inch] [84 inch] [96 inch] [144 inch] lengths [as indicated], by Knappe and Vogt, Grand Rapids, MI.
 - 2. Brackets: [Model No. 186 LL ANO for 8- and 10-inch] [Model No. 187 LL ANO for 12- to 24-inch] deep shelves by Knappe and Vogt, Grand Rapids, MI
 - 3. Shelf Rests: Model No. 210 ANO End Rest and Model No. 211 ANO Center Rest with Model No. 129 RUB Rubber Cushions.
- I. Drawer Slides:
 - 1. Pencil Drawer Slides: Similar to Accuride 2006 having 3/4 extension carburized steel ball bearing, side mounting, 45 pound capacity medium duty load rating, cold rolled steel slide members and ball retainers, bright electro zinc plate finish.

2. Drawers less than 4 inches deep: Similar to Accuride 7432 having full extension carburized steel ball bearing, side mounting, 100 pound capacity medium duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, detent-in, progressive action, positive stop, bright electro zinc plate finish.
www accuride.com
 3. Drawers greater than 4 inches but less than 8 inches deep: Similar to Accuride 7432 having full extension carburized steel ball bearing, side mounting, 100 pound capacity medium duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, detent-in, progressive action, positive stop, bright electro zinc plate finish.
www accuride.com
 4. Drawers greater than 8 inches deep: Similar to Accuride 4032 having full extension carburized steel ball bearing, rail mounting, 150 pound capacity heavy duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, detent-in, progressive action, positive stop, bright electro zinc plate finish. www accuride.com
 5. Refuse Cabinets: Similar to Accuride 3600-201 having full extension carburized steel ball bearing, bottom mounting, 175 pound capacity heavy duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, progressive action, positive stop, bright electro zinc plate finish. www accuride.com
 6. Manufacturing Facility: Accuride International, S.A. de C.V., Mexicali, B.C., C.P. 21395 México.
- J. Flipper Door Slides: For vertically mounted retracting cabinet doors up to 75 pounds and 72 inches tall, Model No. 1432, black color, with hinge carrier strip by Accuride, Inc., as manufactured in the Accuride International, S.A. de C.V., Mexicali, B.C., C.P. 21395 México plant. www accuride.com
- K. Silencers: Provide rubber silencers on jamb and/or head and sill strike areas of all cabinet doors and drawers, 2 for paired doors, and 3 for single doors. Silencers shall be approximately 1/4-inch diameter, color compatible with adjacent finish.
- L. Aluminum Slides for Sliding Glass Doors: Heavy duty track assembly consisting of upper guide, shoe-H bar, lower track and rollers; clear anodized finish:
1. No. D123A by C. R. Laurence Company, Inc., Chicago, IL.
- M. Door and Drawer Locks: All cabinet doors and drawers shall be furnished with locks. Finish exposed portions of locks to match cabinet pull finish. Furnish 2 keys with each lock and key all locks inside one room alike and provide masterkey for all locks in Project.
1. Drawers: Provide one of the following lock assemblies:
 - a. Cam lock similar to Hafele 235.10.261, 1-3/16" cylinder length, chrome plated, with straight and offset cams; Hafele America, Co., Archdale, NC.
 - b. Cam lock similar to CompX Type 170 Thick Panel Lock x LP-700 lock plug, satin nickel finish, with surface-mounted strike plate SP-100; CompX Timberline, Neenah, WI.
 2. Single Doors: Provide one of the following lock assemblies:

- a. Latch lock similar to Olympus 998/999 Series x 999-Strike, chrome plated, sized to fit opening; Olympus Lock, Inc., Lynnwood, WA.
 - b. Deadbolt similar to CompX CB-281 cylinder body x LP-700 lock plug, satin nickel finish, with surface-mounted strike plate SP-100; CompX Timberline, Neenah, WI.
3. Pairs of Doors: Provide the following:
- a. At inactive leaf, Furniture bolt similar to Hafele 252.02.644, polished chrome, with strike 251.60.703; Hafele America, Co., Archdale, NC.
 - b. At active leaf, provide Single Door lock assembly.
- N. Exposed Hardware Finishes: Unless otherwise specified above, or on the Drawings, all exposed portions of the woodwork hardware shall comply with BHMA A156.18 for BHMA finish number indicated.
1. Dark, Oxidized, Satin Bronze, Oil Rubbed: BHMA 613 for bronze base; BHMA 640 for steel base.
 2. Bright Brass, Clear Coated: BHMA 605 for brass base; BHMA 632 for steel base.
 3. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
 4. Bright Chromium Plated: BHMA 625 for brass or bronze base; BHMA 651 for steel base.
 5. Bright Stainless Steel: BHMA 629 (US32).
 6. Satin Stainless Steel: BHMA 630 (US32D).
- O. Stainless Steel Trim: Custom fabricate stainless steel trim shapes to the sizes, shapes and profiles shown from the following materials. Provide in standard commercial tempers and hardness, as required for fabrication, strength and durability from Type 304 alloy. Form exposed work true to line and level, with flush surfaces and accurate angles. Ease exposed edges to a radius of approximately 1/32 inch radius, unless otherwise shown. Miter exposed corner joints and machine fit to a hairline joint. All sheet goods shall be provided finished one side only. Finish designation shown on the Drawings are NAAMM nomenclature.
1. Sheet and Plate: ASTM A 666.
 2. Bar Stock: ASTM A 276..
 3. Pipe: ASTM 312, Grade TP 304..
 4. Tubing: ASTM A 554, Grade MT 304..
 5. Rosettes for Capping Brushed Stainless Steel Standoffs at Glass Tops: Custom fabricate rosettes from satin finished stainless steel materials. All fasteners shall be concealed. Fastener for joining rosette assemblies shall be of a type, design, and size as recommended by the glazier for the application shown and specified. Isolate glass from stainless steel using clear plastic cushions sized to fit under the rosettes.
- P. Stainless Steel Trim Finish: Provide the following mechanical finish to the exposed surfaces of the fabricated work to the extent indicated (NAAMM nomenclature), with texture and reflectivity as required to match the Architect's sample.
1. No. 4 (bright directional polish).
 2. No. 8 (non-directional mirror polish).

- Q. Steel Reinforcing: Carbon steel shapes, tubes and plates complying with ASTM A 36/A 36M ASTM A36 (for shapes and plates), and with ASTM A 500 or ASTM A 501 .A 501 (for tubes).
1. Shop Primer for Concealed Steel Reinforcing: Provide fast curing, lead and chromate free, universal modified alkyd primer complying with performance requirements in FS TT-P-664.
 2. Electrodes for Concealed Steel Reinforcing: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded.
- R. Light Fixtures: Approximately 1-1/4 inch high surface mounted continuous undercabinet LED task light, with adjustable rotation of plus or minus 30 degrees. Task lighting shall have end butted, fixture to fixture, ganging with concealed wiring. Provide each ganged section of light fixtures with a single dimmer switch that, when activated, will switch the entire ganged section of light fixtures to either "on" or "off", and also offers dimming from full capacity to 5 percent capacity.
1. Basis-of-Design Manufacturer and Fixture: Workrite Ergonomics Inc.; Verano Series undercabinet lighting, (800) 959-9675. Other manufacturers will be considered subject to Architect's acceptance.
 2. All light fixture components shall be UL Approved and Listed for the applications indicated. Housings shall be constructed of recycled aluminum with water based enamel finish; with transformer to connect to 120 VAC electrical voltage. Provide NEC acceptable wiring, and conduits if required, from light fixtures complete with 3 prong connector for plugging into outlet strips or power receptacles.
 3. Lamp Type and Wattage: Each fixture shall include evenly spaced 1W LED lamps with a color temperature of 3500 degrees Kelvin and a CRI of 92; length as required to suit applications shown; other manufacturers will be considered subject to Architect's acceptance.
- S. Light Fixtures: Approximately 1-1/2 inch high surface mounted continuous undercabinet fluorescent task light with solid front and non-yellowing acrylic prismatic lens. Task lighting shall have end butted, fixture to fixture, ganging with concealed wiring. Provide each ganged section of light fixtures with a single rocker switch that, when activated, will switch the entire ganged section of light fixtures to either "on" or "off."
1. All light fixture components shall be UL Approved and Listed for the applications indicated. Housings shall be constructed of minimum 22 ga. cold rolled steel with bonderized white baked enamel finish; 120 VAC electrical voltage. Provide NEC acceptable wiring, and conduits if required, from light fixtures complete with 3 prong connector for plugging into outlet strips or power receptacles.
 2. Provide each fixture with high efficiency, electronic ballast, completely contained within light fixture housing sized for specified lamps.
 3. Lamp Type and Wattage: (1)F17T8/F25T8/F32T8/F40T8/SPX35; General Electric, length as required to suit applications shown; other manufacturers will be considered subject to Architect's acceptance.

- T. Door Hardware: At full sized doors, provide door hardware as scheduled under Division 08 Section "Door Hardware".
- U. Hanging (Zee Clip) Strips: Extruded aluminum zee type interlocking clips; type, size and quantity for the condition of use.
- V. Brushed Aluminum Trim Shapes: Custom fabricate aluminum trim shapes to the sizes, shapes and profiles shown from the following materials. Provide in standard commercial tempers and hardness, as required for fabrication, strength and durability. Form exposed work true to line and level, with flush surfaces and accurate angles. Miter exposed corner joints and machine fit to a hairline joint. Finish designations are NAAMM nomenclature.
1. Plate: Alloy 5005 and ASTM B 209 .
 2. Bar Stock: ASTM B 211 .
 3. Extrusions: Alloy 6063 and ASTM B 211 ..
 4. Aluminum Trim Finishes: Provide the following finishes to the exposed surfaces of the fabricated work to the extent indicated (NAAMM nomenclature), with texture and reflectivity as required to match the Architect's sample.
 - a. Class II, Clear Anodic Finish: Complying with AA-M10M32A31 for an Architectural Class II, medium satin, clear natural anodized finish.
- W. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1.
- X. Nails, Wire, Brads, and Staples: Select material, type, size, and finish required for each use.
1. ASTM F 1667 for driven fasteners such as nails, spikes and staples.
 2. ASTM F 547 for nails used with wood and wood based products.
- Y. Anchors: Select material, type, size, and finish required by each substrate for secure anchorage. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.
- Z. Blind Splines: Specialty devices, as required for tight butt joining, types and size as recommended by woodwork fabricator.
- AA. Covercaps: Where mortises of fastener heads, or draw downs are exposed (blind holes) in finished work, provide black plastic covercaps.

2.4 FABRICATION, GENERAL

- A. General: Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to the maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting. The width of scribe and filler panels shall not exceed 1/2 inch , or 1/2 inch clear dimension from adjacent wall to outside face of cabinet door in a 90 degree position, whichever is greater.

1. Interior Woodwork Grade: Custom complying with the referenced quality standard.
- B. Fabricate woodwork to dimensions, profiles, and details indicated.
 1. Reinforcing shown is minimum. Provide additional steel and lumber reinforcing as required to sustain imposed loads and to ensure a rigid assembly.
 2. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects affecting serviceability or appearance. Accurately fit all joints, corners and miters. Conceal all fasteners. Make threaded connections up tight so that threads are entirely concealed.
- C. Shop cut openings to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 1. Seal edges of openings in countertops with a coat of varnish.
 2. Install glass to comply with applicable requirements in Section 08 80 00 "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.5 WOOD CABINETS FOR TRANSPARENT FINISH

- A. General: AWS Type of Cabinet Construction: Comply with AWS Section 10, Style 1, Type A Construction, Flush overlay.
- B. Wood Veneered Surfaces:
 1. Wood Veneered Species and Matching:
 - a. Wood Veneer Species: As indicated on the Drawings and in the Finish Schedule.
 - b. Matching:
 - 1) Grain Matching: Run and match grain vertically for drawer fronts, doors, and fixed panels unless otherwise indicated on the Drawings.
 - 2) Matching of Veneer Leaves: Book match unless otherwise indicated.
 - 3) Veneer Matching within Panel Face: Center match unless otherwise indicated.
 - 4) Veneer Matching within Room: Provide cabinet veneers in each room and space from a single flitch with doors, drawer fronts, and other surfaces matched in a sequenced set with continuous match where veneers are interrupted perpendicular to the grain.
- C. Semiexposed Surfaces Other Than Drawer Bodies: Compatible species to that indicated for exposed surfaces, stained to match.

1. Drawer Sides and Backs: Solid-hardwood lumber, stained to match species indicated for exposed surfaces.
 2. Drawer Bottoms: Hardwood plywood.
- D. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.
- E. Cabinet Locks: Provide door and drawer locks.

2.6 WOOD CABINETS FOR PLASTIC LAMINATE FINISH

- A. General: AWS Type of Cabinet Construction: Comply with AWS Section 10, Style 1, Type A Construction, Flush overlay.
- B. Laminate Cladding for Exposed Surfaces: High-pressure decorative of grade indicated.
1. Horizontal Surfaces Other Than Tops: HGS.
 2. Postformed Surfaces: HGP.
 3. Vertical Surfaces: VGS.
 4. Edges: HGS unless otherwise indicated.
 5. Colors, Patterns, and Finishes: As indicated on the Drawings and in the Finish Schedule.
- C. Materials for Semiexposed Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade VGS.
1. Drawer Sides and Backs: Solid-hardwood lumber.
 2. Drawer Bottoms: Hardwood plywood.
- D. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.
- E. Cabinet Locks: Provide door and drawer locks.

2.7 PLASTIC LAMINATE COUNTERTOPS

- A. General: Comply with AWS Section 11 and as follows.
- B. High-Pressure Decorative Laminate Grade: HGS.
- C. Colors, Patterns, and Finishes: As indicated on the Drawings and in the Finish Schedule.
- D. Edge Treatment: Same as laminate cladding on horizontal surfaces unless otherwise indicated..
- E. Core Material at Sinks: Particleboard or exterior-grade plywood.

2.8 QUARTZ SURFACING MATERIAL COUNTERTOPS

- A. General: Comply with AWS Section 11 and as follows.
- B. Quartz Surfacing-Material Thickness: 3/4 inch .
- C. Colors, Patterns, and Finishes: As indicated by manufacturer's designations in Finish Schedule.
- D. Fabricate tops in one piece, unless otherwise indicated. Comply with quartz-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

2.9 FLUSH WOOD PANELING

- A. General: Flush wood paneling shall be constructed in accordance with AWS Section 8 Standards and as follows.
- B. Core Material:
 - 1. Opaque Finished Paneling: Medium density fiberboard.
 - 2. Transparent Finished Paneling: Medium density particleboard or medium density fiberboard.
- C. Veneered Surfaces:
 - 1. Veneer Types:
 - a. Opaque Finished Paneling: Exposed MDF.
 - b. Transparent Finished Paneling: As indicated on the Drawings and in the Finish Schedule.
 - 2. Transparent Finished Panel Matching:
 - a. Matching of Adjacent Veneer Leaves: Book matched, unless otherwise indicated.
 - b. Veneer Matching With Panel Face: Center balance match, unless otherwise indicated.
 - c. Panel Matching Method: Match panels to one another within each separate area by the following method:
 - 1) Blueprint sequenced matched panels and components.
- D. Edge Detail: Edge veneer banded with continuous hardwood strips matching face veneer. Panel joints to be flush type unless otherwise shown.

2.10 STAIRWORK AND RAILS

- A. General: Stairwork and railings shall be constructed in accordance with AWS Section 7 and as follows.

- B. Treads: Transparent finish.
- C. Risers: Transparent finish.

2.11 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE AND TRANSPARENT FINISHES

- A. General: Complying with AWS Sections 3 and 6, fabricated from solid hardwood with scarfed joints, profiles as indicated, finishes as indicated.
- B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- C. Wood Species: Poplar for opaque finishes; solid hardwood plant finished with transparent finished wood veneer in veneer cut as indicated on the Drawings to match adjacent transparent finished veneered items.

2.12 CLOSET & UTILITY SHELVING

- A. General: Comply with AWS Section 10 and as follows.
- B. Shelf Material: Medium density fiberboard where indicated to be painted; medium density particle board where indicated for plastic laminate or melamine veneer.
- C. Cleats: 3/4-inch solid lumber or thermoset decorative panel.
- D. Finishes: As shown and scheduled on the drawings.

2.13 FLUSH WOOD DOORS FOR TRANSPARENT FINISH

- A. General: Comply with AWS Section 9, Heavy Duty Performance Level and as follows.
- B. Construction: 5-ply, particleboard core doors with minimum 1/16 inch thick, properly dried low density hardwood or high density hardboard crossbanding and transparent finished wood face veneers of the specie and cut indicated.
 - 1. Vertical Edges: Same species as face, lumber or veneer, sanded eased edges, without visible joints in lock or hinge edges and free of knife and saw marks.
 - 2. Core: Single thickness slab of particleboard complying with ANSI A208.1, 1-LD-2, hot pressed with synthetic resin glue.
 - 3. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering. Glue lines between the stiles and rails shall be minimum Type II complying with the performance requirements of WDMA TM-6.

4. Crossbanding materials shall extend full width of door with grain running horizontally, tapeless spliced without voids or show through (telegraphing), and directly glued to core and blocking. Sand crossbanding before application of face veneer. Face veneer shall extend full height of door with grain running vertically, tapeless spliced without voids or show through (telegraphing), and directly glued to crossband. Glue lines between the face veneer, crossbanding and blocking shall be of a type to comply with specified warranty using the hot plate process.
- C. Prefitting: Fit wood doors to suit frame opening sizes indicated. Comply with the following:
1. Jamb and Head Clearance: 1/8 inch .
 2. Paired Door Openings Meeting Edge: 3/16 inch less than nominal door size for each leaf.
 3. Sill Clearance: 1/4 inch from finished floor.
- D. Machining: Machine wood doors, paneling and frames, for hardware. Comply with final hardware schedules, shop drawings, and hardware templates.
1. Hardware Location: +/- 1/32 inch .
 2. Pulls and Pivots: +1/32 inch , - 0 inches .
- E. Door Thickness: 1-3/4 inch .

2.14 FLUSH WOOD DOORS FOR OPAQUE FINISH

- A. General: Comply with AWS Section 9 Heavy Duty Performance Level and as follows.
- B. Construction: 5-ply, particleboard core doors with minimum 1/16 inch thick, properly dried low density hardwood or high density hardboard crossbanding and medium density overlay (MDO) face veneers.
1. Vertical Edges: Same as veneer, sanded eased edges, without visible joints in lock or hinge edges and free of knife and saw marks.
 2. Core: Single thickness slab of particleboard complying with ANSI A208.1, 1-LD-2, hot pressed with synthetic resin glue.
 3. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering. Glue lines between the stiles and rails shall be minimum Type II complying with the performance requirements of WDMA TM-6.
 4. Crossbanding materials shall extend full width of door with grain running horizontally, tapeless spliced without voids or show through (telegraphing), and directly glued to core and blocking. Sand crossbanding before application of face veneer. Face veneer shall extend full height of door with grain running vertically, and directly glued to crossband. Glue lines between the face veneer, crossbanding and blocking shall be of a type to comply with specified warranty using the hot plate process.
- C. Prefitting: Fit wood doors to suit frame opening sizes indicated. Comply with the following:
1. Jamb and Head Clearance: 1/8 inch .

2. Paired Door Openings Meeting Edge: 3/16 inch less than nominal door size for each leaf.
 3. Sill Clearance: 1/4 inch from finished floor.
- D. Machining: Machine wood doors, paneling and frames, for hardware. Comply with final hardware schedules, shop drawings, and hardware templates.
1. Hardware Location: +/- 1/32 inch .
 2. Pulls and Pivots: +1/32 inch , - 0 inches .
- E. Door Thickness: 1-3/4 inch .

2.15 SHOP FINISHING

- A. Production finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.
- B. Priming of interior architectural woodwork with field applied opaque finish required to be performed at fabrication shop are specified in this Section. Refer to Section 09 91 23 "Interior Painting" for finishing opaque finished architectural woodwork.
- C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative overlay.
 2. Gluing of face veneers shall, where possible, be by the hot plate method; glued surfaces shall be in close contact throughout. Glue stains will not be permitted.
 3. Grain of all transparent finished wood shall run in the direction shown, or if not shown, as accepted on the shop drawings.
- D. Exposed Surfaces:
1. Transparent Finish:
 - a. Grade: Premium.
 - b. Section 5 AWS Finish System 7, Catalyzed Vinyl for closed grain woods.
 - c. Staining: Natural to match Architect's sample.
 - d. Sheen: Match Architect's samples.
 2. Opaque Finish:
 - a. Grade: Custom.
 - b. Section 5 AWS Finish System 7, Catalyzed Vinyl.

- c. Color and Sheen: Match Architect's paint samples.
- 3. Plastic Laminate Finish: Gluing of plastic laminate surfacing materials shall be by the hot plate method, glued surfaces shall be in close contact throughout. Glue stains shall not be permitted.
- 4. Quartz Surfacing Finish: As scheduled.
- E. Unexposed Wood Finish: Shop-applied alkyd type primer-sealer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming before installation.

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with requirements of the AWS for the same grade specified in this Section for type of woodwork involved.
 - 1. Install woodwork level, plumb, true, with no distortions, and with no variations in flushness of adjoining surfaces. Shim as required with concealed shims.
 - 2. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- B. Anchor woodwork to blocking built in or directly attached to substrates. Secure to blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- C. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 96 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
 - 1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.
- D. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets without sag, bow, or other variation from a straight line.

2. Maintain veneer sequence matching of cabinets with transparent finish.
 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood blocking, or hanging strips or with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.
- E. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
1. Calk space between backsplash and wall with silicone sanitary sealant specified in Section 07 92 00 "Joint Sealants."
 2. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 3. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
- F. Paneling: Anchor paneling to supporting substrate with concealed panel-hanger clips, by blind nailing on backup strips, splined connection strips, and associated trim and framing. Do not use face fastening, unless otherwise indicated. Space panels so that reveals are parallel and of widths indicated.
- G. Built-in Desks and Credenzas: Install without distortion so that doors, and drawers, fit openings properly and are accurately aligned. Adjust hardware to center doors, and drawers, in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
1. Anchor glass tops securely to supporting framing as indicated on the shop drawings.
- H. Doors:
1. Coordinate installation with the work of other trades to ensure exact fit and perfect alignment. Verify dimensions before proceeding and obtain measurements at job site for work required to be accurately fitted to other construction.
 2. Do not install wood doors until interior wet work, such as tile, terrazzo, and wallboard work are complete and dried in the areas to receive the wood doors.
 3. Do not subject wood doors to abnormal humidity, dryness or heat. Do not expose doors to sudden changes in temperature such as forced heat.
 4. Hang wood doors within frames. Align in frames for uniform clearance at each edge matching clearances specified for factory prefitting.
 5. Field cutting, fitting or trimming, if required, shall be executed in a workmanlike manner. Cuts made at the job site shall be sealed immediately after cutting, using a clear varnish or sealer. Restore finish before installation, if fitting or machining is required at the job site for factory finished doors.
 6. Hardware Installation: Install hardware in accordance with the instructions of the door hardware manufacturer; refer to Division 08 Section "Door Hardware."

- I. Stainless Steel Cased Openings at Elevator Door Jambs: Install stainless steel cased opening work in locations shown, plumb, level and in alignment with previously completed work. Provide concealed fastening as accepted on the shop drawings, and as necessary for a rigid, secure, and permanent installation. Form tight joints with exposed connections accurately and uniformly fitted together. Do not cut or abrade finishes that cannot be completely restored in the field.
- J. Complete the finishing work specified in this Section to extent not completed at shop or before installation of woodwork.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.
 - 1. Anodized aluminum surfaces shall be cleaned with warm water and mild soaps such as those used for hands or dishes. **Do NOT use cleaners that contain abrasives, acids or alkalis, as they will mar the surface. Do NOT clean metal face with solvents, paint thinner or adhesive remover.** After washing, always wipe the surface completely dry with a soft, clean cloth. Stubborn stains may be removed with a thin, clean oil and dry cloth.
 - 2. Manmade stone top surfaces shall be cleaned with soap and water followed with a clean water rinse.

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer, that ensures that woodwork will be without damage or deterioration at time of Substantial Completion.

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SECTION 07 01 80 – RETROFIT FIRE-RESISTIVE MATERIALS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes retrofit fire-resistive materials that are either sprayed or trowel applied.

1.2 SUBMITTALS

- A. Product Data: Submit current edition of manufacturer's application and installation instruction manual and referenced bulletins.
- B. Certification: Submit certification that retrofit products provided comply with the fire test response characteristics.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by retrofit fire-resistive material manufacturer as having the necessary experience staff, and training to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its fire-resistive materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.
- B. Fire-Test-Response Characteristics: Provide retrofit fire-resistive materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency acceptable to authorities having jurisdiction, for fire-resistive material serving as direct-applied protection tested per ASTM E 119.
 - 2. Surface-Burning Characteristics: ASTM E 84.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Contractor, and installer shall attend a pre-installation conference to review the substrates for acceptability, method of application, and applied thicknesses.

- D. Regulatory Requirements: Conform to the applicable building code requirements of the authorities having jurisdiction. The thickness of retrofit fire resistive materials shall match those of the existing fire proofed members being patched unless greater thickness is required to conform to the applicable code requirements for the required fire resistance ratings of the existing fire proofing members using the selected retrofit fire resistive materials.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, shelf life if applicable, and fire-resistance ratings applicable to Project.
- B. Use materials with limited shelf life within period indicated. Remove from Project site and discard materials whose shelf life has expired.
- C. Store materials inside, under cover, aboveground, in a dry location, until ready for use. Remove from Project site and discard wet or deteriorated materials.

1.5 PROJECT CONDITIONS

- A. Ventilation: Ventilate spaces during and after application of retrofit fire-resistive material. Provide a minimum of 4 air changes per hour until fire resistive material cures by the following:
1. Using natural means.
 2. When natural means are inadequate, provide forced-air circulation at a rate of 4 air exchanges per hour.

1.6 COORDINATION

- A. Sequence and coordinate application of retrofit fire-resistive materials with other related work specified in other Sections to comply with the following requirements:
1. Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.
 2. Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
 3. Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
 4. Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, and corrections have been made to defective applications.

PART 2 - PRODUCTS

2.1 RETROFIT FIRE-RESISTIVE MATERIALS

- A. General: For retrofit applications of fire-resistive materials, provide manufacturer's standard products complying with requirements indicated for material composition and physical properties representative of installed products.
- B. Material Composition: Fire-resistive material consisting of one of the following:
 - 1. Factory-mixed, dry formulation of gypsum or portland cement binders, additives, and lightweight mineral or synthetic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.
 - 2. Factory-mixed, dry formulation of inorganic binders, mineral fibers, fillers, and additives conveyed in a dry state by pneumatic equipment and mixed with water at spray nozzle to form a damp, as-applied product.
- C. Physical Properties: Minimum values required to attain fire-resistance ratings matching the fire resistance designs being patched.

2.2 AUXILIARY FIRE-RESISTIVE MATERIALS

- A. General: Provide auxiliary fire-resistive materials that are compatible with retrofit fire-resistive materials and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required to comply with fire-resistance designs indicated and retrofit fire-resistive material manufacturer's written recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive retrofit fire-resistive material.
- C. Water: Potable. Provide water with sufficient pressure and volume to meet the fireproofing application schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with installer present, to determine that they are in satisfactory condition to receive retrofit fire-resistive material. Contractor, and Installer shall submit written statement of each area's substrate acceptability to the Architect prior to beginning application of retrofit fire-resistive materials. A substrate is in satisfactory condition if it complies with the following:
1. Substrates comply with requirements in the Section where the substrate and related materials and construction are specified.
 2. Substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt, and other foreign substances capable of impairing bond of retrofit fire-resistive material with substrate under conditions of normal use or fire exposure.
 3. Objects penetrating retrofit fire-resistive material, including clips, hangers, support sleeves, and similar items, are securely attached to substrates prior to application.
 4. Substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying retrofit fire-resistive material.
- B. Prior to application of retrofit fire-resistive material to steel beams and decks verify that placement of concrete fill on floor and roof decks has been completed.
- C. On roof decks without concrete fill complete all roofing applications and roof mounted equipment installation prior to application of retrofit fire-resistive material to the underside of supporting beams.
- D. Do not proceed with installation of retrofit fire resistive materials until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances that could impair bond of fire-resistive material, including loose or poorly adhered existing fire resistive materials, dirt, oil, grease, release agents, rolling compounds, loose mill scale, and incompatible primers, paints, and other foreign substances which may impair proper adhesion of fireproofing to substrate.
- B. Metal Lathing: Where required by rated assembly and bond, install metal lath, as required, to comply with fire-resistance ratings and retrofit fire-resistive material manufacturer's written recommendations for conditions of exposure and intended use. Securely attach lath to substrate in position required for support and reinforcement of retrofit fire-resistive material. Use anchorage devices of type recommended in writing by retrofit fire-resistive material manufacturer. Attach lathing accessories where indicated or required for secure attachment to substrate.

- C. Cover other work subject to damage from fallout or overspray of retrofit fire-resistive materials before application. Provide temporary enclosure as required to confine spraying operations, if any, protect the environment, and ensure maintenance of adequate ambient conditions for temperature and ventilation.
 - 1. Cover floor slabs with polyethylene sheeting.

3.3 INSTALLATION, GENERAL

- A. Comply with retrofit fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and spray or trowel on retrofit fire-resistive material, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- B. Extend retrofit fire-resistive material in full thickness over entire area of each substrate to be patched.
 - 1. Spray apply fire-resistive materials to maximum extent possible. Following the spraying operation complete the coverage by trowel application or other placement method recommended in writing by the retrofit fire-resistive material manufacturer.
 - 2. Where spray application is not applicable, trowel apply fire resistive material using method recommended in writing by the retrofit fire-resistive material manufacturer.

3.4 CLEANING, PROTECTING, AND REPAIR

- A. Cleaning: Immediately after completing spraying and troweling operations, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces.
- B. Cure exposed retrofit fire-resistive material according to product manufacturers written recommendations to prevent premature drying.
- C. Protect retrofit fire-resistive material, according to advice of product manufacturer and Installer, from damage resulting from construction operations or other causes so fire protection will be without damage or deterioration at time of Substantial Completion.
 - 1. Trades, other than fireproofing installer, who remove fireproofing material will be responsible for replacement of same.
- D. Coordinate application of retrofit fire-resistive material with other construction to minimize need to cut or remove fire protection. As installation of other construction proceeds, inspect retrofit fire-resistive material and patch any damaged or removed areas prior to covering by other construction.

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SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
1. Floors.
 2. Roofs.
 3. Walls and partitions.
 4. Smoke barriers.

1.2 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
1. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 2. Fire-resistance-rated floor assemblies.
 3. Fire-resistance-rated roof assemblies.
- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814 or UL 1479, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814 or UL 1479, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
1. Floor penetrations located outside wall cavities.
 2. Floor penetrations located outside fire-resistive shaft enclosures.
 3. Penetrations located in construction containing fire-protection-rated openings.
 4. Penetrating items larger than 4-inch- diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
 5. Provide T-rating not less than the required rating of the element penetrated, but not less than 1 hour, minimum.

- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

1.3 SUBMITTALS

- A. Product Data: Submit product data for each type of through penetration firestop system product indicated.
- B. Through-Penetration Firestopping Schedule: Submit, for information only, a Through-Penetration Firestopping Schedule indicating the type of through-penetration firestop system to be installed for each penetration. Indicate each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of testing and inspection agency acceptable to the authorities having jurisdiction that evidences compliance with requirements for each condition indicated, and listed in the "Through Penetration Firestopping Schedule" at the end of Part 3 of this Section.
1. Submit documentation, including illustrations, from Underwriter's Laboratories applicable to each through-penetration firestop.
 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
- C. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- D. At Project Closeout, submit a Record Schedule, signed by the Installer, of systems installed, the UL design designations, and the location of each system. The submittal must have the Installer's signature.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified or licensed, by firestop system manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its firestop system materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.

- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestop tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, ITS, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements.
 - a. Through-penetration firestop systems corresponding to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
 - 2) ITS in "Directory of Listed Products."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet.
- B. Ventilate through-penetration firestop systems per manufacturers written instructions by natural means or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide through-penetration firestop systems that are produced by manufacturers listed in UL-Classified Through Penetration Fire Stopping Assemblies in the Schedule at the end of Part 3 of this Section.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. VOC Content: Provide penetration firestopping that complies with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
 - 4. Plastic Foam Adhesives: 50 g/L.
 - 5. Adhesives for Porous Materials (Except Wood): 50 g/L.
 - 6. Fiberglass Adhesives: 80g/L.
 - 7. Primers, sealers and undercoaters: 200 g/L.
- C. Accessories: Provide components for each through-penetration firestop system needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:

- a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.
- D. Gypsum Products: The use of gypsum products for through-penetration firestopping is strictly prohibited.
- E. Acoustical Performance: Provide non-hardening resilient firestop material at penetrations, sleeves and passthroughs in acoustic construction assemblies.
1. Acceptable Products:
 - a. Specified Technologies, Inc. Elastomeric Sealant ES100
 - b. Johns Manville Firetemp CI Caulk.
 - c. 3M Fire Barrier 2001 Silicone RTV Foam.
 - d. Hilti Flexible Firestop Sealant CP 606.

2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Fire Rated Cable Management Devices: Factory-assembled round metallic sleeve device for use with cable penetrations, containing an integrated smoke seal fabric membrane that can be opened and closed for re-penetration.
- C. Blocks/Plugs: Intumescent flexible block/plug suitable for reuse in re-penetration of openings. Blocks shall allow up to 12 inches of unreinforced annular space.
- D. Drop-In Firestop Devices: Factory-assembled devices for use with combustible or noncombustible penetrants in cored holes within concrete floors. Device shall consist of galvanized steel sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete floor, and neoprene gasket.
- E. Tub Box Kit: Cast-in place pre-formed plastic tub box kit with three support legs for use with drain piping assembly associated with bathtub installations.

- F. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- G. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- H. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- I. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- J. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- K. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- L. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- M. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- N. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- O. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

2.4 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without damaging substrate or disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Through-penetration firestop system manufacturer's name.
 6. Installer's name.
- B. Identify fire-resistance-rated construction (including walls, shaft enclosures, partitions, and smoke barriers) with signs or stenciling permanently installed above suspended ceilings or in other concealed spaces. The lettering shall be 3 inches in height and spaced 12 feet (3658 mm) on center:

1. The words ____-HOUR FIRE AND SMOKE WALL - PROTECT ALL PENETRATIONS."
 - a. Replace blank with actual fire-resistance rating.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

SCHEDULE 2 - THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

- A. Select UL-classified systems from the attached schedule and submit "Through-Penetration Firestopping Schedule" as specified in Article 1.3, Submittals.

THROUGH PENETRATION FIRE STOPPING SCHEDULE																
THIS SCHEDULE INDICATES WHICH SERIES OF UL CLASSIFIED THROUGH PENETRATION FIRE STOPPING (TPFS) ASSEMBLIES ARE ACCEPTABLE FOR THIS PROJECT BASED ON BARRIER TYPE, BARRIER CONSTRUCTION AND PENETRANT TYPE. EACH SYSTEM WITHIN A GIVEN SERIES IS CLASSIFIED FOR SPECIFIC PENETRATION CONDITIONS. CONTRACTOR SHALL SELECT TPFS ASSEMBLIES THAT ARE CLASSIFIED FOR USE WITH EACH PENETRATION'S CONDITION BASED ON CRITERIA SUCH AS THE FOLLOWING: PENETRATION SIZE, PENETRATION SHAPE, PENETRANT SIZE(S), PENETRANT MATERIAL(S), PENETRANT QUANTITY, LOCATIONS(S) OF PENETRANT(S) WITHIN PENETRATION.																
BARRIER		FIRE STOPPING REQUIREMENTS	PENETRANT TYPE										OTHER RECESSED DEVICES (NOTE 3)			
TYPE	BASIS OF CONSTRUCTION		NO PENETRANTS	METALLIC, UNINSULATED PIPE, CONDUIT, OR TUBING (EXAMPLES: COPPER, IRON, STEEL)	NONMETALLIC, UNINSULATED PIPE, CONDUIT, OR TUBING (EXAMPLES: PVC, CPVC, GLASS)	ELECTRICAL CABLES	CABLE TRAYS W/ELECTRICAL CABLES (NOTE 9)	INSULATED PIPES (EXAMPLES: COPPER, GLASS, IRON, PLASTIC, STEEL) IN SYSTEMS OPERATING BETWEEN 32 DEGF (0 DEGC) AND 122 DEGF (50 DEGC) (NOTE 1)	INSULATED PIPES (EXAMPLES: COPPER, GLASS, IRON, PLASTIC, STEEL) IN SYSTEMS OPERATING BETWEEN 32 DEGF (0 DEGC) OR ABOVE 122 DEGF (50 DEGC) (NOTE 2)	MISC ELECTRICAL PENETRATIONS (EXAMPLES: BUS DUCTS)	METAL DUCT	UL LISTED ELECTRICAL BOXES				
WALL	WOOD STUDS & GYPSUM WALLBRD	SINGLE PENETRANT SYSTEM MULTIPLE PENETRANTS	W-L-0000 SERIES OR NOTE 4	W-L-1000 SERIES	W-L-2000 SERIES	W-L-3000 SERIES	W-L-4000 SERIES	W-L-5000 SERIES	W-L-5000 SERIES	W-L-6000 SERIES	W-L-7000 SERIES	CLIV OR NOTE 8	NOTE 8			
			W-L-8000 SERIES NOTE 5		W-L-8000 SERIES NOTE 5			W-L-8000 SERIES NOTE 5	N/A	N/A	N/A					
			F RATING EQUAL TO BARRIER RATING													
			T RATING EQUAL TO F RATING (NOTE 9)													
			ADDITIONAL REQUIREMENTS	NONE	NONE			NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE
WALL	METAL STUDS & GYPSUM WALLBRD	SINGLE PENETRANT SYSTEM MULTIPLE PENETRANTS	W-L-0000 SERIES OR NOTE 4	W-L-1000 SERIES	W-L-2000 SERIES	W-L-3000 SERIES	W-L-4000 SERIES	W-L-5000 SERIES	W-L-5000 SERIES	W-L-6000 SERIES	W-L-7000 SERIES	CLIV OR NOTE 8	NOTE 8			
			W-L-8000 SERIES NOTE 5		W-L-8000 SERIES NOTE 5			W-L-8000 SERIES NOTE 5	N/A	N/A	N/A					
			F RATING EQUAL TO BARRIER RATING													
			T RATING EQUAL TO F RATING (NOTE 9)													
			ADDITIONAL REQUIREMENTS	NONE	NONE			NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE
WALL	POURED CONC., CONC. BLOCK OR MASONRY	SINGLE PENETRANT SYSTEM MULTIPLE PENETRANTS	W-J-0000 SERIES OR NOTE 4	C-AJ-1000 OR W-J-1000 SERIES	C-AJ-2000 OR W-J-2000 SERIES	C-AJ-3000 OR W-J-3000 SERIES	C-AJ-4000 OR W-J-4000 SERIES	C-AJ-5000 OR W-J-5000 SERIES	C-AJ-5000 OR W-J-5000 SERIES	C-AJ-6000 SERIES	C-AJ-7000 OR W-J-7000 SERIES	??	NOTE 8			
			C-AJ-8000 OR W-J-8000 SERIES -- NOTE 5		C-AJ-8000 OR W-J-8000 SERIES - NOTE 5			C-AJ-8000 OR W-J-8000 SERIES - NOTE 5	N/A		N/A					
			F RATING EQUAL TO BARRIER RATING													
			T RATING EQUAL TO F RATING (NOTE 9)													
			ADDITIONAL REQUIREMENTS	NONE	NONE			NONE	NONE		NONE	NONE	NOTE 6	NONE	NOTE 7	NONE

WALL	POURED CONC. BLOCK OR MASONRY	SINGLE PENETRANT SYSTEM	UL CLASSIFIED	C-BK-1000 OR W-K-1000 SERIES	N/A	N/A	W-K-4000 SERIES	N/A	N/A	N/A	N/A	N/A	NOTE 8	
			NOTE 4	N/A										
			F RATING	EQUAL TO BARRIER RATING										
			T RATING	EQUAL TO F RATING (NOTE 9)										
			ADDITIONAL REQUIREMENTS	NONE										
FLOOR	FRAMED	SINGLE PENETRANT SYSTEM	UL CLASSIFIED	F-C-1000 SERIES	F-C-2000 SERIES	F-C-3000 SERIES	N/A	F-C-5000 SERIES	F-C-5000 SERIES	N/A	F-C-7000 SERIES	??	NOTE 8	
			NOTE 4	F-C-8000 SERIES NOTE 5				F-C-8000 SERIES NOTE 5	F-C-8000 SERIES NOTE 5		N/A	N/A		
			F RATING	EQUAL TO BARRIER RATING										
			T RATING	EQUAL TO F RATING (NOTE 9)										
			ADDITIONAL REQUIREMENTS	NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE
FLOOR	POURED CONC.	SINGLE PENETRANT SYSTEM	UL CLASSIFIED	C-AJ-0000 SERIES, F-A-0000 SERIES OR NOTE 4	C-AJ-1000 OR F-A-1000 SERIES	C-AJ-2000 OR F-A-2000 SERIES	C-AJ-3000 OR F-A-3000 SERIES	C-AJ-4000 OR F-A-4000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-6000 SERIES	C-AJ-7000 OR F-A-7000 SERIES	??	NOTE 8
			NOTE 4	C-AJ-8000 OR F-A-8000 SERIES -- NOTE 5				C-AJ-8000 OR F-A-8000 SERIES -- NOTE 5	C-AJ-8000 OR F-A-8000 SERIES -- NOTE 5		N/A	N/A		
			F RATING	EQUAL TO BARRIER RATING										
			T RATING	EQUAL TO F RATING (NOTE 9)										
			ADDITIONAL REQUIREMENTS	NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE
FLOOR	POURED CONC.	SINGLE PENETRANT SYSTEM	UL CLASSIFIED	C-BJ-0000 SERIES OR NOTE 4	C-BJ-1000 OR F-B-1000 SERIES	C-BJ-2000 OR F-B-2000 SERIES	C-BJ-3000 OR F-B-3000 SERIES	C-BJ-4000 OR F-B-4000 SERIES	C-BJ-5000 OR F-B-5000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-6000 SERIES	C-BJ-7000 OR F-B-7000 SERIES	??	NOTE 8
			NOTE 4	C-BJ-8000 OR F-B-8000 SERIES -- NOTE 5				C-AJ-8000 OR F-A-8000 SERIES -- NOTE 5	C-BJ-8000 OR F-B-8000 SERIES -- NOTE 5		N/A	N/A		
			F RATING	EQUAL TO BARRIER RATING										
			T RATING	EQUAL TO F RATING (NOTE 9)										
			ADDITIONAL REQUIREMENTS	NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE

THIS SCHEDULE USES THE IDENTIFICATION SYSTEMS OF UNDERWRITERS LABORATORIES, INC. AS DEFINED IN THEIR "FIRE RESISTANCE DIRECTORY" AND AS USED BY MANUFACTURERS ON THEIR UL CLASSIFIED SYSTEM.

INDICATED RATINGS MAY BE EXCEEDED. "N/A" = NOT APPLICABLE

NOTES

EXAMPLES OF SYSTEMS THAT OPERATE BETWEEN 32 DEGF (0DEGC) AND 122 DEGF (50 DEGC):

CHILLED WATER SUPPLY & RETURN	DOMESTIC HOT WATER LESS THAN 122 DEGF (50 DEGC)
HEAT PUMP WATER SUPPLY & RETURN	DOMESTIC HOT WATER RECIRCULATION LESS THAN 122 DEGF (50 DEGC)

DOMESTIC COLD WATER

EXAMPLES OF SYSTEMS OPERATING BELOW 32 DEGF (0DEGC) OR ABOVE 122 DEGF (50 DEGC):

STEAM SUPPLY & RETURN	HEATING HOT WATER SUPPLY & RETURN
STEAM VENT	HOT-CHILLED WATER SUPPLY & RETURN
CONDENSATE PUMP DISCHARGE	GLYCOL HEATING HOT WATER SUPPLY & RETURN
BOILER BLOW DOWN	DOMESTIC HOT WATER SUPPLY 140 DEGF (60 DEGC)
CRYOGENIC VENT	DOMESTIC HOT WATER RECIRCULATION 140 DEGF (60 DEGC)

EXAMPLES OF OTHER RECESSED DEVICES:

MEDICAL GAS ZONE VALVES	UNIT HEATERS
MEDICAL GAS OUTLETS	FIRE FIGHTERS' PHONE
FIRE VALVE CABINETS	FIRE EXTINGUISHER CABINET
FIRE HOSE CABINETS	

SEAL OPENING USING BARRIER'S ORIGINAL CONSTRUCTION.

WHERE A SERIES 8000 CLASSIFIED SYSTEM IS NOT AVAILABLE, INSTALL PENETRANTS SINGLY, AND PROVIDE SINGLE-PENETRANT SYSTEMS. FOR SYSTEMS THAT OPERATE BELOW 32 DEGF (0DEGC) OR ABOVE 122 DEGF (50 DEGC), COMPLY WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:

PROVIDE TPFS SYSTEM USING INTUMESCENT ELASTOMERIC WRAP STRIP AS ITS FILL, VOID, OR CAVITY MATERIAL.

DO NOT USE SERIES 8000 PENETRATIONS. PROVIDE ONLY SINGLE PENETRATIONS.

FOR PENETRATIONS PROTECTED WITH DAMPERS, PROVIDE TPFS SYSTEM APPROVED BY DAMPER MANUFACTURER.

WHERE UL CLASSIFIED SYSTEMS ARE NOT AVAILABLE FOR OTHER RECESSED DEVICES, MAINTAIN CONTINUITY OF RATED BARRIER CONSTRUCTION AROUND RECESS.

9. PROVIDE PILLOW TYPE FIRESTOP SYSTEM TO FILL VOIDS IN CABLE TRAYS AT COMPUTER SERVER ROOMS, AND WHERE INDICATED AS "FREQUENTLY MODIFIED" LOCATIONS.

10. THE USE OF GYPSUM PRODUCTS IS STRICTLY PROHIBITED.

NOTE:

For Project Closeout, submit a list of systems installed, the UL numbers, and the location of each system. The submittal must have the installer's signature.

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SECTION 07 84 46 - FIRE-RESISTIVE JOINT SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fire-resistive joint systems for the following:
 - 1. Floor-to-floor joints.
 - 2. Floor-to-wall joints.
 - 3. Head-of-wall joints.
 - 4. Bottom of wall joints.
 - 5. Wall-to-wall joints.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed.
- B. Joint Systems in and Between Fire Resistance Rated Constructions: Provide systems with assembly ratings not less than that equaling or exceeding fire-resistance rating of constructions in which joints are located, as determined by UL 2079.

1.3 SUBMITTALS

- A. Product Data: Submit product data for each type of product indicated.
- B. Fire Resistive Joint System Schedule: Submit, for information only, a Fire Resistive Joint Schedule indicating the type of fire resistive joint system to be installed for each joint. Indicate each kind of construction condition. Include fire resistive joint design designation of testing and inspection agency acceptable to the authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.
- C. Product Certificates: Signed by manufacturers of fire resistive joint system products certifying that products furnished comply with requirements.

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** A firm or individual certified or licensed, by the fire resistive joint system manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its fire resistive joint system materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.
- B. **Source Limitations:** Obtain fire-resistive joint systems, for each kind of joint and construction condition indicated, through one source from a single manufacturer.
- C. **Fire-Test-Response Characteristics:** Provide fire-resistive joint systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
 - 1. Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for fire-resistive joint systems acceptable to authorities having jurisdiction.
 - 2. Fire-resistive joint systems are identical to those tested per methods indicated in Part 1 "Performance Requirements" Article and comply with the following:
 - a. Fire-resistive joint system products bear classification marking of qualified testing and inspecting agency.
 - b. Fire-resistive joint systems correspond to those indicated by referencing system designations of the qualified testing and inspecting agency.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fire-resistive joint system products to Project site in original, unopened containers or packages with qualified testing and inspecting agency's classification marking applicable to Project and with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for fire-resistive joint systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. **Environmental Limitations:** Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet.
- B. Ventilate fire-resistive joint systems per manufacturer's written instructions by natural means or, if this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide fire resistive joint systems indicated for each application in the Fire-Resistive Joint System Schedule at the end of Part 3.

2.2 FIRE-RESISTIVE JOINT SYSTEMS

- A. Compatibility: Provide fire-resistive joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.
- B. Accessories: Provide components of fire-resistive joint system, including forming materials, that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of Work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.

2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from fire-resistive joint system materials. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates or damaging adjoining surfaces.

3.3 INSTALLATION

- A. Install fire-resistive joint systems to comply with Part 1 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.
- B. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.
 2. Apply fill materials so they contact and adhere to substrates formed by joints.
 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect fire-resistive joint systems and to prepare inspection reports.
1. Inspecting agency will state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.
- B. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and inspecting agency has approved installed fire-resistive joint systems.
- C. If deficiencies are found, repair or replace fire-resistive joint systems so they comply with requirements.

3.5 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.6 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

- A. Designation System for Joints in or between Fire-Resistance-Rated Constructions: Alphanumeric designations listed in UL's "Fire Resistance Directory" under product Category XHBN.
- B. Designation System for Joints at the Intersection of Fire-Resistance-Rated Floor or Floor/Ceiling Assembly: Alphanumeric designations listed in UL's "Fire Resistance Directory" under product Category XHDG.
- C. Floor-to-Floor, Fire-Resistive Joint Systems: UL-Classified (FF-Series) system as required to maintain floor fire rating indicated.
- D. Floor-to-Wall, Fire-Resistive Joint Systems: UL-Classified (FW-Series) system as required to maintain floor to wall fire rating indicated.
- E. Head-of-Wall, Fire-Resistive Joint Systems: UL-Classified (HW-Series) system as required to maintain floor to wall fire rating indicated.
- F. Bottom-of-Wall, Fire-Resistive Joint Systems: UL-Classified (BW Series) systems as required to maintain bottom of wall fire rating indicated.
- G. Wall-To-Wall, Fire-Resistive Joint Systems: UL-Classified (WW-Series) system as required to maintain floor to wall fire rating indicated.

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SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes joint sealants.

1.2 SUBMITTALS

- A. Product Data: Submit product data for each joint sealant product indicated.
- B. Samples: Submit samples for each exposed joint sealant product indicated.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers. Store and handle materials in compliance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Architectural Sealants: Not more than 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: Not more than 250 g/L.
 - 3. Sealant Primers for Porous Substrates: Not more than 775 g/L.
- B. Colors: For fully concealed joints, provide the manufacturer's standard color of sealant which has the best overall performance characteristics for the application shown. For exposed joints, the Architect will select colors from the manufacturer's standard colors.

2.2 JOINT SEALANTS

- A. Butt Glazing Sealant: Comply with ASTM C 920, Type S, Grade NS, Class 50; use NT, G, and A, black color unless otherwise indicated.
 - 1. Products and Manufacturers: Provide one of the following:

- a. 795; Dow Corning.
 - b. Spectrem 2; Tremco, an RPM Co.
 - c. Silpruf SCS 2000; Momentive.
 - d. Sika, Sikasil WS 295.
- B. Two-Part Polyurethane Sealant for Paving Applications:
1. For Paving Applications with Slopes not Exceeding 5% (Self Leveling): ASTM C 920, Type M, Grade P, Class 25; use T (except with a Shore A hardness of 35 or greater) and I (Class 1 or 2) for water immersion; and abrasion resistant,; one of the following:
 - a. Pecora Corporation; Urexpam NR-200.
 - b. Tremco, an RPM Co.; Vulkem, 445SSL.
 - c. Sika; Sikaflex 1c SL.
- C. Sealants for Contact with Food: Comply with 21 CFR 177.2600, NSF Standard 51, and ASTM C 920 for Type S, Grade NS, Class 25, Use NT.
1. Dow Corning; 786 Mildew Resistant Silicone Sealant.
- D. Mildew-Resistant Silicone Sealant (use for joints at plumbing fixtures, toilet room countertops and vanities): Complying with ASTM C 920, Type S (single component), Grade NS (non-sag), class 25, Use NT (non-traffic), Substrate uses G, A, and O; and containing a fungicide for mildew resistance; white color.
1. Products: Provide one of the following:
 - a. Dow Corning; 786 Mildew Resistant Silicone Sealant.
 - b. Momentive; Sanitary SCS 1700.
 - c. Pecora Corporation; 898 Silicone Sanitary Sealant.
 - d. Tremco, an RPM Co.; Tremsil 200 Sanitary.
- E. Latex Sealant: Complying with ASTM C 834, Type OP (opaque sealants):
1. Products: Provide one of the following:
 - a. Pecora Corporation; AC-20 + Silicone.
 - b. DAP Products Inc.; Alex Plus Acrylic Latex Caulk Plus Silicone.
 - c. Tremco, an RPM Co.; Tremflex 834.

2.3 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

- B. Cylindrical Sealant Backings: One of the following preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding backings of flexible plastic foam complying with ASTM C 1330, and of type indicated below. Select shape and density of cylindrical sealant backings in consultation with the manufacturer for proper performance in specific condition of use in each case.
1. Type C: Closed-cell polyethylene foam material with a surface skin, which is nonabsorbent to liquid water and gas, non-outgassing in unruptured state; one of the following:
 - a. HBR Closed Cell Backer Rod; Nomaco, Inc.
 - b. MasterSeal 920; BASF Master Builders.
 - c. Mile High Foam, Backer Rod Mfg., Inc..

2.4 MISCELLANEOUS MATERIALS

- A. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.
- B. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and which will not stain nor mar the finish of surfaces adjacent to joints to which it is applied.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with the recommendations of joint sealant manufacturer and the following requirements:
1. Remove foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), existing joint sealants, oil, grease, water, and surface dirt.
 2. Clean concrete, masonry, unglazed surfaces of tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 3. Remove laitance and form-release agents from concrete.
 4. Clean metal, glass, porcelain enamel, glazed surfaces of tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

- B. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- C. Installation of Sealant Backings: Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- D. Installation of Sealants: Install sealants so they directly contact and fully wet joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform, concave shaped beads, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint.
- F. Cleaning: Clean excess sealants or sealant smears adjacent to joints as installation progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.2 JOINT SEALANT SCHEDULE

- A. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - 1. Control and Expansion Joints on Exposed Interior Surfaces of Exterior Walls: Latex sealant.
 - 2. Perimeter Joints of Exterior Openings Where Indicated: Latex sealant.
 - 3. Vertical Control and Expansion Joints in Stone and Tile Surfaces: Latex sealant.
 - 4. Horizontal Control and Expansion Joints in Stone and Tile Flooring Surfaces: Two-Part Polyurethane Sealant for Paving Applications.
 - 5. Vertical Control Joints on Exposed Surfaces of Interior Unit Masonry and Concrete Walls and Partitions: Latex sealant.
 - 6. Joints on Underside of Precast Beams and Planks: Latex sealant.
 - 7. Perimeter Joints between Interior Wall Surfaces and Frames of Interior Doors, Windows, and Elevator Entrances: Latex sealant.
 - 8. Perimeter Joints between Scalloped, Bent, or Warped Interior Wallboard Surfaces and Straight Trim: Latex Sealant.
 - 9. Joints between Plumbing Fixtures and Adjoining Walls, Floors, and Counters: Mildew resistant silicone sealant.
 - 10. Joints between Glass, and between Glass and Adjacent Substrates: Butt glazing sealant.

END OF SECTION 07 92 00

SECTION 08 11 13 - HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hollow metal doors and frames.
 - 1. The integration of a security system into the hollow metal door and frame work is required. The Contractor shall be responsible for the total and complete coordination of the security system components into the Work.

1.2 SUBMITTALS

- A. Product Data: Submit product data for each product indicated. Include material descriptions, core descriptions, label compliance, sound and fire-resistance ratings, and finishes for each type of door and frame specified.
- B. Shop Drawings: Submit door and frame schedule using same reference designations indicated on Drawings. Include opening size(s), handing of doors, frame throat dimensions, details of each frame type, elevations of door design types, details of construction, location and installation requirements of door hardware and reinforcements, hardware group numbers, details of joints and connections, fire label requirements including fire rating time duration, maximum temperature rise requirements, and smoke label requirements.
 - 1. Indicate routing of electrical conduit and dimensions and locations of cutouts in doors and frames to accept electric hardware devices.
- C. Construction Samples: Submit approximately 18 by 24 inches construction samples, representing the required construction of doors and frames for Project.
 - 1. Welded Frames: Show profile, welded corner joint, welded hinge reinforcement, dust-cover boxes, floor and wall anchors, stops, and silencers. Include glazing stops if applicable.
- D. Certificate of Compliance for Fire Rated Doors: Provide copies of Certificate of Compliance for all fire rated door assemblies, all smoke and draft control door assemblies, and all temperature rise rated door assemblies.
- E. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

1.3 QUALITY ASSURANCE

- A. Hollow Metal Door and Frame Standard: Comply with the applicable provisions and recommendations of the following publications by Hollow Metal Manufacturers Association (HMMA) Div. of National Association of Architectural Metal Manufacturers (NAAMM), unless more stringent requirements are indicated in the Contract Documents:
1. HMMA "Hollow Metal Manual."
 2. HMMA 861 "Guide Specifications for Commercial Hollow Metal Doors and Frames."
- B. Manufacturer Qualifications: A firm experienced in manufacturing hollow metal doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 or UL 10C "Standard for Positive Pressure Fire Tests of Door Assemblies." Fire classification labels at all doors with fire ratings greater than 20 minutes shall indicate the temperature rise developed on the unexposed surface of the door after the first 30 minutes of fire exposure.
1. Provide metal labels permanently fastened on each door which is within the size limitations established by the labeling authority having jurisdiction.
 2. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.

Positive Pressure Rated Door Assemblies: Where indicated provide positive pressure rated fire rated door assemblies. Sizes and configurations as shown on the drawings. Installed door assemblies shall be in accordance with door manufacturer's certified assemblies.

- a. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches or less above the sill.
 3. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
- D. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257 or UL 9.
- E. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage.
- B. Inspect doors and frames, on delivery, for damage. Tool marks, rust, blemishes, and other damage on exposed surfaces will not be acceptable. Remove and replace damaged items as directed by Architect. Store doors and frames at building site in a dry location, off the ground, and in such a manner as to prevent deterioration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide doors and frames by one of the following:
 - 1. Hollow Metal Doors and Frames:
 - a. Ceco Door Products; an Assa Abloy Group Company. Furnish doors and frames manufactured in the Milan, TN plant.
 - b. Curries Company; an Assa Abloy Group Company. Furnish doors and frames from either the Mason City, IA, Austell, GA, or the Easton, PA plants.
 - c. Steelcraft; an Allegion PLCIngersoll-Rand Company. Furnish doors manufactured in the Blue Ash, OH plant. Furnish frames manufactured in the Blue Ash, OH plant.

2.2 MATERIALS

- A. Specified Gage Thickness: All specified gauge thicknesses are Manufacturer's Standard Gauge.
- B. Hot-Rolled Steel Sheets: ASTM A 1011/A 1011M1008/A 1008M, CS (commercial steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Cold-Rolled Steel Sheets: ASTM A 1008/A 1008M1011/A 1011M, CS (commercial steel), Type B, free from scale, pitting, coil breaks, surface blemishes, buckles, waves, or other defects, exposed (matte) dull finish, suitable for exposed applications.
- D. Inserts, Bolts, and Fasteners: Galvanized steel.
 - 1. Expansion Bolts and Shields: FS FF-S-325, Group III, Type 1 or 2.
 - 2. Machine Screws: FS FF-S-92, carbon steel, Type III cross recessed, design I or II recess, style 2C flat head.

- E. Filler: Sound deadening and heat retarding mineral fiber insulating material.
- F. Glass and Glazing: Refer to Section 08 80 00 "Glazing."

2.3 PANELS

- A. Provide panels of same materials, construction, and finish as specified for doors.

2.4 WELDED FRAMES

- A. Fabricate hollow metal frames, formed to profiles indicated, with full 5/8 inch stops, and of the following minimum thicknesses.
 - 1. For interior use, form frames from cold- rolled steel sheet of the following thicknesses:
 - a. Openings up to and Including 48 Inches Wide: 16 gauge (0.053 inch).
 - b. Openings More Than 48 Inches Wide: 14 gauge (0.067 inch).
 - 2. Frame heads at all masonry openings shall be formed to extend to the lowest CMU horizontal mortar joint.
- B. Provide frames either saw mitered and full (continuously) profile welded, or machine mitered and full (continuously) profile welded, on back side at frame corners and stops with edges straight and true. Grind welds smooth and flush on exposed surfaces.
- C. Hardware Reinforcement: Fabricate reinforcements from same material as frame to comply with the following. Offset reinforcement so that faces of mortised hardware items are flush with surface of the frame.
 - 1. Hinges and Pivots: 7 gauge (0.167 inch) thick by 1-1/4 inches wide by 10 inches.
 - 2. Strike, Surface Mounted Hold Open Arms, and Flushbolt Reinforcements: 12 gauge (0.093 inch) thick by size as required by hardware manufacturer.
 - 3. Closer Reinforcements: 12 gauge (0.093 inch) thick one piece channel by size as required by hardware manufacturer.
 - 4. Other Hardware Reinforcements: As required for adequate strength and anchorage.
- D. Electrical Requirements: Make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replaced.
 - 1. Provide all cutouts and reinforcements required for hollow metal frames to accept security system components.
 - 2. Frames with Electric Hinges and Pivots: Provide welded on UL listed back boxes with metal conduit or raceway to permit wiring from electric hinge or pivot to other electric door hardware.

- a. Hinge Location: Center for doors less than 90 inches tall or second hinge from door bottom for doors greater than 90 inches; top or bottom electric hinge locations shall not be permitted.
- E. Mullions and Transom Bars for Sidelights, Transoms, and Borrowed Light Frames: Provide closed or tubular mullions and transom bars where indicated. Fasten mullions and transom bars at crossings and to jambs by butt welding. Reinforce joints between frame members with concealed clip angles or sleeves of same metal and thickness as frame.
- F. Jamb Anchors: Locate jamb anchors above hinges and directly opposite on strike jamb as required to secure frames to adjacent construction. At metal stud partitions locate the additional jamb anchor below the top hinge.
1. Masonry Construction: Adjustable, corrugated or perforated, anchors to suit frame size; formed of same material and gauge thickness as frame; at non-rated frames use friction fit T-shaped anchors, at rated frames use anchors consisting of spot welded strap and adjustable anchor; with leg not less than 2 inches wide by 10 inches long. Furnish at least the number of anchors per jamb according to the following frame heights:
 - a. Two anchors per jamb up to 60 inches in height.
 - b. Three anchors per jamb from 60 to 90 inches in height.
 - c. Four anchors per jamb from 90 to 96 inches in height.
 - d. One additional anchor per jamb for each 24 inches or fraction thereof more than 96 inches in height.
 2. Metal-Stud Partitions: Metal channel stud zee anchor sized to match stud width, welded to back of frames, formed of same material and gauge thickness as frame. Provide at least the number of anchors for each jamb according to the following heights:
 - a. Three anchors per jamb up to 60 inches in height.
 - b. Four anchors per jamb from 60 to 90 inches in height.
 - c. Five anchors per jamb from 90 to 96 inches in height.
 - d. One additional anchor per jamb for each 24 inches or fraction thereof more than 96 inches in height.
 3. In-Place Concrete or Masonry: Anchor frame jambs with minimum 3/8-inch- diameter countersunk flat head bolts into expansion shields or inserts 6 inches from top and bottom of each jamb with intermediate anchors spaced a maximum of 26 inches o.c. Soffit face of frame shall be punched and dimpled to accept countersunk bolt head. Reinforce frame with spacer to prevent bowing. Bolt head shall be set slightly below soffit face, filled and ground smooth at time of installation.
- G. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, formed of same material as frame, 12 gauge (0.093 inch) thick, and punched with two holes to receive two (2) 0.375 inch fasteners. Where floor fill or setting beds occur support frame by adjustable floor anchors bolted to the structural substrate. Terminate bottom of frames at finish floor surface. Weld floor anchors to frames with at least 4 spot welds per anchor.

- H. **Head Strut Supports:** Provide 3/8-by-2-inch vertical steel struts extending from top of frame at each jamb to supporting construction above. Bend top of struts to provide flush contact for securing to supporting construction above by bolting, welding, or other suitable anchorage. Provide adjustable wedged or bolted anchorage to frame jamb members to permit height adjustment during installation. Adapt jamb anchors at struts to permit adjustment.
- I. **Head Reinforcement:** For frames more than 48 inches wide in masonry wall openings, provide continuous steel channel or angle stiffener, 12 gauge (0.093 inch) thick for full width of opening, welded to back of frame at head. Head reinforcements shall not be used as a lintel or load bearing member for masonry.
- J. **Spreader Bars:** Provide removable spreader bar across bottom of frames, tack welded to jambs and mullions to serve as bracing during shipment and handling and to hold frames in proper position; do not tack weld bars to frames until anchorage and adjacent construction have been completed.
- K. **Door Silencer Holes:** Drill strike jamb stop to receive three silencers on single door frames and for two silencers on double door frames. Insert plastic plugs in holes to keep holes clear during installation.
- L. **Plaster, Mortar and Grout Guards and Removable Access Plates:** Provide minimum 26 gauge (0.016-inch-) thick plaster guards or dust-cover boxes of same material as frame, welded to frame at back of hardware cutouts to close off interior of openings and prevent mortar or other materials from obstructing hardware and hardware fastener installation and hardware operation. Provide removable access plates in the heads of frames to receive overhead concealed door closers.

2.5 STOPS AND MOLDINGS

- A. Provide continuous stops and moldings around glazed panels where indicated.
- B. Form fixed stops and moldings integral with frame, on the exterior (non-secured) side of the frame.
- C. Provide removable stops and moldings formed of 20 gauge (0.032-inch-) thick steel sheets matching hollow metal frames. Secure with countersunk oval head machine screws spaced uniformly not more than 12 inches o.c. Form corners with butted or mitered hairline joints.
- D. Coordinate rabbet width between fixed and removable stops with type of glass or panel and type of installation indicated.

2.6 FABRICATION

- A. Fabricate doors and frames rigid, neat in appearance, and free of defects, warp, wave, and buckle. Accurately form metal to sizes and profiles indicated. Accurately machine, file, and fit exposed connections with hairline joints. Weld exposed joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
- B. Exposed Fasteners: Provide countersunk flat heads for exposed screws and bolts, unless otherwise indicated.
- C. Hardware Preparation: Prepare doors and frames to receive hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final hardware schedule and templates provided by hardware supplier. Secure reinforcement by spot welding. Comply with applicable requirements of ANSI/BHMA A156.115 and A156.115W specifications for door and frame preparation for hardware. Factory reinforce doors and frames to receive surface-applied hardware. Factory drill and tap for surface-applied hardware, except at pushplates and kickplates provide reinforcing only.
 - 1. Locate hardware as indicated on the Drawings or in Section 08 71 00 "Door Hardware" or, if not indicated, according to HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."

2.7 STEEL SHEET FINISHES

- A. General: Clean, treat and prime surfaces of fabricated hollow metal door and frame work, inside and out, whether exposed or concealed in the construction.
- B. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale, shavings, filings, and rust, if present, complying with SSPC-SP 3, "Power Tool Cleaning,"
- C. Factory Priming for Field-Painted Finish: Apply shop primer immediately after surface preparation and pretreatment. Apply a sufficient number of coats, baked on, to obtain uniformly smooth exposed surfaces. Touch up surfaces having runs, smears, or bare spots.
 - 1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, corrosion-inhibiting, lead- and chromate-free, universal primer complying with ANSI A250.10 acceptance criteria; compatible with substrate and field-applied finish paint system indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install doors and frames according to the referenced standards, the Architect reviewed shop drawings, and manufacturer's written recommendations and installation instructions.
- B. Frames: Install frames where indicated. Extend frame anchorages below fills and finishes. Coordinate the installation of built-in anchors for wall and partition construction as required with other work.
 - 1. Welded Frames:
 - a. Set masonry anchorage devices where required for securing frames to in-place concrete or masonry construction.
 - 1) Set anchorage devices opposite each anchor location as specified and anchorage device manufacturer's written instructions. Leave drilled holes rough, not reamed, and free of dust and debris.
 - b. Placing Frames: Remove temporary spreader bars prior to installation of the frames. Set frames accurately in position; plumb; align, and brace securely until permanent anchors are set.
 - 1) At concrete or masonry construction, set frames and secure in place with machine screws and masonry anchorage devices. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 2) Anchor bottom of frames to floors through floor anchors with threaded fasteners.
 - 3) Field splice only at approved locations indicated on the shop drawings. Weld, grind, and finish as required to conceal evidence of splicing on exposed faces.
 - 4) Remove spreader bars only after frames are properly set and secured. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
 - 2. At fire-rated openings, install frames according to NFPA 80.
 - 3. Existing Frames (Salvaged from Alteration Work): Install salvaged existing frames in locations indicated.
- C. Doors:
 - 1. Non-Fire Rated Doors: Fit non-fire-rated doors accurately in their respective frames, with the following clearances:
 - a. Jambs and Head: 3/32 inch.

- b. Meeting Edges, Pairs of Doors: 1/8 inch.
 - c. Bottom: 3/8 inch, if no threshold or carpet.
 - d. Bottom: 1/8 inch, at threshold or carpet.
- 2. Fire-Rated Doors: Install with clearances as specified in NFPA 80.
 - 3. Smoke Control Doors: Install according to NFPA 105.
 - 4. Existing Doors (Salvaged from Alteration Work): Install salvaged existing doors in locations indicated.
- D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow metal manufacturer's written instructions.
- 1. Secure stops with countersunk flat or oval head machine screws spaced uniformly not more than 9 inches² inches
- E. Wood Door Installation: Refer to Section 08 14 16 "Flush Wood Doors."
- F. Apply hardware in accordance with hardware manufacturer's instructions and Section 08 71 00 "Door Hardware." Drill and tap for machine screws as required. Do not use self tapping sheet metal screws. Adjust door installation to provide uniform clearance at head and jambs, and to contact stops uniformly. Adjust hardware items just prior to final inspection. Leave work in complete and proper operating condition.
- 1. Field cut existing hollow metal doors and frames indicated to receive new hardware. Field cutting shall be executed in a workmanlike manner and shall not void the existing door and frame labeling.

3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items just before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise unacceptable.
- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
 - 1. Finish Painting: Refer to Section 09 91 23 "Interior Painting."
- C. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise defective.
- D. Institute protective measures required throughout the remainder of the construction period to ensure that hollow metal doors and frames will be without damage or deterioration, at time of substantial completion.

END OF SECTION 08 11 13

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes solid core flush wood doors.
 - 1. The integration of a security system into the flush wood door work is required. The Contractor shall be responsible for the total and complete coordination of the security system components into the Work.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of door required. Include factory-finishing specifications.
 - 1. Submit laboratory test report results of hinge loading, cycle/slam, stile edge screw withdrawals, and stile edge split resistance for fire rated doors.
- B. Shop Drawings: Submit shop drawings indicating location, size, thickness, and hand of each door; elevation of each kind of door; construction details not covered in the product data; location and extent of hardware blocking; undercuts, special beveling, and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware of factory machined doors.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate fire label requirements including fire rating time duration, maximum temperature rise requirements, and smoke label requirements.
 - 4. Indicate routing of electrical conduit and dimensions and locations of cutouts in wood doors to accept electric hardware devices.
- C. Samples: Cut away corner section of each door type approximately 8 by 10 inches demonstrating door construction, face veneer and finish.

1.3 INFORMATIONAL SUBMITTALS

- A. Certificate of Compliance for Fire Rated Doors: Provide copies of testing agency's Certificate of Compliance for all fire rated door assemblies, all smoke and draft control door assemblies, and all temperature rise rated door assemblies.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with the applicable provisions and recommendations of AWI's "Architectural Woodwork Quality Standards Illustrated, 8th Edition, Version 2.0, Section 1300" where standards and specifications conflict the more stringent shall be required.
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252, and UL 10C "Standard for Positive Pressure Fire Tests of Door Assemblies." Fire classification labels at all doors with fire ratings greater than 20 minutes shall indicate the temperature rise developed on the unexposed surface of the door after the first 30 minutes of fire exposure.
 - 1. Provide metal labels permanently fastened on each door which is within the size limitations established by the labeling authority having jurisdiction.
 - 2. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.
 - 3. Positive Pressure Rated Door Assemblies: Where indicated provide positive pressure rated fire rated door assemblies. Sizes and configurations as shown on the drawings. Installed door assemblies shall be in accordance with door manufacturers certified assemblies.
 - a. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches or less above the sill.
 - 4. Provide fire rated door assemblies with smoke and draft control rating at corridors, stairwells, and where required by applicable codes. Sizes and configurations as shown on the drawings. Installed door assemblies shall be in accordance with door manufacturers certified assemblies.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect wood doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in heavy duty cardboard cartons.
- C. Handle wood doors with clean gloves. Lift and carry wood doors when moving them around the site, do not drag wood doors across one another.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until wet work, such as masonry, concrete, stone, tile, terrazzo, plastering, wallboard joint treatment, is complete and dried, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period. Do not expose doors to sudden changes in temperature such as forced heat used to dry out the site.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship for the life of the original installation of the door. A representative of the door manufacturer shall inspect the installed doors and shall note on the warranty that no provisions of the warranty have been nullified in the manufacture and/or installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance to requirements, provide products by one of the following:
 - 1. Algoma Hardwoods, Inc.
 - 2. Eggers Industries, Architectural Door Division.
 - 3. Marshfield Door Systems, Inc.
 - 4. VT Industries.

2.2 DOOR CONSTRUCTION

- A. Doors for Opaque Finish:
 - 1. Grade: Custom.
 - 2. Face Veneer: Medium-density overlay.
 - 3. Thickness: 1-3/4 inch unless otherwise indicated.
 - 4. Materials:
 - a. Particleboard Core Material: Complying with ANSI A208.1, Grade 1-LD-1 or 1-LD-2.
 - b. Blocking: 5-1/2 inch wide minimum top-rail blocking at doors with closers and bottom rail blocking at doors with kickplates consisting of minimum 1/2 inch wide single length structural composite lumber (SCL) outer band and single length SCL inner band.

- c. Vertical Edges: 1-3/8 inch wide minimum prior to fitting, 2 ply laminated wood construction consisting of a single piece hardwood outer band, without fingerjoints, and an inner band of SCL. Trim non-rated door width equally on both jamb edges.
 - d. Crossbanding: Minimum 1/16 inch thick, low density hardwood, composite, or high density hardboard.
5. Construction: AWI Section 1300, PC-5 CE. Stiles, rails, and blocking bonded to core then entire unit abrasive planed before veneering. Crossbanding materials shall extend full width of door with grain running horizontally, tapeless spliced without voids or show through (telegraphing), and directly glued to core and blocking. Sand cross banding before application of face veneer. Face veneer shall extend full height of door with grain running vertically, tapeless spliced without voids or show through (telegraphing), and directly glued to cross band. Glue lines between face veneer, crossbanding, and blocking shall be of a type to comply with the specified warranty using the hot plate process.

B. Fire Rated Door Construction:

1. Construction: AWI Section 1300, FD-5, with particleboard or mineral core as required to provide fire rating indicated, and faced to match non-rated fire doors. Provide required label(s) on each door.
2. Blocking: For mineral-core doors, provide composite blocking, of same thickness as core, approved for use in doors of fire ratings indicated, and as follows:
 - a. 5-1/2 inch wide minimum top-rail blocking consisting of minimum 1/2 inch wide single length mill option hardwood outer band and single length lumber inner band fabricated of same materials as vertical edges.
 - b. Provide either two 4-1/2 inch by 18 inch minimum sized lock blocks on each door stile or a single 10 inch high continuous lock rail located on lockcase body centerlines.
3. Vertical Edge Construction: Provide manufacturer's standard laminated-edge construction meeting label requirements, with intumescent seals concealed by outer stile matching face veneer, and meeting or exceeding the specified direct screw withdrawal, split resistance, cycle slam, and hinge loading criteria. Finish outer bands to match door faces without joints.
 - a. Split Resistance: Not less than 696 pounds when tested in accordance with WDMA TM-5; or, not less than 1305 pounds when tested in accordance with ASTM D143.
 - b. Cycle/Slam: Not less than 200,000 cycles with no loosening of hinge screws or other visible signs of failure when tested in accordance with the requirements of WDMA TM-7; or, not less than 502,000 cycles when tested in accordance with ANSI A151.1
 - c. Direct Screw Withdrawal: Not less than 700 pounds when tested in accordance with WDMA TM-10; or, not less than 877 pounds when tested in accordance with ASTM D1037 using #12 x 1-1/4 steel screws, threaded to the head with either A or AB wood threads.
 - d. Hinge Loading: Not less than 684 pounds average when tested in accordance with WDMA TM-8.

4. Pairs: Provide fire-rated pairs with fire-retardant stiles matching face veneer that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals.
 5. Thickness: 1-3/4 inch unless otherwise indicated.
- C. Wood Beads for Light Openings in Wood Doors: Manufacturer's standard flush designed, solid wood, rectangular shaped, back beveled or quirked, beads matching veneer species of door faces. Include glazing compounds or tapes sized for back bevel or quirk provided. Include finish nails for removable stops sized in accordance with wood door manufacturers recommendations.
- D. Wood-Veneered Beads for Light Openings in Fire Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include glazing compounds or tapes and concealed metal glazing clips for opening size and fire rating indicated. Include finish nails for removable stops sized as required for fire rating indicated.

2.3 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3 unless otherwise indicated to match existing frame hardware preparations. Comply with final hardware schedules, door frame Shop Drawings, AWI Section 1300-G-20, BHMA A156.115-W standards, and hardware templates.
1. Coordinate measurements of hardware mortises in frames to verify dimensions and alignment before factory machining.
 2. Locate lock and latchsets in doors to match existing strike locations on existing door frames; locate hinges in doors to match hinge locations on existing door frames.
 3. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required. Install light beads with fasteners spaced for opening size and fire rating indicated. Install wood bead moldings with finish nails and countersink without striking bead. Fill countersunk heads with putty matching wood bead color.

2.4 SHOP PRIMING

- A. Doors for Opaque Finish: Shop prime faces and edges of doors, including cutouts, with one coat of wood primer/sealer as standard with door manufacturer. Surfaces shall be clean and dry before priming. Apply primer/sealer uniformly without bare spots, runs, or sags.

2.5 FACTORY FINISHING

- A. General: Finish doors at factory that are indicated to receive transparent finish.
- B. Grade: Premium.
- C. Finish: Manufacturer's standard finish with performance meeting or exceeding either AWI System TR-4 conversion varnish or AWI System TR-6 catalyzed polyurethane.
- D. Staining: Prepare door faces, stiles, rails, and cutouts, with toners, or stains, prior to the application of finish to match Architect's sample.
- E. Effect and Sheen: Match Architect's sample.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: Apply hardware to new doors in accordance with hardware manufacturers instructions and Section 08 71 00 "Door Hardware." For particleboard core doors drill pilot holes of proper size for installing hinge screws. Adjust hardware items just prior to final inspection. Leave work in complete and proper operating condition.
 - 1. Factory wrapping shall be maintained on new doors during construction period, and all hardware shall be installed by cutting the factory wrapping at the mounting location of the hardware item.
- B. General Door Installation Standards: Install doors in locations indicated to comply with manufacturer's written instructions, referenced quality standard, and as indicated. Where standards conflict the more stringent shall apply.
 - 1. Install fire-rated doors in corresponding fire-rated frames according to fire label requirements.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge, matching clearances specified for factory prefitting, and to contact stops uniformly. Field cutting, fitting or trimming, if required, shall be executed in a workmanlike manner.

- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.
- E. Field-Finished Doors: Refer to the following for finishing requirements:
 - 1. Section 09 91 23 "Interior Painting."

3.2 ADJUSTING AND PROTECTION

- A. Rehang or replace doors that do not swing or operate freely.
- B. Protection: Protect wood doors to ensure that the wood door work will be without damage or deterioration at the time of Substantial Completion.
 - 1. Refinish or replace wood doors damaged during installation. Replace any new wood doors that are warped, twisted, demonstrate core show through, are not true in plane, or cannot be refinished to the satisfaction of the Architect.

END OF SECTION 08 14 16

SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes access doors and frames.

1.2 SUBMITTALS

- A. Product Data: Submit product data for each type of access door and frame indicated. Include construction details relative to materials, individual components and profiles, finishes, and fire ratings (if required) for access doors and frames.
- B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items with concealed framing, suspension systems, piping, ductwork, and other construction. Show the following:
 - 1. Method of attaching door frames to surrounding construction.
 - 2. Ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim.
- C. Schedule: Provide complete door and frame schedule, including types, general locations, sizes, construction details, latching or locking provisions, and other data pertinent to installation.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain access doors of each type for entire project from one source from a single manufacturer.
- B. Fire-Rated Access Doors and Frames: Provide access doors and frames complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are labeled and listed by UL
 - 1. Vertical Access Doors: NFPA 252 or UL 10B.
- C. Size and Location Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule.

1.4 COORDINATION

- A. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and where shown on the drawings, and indicate on schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES

- A. Flush, Insulated, Fire-Rated Access Doors and Trimless Frames: Fabricated from steel sheet.
1. Locations: Gypsum board wall surfaces indicated to be fire rated.
 2. Fire-Resistance Rating: One and one-half hours.
 3. Temperature Rise Rating: 250 deg F at the end of 30 minutes.
 4. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal.
 5. Frame: Sheet metal with drywall bead.
 6. Hinges: Continuous piano hinge.
 7. Automatic Closer: Spring type.
 8. Latch: Self-latching bolt operated by knurled knob with interior release.
 9. Products: One of the following:
 - a. Larsen's Industries, Inc.; L-FRAP.
 - b. Milcor; Style UFR-DW.
 - c. Nystrom, Inc.; IW Series.
- B. Flush Access Typical Doors and Trimless Frames for Vertical Surfaces: Fabricated from steel sheet.
1. Locations: Gypsum board wall surfaces.
 2. Door: Minimum 14 gauge (0.067 inch) thick sheet metal, set flush with surrounding finish surfaces.
 3. Frame: Minimum 16 gauge (0.053 inch) thick sheet metal with drywall bead.
 4. Hinges: Continuous concealed type.
 5. Latch: Flush, screwdriver- operated cam latch of number required to hold door in flush, smooth plane when closed.
 6. Products: One of the following:
 - a. Larsen's Industries, Inc.; Model L-DWC.
 - b. Milcor; Style DW.
 - c. Nystrom, Inc.; NW Series.
- C. Flush Access Typical Doors and Trimless Frames for Horizontal Surfaces: Fabricated from glass fiber reinforced gypsum.
1. Locations: Gypsum board ceiling surfaces.
 2. Door: Minimum 1/8 inch thick glass fiber reinforced gypsum, set flush with surrounding gypsum wallboard finish surfaces.
 3. Frame: Minimum 1/8 inch thick glass fiber reinforced gypsum, with tapered square edge.
 4. Hinges and Latch: None, lay-in manual push up type.
 5. Products: One of the following:

- a. Chicago Metallic Ceiling Systems and Specialty Products: Glass Reinforced Gypsum Drywall Ceiling Access Doors.
 - b. Formglas, Inc.: Interior Ceiling Access Panel.
 - c. Acudor Products, Inc.: GFRG Ceiling Access Panel.
 - d. Wind-Lock; Stealth Access Panels.
- D. Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.
1. Locations: Ceramic-tile wall surfaces.
 2. Door: Minimum 14 gauge (0.067 inch) thick sheet metal, set flush with exposed face flange of frame.
 3. Frame: Minimum 16 gauge (0.053 inch) thick sheet metal with 1-inch- wide, surface-mounted trim.
 4. Hinges: Continuous piano hinge.
 5. Latch: Flush, screwdriver- operated cam latch of number required to hold door in flush, smooth plane when closed.
 6. Products: One of the following:
 - a. Larsen's Industries, Inc.; Model L-MPG.
 - b. Milcor; Style M.
 - c. Nystrom, Inc.; NT Series.

2.2 FABRICATION

- A. General: Provide access door assemblies manufactured as integral units ready for installation.
- B. Steel Access Doors: Fabricate units of continuous welded steel construction. Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
1. Provide special sized access doors where required or requested.
- C. Glass Fiber Reinforced Gypsum Doors: Fabricate units of monolithic glass fiber reinforced gypsum construction having a shell thickness of between 1/8 to 3/16 inch and weighing approximately 2 pounds per square foot . Edges of doors shall be rabbetted to overlap and rest on the frame.
1. Provide special sized access doors where required or requested.
- D. Frames:
1. Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame for steel frames.
 2. Provide trimless carbon steel frames with drywall bead for installation in gypsum wallboard assembly, furnish perforated frames with drywall bead, securely attached to perimeter of frames, in size to suit thickness of gypsum panels indicated. Provide mounting holes in frames to attach frames to metal framing in drywall construction.

3. Provide trimless glass fiber reinforced frames with tapered edges for taping and joint compound installation into gypsum wallboard ceiling assembly, in size to suit thickness of gypsum panels used.

2.3 CARBON STEEL FINISHES

- A. Surface Preparation: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- B. Apply shop primer to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's instructions for installation of access doors. Coordinate installation with work of other trades.
- B. Advise installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.
- C. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- D. Install access doors flush with adjacent finish surfaces.
- E. Adjust doors and hardware after installation for proper operation.
- F. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 13

SECTION 08 35 13.23 – ACCORDION FOLDING FIRE DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Model: FireGuard
- B. Division 0 and Division 1, as indexed, apply to this section.
- C. Furnish and install all horizontal sliding, accordion-type fire doors shown on the drawings and specified herein.

1.2 RELATED SECTIONS

- A. All headers, support structures, surrounding insulation, jambs, storage pockets, pocket doors, access doors, blocking and trim shall be furnished and installed by other sections.
- B. All electrical wire, wiring, conduit and electrical boxes shall be furnished and installed by electrical section.
- C. Drilling/placement of anchorage points into pre or post tensioned decks, welding/punching/drilling steel members and all drywall work.
- D. All track, soffit, chain guide and wall mounted striker posts shall be painted by Section 09900. Color shall be selected by the architect.
- E. Interface to the fire doors shall be accomplished using a MODBUS gateway (by others) configured for RS485 communications. Use 18-gauge single twisted pair communication wire from the MODBUS gateway and daisy chain connections to each fire door (maximum of 32 doors per gateway). Terminate the end-of-line with a load resistor as specified by the MODBUS gateway manufacturer.

1. Communication lines are daisy chained from the MODBUS gateway to each fire door. The communications line is connected to a USOC RJ11, 6 Position, 4 Contact wall plate at each door. The [COM+]/[COM-] wires are connected to the center pins (Red and Green wires respectively). The plate is then mounted to a j-box centrally located on the back wall of the fire door pocket. All wiring, conduit, j-boxes and wall plates are provided by the Electrical Contractor. Connection from the wall plate to the fire door controller is accomplished by a modular plug data cable provided by the manufacturer.

1.3 QUALITY ASSURANCE

- A. Installation shall be performed by factory trained and certified installers with a minimum of three years experience installing accordion-type fire doors.
- B. Fire doors shall be listed by Underwriters Laboratories for ratings as indicated, when tested in accordance with the requirements of UL 10B and NFPA252.
- C. Automatic closing system shall be listed by Underwriters Laboratories in accordance with the requirements of UL 864 and be intended for use with assembly in compliance with NFPA 80, Chapter 9, Section 9.4.2.1.
- D. Fire doors used for smoke and draft control shall bear the "S" mark on the fire door label and shall have an air leakage of less than 3 ft³/ft² at 0.1 inch of water column pressure when tested in accordance with UL 1784 with an artificial bottom seal.
- E. Fire doors used at the point of access to an elevator shall bear the "E" mark on the fire door label and shall have an air leakage of less than 3 ft³/ft² at 0.1 inch of water column pressure when tested in accordance with UL 1784 without an artificial bottom seal.
- F. Fire doors shall be capable of resisting an air pressure differential up to .05 inches of water column.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's technical literature; include UL listing data.
- B. Sustainable Design Submittals: Submit the following in compliance with Section 01 81 13 "Sustainable Design Requirements":

1. **Product Data:** For recycled content, indicating postconsumer and preconsumer recycled content and cost.
- C. **Shop Drawings:** Indicate construction and installation details and dimensions, including layout, electrical requirements, required stacking depth, height of header above finished floor, and requirements for anchorage and support of each door.
- D. **Operation and Maintenance Data:** Operating manual, troubleshooting and repair methods, and wiring diagrams shall be provided as part of project close out procedure.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver to the job site in manufacturer's original, unopened package.

1.6 COORDINATION BY GENERAL CONTRACTOR

- A. Coordinate with the following:
 1. Fire Alarm system.
 2. Electrical.
 3. Floor and ceiling finish.
- B. Assure accurate installation of header, jamb, and trim. Provide field dimensions for fabrication. Supervise unloading and handling of materials.
- C. Permanent power shall be in-place and ready for final connection when fire doors are erected. Assure access to and proper clearance for motor operators.
- D. After testing the fire alarm system, automatic-closing fire doors shall be re-set to the original positions.
- E. Store boxes flat (not more than three high) in a dry area and protect from elements that may damage materials. Replace damaged materials at no cost to the owner.

1.7 WARRANTY

- A. Materials and installation shall be warranted against defects in workmanship for a period of one (1) year from the date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER AND MODEL

- A. Acceptable Manufacturer:
 - 1. Won-Door Corp., 1865 South 3480 West Salt Lake City, UT, Phone: 800 453-8494, Fax: (801) 977-9749, www.wondoors.com/
- B. Horizontal sliding accordion-type fire doors shall be Won-Door FireGuard model FG 90 minute as manufactured by Won-Door Corporation, Salt Lake City, Utah.
- C. No substitutions allowed.

2.2 ACCORDION FIRE DOORS - GENERAL

- A. Fire Rating: Fire doors shall be listed by Underwriters Laboratory as special purpose fire doors having a 90 minute fire-resistive rating in accordance with the requirements of UL 10B and NFPA 252.
- B. Closing and Opening Operation: Automatic Closing System shall be a Microprocessor-based system rated to UL864 (Control Units and Accessories for Fire Alarm Systems) and shall commence closing upon activation by fire alarm system and/or by low battery charge.
 - 1. Obstruction Detection: Contact with an obstruction shall cause the door to stop, reverse enough to remove pressure on the leading edge, pause, and then re-close when in an alarm condition.

2. While the door is opening under motor power, constant pressure to the leading edge in the direction of opening shall cause the door to continue to open until the leading edge is released. This is termed motor-assisted opening.
 3. Constant pressure to the leading edge while not under motor power shall prevent motor operation and allow the door to be opened manually.
- C. Exit Hardware Operation: Provide fire exit hardware on both sides of door.
1. In emergency mode, a slight pressure on the hardware will cause the door to open a minimum of 32 inches, pause for 3 seconds, and then automatically close.
 2. The open distance shall be field programmable, up to the entire opening width, if the local authority requires an opening larger than 32 inches.
 3. The pause before re-close shall be field programmable, up to 30 seconds, if the local authority requires a longer pause time.
 4. The exit hardware shall have the ability when not in the emergency (fire) mode or the security (lock) mode to be used to open the door and move it back into the storage pocket.

2.3 COMPONENTS

- A. Door Construction: Two parallel, accordion-type walls of panels independently suspended with no floor tracks, pantographs or interconnections except at the lead-post.
1. Panels: 24 gauge steel, V-grooved; Modular design; Capable of in-place repair.
 2. Perimeter Seals: shall consist of continuous extruded vinyl sweeps attached to the top and bottom of the fire door to form a smoke and draft seal.
 3. Hanging Weight: 5.5 pounds per sq. ft. when extended across the opening.
 4. Finish: All steel parts factory-applied enamel.
 5. Color: Manufacturer's standard platinum.
- B. Suspension System: Two tracks, on 8 inch centers, attached to overhead structural support.

1. Tracks: 14 gauge cold rolled steel or .125 aluminum.
 2. Panel Hangers: Every other panel individually suspended from a steel hanger pin and a 1/4 inch ball bearing roller.
 3. Lead Post Hangers: 8 wheel ball bearing trolley.
- C. Power Supply: 12-volt maintenance-free DC battery, automatically maintained at capacity by continuous charger, 120 V AC.
- D. Automatic Closing System shall be listed to UL864 including capability to send and receive signals from the Fire Control Panel, and shall consist of the following:
1. Microprocessor Based Electronic Control box with the ability to:
 - a. Monitor dual power sources continually for peak performance including
 - 1) Detect a missing battery, bad battery, or low battery condition
 - 2) Detect if the charging circuit is bad
 - 3) Detect fuse failures
 - 4) Detect high or low AC conditions
 - b. Monitor the health of the drive train.
 - c. Monitor inputs including:
 - 1) Sticky door block, exit hardware, patron hardware and key switches.
 - 2) Key switch mis-wires where key open and key close are on simultaneously.
 - d. Run a "watch dog" monitoring circuit which will force a software restart in the event of software hangs, including tracking number of resets for diagnostic purposes.
 - e. Record the number of door closes, openings, lost communication with external microprocessors, and manual resets.

- f. Monitor ambient temperature and lockout the operating devices when the environment at the door becomes untenable.
 - g. Enter a security mode to help control access through the opening.
 - h. Withstand voltages up to 120 AC on the fire alarm input circuit without damage including the ability to indicate that the alarm circuit has not been wired as a dry contact, "no voltage" circuit when errant voltages are applied to the circuit.
 - i. Communicate with other microprocessors in the assembly via an internal buss system.
 - j. Indicate faults or supervised information both locally and at a remote location.
2. Motor Operator Assembly including: A DC gear motor, drive sprocket, clutch, and position sensors. The motor shall drive the fire door by means of a chain attached to a stabilizer bar trolley. The motor shall be rated for continuous use with unlimited cycle duty.
 3. If a key switch is NOT used, a door control momentary rocker switch shall be mounted on one side of the door and shall function as follows:
 - a. Pressing the upper portion shall close the door and/or clear fault conditions.
 - b. Pressing the lower portion of the switch shall open the door and/or temporarily mute the local horn.
 4. Leading Edge Obstruction Detector shall be pressure sensitive such that contact with an obstruction shall cause the door to stop, pause for 3 seconds, then re-close when in alarm mode. The obstruction detection system shall be fully functional at all times.
 5. Exit Hardware shall be located on both sides of the fire door.
 6. Doors installed at the point of access to an elevator ("E" label) shall include the following extras: track seals, anti-sway brackets every five feet or less across the opening, and foil tape between the panels and the smoke liner.
- E. Remote Operation and Monitoring. Fire doors shall be remotely monitored and controlled through a building monitoring system (BMS) and interface with the BMS using MODBUS communication.
1. MODBUS Door Controls shall Include: Open, Close, Set Fire Mode for Testing, Reset, Lock (with Access Control Option), Unlock (with Access Control Option).

2. MODBUS Monitor Status: Door position across opening width, Door Status (OPEN, CLOSED, OPENING, CLOSING), Errors, Battery Voltage, AC Voltage.

2.4 OPTIONS

- A. An infrared light beam shall be provided on non-curved doors to monitor the opening path. In the event that an object is placed in the path of the door for more than 4 minutes, the beam shall cause the door to sound an alarm indicating a path obstruction.

2.5 RELATED CONSTRUCTION

- A. Track Support Construction: Provide supports attached to structure and mounting surface for tracks; comply with door manufacturer's instructions and recommendations. Headers, if furnished & installed by the general contractor or other sections, shall be parallel with the finished floor within +/- 1/8" tolerance over the entire length of the opening.
- B. Pocket Construction: Provide pocket for concealment of accordion folding fire door when open; comply with door manufacturer's instructions and recommendations to ensure pocket and soffit are built to the dimensions specified, plumb and level.
- C. Pocket Door: Maintain full pocket clear width when pocket door is open.
- D. Striker Recess: Mount 16 gauge steel striker in wall recess deep enough to prevent striker from protruding beyond face of wall; construct recess to maintain fire rating of wall.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that adjacent construction is suitable for installation of door.
- B. Verify that electrical utilities have been installed and are accessible.

- C. Verify that door opening is plumb and header is level and of correct dimensions.
- D. Notify Architect of any unacceptable conditions or varying dimensions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions, shop drawings, and NFPA 80.
- B. Install fire doors plumb and level.
- C. Installation shall be performed by factory trained and certified installers with a minimum of three year's experience installing electrically operated accordion folding fire doors.

3.3 ADJUSTING

- A. Adjust door installation to provide uniform clearances and smooth, quiet, non-binding operation.
- B. Test door closing functions under all anticipated conditions.
- C. Verify that all operations are functional and meet the requirements of the authorities having jurisdiction.

3.4 CLEANING

- A. Clean surfaces using manufacturer's recommended means and methods.

3.5 PROTECTION

- A. Protect installed work from damage.

3.6 STORAGE OF WASTE AND RECYLING

- A. Store and recycle waste in accordance with Section 01 74 19 Construction Waste Management and Disposal.

END OF SECTION

SECTION 08 41 26 - ALL-GLASS ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes all-glass entrance and storefront systems. The all glass entrance and storefront work includes the following:
1. All-glass swing entrance doors and framing, including hardware.
 2. All-glass sliding entrance doors, and framing, including hardware.
 3. All glass side lights.
 4. Metal trim, and similar items in conjunction with all glass entrance and storefronts.
 5. Sealants, joint fillers, and gasketing systems for all glass entrances and storefronts.
 6. Anchors, shims, fasteners, inserts, expansion devices, accessories, support brackets and attachments for all-glass entrances and storefronts.
 7. Glass and glazing for all-glass entrances and storefronts.
 8. Security system components may be incorporated into the door and frame openings of all-glass entrance and storefront work at the Owner's option. Cooperate with the Owner's security system contractors if the Owner chooses to incorporate security system components during the course of the Work.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions for each all-glass entrance and storefront product specified.
- B. Shop Drawings: Submit shop drawings showing scaled elevations, plans, and sections of the all-glass entrance and storefront work. Full scale sections shall be prepared and submitted for details of the assemblies that cannot be shown in the elevations or sections. Include with shop drawings metal thickness of all metal components, glass thicknesses, metal finishes, details of fittings, and all other pertinent information as necessary or requested by the Architect to indicate compliance with the Contract Documents. Details of field connections, anchorage, and their relationship to the work of others shall be clearly indicated for the coordination of the work by other building trades. Details of fastening and sealing methods and product joinery shall be shown to ensure proper performance of the field installation. No work shall be fabricated until shop drawings for that work have been approved by Architect for fabrication.
1. Show direction of satin finish for each component receiving a directional finish.

1.3 INFORMATIONAL SUBMITTALS

- A. Structural Calculations: Submit, for information only, copies of structural calculations indicating complete compliance with the specified performance requirements. Calculations shall be prepared, signed and sealed by a Professional Engineer registered in the state wherein the work is to be erected. Clearly indicate loads that will be transferred to adjacent supporting cladding and framing elements.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: The all-glass entrance and storefront drawings and specifications are based on the <insert manufacturer and system> system. Award the fabrication of all-glass entrance and storefront door and frame components to a single firm specializing in the fabrication of all-glass entrance and storefront components who has successfully produced work similar in design and extent to that required for the project, in not less than three projects of similar scope to the satisfaction of the Architect, and whose work has resulted in construction with a record of successful in-service performance for a period of five (5) years. The fabricator shall have sufficient production capacity, have organized quality control and testing procedures, and published written and illustrated installation manuals, to produce and properly install the entrance assemblies required without causing delay in progress of the Work.
- B. Installer Qualifications: Subcontract the all-glass entrance and storefront work to a firm which is specialized in the erection of all-glass entrances and storefronts and who has successfully produced work similar in design and extent to that required for the project, in not less than three projects of similar scope to the satisfaction of the Architect, and whose work has resulted in construction with a record of successful in-service performance for a period of 10 years.
- C. Standards: Comply with the applicable provisions and recommendations of the following standards below, where standards conflict the more stringent shall apply:
1. American Architectural Manufacturers Association (AAMA): "Aluminum Store Front and Entrance Design Guide Manual."
 2. American Institute of Steel Construction (AISC), "Steel Construction Manual," Current Edition.
 3. Federal Standard 16 CFR 1201, Consumer Product Safety Commission (CPSC): "Safety Standard for Architectural Glazing Materials," as published in the Code of Federal Regulations (CFR). Comply with the applicable requirements of the laws, codes, ordinances and regulations of Federal and Municipal authorities having jurisdiction, wherever requirements conflict the more stringent shall be required. Obtain approvals from all such authorities. As a minimum provide safety glazing complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.
 4. Welding Standards: Welding shall be performed by skilled and qualified mechanics. Welding shall be performed in accordance with the applicable provisions of AWS D1.1 "Structural Welding Code - Steel."
 5. Glass Association of North America (GANA): "Fully Tempered Heavy Glass Door and Entrance Systems Design Guide."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging of components shall be so selected to protect the components from damage during shipping and handling.
- B. Storage on Site: Store all-glass entrance and storefront components in a location and in a manner to avoid damage to the components. Keep handling on site to a minimum. Exercise particular care to avoid damage to finishes of metals.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of supporting structure by field measurements before fabrication so that the all-glass entrance and storefront work will be accurately designed, fabricated and fitted to the structure. Indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Use Contractor's lines and benchmarks as a basis for measurements.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating all-glass entrance and storefront work without field measurements. Coordinate supporting structure construction to ensure that actual dimensions correspond to established dimensions.

1.7 WARRANTY

- A. Special Warranty: Submit a two (2) year written warranty, beginning from date of substantial completion, and executed by the Contractor, manufacturer and the all-glass entrance and storefront installer agreeing to repair or replace components of the all-glass entrance and storefront systems that develop defects in materials or workmanship within the specified warranty period. Defects include, structural failures, sealant failures, deterioration of metals, metal finishes, failure of operating components to function properly, and any other evidence of failure or deterioration of the all-glass entrance and storefront work to meet performance requirements.
- B. Heat Soaked Tempered Glass Warranty: Submit a five (5) year written warranty, beginning from date of substantial completion, and executed by the Contractor, manufacturer and the all-glass entrance and storefront installer agreeing to replace glass components of the all-glass entrance and storefront systems that spontaneously break as a result of Nickel Sulfide (NiS) inclusions within the specified warranty period without material or labor charges to the Owner.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Provide all-glass entrance and storefront systems meeting or exceeding the following performance requirements:
1. Structural Properties:
 - a. Lateral Loads: The all-glass entrance and storefront work, including glass, shall be designed, fabricated and installed to withstand a maximum inward and outward lateral pressure of 5 psf for sidelights. The lateral load imposed on the head rail stops at the all-glass door panels shall be 20 lbf/sq. ft. .
 - 1) Where interior glazing is installed adjacent to a walking surface, the differential deflection of two adjacent unsupported edges shall not be greater than the thickness of the panels when a force of 50 plf is applied horizontally to one panel at any point up to 42 inches above the walking surface.
 - b. Deflection Limitations:
 - 1) Deflections: Base calculations for the following deflections upon the combination of maximum direct lateral pressures, building deflections, and erection tolerances.
 - a) The deflection of any framing member in a direction normal to the plane of the wall when subjected to the full lateral pressures specified above shall not exceed 1/175 of the glass edge length or 3/4 inch whichever is less, except limit deflection of glass to 1/2 inch .
 - b) Glass, sealants and interior finishes shall not be included to contribute to framing member strength, stiffness or lateral stability.
 - c. Dead Loads:
 - 1) Limit deflections of metal members spanning door openings to 1/300. The clearance between the member and an operable door shall be no less than 1/16 inch .
 - 2) Twisting (rotation) of the horizontals due to the weight of the glass shall not exceed 1 degree, measured between ends and center of each span.
 - d. Operational (Traffic) Loads: Design and fabricate all-glass entrances to withstand the operating loads which result from heavy traffic conditions using the specified hardware, without measurable permanent deflection. Limit elastic deflections so as to provide the normal degree of rigidity required to avoid glass breakage, and other objectionable results of excessive flexibility.

- B. Building Frame Movement: Design, fabricate and install all-glass entrances and storefronts to withstand building movements including loading deflections, shrinkage, creep and similar movements.
- C. Design Modifications:
 - 1. Submit design modifications necessary to meet the performance requirements and field coordination.
 - 2. Variations in details or materials shall not adversely affect the appearance, durability or strength of components.
 - 3. Maintain the general design concept without altering size of members, profiles and alignment.

2.2 MATERIALS

- A. Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), tested for surface and edge compression per ASTM C 1048 and for impact strength per 16 CFR 1201 for Category II materials. After tempering, heat soak 100% of all fabricated glass units to European Union Standard EN14179 to reduce the potential for inclusion related glass breakage. Statistical heat soaking shall not be permitted.
 - 1. Class 1: Clear.
 - a. Thickness: 1/2 inch , unless greater thickness is required to suit the performance requirements.
 - 2. Exposed Edges: Flat edge (cut edge of glass is flat and surface edges are slightly arrised) with polished finish.
 - 3. Butt Edges: Flat edge (cut edge of glass is flat and surface edges are slightly arrised) with polished finish.
 - 4. Exposed Fin Edges: Round edge (cut edge of glass is slightly curved to form an arc of a circle to glass fabricator's standard radius) with polished finish.
- B. Basis-of-Design Tempered and Heat Soaked Glass Fabricator: Viracon, Inc., 800 Park Drive, Owatonna, MN (800) 533-2080.
 - 1. Subject to requirements, provide tempered and heat soaked glass by the basis-of-design fabricator, or by one of the following:
 - a. J.E. Berkowitz L.P., Westville, NJ 08093, (856) 456-7800.
 - b. Oldcastle Glass, 8230 Preston Court, #M, Jessup, MD 20794, (301) 490-5822.
- C. Aluminum: AA Alloy 6063 and ASTM B 221 (ASTM B 221M), ["Anodizing Quality,"]with tempering as required to suit performance requirements and finishes specified.
 - 1. Stainless-Steel Cladding: ASTM A 666, Type 304.

- a. Surface Texture and Color: Use only materials which are smooth and free of surface blemishes, including, but not limited to, pitting, seam marks, roller marks, rolled trade names and roughness. Do not use materials which have stains and discolorations which do not match the Architect's sample in color and grain characteristics.
- b. Surface Flatness and Edges: Provide materials which have been cold-rolled, cold-finished, cold-drawn, stretcher leveled, machine cut and otherwise produced to the highest commercial standard for flatness with edges and corners sharp and true to angle, as required.
- c. Tempers: Fabricate from standard commercial tempers and hardnesses, as required for forming, fabrication, strength and durability and which will finish to match the Architect's sample.

2.3 COMPONENTS

- A. Glass Entrances[and Sidelights]: Provide and extruded aluminum retained, glass and metal frame and door system fabricated and finished to suit the conditions indicated and specified. System shall be complete with all aluminum framing members, fasteners, anchors, gaskets, washers, glass and glazing, and hardware components. All aluminum members shall be clad with metal cladding specified under paragraph 2.2 and finished as specified under Article 2.6. Glass door and sidelight framing system shall be similar to the following:
 1. Manufacturers and Systems: One of the following:
 - a. Glassier Door Series 1301; Blumcraft of Pittsburgh Div. of CR Laurence.
 - b. Total Vision Concept (TVC) Entrances; Oldcastle Glass, Rosemont, IL.
 - c. Dorma-Glas Entrance Systems; Dorma-Glas, Inc., Upper Marlboro, MD.
 - d. Jeb Edge All-Glass Entrances; J. E. Berkowitz; Pedricktown, NJ.
 2. [Patch Fittings,]Top and Bottom Rails: Fabricate of one-piece [cast aluminum top patch fittings and one piece]extruded aluminum rails, retaining 1/2" clear tempered glass materials unless otherwise shown. Provide recessed aluminum headers for door head opening support. Adhesively laminate or mechanically clad [patch fittings and]rail base metal members, returning cladding around extrusions to eliminate exposed edges. Fabricate [patch fittings and]rails with continuous bosses, or serrated edges, to receive dry gaskets to secure the glass in the [patch fittings]and rails in lieu of wet glazing materials. Provide end caps to close off [patch fitting and]rail ends fabricated from stainless steel.
 3. Sidelight Channels: Recessed aluminum head channels for concealed sidelight head and sill support. Channels shall be fabricated with continuous bosses, or serrated edges, to receive dry gaskets to secure the glass in the channel in lieu of wet glazing materials.
 4. Sidelight Rails: Exposed metal clad aluminum rails for exposed side light support. Rails shall be fabricated with continuous bosses, or serrated edges, to receive dry gaskets to secure the glass in the rails in lieu of wet glazing materials. Provide recessed aluminum headers, matching, door opening headers, for sidelight head opening support. Provide end caps to close off channel ends fabricated from stainless steel.
 5. Accessory Fittings: Match [patch fitting] [and] [rail] metal and finish for the following:

- a. Overhead doorstop.
 - b. Center-housing lock.
 - c. Glass-support-fin brackets.
- B. Anchors and Fastenings:
1. Material: Steel.
 2. Anchor and Fastener Metal Alloy Types, Designations and Standards: Alloys as recommended by fabricator for the application(s) indicated.
- C. Spacers, Setting Blocks, Gaskets: Permanent, nonmigrating types of material and in hardness recommended by all-glass storefront and entrance manufacturer and complying with the performance requirements.
- D. Slip and Separator Gaskets:
1. Bolted slip-joints: Non-metallic, low friction material bearing temperature and moisture resistances and low abrasion properties as required to suit performance criteria.
 2. Non-bolted slip-joints: Non-corrosive, non-toxic impregnated felt, or butyl, tape with a pressure sensitive adhesive on one surface which is formulated for proper adhesion to metals shown; gasket shall bear temperature and moisture resistance properties as required to suit performance criteria; thickness and width as required.
- E. Adhesives and Epoxies: As required for laminating cladding to base components.
- F. Vinyl Wiper Blade Strips: A translucent and continuous V-shaped vinyl strip with one 5/16 inch wide rigid leg having a one side pre-applied clear high bond strength tape and a second 5/16 inch wide soft leg. Overall thickness of gap not to exceed 5/16 inch .
1. C.R. Laurence: SDTNLT2 Translucent Vinyl Edge L Seals.

2.4 **HARDWARE**

- A. General: Heavy-duty hardware units in sizes, quantities, and types recommended by manufacturer for all-glass entrances indicated. For exposed parts, match cladding metal finish.
- B. Concealed Overhead Closers and Pivots: Provide one concealed overhead closer and pivot set per door leaf. Closers and pivots shall comply with BHMA A156.4, Grade 1. Properly detail closers to meet application and installation requirements as indicated. Comply with manufacturers recommendations for size of door closer depending on size and weight of door, stack pressure conditions, and anticipated frequency of use. Provide manufacturers standard cover plate finished to match cladding. Provide each pivot set with extended spindles.
1. Maximum Opening Force: 5 lbf .

- C. Concealed Floor Closers and Pivots: Provide one concealed floor closer and one pivot set per door leaf. Closers and pivots shall comply with BHMA A156.4, Grade 1. Properly detail closers to meet application and installation requirements as indicated. Comply with manufacturers recommendations for size of door closer depending on size and weight of door, stack pressure conditions, and anticipated frequency of use. Provide manufacturers standard cover (dress) plate finished to match cladding. Provide each pivot set with extended spindles.
1. Hold Open: [Automatic, at angle selected] [Selective].
 2. Delayed-Action Closing: Comply with requirements of authorities having jurisdiction and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)," where requirements conflict the more stringent shall apply.
 3. Maximum Opening Force: 5 lbf .
- D. Push-Pull Set: <As specified>.
- E. Overhead Angle Stops: Provide one overhead angle stop per door opening. Special angle stop, fabricated from brass or bronze, for single or pairs of doors without stops and having a minimum of 2 rubber silencers per stop, minimum 2 inches wide x 3 inches long base for mortising into the head of door frame, 1 inch maximum stop face projection.
- F. Floor Bumper: Provide one floor bumper per door leaf. Cast half dome design with rubber bumper. Provide manufacturer's standard riser heights as required for carpeted areas in conjunction with the floor bumpers scheduled. One of the following:
1. 3320X; Door Controls International (DCI).
 2. FS438; Ives (IVS).
 3. 1212; Trimco (TBM).
 4. 443; Rockwood Manufacturing Company (RM).

2.5 FABRICATION

- A. General: Fabricate the all-glass entrances and storefronts to the designs, shapes, and sizes shown using the materials, and components, specified and shown to produce assemblies which meet or exceed the performance requirements. To the greatest extent possible complete fabrication, assembly, finishing, hardware applications and other work before shipment to Project site.
- B. Provide holes and cutouts in glass to receive hardware, fittings, rails, and accessories before tempering glass. Drill, countersink, and chamfer holes using tooling, materials and methods which are selected and applied to prevent spalling of the cut glass surfaces at holes and cutouts. The internal surface of holes and cutouts shall be smooth with minimal roughness from drilling operations. Do not cut, drill, or make other alterations to glass after tempering.
1. Fully temper glass using horizontal (roller-hearth) process and fabricate so, when installed, roll-wave distortion is parallel with bottom edge of door or lite.
 2. Factory assemble components and factory install hardware to greatest extent possible.

- C. Fabricate all entrances to accommodate the swing direction shown.
- D. Metal components of all-glass entrances and storefronts shall be cut, reinforced, drilled and tapped in strict accordance with the printed door hardware manufacturers templates and instructions. Provide solid carbon steel hardware reinforcements, securely fastened to doors and frames where door hardware is to be attached.
 - 1. Security system components may be incorporated into the door and frame openings of each all-glass entrance. Provide all cutouts required by the Owner's security system vendor and all prewiring for vendor provided security system devices. Wherever all-glass storefront and entrance framing components are to receive wiring provide unobstructed clear paths free of burrs and sharp objects with pull strings to facilitate wiring.
- E. Joints in Metal Work: All exposed metal work shall be carefully fitted and matched to produce continuity of line and design, with all joints, being accurately fitted for hairline contact and rigidly secured. Where additional rigidity or strength is required to satisfy the performance requirements reinforce entrance components with aluminum or carbon steel shapes, bars, and plates.
- F. Shop Assembly: As far as practicable, all fitting and assembly work shall be done in a fabrication shop.
- G. Exposed Fasteners: Not permitted.

2.6 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish Application:
 - 1. Apply anodized coatings to all exposed surfaces of storefront and entrance components.
- C. Appearance of Finished Work: During production, maintain large size color range samples for use in comparing against production material. Variations in appearance of abutting or adjacent pieces are acceptable if they are within the range of approved samples. Noticeable variations in the same piece are not acceptable.
- D. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- E. Class II, Clear Anodic Finish: Complying with AA-M10C22A31 for an Architectural Class II finish and the following:

1. Metal Preparation and Pretreatment: Remove die markings prior to finishing operations. Perform this work in addition to the finish specified. Scratches, abrasions, dents and similar defects are unacceptable.
 2. Thickness: Minimum 0.4 mil , weighing not less than 15.5 mg per square inch , minimum apparent density of 38 g per cubic inch .
 3. Performance Criteria: Meets or exceeding AAMA 611.
 4. Color: Medium matte finished, clear natural anodized.
 5. Post Anodizing Finish (Sealing): Anodized finishes shall be fully sealed by the manufacturer or processor according to procedures recommended by the licensor of the process. Maximum weight loss shall be 2.6 mg/ square inch .
- F. Class I, Clear Anodic Finish: Complying with AA-M10C22A41 for an Architectural Class I finish and the following:
1. Metal Preparation and Pretreatment: Remove die markings prior to finishing operations. Perform this work in addition to the finish specified. Scratches, abrasions, dents and similar defects are unacceptable.
 2. Thickness: Minimum 0.7 mil , weighing not less than 27.0 mg per square inch , minimum apparent density of 38 g per cubic inch .
 3. Performance Criteria: Meets or exceeding AAMA 611.
 4. Color: Medium matte finished, clear natural anodized.
 5. Post Anodizing Finish (Sealing): Anodized finishes shall be fully sealed by the manufacturer or processor according to procedures recommended by the licensor of the process. Maximum weight loss shall be 2.6 mg/ square inch .
- G. Class II, Color Anodic Finish: Complying with AA-M12C22A32/A34 for an Architectural Class II finish and the following:
1. Metal Preparation and Pretreatment: Remove die markings prior to finishing operations. Perform this work in addition to the finish specified. Scratches, abrasions, dents and similar defects are unacceptable.
 2. Thickness: Minimum 0.4 mil , weighing not less than 15.5 mg per square inch , minimum apparent density of 38 g per cubic inch .
 3. Performance Criteria: Meets or exceeding AAMA 611.
 4. Color: Medium matte finished, integrally colored or electrolytically deposited color anodized.
 5. Post Anodizing Finish (Sealing): Anodized finishes shall be fully sealed by the manufacturer or processor according to procedures recommended by the licensor of the process. Maximum weight loss shall be 2.6 mg/ square inch .

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate all-glass entrance and storefront work with the work of other Sections and provide items to be placed during the installation of other work at the proper time to avoid delays in the work.
- B. Place such items, including concealed overhead framing, accurately in relation to the final location of the all-glass entrance and storefront components.

3.2 EXAMINATION

- A. Examine the substrates, adjoining construction, and conditions under which the Work is to be installed. Do not proceed with the Work until unsatisfactory conditions have been corrected.
 - 1. Before beginning installation of the all-glass entrance and storefront work examine all parts of the existing building structural frame and the existing building cladding indicated to support the all-glass entrance and storefront work. **[Ensure that the existing swing door thresholds, existing swing doors, swing door framing and subframes have been completely removed with all projecting anchors cut off flush.]** Notify Contractor in writing, of any dimensions, or conditions, found which will prevent the proper execution of the all-glass entrance and storefront work, including specified tolerances. Use Contractor's offset lines and bench marks as basis of measurements.

3.3 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing all-glass entrance and storefront systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints.
 - 1. Cut and trim component parts of the all-glass entrance and storefront work during erection only with the approval of the manufacturer or fabricator, and in accordance with his recommendations. Restore finish completely to protect material and remove all evidence of cutting and trimming. Remove and replace members where cutting and trimming has impaired strength or appearance, as directed by Architect.
 - 2. Set components within the erection tolerances with uniform joints where shown. Place components on aluminum or stainless steel shims and fasten to supporting substrates using bolts and similar fasteners.
 - 3. Do not erect components which are warped, deformed, bowed, defaced or otherwise damaged as to impair strength. Remove and replace members damaged in the process of erection.

4. No holes or slots shall be burned, cut into, or field drilled in any building framing member without the written acceptance of the structural engineer.
- B. Entrance Doors [**and Sidelights**]: Doors [**and Sidelights**] shall be securely anchored in place to a straight, plumb and level condition, without distortion. Adjust doors to operate smoothly, without binding, with hardware functioning properly. Hardware movement, shall be field tested and final adjustment, and lubrication, made for proper operation and performance of doors.
 1. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.
 2. Set, seal, and grout floor closer cases as required to suit hardware and substrate indicated.
- C. Maintain uniform clearances between adjacent components.
- D. Install silicone glazing sealant to comply with requirements of Section 08 80 00 "Glazing," unless otherwise indicated.
- E. Install copolymer strips, in one continuous length, at each glass to glass panel vertical joint.
- F. Install vinyl wiper blade strips, in one continuous length, at each glass to glass panel vertical joint.

3.4 ERECTION TOLERANCES

- A. The all-glass entrance and storefront systems shall be fabricated and erected to accommodate the dimensional tolerances of the structural frame and surrounding cladding, while providing the following as installed tolerances.
 1. Variation from theoretical calculated position as located in plan or elevation in relation to established floors lines, column lines and other fixed elements of the structure, including variations from plumb, level, straight and member size: +/- 1/4 inch max. in any 20 foot run, column-to-column bay, or floor-to-floor height.
 2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch . Where surfaces meet at corners, limit offset from true alignment to 1/16 inch .
 3. Variation from angle, or plumb, shown: +/- 1/8 inch max. in 10 foot run or story height, non-cumulative.
 4. Variation from slope, or level, shown: +/- 1/8 inch max. in any 20 foot run or column-to-column bay, non-cumulative.

3.5 ANCHORAGE

- A. Anchorage of the all-glass entrance and storefront work to the structure shall be in accordance with the accepted shop drawings.

3.6 WELDING

- A. Weld with electrodes and by methods recommended by manufacturer of material being welded, and in accordance with AWS D1.1 for concealed steel members. Use only methods which will avoid distortion, and discoloration, of exposed faces.

3.7 REMOVAL OF DEBRIS

- A. All debris caused by, or incidental to, the erection of the all-glass entrance and storefront work shall be removed from the site and disposed of legally.

3.8 CLEANING

- A. Clean metal surfaces promptly after installation, exercising care to avoid damage to factory finished exposed surfaces.
- B. Wash glass on both faces not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer. Remove excess glazing and sealant compounds, dirt, and other substances.
- C. Immediately remove any deleterious material from exposed metal surfaces.

3.9 PROTECTION

- A. Institute protective measures required throughout the remainder of the construction period to ensure that all-glass entrance and storefront work will be without damage or deterioration, at time of acceptance.

END OF SECTION 08 41 26

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SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes door hardware.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data including installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples: Submit samples of exposed door hardware for each type indicated below, in specified finish. Tag with full description for coordination with the Door Hardware Schedule.
 - 1. Door Hardware: As follows:
 - a. Locks and latches.
 - b. Operating trim.
 - c. Coat hooks.
 - 2. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- C. Door Hardware Schedule: Submit door hardware schedule prepared by or under the supervision of door hardware supplier. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware. The Architect's review of schedule shall neither be construed as a complete check nor shall it relieve the Contractor of responsibility for errors, deviations, or omissions from the specified requirements to provide complete door hardware for the project.
 - 1. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
 - a. Organize door hardware sets in same order as in the Door Hardware Schedule..
 - 2. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.

- d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware. Supply templates to door and frame manufacturer(s) to enable proper and accurate sizing and locations of cutouts for hardware. Detail conditions requiring custom extended lip strikes, or other special or custom conditions.
 - g. Door and frame sizes and materials.
 - h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
 - 1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
- D. Keying Schedule: Submit keying schedule prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
- E. Warranties: Submit special warranties specified in this Section.
- F. Fire-Rated Door Assembly Testing: Submit a written record of each fire door assembly to the Owner to be made available to the Authority Having Jurisdiction (AHJ) for future building inspections.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit maintenance data for each type of door hardware. Include final hardware and keying schedule.
- B. Warranties: Submit special warranties specified in this Section.
- C. Fire-Rated Door Assembly Testing: Submit a written record of each fire door assembly to the Owner to be made available to the Authority Having Jurisdiction (AHJ) for future building inspections.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

- B. Supplier Qualifications: Door hardware supplier, who has completed a minimum of three (3) projects over the last five (5) years which were similar in material, design and extent to that indicated for the project and which have resulted in construction with a record of successful in service performance, and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
 - 1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- C. Source Limitations: Obtain each type of door hardware from a single manufacturer, unless otherwise indicated.
- D. Regulatory Requirements: Comply with the following:
 - 1. Provide hardware items complying with the applicable provisions for accessibility and usability by the disabled and handicapped in compliance with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1,.
 - 2. NFPA 101: Comply with applicable provisions for means of egress doors.
 - 3. Electrified Door Hardware: Listed and classified by Underwriter's Laboratories, Inc. or by a testing agency acceptable to authorities having jurisdiction, as suitable for the purpose indicated.
- E. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by Underwriter's Laboratories, Inc. for fire ratings indicated, based on testing according to NFPA 252. Provide only door hardware items that are identical to items tested by UL for the types and sizes of doors required. In case of conflict between type of hardware specified and type required for accessibility or fire protection, furnish type required by NFPA and UL. Doors indicated in fire rated partitions and walls shall be positive latching and self-closing, with smoke gaskets where required by applicable codes.
 - 1. Wherever exit device hardware is required on doors, comply with UL 305. Furnish hardware to door manufacturer for installation at factory. Provide supplementary label, "Fire Exit Hardware," on each exit device to certify that panic hardware has been panic load tested with door.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

1.6 COORDINATION

- A. Coordinate layout and installation of recessed pivots and closers with floor construction.

- B. Templates: Furnish templates and door hardware schedules, coordinated for the application of door hardware items with door and frame details, to door opening fabricators and trades performing door opening work to permit the preparation of doors and frames to receive the specified door hardware. Where the door hardware item scheduled is not adaptable to the finished size of door opening members requiring door hardware, submit an item having a similar operation and quality to the Architect for review. Each door hardware item shall be fabricated to templates.
- C. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to, power supplies, fire alarm system and detection devices, access control system, security system, building control system.
- D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.7 WARRANTY

- A. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Faulty operation of door hardware.
 - 2. Deterioration of metals, metal finishes, and other materials beyond normal use.
- B. Warranty Period for Electromagnetic Locks: Five years from date of Substantial Completion.
- C. Warranty Period for Manual Closers: Ten years from date of Substantial Completion.
- D. Warranty Period for Concealed Floor Closers: Five years from date of Substantial Completion.
- E. Warranty Period for Exit Devices: Five years from date of Substantial Completion.
- F. Warranty Period for Other Hardware: Two years from date of Substantial Completion.
- G. Warranty for Mortised Mechanical Lock and Latchsets: Ten years from date of Substantial Completion.
- H. Warranty for Heavy Duty Cylindrical Mechanical Lock and Latchsets: Seven years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section, , and the Door Hardware Schedule.
1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturer's products.
 2. The hardware supplier shall review each hardware set and compare it with the door types, details, and sizes as shown and verify each hardware item for function, hand, backset, and method of fastening through shop drawing submittals.

2.2 HINGES AND PIVOTS

- A. Butt Hinge Products and Manufacturers:
1. Standard Weight, Ball Bearing, 5 Knuckle, Steel: Complying with BHMA A156.1 A8112, one of the following:
 - a. BB5000; Bommer Industries, Inc., Landrum, SC (BI).
 - b. BB1279; Hager Companies (HAG).
 - c. TA2714; McKinney Products Company (MCK).
 - d. FBB179; Stanley Commercial Hardware (STH).
 2. Heavy Weight, Ball Bearing, 5 Knuckle, Steel: Complying with BHMA A156.1 A8111, one of the following:
 - a. BB5004; Bommer Industries, Inc., Landrum, SC (BI).
 - b. BB1168; Hager Companies (HAG).
 - c. T4A3786; McKinney Products Company (MCK).
 - d. FBB168; Stanley Commercial Hardware (STH).
 3. Heavy Weight, Ball Bearing, 5 Knuckle, Stainless Steel: Complying with BHMA A156.1 A5111, one of the following:
 - a. BB5006; Bommer Industries, Inc., Landrum, SC (BI).
 - b. BB1199; Hager Companies (HAG).
 - c. T4A3386-32D; McKinney Products Company (MCK).
 - d. FBB199(US32D); Stanley Commercial Hardware (STH).
- B. Butt Hinge and Offset Pivot Hinge Quantity: Provide the following, unless otherwise indicated:
1. Two Hinges: For doors with heights up to and including 60 inches.

2. Three Hinges: For doors with heights of greater than 60 inches to and including 90 inches
 3. Four Hinges: For doors with heights greater than 90 inches to and including 120 inches
 4. Provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
- C. Butt Hinge Sizes: 4-1/2 inches h. x 4 inches or 4-1/2 inches w. for doors up to and including 36 inches in width; 5 inches h. x 4 inches or 4-1/2 inches w. for doors greater than 36 inches in width.
- D. Hinge Characteristics: Full mortise type with square corners. All butt hinges are to have non-rising pins. Provide only steel bodied butt and pivot hinges at labeled doors. All butt hinges shall be furnished with button tips. Provide heavy weight, ball bearing, hinges at doors 40 inches and greater in width.
- E. Fasteners: Package all hinges and pivots with machine and wood screws as required by door and frame construction.

2.3 LOCKS AND LATCHES

- A. Bored Lock and Latch Sets: Extra heavy duty, commercial, cylindrical bodies complying with BHMA A156.2 Series 4000, Grade 1. Furnish cylindrical type, field reversible, lock and latch sets with deadlocking brass or stainless steel latch bolts having a minimum 1/2 inch throw together with guard (auxiliary) latch added to bolt, 2-3/4 inches backset, and UL listed for 3 hour single doors. Furnish latch bolts having a minimum 3/4 inch throw together with guard (auxiliary) latch added to bolt, and UL listed for labeled pairs of fire doors. All lock and latch sets, to be furnished complete with heavy gage steel zinc dichromate coated cylindrical bodies, trim, 2-1/4 inches by 1-1/8 inches beveled square cornered fronts, and 6 pin tumbler key in lever core. Provide wrought steel, aluminum, or black plastic, box strikes for each lock and latch set with curved lips of sufficient length to protect frames. Provide plated cast zinc levers with plated wrought brass or bronze roses. Where electro-mechanical locksets are scheduled provide transformers properly sized for conversion of power supply to the power characteristics of the electromechanical locksets. Where electro-mechanical locksets are scheduled provide request to exit (REX) monitoring feature.
1. Sargent 10 Line, LL Design; Sargent Manufacturing Company (SGT). Where electro-mechanical locksets are scheduled provide 10G70 Series with trim matching mechanical locksets.
 2. Corbin-Russwin CL3300 Series, Newport NZD Design; Corbin Russwin Architectural Hardware (CR). Where electro-mechanical locksets are scheduled provide CL33900 Series with trim matching mechanical locksets.
 3. Schlage ND-Series, Rhodes RHO; Schlage Lock Company (SCH). Where electro-mechanical locksets are scheduled provide ND Series Electrified Locks with trim matching mechanical locksets.

- B. Mortise Lock and Latch Sets: Heavy duty, commercial, mortise bodies complying with BHMA A156.13 Series 1000, Grade 1, with throughbolted lever trim. Furnish mortise type, field reversible without disassembly, field multifunctional without opening lock cases, lock and latch sets with 1 or 2 piece anti-friction deadlocking stainless steel latchbolts having a minimum 3/4 inch throw, 2-3/4 inches backset, and UL listed for 3 hour doors. All lock and latch sets, to be furnished complete with heavy 0.109 inch (12 gage) wrought steel zinc dichromate or chrome plated case, trim, adjustable beveled square cornered armored fronts, cold forged steel or stainless steel hubs, and 6 pin cylinders. Conceal fastenings, washers and bushings. Provide wrought, or black plastic, box strikes for each lock and latch set. Provide brass, bronze or stainless steel strikes with curved lips of sufficient length to protect frames. Provide solid forged or cast levers with wrought roses. Where electro-mechanical locksets are scheduled provide transformers properly sized for conversion of power supply to the power characteristics of the electromechanical locksets. Where electro-mechanical locksets are scheduled provide request to exit (REX) monitoring feature.
1. Sargent 8200 Series, LNJ Design x 130 KB Turnlever; Sargent Manufacturing Company (SGT). Provide handed ANSI 4-7/8 inch curved lip strikes die punched to match bolts provided with latchset functions only, provide non-handed standard curve lip strikes 82-0110 for all other functions. Where electro-mechanical locksets are scheduled provide 8270 Series with trim matching mechanical locksets.
 2. Corbin-Russwin ML2000 Series, Lustra LSA Design x 519F10 Thumbturn Lever; Corbin Russwin Architectural Hardware (CR). Provide handed ANSI 4-7/8 inch curved lip strikes die punched to match bolts provided with latchset functions only 340L62 (RH) and 340L63 (LH), provide handed standard curve lip strikes for all other functions 340L60 (RH) and 340L61 (LH). Where electro-mechanical locksets are scheduled provide ML20900 ECL Series with trim matching mechanical locksets.
 3. Schlage L9000 Series, 03 Design x A Rose x 09-905 Turnlever; Schlage Lock Company (SCH). Provide handed ANSI 4-7/8 inch curved lip strikes die punched to match bolts provided with latchset functions only (Part No. XL11-820/XL11-821), provide non-handed standard curve lip strikes for all other functions 10-072. Where electro-mechanical locksets are scheduled provide L9000EL Series with trim matching mechanical locksets.
 4. Best 45H Series, with 3 Lever Design x H Rose x Thumbturn; Stanley Security Solutions. Provide handed ANSI 4-7/8" curved lip strikes die punched to match bolts provided with latchset functions only S5, provide handed standard curve lip strikes for all other functions S6. Where electro-mechanical locksets are scheduled provide 45HW Series with trim matching mechanical locksets.

2.4 DOOR BOLTS

- A. Manual Surface Bolts: Provide 12 inch surface mounted slide bolts UL Listed for A labeled metal fire doors and complying with BHMA A156.16, Type 84161. Furnish manufacturers standard guide brackets and strikes for conditions indicated.
1. 1012F; Door Controls International (DCI).
 2. SB453-12; Ives (IVS).
 3. 580-12; Rockwood Manufacturing Company (RM).

- B. Manual Flush Bolts: Provide flush bolts, with 1 inch wide fronts, in paired sets (top and bottom), with 1/2 inch diameter flattened bolt tip for both wood and metal doors and standard 12 inch rod at flushbolts for metal doors. Flush bolts shall fit ANSI A115.4 door and frame preparation. Bolts to comply with BHMA A156.16, Type L14081, L14251, L04261 or L24081. Furnish rods of proper length to afford easy reach from the floor. Furnish manufacturers standard top strikes for top bolts.
1. Manual Flushbolts for Wood Doors: One of the following:
 - a. No. 790F; Door Controls International (DCI).
 - b. FB358; Ives (IVS).
 - c. 3913; Trimco Hardware (TBM).
 - d. 557; Rockwood Manufacturing Company (RM).
 2. Manual Flushbolts for Metal Doors: One of the following:
 - a. No. 780F; Door Controls International (DCI).
 - b. FB458; Ives (IVS).
 - c. 3917; Trimco Hardware (TBM).
 - d. 555; Rockwood Manufacturing Company (RM).

2.5 CYLINDERS AND KEYING

- A. Cores for Bored Cylindrical Locksets: Provide key-in lever 6 pin cores for all bored cylindrical locksets, keyed into base building system, as manufactured by the bored lockset manufacturer.
- B. Cylinders: Full faced cylinders with square shouldered (not tapered) compression rings, 6 pin cylinders, standard threaded, keyed into building system, with cams to suit lock functions. Provide cylinders for installation into all locks.
1. 1100 Series Flexible Head Mortise Cylinder; Corbin Russwin Architectural Hardware (CR).
 2. Series 40 Adjustable Front Cylinder; Sargent Manufacturing Company (SGT).
 3. 30-001 full-faced mortised cylinder with 36-083 compression rings; Schlage Lock Company (SCH).
 4. 1E Series with Straight Rings ; Stanley Security Solutions.
- C. Keying System: Final keying to determine lock cylinders, keyed alike sets, level of keying, master key groups, grandmaster keying system shall be as directed by the Owner. Supplier and Contractor shall meet with the Owner and obtain final instructions in writing. Provide 2 nickel silver keys for each lock, and 6 keys for each grandmaster and masterkey system. Provide 2 blank keys for each lock for the Owner's convenience in making additional keys.
1. Temporary Cylinders: Provide temporary cylinders in locks during construction and as may be necessary for security or as may be requested by the Owner. All temporary cylinders shall be individually keyed as required and subject to a single master key.

- D. Key Control System: Furnish a key control system with complete accessories including key gathering envelopes, labels, reserve pattern key tags with self-locking key clips, key receipt forms, key receipt holders, 3 way visible card index, temporary key markers and permanent key markers.

2.6 STRIKES

- A. Strikes for Locks and Latches: All strikes for locks and latches shall be provided by the lock and latch manufacturer unless otherwise specified or scheduled, refer to Article 'Locks and Latches'.
- B. Dustproof Floor Strikes: Complying with BHMA A156.16, Type L04251, L04021 or L14021, one of the following:
1. No. 80; Door Controls International.
 2. DP2; Ives.
 3. 3910; Trimco Hardware (TBM).
 4. 570; Rockwood Manufacturing Company (RM).

2.7 OPERATING TRIM (PUSHES AND PULLS)

- A. Type 1: Fabricate push pulls for back to back mounting from 1-1/2 inch diameter stainless steel bar stock in finish as scheduled. Custom fabricate push pulls to length indicated with minimum 2-11/16 inch projection, minimum 1-1/2 inch clearance with bases centered and anchored to top and bottom rails. Furnish spacers threaded to accept concealed throughbolt attachment including provision for spanner tightening of bolts of assembly. Do not provide baseplates at stile to pull interface.
1. T51-01-023; Elmes.
- B. Type 2: Fabricate push pulls for back to back mounting from 1-inch diameter stainless steel bar stock in finish as scheduled. Custom fabricate pulls with minimum 3-1/4 inch projection, 2-1/4inch clearance, minimum 4-inch offset, 10-inch center to center of bases with center line of pull centered on door stiles. Furnish spanner turning washer and stud assemblies threaded to accept concealed throughbolt attachment including provision for spanner tightening of bolts of push/pull assembly. Do not provide baseplates at stile to pull interface. Provide one of the following:
1. 1191-3; Trimco Hardware (TBM).
 2. BF157; Rockwood Manufacturing Company (RM).

- C. Type 3: Fabricate push pulls for back to back mounting from 1-inch diameter stainless steel bar or tube stock in finish as scheduled. Custom fabricate push pulls to length indicated with minimum 3-inch projection, minimum 2-inch clearance with bases centered on door stiles and anchored to top and bottom rails. Furnish spacers threaded to accept concealed throughbolt attachment including provision for spanner tightening of bolts of assembly. Do not provide baseplates at stile to pull interface.
1. RM3300 with straight intermediate post; Rockwood Manufacturing Company (RM).
- D. Type 4: Full mortised, cast bronze or brass flush door pull, with black painted interior, complying with BHMA A156.6, Type J403 except with concealed fastening, and having minimum overall dimensions of 2-1/2 inch by 4 inches
1. 1060; Trimco Hardware (TBM).
 2. 61064 Flush Pull; Tydix (TY).
 3. Flush Pull 95B; Rockwood Manufacturing Company (RM).
 4. 17N; Hager Companies (HAG).
- E. Type 5: Full mortised, solid, bronze or brass door edge pull, with 1/2 inch finger clearance, having nominal overall dimensions of 4 inches long by 2.56 inches overall, with minimum 11/16 inch backbend drilled and countersunk to receive a minimum of 2 screw fasteners; form for full mortise application with lockedge face shaped for square or bevel cut edge as indicated; finish as scheduled.
1. SRO Style Edge Pull; Tydix (TY).
 2. DP3/DR; Doug Mockett and Co., Inc.
- F. Type 7: Full mortised, cast brass edge pull, complying with BHMA A156.14, Type D2801, minimum overall dimensions of 3/4 inch $\frac{3}{4}$ " x 3-7/8".
1. 230; Ives (IVS).
 2. 880 Cast Lever Edge Pull; Rockwood Manufacturing Company (RM).
 3. 9882; Hager Companies (HAG).
 4. 1063; Trimco Hardware (TBM).

2.8 ACCESSORIES FOR PAIRS OF DOORS

- A. Tubular Coordinators and Filler Bars: UL listed for use on labeled doors and complying with BHMA A156.3, Type 21A. Provide with filler piece of length as required to close the header area and mounting brackets at stop mounted hardware. Furnish extenders at active leaf levers where required to clear overlapping astragals on doors installed with pocket pivot hinges or jambs with deep jamb stops.
1. No. 600 Series x Filler Bar; Door Controls International (DCI).
 2. COR Series Coordinators x FL filler; Ives (IVS).
 3. 1600 Series x FB Series Filler Bar; Rockwood Manufacturing Company (RM).

- B. Coordinator Brackets: UL listed for use on labeled doors and complying with BHMA A156.3, Type 21B. Minimum 7-inch projection.
1. No. 500 Coordinator; Door Controls International (DCI).
 2. CORG7; Ives (IVS).
 3. 576; Rockwood Manufacturing Company (RM).
- C. Carry Open Bars: UL listed for use on labeled doors and complying with BHMA A156.3, Type 21. Provide carry-open bars for inactive leaves of pairs of doors, unless automatic or self-latching bolts are used.
1. No. CB Carry Bar; Door Controls International (DCI).
 2. CB1 Carry Bar; Ives (IVS).
 3. 1100; Rockwood Manufacturing Company (RM).
- D. Astragals: UL listed for use on labeled doors, surface applied continuous extruded aluminum minimum 7/8" wide retaining EPDM gaskets for installation on both sides of all meeting stiles of doors:
1. 125NA; National Guard Products, Inc. (NGP).
 2. 305CN; Pemko Manufacturing Co., Inc. (PEM).
- E. Lock Protectors: Fabricated from heavy gauge metal and in finish as scheduled. Fabricate lock protectors with no exposed fasteners on face of lock protector. Furnish protectors sized to cover the latch bolt area of the door and lock and narrow enough to clear rose and escutcheon lock trims, offset formed to clear strike projection. Machine lock protectors where required to accommodate rose and escutcheon trims, and cylinders.
1. LG Series Lock Guards; Ives (IVS).
 2. Latch Guard 320; Rockwood Manufacturing Company (RM).

2.9 CLOSERS

- A. Surface-Mounted Closers with Track Arms: Closers shall be certified by ETL laboratories and the manufacturer to a minimum of 8,000,000 cycles and meet BHMA A156.4, Grade 1. Closers used in conjunction with overhead stops and holders shall be templated and coordinated to function properly. Properly detail closers to meet application requirements by providing drop plates, brackets, etc. to meet application and installation requirements as indicated. Comply with manufacturer's recommendations for size of door closer depending on size of door, stack pressure conditions, exposure to weather, and anticipated frequency of use. Closers shall have adjustable spring power, full rack and pinion, independent closing speed and latch regulating V-slotted valves, fully hydraulic with a high strength cast iron cylinder and solid forged steel arms, bore diameter of 1-1/2 inches (38.1 mm), pinion shaft diameter of 5/8 inches (15.87 mm), adjustable back check, cushion and built-in stop feature where scheduled, hold open arms where scheduled, delayed action where scheduled, arm finish to match closer cover finish scheduled. Provide metal covers of clean line design with plated or primed for paint finish as scheduled and that require removal in order to make adjustments to closer.

1. 4011T; LCN Closers (LCN).
 2. 281 with Track Arm; Sargent Manufacturing Company (SGT).
- B. Surface-Mounted Closers Without Track Arms : Closers shall be certified by ETL laboratories and the manufacturer to a minimum of 8,000,000 cycles and meet BHMA A156.4, Grade 1. Closers used in conjunction with overhead stops and holders shall be templated and coordinated to function properly. Properly detail closers to meet application requirements by providing drop plates, brackets, etc. to meet application and installation requirements as indicated. Comply with manufacturer's recommendations for size of door closer depending on size of door, stack pressure conditions, and anticipated frequency of use. Closers shall have adjustable spring power, full rack and pinion, independent closing speed and latch regulating V-slotted valves, fully hydraulic with a high strength cast iron cylinder and solid forged steel arms, bore diameter of 1-1/2 inches, pinion shaft diameter of 5/8 inches, adjustable back check, cushion and built-in stop feature where scheduled, hold open arms where scheduled, delayed action where scheduled, arm finish to match closer cover finish scheduled. Provide metal covers of clean line design with plated or primed for paint finish as scheduled and that require removal in order to make adjustments to closer.
1. 4110/4010; LCN Closers (LCN).
 2. 281; Sargent Manufacturing Company (SGT).
- C. Overhead Concealed Closers, Butt and Offset Hung: Closers shall meet BHMA A156.4, Grade 1. Properly detail closers to meet application and installation requirements as indicated. Comply with manufacturer's recommendations for size of door closer depending on size of door, stack pressure conditions, and anticipated frequency of use. Provide manufacturers standard cover plate finished to match exposed portions of butts or pivots provided.
1. 2010/2030; LCN Closers (LCN).
 2. RTS 88-BI Series, Offset Slide Arm, barrier free function; Dorma.
- D. Overhead Concealed Closers, Center Hung: Closers shall meet BHMA A156.4, Grade 1. Properly detail closers to meet application and installation requirements as indicated. Comply with manufacturer's recommendations for size of door closer depending on size of door, stack pressure conditions, and anticipated frequency of use. Provide manufacturers standard cover plate finished to match exposed portions of pivots provided. Provide with manufacturers standard top arm and pivot to suit conditions indicated.
1. 6030; LCN Closers (LCN).
 2. RTS 88-BI Series, End Loaded Arm, barrier free function; Dorma.
- E. Electromagnetic Overhead Surface Closers: Closers shall meet BHMA A156.15 and NFPA 101. Properly detail closers to meet application requirements by providing drop plates, brackets, etc. to meet application and installation requirements as indicated. Comply with manufacturer's recommendations for size of door closer depending on size of door, stack pressure conditions, and anticipated frequency of use. Arm and track finish to match closer cover finish scheduled. Provide metal covers of clean line design with plated or primed for paint finish as scheduled and that require removal in order to make adjustments to closer. Furnish closers for 24 V AC/DC voltage.

1. Sentronic 4040SE; LCN Closers (LCN).
- F. Floor Closers: Closer sizes shall be as recommended by the manufacturer for size of door, stack pressure conditions, and anticipated frequency of use with special details as follows:
1. Special Details:
 - a. Closer Cover Pan: Where stone or ceramic tile flooring is indicated at door thresholds and a special dress plate is not indicated or scheduled, furnish metal pan specially constructed and designed to be installed below and to support removable sections of finished flooring.
 - b. Extended Spindles: Furnish extended spindles.
 - c. All floor closers shall be manufactured with separate independent valves for closing adjustment, latching adjustment, and backchecking adjustment.
 - d. All floor closers shall be provided with a built-in positive deadstop to prevent doors from swinging beyond the desired opening degree.
 2. Center Hung, Single Acting, Heavy Duty: 28 Series; with special machined fully concealed arm, non-hold open (NHO), Checkmate No. 1 holders, physically handicapped (PH), delayed action (DA), as scheduled; Rixson- Firemark, Inc. (RIX).
 3. Offset Hung Heavy Duty: 27 Series; non-hold open (NHO), Checkmate No. 1 holders, physically handicapped (PH), delayed action (DA), as scheduled; Rixson- Firemark, Inc. (RIX).
 4. Center Hung, Double Acting, Heavy Duty: 40 Series; with special machined fully concealed arm, non-hold open (NHO), physically handicapped (PH), delayed action (DA), as scheduled; Rixson- Firemark, Inc. (RIX).

2.10 STOPS AND HOLDERS

- A. Angle Stops: Special angle stop, fabricated from brass or bronze, for single or pairs of doors without stops and having either a single continuous formed sponge silencer or a minimum of 2 rubber silencers per stop, minimum 1-1/2 inches wide x 3 inches long base for mortising into the head of door frame, minimum 3/4 inch maximum stop face projection; finish as scheduled.
1. AS18 Angle Stop; Ives (IVS).
 2. 489; Rockwood Manufacturing Company, Inc. (RM).
 3. 1801 Angle Stop; Architectural Builders Hardware Mfg., Inc. (ABH).
- B. Roller Latch Angle Stops: Special angle stop BHMA A156.16 Type E19111, fabricated from brass or bronze, for single doors without stops and having a minimum of 2 rubber silencers per stop, minimum 1-1/2 inches wide x 4-1/2 inches long base for mortising into the head of door frame, 9/16 inch maximum stop face projection, adjustable roller latch and ramp roller strike; finish as scheduled.
1. 4040 Adjustable Roller Latch; Door Controls International (DCI).
 2. RL1152; Ives (IVS).
 3. 593; Rockwood Manufacturing Company (RM).

4. 1559BL; Trimco Hardware (TBM).
- C. Roller Latches: Special roller latch complying with BHMA A156.16 Type E19101, fabricated from brass or bronze, for single doors, minimum 1 inchwide x 3-3/8 inches long base for mortising into the head door frame, adjustable nylon covered roller latch and ramp roller strike; finish as scheduled.
1. 4030 Adjustable Roller Latch; Door Controls International (DCI).
 2. RL30; Ives (IVS).
 3. 590; Rockwood Manufacturing Company (RM).
 4. 1559WA; Trimco Hardware (TBM).
- D. Ball Type Latches: 4 way adjustable ball catch complying with BHMA A156.9 Type B13292, fabricated from brass or bronze, for single doors, with two adjustable stainless steel balls held under adjustable spring tension and hook strike.
1. CL21A; Ives (IVS).
- E. Concealed Overhead Door Holders: Heavy duty, concealed mounting, full mortised, bronze bodied, slide track design, with heavy shock absorber spring providing 5 to 7 degree compression before deadstop, non-metal slide and shock blocks, 110 degree maximum opening, complying with BHMA A156.8 Type C11511 for hold open and Type C11541 for stop function. Provide stop, or hold open, functions as scheduled.
1. 1000 Series; Architectural Builders Hardware Mfg., Inc. (ABH).
 2. 100 Series; Glynn-Johnson (GJ).
 3. Checkmate Heavy Duty 1 Series; Rixson-Firemark, Inc. (RIX).
- F. Exposed Overhead Door Holders: Heavy duty, surface mounted, bronze bodied, slide track design, with heavy shock absorber spring providing 5 to 7 degree compression before deadstop, non-metal slide and shock blocks, 110 degree maximum opening, complying with BHMA A156.8 Type C12511 for hold open and Type C12541 for stop function. Provide stop, or hold open, functions as scheduled.
1. 9000 Series; Architectural Builders Hardware Mfg., Inc. (ABH).
 2. 90 Series; Glynn-Johnson (GJ).
 3. Checkmate Heavy Duty 9 Series; Rixson-Firemark, Inc. (RIX).
- G. Floor Stops: Cast half dome design with rubber bumper, finish as scheduled. Provide manufacturer's standard riser heights as required for carpeted areas in conjunction with the floor bumpers scheduled. Unless otherwise scheduled, provide floor stops at each door leaf where partition construction does not allow the door to swing greater than 90 degrees.
1. For Thresholds, Carpet and/or Undercut Doors: Comply with BHMA 156.16 Type L12161, L02161 or L12141.
 - a. 3320X; Door Controls International (DCI).
 - b. FS438; Ives (IVS).
 - c. 1211; Trimco Hardware (TBM).

- d. 443; Rockwood Manufacturing Company (RM).
2. For Doors with Standard 3/8 inch Clearance: Comply with BHMA 156.16 Type L12161, L02141 or L12141.
 - a. 3310X; Door Controls International (DCI).
 - b. FS436; Ives (IVS).
 - c. 1210; Trimco Hardware (TBM).
 - d. 441; Rockwood Manufacturing Company (RM).
3. For Acoustical Doors: A security type door stop, molded from black flame resistant resilient material wrapped around a heavy duty threaded steel stud for grouting into the floor substrates, approximately 1-1/2 inch tall x 2 inch diameter x 2-1/2 inch stud length.
 - a. FS18S; Ives.
 - b. 1209; Trimco Hardware (TBM).
 - c. 466; Rockwood Manufacturing Company (RM).
 - d. 269F; Hager Companies (HAG).
- H. Silencers for Wood Door Frames: BHMA A156.16, Type L03021; grey rubber. Provide 2 silencers for each pair of doors, 3 silencers for each single door.
- I. Silencers for Metal Door Frames: BHMA A156.16, Type L03011; grey rubber. Provide 2 silencers for each pair of doors, 3 silencers for each single door.
- J. Silencers for Aluminum Door Frames: Refer to Section **08 12 16 "INTERIOR ALUMINUM FRAMES."**
- K. Wall Stops: Cast disc type with concave rubber bumper, having an minimum of 2-1/8 inch diameter base with nominal 1 inch projection and concealed attachment to substrate. Unless otherwise scheduled, provide wall stops at each door leaf where partition construction does not allow the door to swing greater than 90 degrees.
 1. For Attachment to Masonry: Complying with BHMA A156.16, Type L12251 or L12101.
 - a. WS401CCV; Ives (IVS).
 - b. 1270CV; Trimco Hardware (TBM).
 - c. 404; Rockwood Manufacturing Company (RM).
 2. For Attachment to Gypsum Wallboard: Complying with BHMA A156.16, Type L12251 or L12101.
 - a. WS402CCV; Ives (IVS).
 - b. 1270WV; Trimco Hardware (TBM).
 - c. 403; Rockwood Manufacturing Company (RM).

3. For Acoustical Doors: A security type door stop, molded from black flame resistant resilient material wrapped around a heavy duty threaded steel stud for grouting into the floor substrates, approximately 1-1/2 inch tall x 2 inch diameter x 2-1/2 inch stud length.
 - a. FS18S; Ives.
 - b. 1209; Trimco Hardware (TBM).
 - c. 466; Rockwood Manufacturing Company (RM).
 - d. 269F; Hager Companies (HAG).

- L. Magnetic Catches: Aluminum bodied extra heavy duty magnetic catch with outside dimensions of approximately 13/16 x 3-1/8 x 1 inch complying with BHMA A156.9, Type B03161 fabricated with self aligning magnets and furnished complete with door strikes.
 1. 327; Ives (IVS).
 2. 901; Rockwood Manufacturing Company (RM).
 3. CD45 Double Magnetic Cabinet Catch; Stanley Commercial Hardware (STH).

2.11 SLIDING DOOR HARDWARE

1. Sliding Door Hardware: Provide complete sets consisting of continuous ball bearing hanger tracks, door hangers with provision for horizontal and vertical adjustments, floor guide, supports, track mounted stops, and rated for a door weight of 1000 pounds.
 - a. Dorma Agile 150.

2.12 MISCELLANEOUS DOOR HARDWARE

- A. Boxed Power Supplies: Provide modular units complying with NEMA ICS 6, electrified for Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems.

- B. Coat Hooks: Double coat hook, cast brass bodied, minimum 1-1/8 by 1-1/8 x 1-1/8 inch projection.
 1. 582 Double Coat Hook; Ives (IVS).
 2. Small Double Coat Hook No. 796; Rockwood Manufacturing Company (RM).

- C. Coat Hooks: Single coat hook, fabricated from brass or stainless steel, minimum 1 inch diameter x 3 inch projection.
 1. RM 804; Rockwood Manufacturing Company (RM).

2.13 FABRICATION

- A. Manufacturer's Nameplate: Provide each door hardware item without exposed manufacturers labels, names, or designs.
- B. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips oval-head screws with finished heads to match surface of door hardware item being attached. Machine screws and expansion shields shall be used for attaching hardware to concrete and masonry. Use throughbolts for renovation work only where existing door blocking and reinforcements are unknown.
 - 1. Concealed Fasteners: All new doors and door frames have been specified with adequate blocking and reinforcement provisions to eliminate exposed throughbolting of hardware items. Doors installed with exposed throughbolts will be rejected and replaced by the Contractor at no cost to the Owner. Where through bolts are used on existing doors provide sleeves for each through bolt.

2.14 FINISHES

- A. Standard: Comply with BHMA A156.18.
- B. Appearance of Finished Work: Finishes of the same designation, that come from 2 or more sources, shall match when the items are viewed at arms length and approximately 24 inches apart. Unless otherwise scheduled, match each hardware item in a single hardware set with the scheduled latch or lock set finish. Painting of BHMA 600 (USP) surfaces is required and is specified under Division 09 Section 'Painting':
- C. Designations: The abbreviations used to schedule hardware finishes are generally BHMA (Federal Standards where indicated in parenthesis) designations. Comply with base material and finish requirements indicated by the following:
 - 1. BHMA 600 (USP): Primed for painting.
 - 2. BHMA 605 (US3): Bright brass, clear coated.
 - 3. BHMA 606 (US4): Satin brass, clear coated.
 - 4. BHMA 611 (US9): Bright bronze, clear coated.
 - 5. BHMA 612 (US10): Satin bronze, clear coated.
 - 6. BHMA 613 (US10B): Dark-oxidized satin bronze, oil rubbed.
 - 7. BHMA 618 (US14): Bright nickel plated, clear coated.
 - 8. BHMA 619 (US15): Satin nickel plated, clear coated.
 - 9. BHMA 622:(US19): Flat black coated.
 - 10. BHMA 625 (US26): Bright chromium plated.
 - 11. BHMA 626 (US26D): Satin chromium plated.
 - 12. BHMA 628 (US28): Satin aluminum, clear anodized.
 - 13. BHMA 629 (US32): Bright stainless steel.

14. BHMA 630 (US32D): Satin stainless steel.
15. Alum.: Aluminum.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Hardware for fire door assemblies shall be installed in accordance with NFPA 80. Hardware for smoke and draft control door assemblies shall be installed in accordance with NFPA 105. Install hardware for non-labeled and non-smoke and draft door assemblies in accordance with BHMA A156.115 for steel doors and frames, BHMA A156.115-W series for wood doors, and hardware manufacturers installation instructions for doors and frames fabricated from other than steel or wood.
 1. All modifications to fire doors and frame for electric and mortised hardware shall be made by the respective door and frame manufacturers.
- B. Smoke Seals at S Labeled Door Assemblies: Provide and install smoke seals at S labeled doors in accordance with door manufacturer's instructions.

3.2 INSTALLATION

- A. Mounting Heights: Mount door hardware units at the following heights, unless specifically indicated on the drawings or required to comply with governing regulations:
 1. Locks and Latches: 38 inches to center of lever from finish floor.
 2. Door Pulls: 44 inches from finish floor to center of grip. Pull bases centered on door stiles, unless otherwise indicated.
 3. Door Pulls: Pull bases centered on top and bottom door rails, and spaced from lock edge of door stile as indicated, or recommended, by the pull manufacturer.
 4. Push Plates: 44 inches from finish floor to center of plate. Coordinate with pull location.
 5. Horizontal Push/Pull Bar: 42 inches from finish floor to center of pull/pull. Push/Pull bases centered on door stiles, unless otherwise indicated.
 6. Butt Hinges: 10 inches to bottom of lowest hinge from finish floor; 5 inches to top of upper hinge from top of door; space intermediate hinges equally between lower and upper hinges.
 7. Deadbolts: Not more than 44 inches from finish floor to operating trim.
 8. Flush Bolt Operating Mechanisms: Top bolt 66 to 72 inches from finish floor, bottom bolt 12 inches from finish floor.
 9. Exit Devices: 40 inches from finish floor to center of touch bar. 38 inches from finish floor to center of cross bar.
 10. Coat Hooks: 48 inches from finish floor to center of coat hook.

- B. Install each door hardware item to comply with manufacturer's written instructions. Install overhead surface closers for maximum degree of opening obtainable. Place on room side of corridor doors, stair side of stair doors, secondary corridor side of doors between corridors. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be finished, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. All wall stops shall be installed with proper reinforced blocking in wallboard construction. Drywall anchors are not an acceptable means of reinforcement/blocking. Provide intermediate steel plates or channel reinforcement backing at wall stops mounted in wallboard construction.
- C. Do not install permanent key cylinders in locks until the time of preliminary acceptance by the Owner. At the time of preliminary acceptance, and in the presence of the Owner's representative, permanent key all lock cylinders. Record and file all keys in the key control system, and turn system over to Owner for sole possession and control.
- D. Key control storage system shall be installed where directed by the Owner.

3.3 ADJUSTING

- A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every hardware component. Replace hardware components that cannot be adjusted to operate as intended. Adjust door control devices to compensate for building stack pressures, final operation of forced air mechanical equipment and to comply with referenced accessibility requirements.
 - 1. Test each electrical hardware item to determine if devices are properly functioning. Wiring shall be tested for correct voltage, current carrying capacity, and proper grounding. Stray voltages in wiring shall be eliminated.
 - 2. Coordinate with electrical installation for interface and connection with life safety and security systems.
- B. Fire-Rated Door Assembly Testing: Upon completion of the installation, test each fire door assembly in the project to confirm proper operation of its closing device and that it meets all criteria of a fire door assembly as per NFPA 80 2007 Edition. The inspection of the fire doors is to be performed by individuals with knowledge and understanding of the operational components of the type of door being subjected to testing and whom are either credentialed as an Architectural Hardware Consultant (AHC) or as a Fire Door Annual Inspector (FDAI). A written record shall be maintained and transmitted to the Owner to be made available to the Authority Having Jurisdiction (AHJ). The record shall list each fire door assembly throughout the project, and include each door number, an itemized list of hardware set components at each door opening, and each door location in the facility.

3.4 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation. Clean hardware components as necessary to restore proper finish. Provide protection during the progress of the work and maintain conditions that ensure door hardware is in perfect working order and without damage or deterioration at time of Substantial Completion.

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Windows.
 - 2. Doors.
 - 3. Glazed entrances.
 - 4. Interior borrowed lites.
 - 5. Storefront framing.
- B. Refer to Section 08 41 26 "All-Glass Entrances and Storefronts" for requirements applicable to single subcontract responsibility for glazing.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each glass product and glazing material indicated.
- B. Glass Manufacturer's Letter: The glass manufacturer shall submit a letter certifying that he has reviewed the glazing details proposed for the project, including the use of gaskets and sealants, and that each product to be furnished is recommended for the application shown.
- C. Samples: Label samples to indicate product, characteristics, and locations in the work. Furnish samples of the following:
 - 1. Except for clear glass, submit samples of each glass type specified, in the form of 12-inch- square Samples.
 - 2. Submit samples of each glass type specified where production run variations, and defects are expected.
 - 3. Submit samples of applied film adhered to clear glass, in the form of 12-inch- square samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
 - 1. Material Certificates: Submit glass treatment certificates signed by manufacturer of the heat soaked glass products certifying that products furnished comply with requirements.

- B. Warranties: Submit special warranties specified in this Section.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Submit maintenance data for each applied glass film to be installed or applied; including recommendations and instructions for cleaning, maintenance, removal, and replacement of same.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
- C. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.
- D. Safety Glass: Comply with the applicable requirements of the laws, codes, ordinances and regulations of Federal and Municipal authorities having jurisdiction, wherever requirements conflict the more stringent shall be required. Obtain approvals from all such authorities. [As a minimum provide Category II materials complying with testing requirements in 16 CFR 1201 (Consumer Product Safety Commission "Safety Standard for Architectural Glazing Materials", as published in the Code of Federal Regulations) and ANSI Z97.1] [As a minimum provide materials complying with testing requirements of BS EN 12600 and BS 6262-4].
1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction. Locate permanent markings in one corner, and in the same location, of each glass lite in accordance with the requirements of the SGCC labeling guidelines. Markings shall have a nominal size of no greater than 1-inch in diameter, and be located with glass edge clearances, at the corner, by not more than 3/4-inch up and 3/4-inch over.
- E. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: GANA's "Glazing Manual" and "Laminated Glass Design Guide."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials.
- B. Deliver film to project site, and handle/store in accordance with manufacturer's instructions, in unopened containers and in a manner that will ensure no deterioration of, or detrimental effects on, film and its system for adhering to glass. Protect from physical abuse.

1.7 WARRANTY

- A. Manufacturer's Special Warranty on Ceramic Frit Coated-Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units whose coatings flake, peel, or crack within the specified warranty period indicated below. Upon notification of such deterioration within the warranty period furnish replacement glass units for those glass units whose coatings have flaked, peeled or cracked at the convenience of the Owner.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Laminated Glass: Written warranty, made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated-glass units that develop edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those specified within the warranty period indicated below. Upon notification of such deterioration within the warranty period furnish replacement glass units for those glass units having edge separation, delamination and blemishes at the convenience of the Owner.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Heat Soaked Tempered Glass Warranty: Submit a five (5) year written warranty, beginning from date of substantial completion, and executed by the Contractor, manufacturer and the glass installer agreeing to replace glass units that spontaneously break as a result of Nickel Sulfide (NiS) inclusions within the specified warranty period without material or labor charges to the Owner.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Refer to the finish schedules on the drawings for the extent of glass types and locations. The Contractor shall confirm the levels of heat treatment required for each glass type scheduled as contained in Articles Performance Requirements, Submittals and Quality Assurance.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide and install glazing systems capable of withstanding impact loads without failure of any kind, including loss or breakage of glass, failure of seal or gaskets, exudation of glazing sealants, and excessive deterioration of glazing materials.
- B. Glass Design: Glass thicknesses and heat treatments indicated are minimum requirements. Glazing details shown are for convenience of detailing only and are to be confirmed by the Contractor relative to cited standards and final framing details.
 - 1. At [interior aluminum door and framed,] openings provide glass thickness such that the center of glass deflection at a full lateral pressure of 5 psf in a direction normal to the plane of the wall shall not exceed 1/2 inch . Confirm glass thicknesses and heat treatments, as required to meet the performance requirements.
 - 2. Confirm glass thicknesses and heat treatments, as required to meet the performance and testing requirements specified in [Section 08 41 13 "Aluminum-Framed Entrances and Storefronts."] [and] [Section 08 41 26 "All-Glass Entrances and Storefronts."]

2.3 INSULATING GLASS SCHEDULE

- A. Low-E Insulating Glass: Provide insulating glass units complying with the following:
 - 1. Manufacturer: Match Existing.
 - 2. Overall Unit Thickness and Thickness of Each Lite: 25mm (1 inch) and 6mm (1/4 inch)
 - 3. Interspace Content: 1/2" Poly/Butyl Spacer
 - 4. Outer Lite: 1/4" Bronze Annealed Glass
 - 5. Inner Lite: 1/4" Clear Tempered Low E #3 Surface

2.4 HEAT-TREATED FLOAT GLASS (GL##)

- A. General: Heat treat glass where required to meet safety glazing requirements.
- B. Sizes and Cutting: Prior to heat treatment, cut glass to required sizes as determined by accurate measurement of openings to be glazed, making allowance for required edge clearances. Cut and process edges in accordance with glass manufacturer's recommendations. Do not cut or treat edges in the field. Make all cuts for hardware, access, or glass-mounted trim or accessories before heat treating.

- C. Fully Tempered Glass: Provide glass complying with ASTM C1048 Kind FT and meeting the requirements of ANSI Z97.1. Surface compression shall be equal to or greater than 10,000 psi . After tempering, heat soak 100% of all fabricated glass units to European Union Standard EN14179 to reduce the potential for inclusion related glass breakage. Statistical heat soaking shall not be permitted.

2.5 GLAZING SEALANTS

- A. Gasket, Blocking, and Spacer Wet Glazing Materials: Silicone, compatible with and adherent to each material it will be in contact with, as recommended by the manufacturer to fulfill performance requirements.
- B. Butt Glazing Sealants: Refer to Section 07 92 00 "Joint Sealants," Article "Elastomeric Joint Sealants," subparagraph "Butt Glazing Sealant."
- C. Glazing Sealant for Fire-Resistive Glazing Products: Identical to product used in test assembly to obtain fire-protection rating.
 - 1. VOC Content: Provide glazing sealants and sealant primers having not more than 100 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 GLAZING GASKETS

- A. Dense Compression Gaskets: Continuous extruded EPDM with cross sectional profile, physical properties, and tolerances as recommended by the glass manufacturer, and as required, to comply with the performance requirements specified and shown all in compliance with the applicable provisions of ASTM C 864, Option II.

2.7 DECORATIVE WINDOW FILM (GF##)

- A. Applied Film: A water resistant, permanent, translucent patterned vinyl film laminated to a clear pressure sensitive adhesive and transparent synthetic liner.
 - 1. Color and Pattern: Refer to the Finish Schedule.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces, and wet glazing materials, contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

1. VOC Content: Provide cleaners, primers, and sealers having not more than the following VOC contents when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - a. Cleaners and Sealers: 200 g/L.
 - b. Primers: 250 g/L.
- C. Setting Blocks: EPDM complying with ASTM C 864 (Option II), blocks, 85 +/- 5 Shore A durometer hardness, 1/16 inch less than the channel width, and length based on the face area the glass unit to be supported in accordance with GANA standards and glass manufacturer recommendations but not less than 4 inches .
- D. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.9 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.
 1. Edge and Surface Conditions: Comply with the recommendations of AAMA "Structural Properties of Glass" for "clean-cut" edges, except comply with manufacturer's recommendations when they are at variance therewith.
 2. Exposed Glass Edges and Surface Condition: All edges shall be flat with an arrissed edge profile (small bevel of uniform width not exceeding 1/16 inch at an angle of approximately 45 degrees to the surface of the glass) with a polished (surface is reflective in appearance similar to the major surface of the glass) surface.
- B. Cutting: Do not nip glass edges. Edges may be wheel cut or sawed and seamed at manufacturer's option. For glass to be cut at site, provide glass 2 inches larger than required in both dimensions, so as to facilitate cutting of clean cut edges without the necessity of seaming or nipping. Do not cut, seam, nip or abrade heat-treated glass.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine glass framing, with glazier and glass framing erector present, for compliance with the following:
 1. Compliance with the specified manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 2. Minimum required face or edge clearances.
 3. Effective sealing between joints of glass-framing members.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing stops, glazing channels, and rabbets which will be in contact with the glazing materials immediately before glazing. Remove coatings which might fail in adhesion or interfere with bond of sealants. Comply with manufacturer's instructions for final wiping of surfaces immediately before application of primers. Wipe metal surfaces with IPA (isopropyl alcohol).
 - 1. Prime surfaces to receive glazing compounds. When priming, comply with wet glazing manufacturer's recommendations.
- B. Inspect each unit of glass immediately before installation. Do not install glass units which are improperly sized or have damaged edges, scratches or abrasion or other evidence of damage. Remove labels from glass immediately after installation.
- C. Substrate Preparation for Applied Film: Clean glass surfaces to receive the application of applied film. Remove foreign deposits, including paint spatter and glazing sealant materials that have migrated from glazing channel. Wash with detergent, rinse, and dry each glass surface immediately prior to film application; comply with film manufacturer's instructions and recommendations. Control and limit unnecessary activities, occupancies, air movements, and similar incidents in each space of the building during the time of cleaning and film application; so as to ensure the best possible environment for application of film on clean substrates. Comply with environmental conditions as recommended by film manufacturer prior to applying film to glass.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
 - 1. All glass units shall be installed in accordance with the glass manufacturer's recommendations.
 - a. Butt Glazed Interior Monolithic Glass Units: Mask the surfaces on both sides of the joints to be glazed. Provide wood dowel, with a diameter of at least 3 times of the joint width, wrapped in polyethylene tape, and firmly taped to interior face of glass unit to be glazed to act as a back-up during glazing operation. Place glazing sealant and tool face of sealant slightly concave using extreme care not to chip or otherwise abrade corners of glass. Allow sealant to fully cure before removing dowel.

- B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to surfaces indicated to receive glazing materials.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless more stringent requirements are recommended by glass manufacturer.
 - 1. For Glass Units Less Than 72 inches : Locate setting blocks at sill one-quarter of the width in from each end of the glass unless otherwise recommended by the glass manufacturer.
 - 2. For Glass Units 72 inches or Greater: Locate setting blocks at sill one-eighth of the width in from each end of the glass, but not less than 6 inches , unless otherwise recommended by the glass manufacturer.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Set glass lites with uniform pattern, draw, bow, and similar characteristics, producing the greatest possible degree of uniformity in appearance on the entire wall elevation.
 - 1. Set glass units with void between edge of units and glazing channel.
- H. Where wedge-shaped gaskets are driven into one side of channel to pressurize gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- I. Miter cut gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away.
- J. Film Application: Comply with film manufacturer's installation requirements, instructions, and recommendations. Avoid seams whenever possible and, where not possible, minimize the number of seams. Produce seams which are tightly-buttet; without overlaps and gaps which are visible only at viewing distances of 20 inches and less. Apply film by method which will ensure the inclusion of no air bubbles or other foreign substances.
 - 1. Extend film to cover full expanse of each glass sheet to receive film; but without either overlapping the glass glazing materials, or leaving edge gaps of more than 1/32 inch .
 - 2. In order to minimize the possibility of visible differences in the color or shading intensity of the butted films at seams, apply each film with its butted edge taken from the same end of the film roll (reverse the direction-of-application). Remove and replace film application where mismatching of films is visually noticeable where directed by Architect.

3. Exercise extreme care during application of film, including the cutting and pressing-in-place of film, so as to avoid the scoring and abrading of surfaces of glass.
4. Adhere film to glass, using procedures recommended by film manufacturer. Press into place to ensure that entire film sheet, including edges, are firmly and permanently adhered.

3.4 PROTECTION AND CLEANING

- A. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way and from any source, including natural causes, accidents, and vandalism.
- B. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass and film as recommended by glass and film manufacturer.

END OF SECTION 08 80 00

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SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes non-structural metal framing assemblies.

1.2 ASSEMBLY PERFORMANCE REQUIREMENTS

- A. Gypsum Board Assembly Deflections:
 - 1. Typical Walls: Wall assemblies shall be constructed for deflection not to exceed 1/240 of the wall height when subjected to a positive and negative pressure of 5 psf
 - 2. Walls with Ceramic Tile Finish: Wall assemblies to receive tile finishes shall be constructed for deflection not to exceed 1/360 of the wall height when subjected to a positive and negative pressure of 5 psf
 - 3. Walls with Stone Tile Finish: Wall assemblies to receive stone tile finishes shall be constructed for deflection not to exceed 1/720 of the wall height when subjected to a positive and negative pressure of 5 psf
 - 4. Ceilings, bulkheads, soffits, ceiling transitions, ledges, and coves shall be constructed for a deflection not to exceed 1/360 of the distance between supports.

1.3 SUBMITTALS

- A. Product Data: Submit product data for each product indicated.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturers performing the Works of this Section shall be, during the tendering period as well as during installation, ISO 9001 and ISO 9002 certified or equivalent.
- B. Fire-Test-Response Characteristics: For non-structural metal framing assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."
- C. Fire-Test-Response Characteristics: Provide gypsum board wall assemblies that comply with the following requirements:

1. Fire-Resistance Characteristics: Where indicated, provide gypsum board wall assemblies identical to those of assemblies tested for fire resistance according to one or more of the following standards or testing laboratory, or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. ASTM E 119 "Test Methods for Fire Tests of Building Construction and Materials."
 - b. Underwriters Laboratory (UL) "Fire Resistance Directory."
 - c. ISO 834, Parts 1, 3-9, "Fire Resistance Tests: Elements of Building Construction."
 - d. BS 476-6, "Fire tests on building materials and structures. Method of test for fire propagation for products."
 - e. BS 476-7, "Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products."
2. Identify materials with appropriate markings of applicable testing and inspecting agency.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 PROJECT CONDITIONS

- A. Comply with ASTM C 754 requirements or wallboard material manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to authorities having jurisdiction.

2.2 STEEL SUSPENDED CEILING FRAMING

- A. Components, General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article 'Assembly Performance Requirements'.

- B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating , soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.
- C. Hanger Attachments to Overhead Decks: Suitable for application indicated, fabricated from corrosion-resistant materials, with eyepins, clips or other devices for attaching hangers and capable of sustaining, without failure, a load equal to 10 times that imposed by the complete ceiling system.
- D. Hangers: As follows:
1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating , soft temper, 0.162-inch diameter.
 2. Rod Hangers: ASTM A 510, mild carbon steel.
 - a. Diameter: 1/4-inch.
 - b. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
 3. Flat Hangers: Commercial-steel sheet, ASTM A 653/A 653M G60, hot-dip galvanized zinc coating [GB/T 2518-2004 Continuous Hot-dip Zinc-coated Steel Sheets and Strips].
 - a. Size: 1 by 3/16 inch by length indicated.
 4. Angle Hangers: Angles with legs not less than 0.866 inch wide; formed with 0.039 inch thick, galvanized steel sheet complying with coating designation from one of the following standards; Provide bolted connections and 3/8-inch diameter bolts.
 - a. ASTM A 653/A 653M "Standard specification for Sheet Steel, zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot Dip Process"; Z275.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch, a minimum 1/2-inch- wide flange, with manufacturer's standard corrosion-resistant zinc coating.
- F. Furring Channels (Furring Members): Commercial-steel sheet with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating..
1. Cold Rolled Channels: 0.0538-inch bare steel thickness, with minimum 1/2-inch- wide flange, 3/4 inch deep.
 2. Steel Studs: ASTM C 645, 0.0312 inch minimum base metal thickness and minimum depth as required to suit deflection criteria.
 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
 - a. Minimum Base Metal Thickness: 0.0312 inch.
 4. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.

- G. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.3 STEEL PARTITION AND SOFFIT FRAMING

- A. General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article 'Assembly Performance Requirements'.
1. In areas where top of partitions are dependent on ceiling system for lateral support, coordinate design and installation to comply with the above deflection limitation.
 2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G40, hot-dip galvanized zinc coating.
- B. Steel Studs and Runners: ASTM C 645, in minimum depth indicated in partition type details.
1. Minimum Base Metal Thickness:
 - a. Typical: As required to comply with deflection criteria, but not less than 25 gage 0.0179 inch.
 - b. Partitions Supporting Wall Mounted Casework: 16 gauge (0.053 inch) minimum thickness.
 2. Depth: As indicated.
- C. Deflection Track: ASTM C 645 top runner with custom fabricated flanges with depths sized to accommodate roof and floor deck live and dead load deflections but not less than 2 inch deep flanges. Steel sheet top runner manufactured to prevent cracking of gypsum board applied to interior partitions resulting from deflection of structure above; in thickness indicated for studs and in width to accommodate depth of studs; one of the following:
1. Delta Star, Inc., Superior Metal Trim; Superior Flex Track System (SFT), San Carlos, CA.
 2. Metal-Lite, Inc.; Slotted Track. Crossville, TN www.metal-lite.net
 3. The Steel Network, Inc; VertiClip SLD Series or VertiTrack VTD Series, Durham, NC. www.steelnetwork.com
- D. Firestop Track: ASTM C 645 top runner with custom fabricated flanges with depths sized to accommodate roof and floor deck live and dead load deflections but not less than 2 inch deep flanges. Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs; one of the following:
1. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip. Watkins, MN www.firetrak.com
 2. Metal-Lite, Inc.; The System, Crossville, TN. www.metal-lite.net

3. The Steel Network, Inc: VertiClip SLD Series or VertiTrack VTD Series, Durham, NC.www.steelnetwork.co

- E. Flat Strap and Backing Plate: ASTM C 645, 36 -inch wide steel sheet for blocking and bracing required for the attachment of surface mounted items and accessories indicated.
 1. Minimum Base Metal Thickness: 0.0312 inch.

- F. Cold-Rolled Channel Bridging: For channel bridging for fixture attachment or lateral bracing provide 0.0538-inch bare steel thickness, with minimum 1/2-inch- wide flange:
 1. Depth: 1-1/2 inches.
 2. Clip Angle: 1-1/2 by 1-1/2 inch, 0.068-inch- thick, galvanized steel.

- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 1. Minimum Base Metal Thickness: 0.0179 inch.
 2. Depth: 7/8 inch.

- H. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.

- I. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members securely to substrates involved; complying with the recommendations of the gypsum board manufacturers for applications indicated.

- J. Z Clips: Z shapes clips formed from 1-inch- wide strips of minimum 20 gauge (0.032-inch-) thick galvanized steel. Clips to be sized to extend through the thickness of the sprayed applied fire resistive material on the bottom flange of the steel beam with 2-inch- long upper and lower legs. Legs of clips fastened to bottom of beam (prior to the application of the spray applied fire resistive materials) and top of ceiling runner (or deflection channel) with steel fasteners or welds. Clips to be spaced a maximum of 16-inches- on center.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24)(ASTM D 3960), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. One of the following:
 1. U.S. Gypsum; SHEETROCK Acoustical Sealant.

- C. Isolation Strip at Exterior Walls: Adhesive-backed, closed-cell, compressible, non-extruding, sound transmission reducing, vinyl foam tape strips with approximately 13 Shore 00 hardness that allow fastener penetration without foam displacement, 0.90-inch- thick, in width 1/2-inch- less than window mullion width.
 - 1. VL8229E Norton Sealant Tape; gray color.
- D. Window Mullion Fillers: Refer to Section 05 75 00 "Decorative Formed Metal."
- E. Wood Blocking and Trim Not Concealed in Partition Construction: Refer to Section 06 40 23 "Interior Architectural Woodwork."
- F. Wood Blocking and Plywood Concealed in Partition Construction: Fire retardant treated, refer to Section 06 10 53 "Miscellaneous Rough Carpentry."
- G. Metal Post for Tube Framing at Partial Height Walls: Refer to Section 05 50 00 "Metal Fabrications."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which non-structural metal framing attaches or abuts, installed door frames and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordination with Sprayed Fire-Resistive Materials:
 - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
 - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of the non-structural metal framing and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLING STEEL FRAMING, GENERAL

- A. General: Install steel framing to comply with ASTM C 754 and ASTM C 840 and the gypsum board manufacturer's recommendations, where standards conflict the more stringent shall apply.
- B. Install supplementary framing, blocking, backerplates and bracing at locations in gypsum board assemblies which are indicated to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."
 - 1. The design of the bathrooms being renovated includes the provision and installation of tile units and tile backer boards. Where alterations and demolition reveal existing nonstructural metal framing that is indicated to remain but does not comply with the performance requirements, provide supplementary framing sized, spaced, and fastened to the existing framing members in accordance with the manufacturer's recommendations to comply with the performance requirements.
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.
 - 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
 - 2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
 - a. Use deep-leg deflection track where indicated.
 - b. Use proprietary firestop track where indicated.

3.4 INSTALLING STEEL SUSPENDED CEILING FRAMING

- A. Suspended Ceiling Framing:
 - 1. Suspend ceiling hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 3. Attach hangers to structural members. Do not support ceilings from or attach hangers to permanent metal forms, steel deck tabs, steel roof decks, ducts, pipes, or conduit.

4. Secure wire hangers by looping and wire-tying, to eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
 5. Secure rod and flat hangers to structure, including intermediate framing members, by attaching to devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
- B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet measured lengthwise on each member and transversely between parallel members.
- C. Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.
- D. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards unless more stringent spacings are recommended by the gypsum board manufacturer.
- E. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

- A. Install continuous runners (tracks) sized to match studs at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction. Secure runners to substrates with fasteners spaced a maximum of 24 inches o.c. unless closer spacing is recommended by the framing manufacturer for the floor and ceiling construction involved. Provide fasteners at all corners and ends of runner tracks.
1. Where studs are installed directly against exterior walls, install foam gasket isolation strip between studs and wall.
- B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings and at partial height partitions. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
1. Cut studs 1/2 inch short of full height to provide perimeter relief.
 2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
 3. Terminate partition framing at suspended ceilings where indicated.

4. Terminate partial height partition framing as indicated.
- D. Install steel studs and furring in sizes and at spacing indicated but not less than that required by the referenced steel framing installation standard to comply with maximum deflection and minimum loading requirements specified, unless more stringent requirements are recommended by the gypsum board manufacturer:
 1. Space studs 16 inches o.c., unless otherwise indicated.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
- F. Install backerplates for support of wall mounted items.
- G. Curved Partitions:
 1. Cut top and bottom track (runners) through leg and web at 2-inch intervals for arc length. In cutting lengths of track, allow for uncut straight lengths of not less than 12 inches at ends of arcs.
 2. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 3. Support outside (cut) leg of track by clinching steel sheet strip, 1-inch- high-by-thickness of track metal, to inside of cut legs using metal lock fasteners.
 4. Begin and end each arc with a stud, and space intermediate studs equally along arcs at stud spacing recommended in writing by gypsum board manufacturer for radii indicated. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.
- H. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 1. Install two 0.0312-inch thick studs at each jamb, unless otherwise indicated. Install one additional stud no more than 6 inches from jamb studs at single doors greater than 48 inches and at all pairs of doors.
 2. Install cripple studs at head adjacent to each jamb stud. Provide runner track and typical studs above door openings with studs spaced not more than 24 inches o.c.
 3. At all welded frames with fixed anchor clips secure stud reinforcing to jamb anchor clips with not less than two self tapping screws per clip.
 4. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- I. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

- J. Isolation Strip Attachment: Where partitions abut exterior wall window mullions, and partition filler panels are not indicated, adhesively attach isolation strips to window mullions. Center isolation strips on mullion to form a continuous, sound resistant and lightproof, recessed joint seal for the entire length of the interface between the partition studs and trim members and the vertical window mullions.

3.6 CLEANING AND PROTECTION

- A. Clean floors of all non-structural metal framing debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.
- B. Provide final protection and maintain conditions that ensures non-structural metal framing Work remains without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes gypsum board assemblies.

1.2 PRE-INSTALLATION MEETING

- A. Prior to start of each type of gypsum wallboard system, and at the Contractor's direction, meet at the site and review the installation procedures and coordination with other Work. Meeting shall include Contractor, Architect and major material manufacturer as well as the Installer and other subcontractors whose Work must be coordinated with the gypsum wallboard Work.

1.3 SUBMITTALS

- A. Product Data: Submit product data for each product indicated.
- B. Sustainable Design Submittals:
 - 1. Completed "LEED Criteria Worksheet," for each component material of the product or assembly used in the installation of Work of this Section. Refer to Section 01 81 13 "Sustainable Design Requirements."
- C. Samples: Submit full size samples in 12-inch- long lengths for each exposed trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."
- B. Fire-Test-Response Characteristics: Provide gypsum board assemblies that comply with the following requirements:

1. Fire-Resistance Characteristics: Where indicated, provide gypsum board assemblies identical to those of assemblies tested for fire resistance according to one or more of the following standards or testing laboratory, or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. ASTM E 119 "Test Methods for Fire Tests of Building Construction and Materials."
 - b. Underwriters Laboratory (UL) "Fire Resistance Directory."
 - c. ISO 834, Parts 1, 3-9, "Fire Resistance Tests: Elements of Building Construction."
 - d. BS 476-6, "Fire tests on building materials and structures. Method of test for fire propagation for products."
 - e. BS 476-7, "Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products."
 2. Identify materials with appropriate markings of applicable testing and inspecting agency.
- C. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- D. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.
- C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.6 PROJECT CONDITIONS

- A. Comply with ASTM C 840 requirements or wallboard material manufacturer's written recommendations, whichever are more stringent.

- B. Installation of wallboard joint treatments shall not start until the space to receive wall board joint treatments is heated to maintain a continuous and uniform temperature of not less than 55 deg F, from one week prior to beginning of joint treatment until joint treatment is completed and thoroughly dry. Ventilation, either natural or supplied by fans, circulators or air conditioning systems shall be provided to remove excess moisture during joint treatment. Temperature requirements may be waived only on recommendation of wallboard materials manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to authorities having jurisdiction.

2.2 INTERIOR GYPSUM WALLBOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. USG Corporation
- B. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- C. Gypsum Wallboard: ASTM C 1396/C 1396M .
1. Regular Type:
 - a. Thickness: 5/8 inch, unless otherwise indicated.
 - b. Long Edges: Tapered.
 - c. Location: Vertical surfaces, unless otherwise indicated.
 2. Type X:
 - a. Thickness: 5/8 inch.
 - b. Long Edges: Tapered.
 - c. Location: Where required for fire-resistance-rated assembly.
- D. Sag-Resistant Gypsum Wallboard for Interior Ceilings: ASTM C 1396/C 1396M , manufactured to have more sag resistance than regular-type gypsum board.
1. Thickness: 1/2 inch.
 2. Long Edges: Tapered.

3. Location: Ceiling surfaces.

2.3 TILE BACKING PANELS

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Moisture/Mold Resistant Water-Resistant Gypsum Backing Board to receive Tile Units having a Face Dimension of up to and including 8 by 8 inches [in areas other than][showers][and steam rooms]: ASTM C 1396/C 1396M .
 1. Core: 5/8 inch, [Type X] [or Class 1 (both sides)].
 2. Long Edges: Tapered.
 3. Products and Manufacturers: The following products and manufacturers are known to comply with the requirements:
 - a. US Gypsum: Sheetrock Mold Tough Firecode Board.
 - b. US Gypsum: Sheetrock Mold Tough Firecode Board or equivalent manufactured by USG Boral Gypsum Board China.
- C. Cementitious Backer Units to receive Tile Units having a Face Dimension of Greater than 8 by 8 inches : ANSI A118.9.
 1. Thickness: 1/2 inch.

2.4 TRIM ACCESSORIES

- A. Interior Steel Trim Accessories: ASTM C 1047; formed metal sheet steel zinc coated by hot dipped process. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047.
 1. Cornerbead: Use at outside corners.
 2. LC-Bead with both face and back flanges to receive joint compound; use at exposed panel edges.
 3. U-Bead with face and back flanges; face flange formed to be left without application of joint compound: Use where indicated.
 4. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.
 5. Expansion (Control) Joint: One-piece control joint formed with V-shaped slot, with removable strip covering slot opening. Use where indicated.
- B. Aluminum Trim Accessories: Extruded aluminum trim with 1/4 inch diameter holes in fins for attachment to wallboard or studs; longest lengths available in profiles indicated; primed for finish painting; sized for scheduled wallboard thickness shown.

2.5 JOINT TREATMENT MATERIALS

- A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of the wallboard products and joint treatment materials for each application indicated.
- B. Joint Tape:
 - 1. Interior Gypsum Wallboard over Metal Studs: 2 inch wide by 0.012 inch thick paper and complying with the physical test requirements of ASTM C 474.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, flanges of trim accessories, and fasteners, use setting-type taping compound.
 - 3. Second coat: For filling over tape, beads and fasteners. Use setting-type, sandable topping compound.
 - 4. Third coat: For finishing over tape, beads and fasteners. Use drying-type, all-purpose compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
 - 1. Moisture/Mold Resistant Gypsum Backing Board: Use setting-type taping and setting-type, sandable topping compounds.
 - 2. Cementitious Backer Units: As recommended by manufacturer.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24)(ASTM D 3960), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. One of the following:
 - 1. U.S. Gypsum: SHEETROCK Acoustical Sealant.
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets, and Fire Resistive Insulation for Installation Within Gypsum Wallboard Partitions: ASTM C 665 for Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
 2. Recycled Content: Provide blankets with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 40 percent by weight.
 - a. Thermafiber Division of Owens Corning: SAFB Blankets.
 - b. Rockwool Ltd.: Rockwool Acoustic Slabs.
- E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- F. Wood Blocking and Trim Not Concealed in Partition Construction: Refer to Section 06 40 23 "Interior Architectural Woodwork."
- G. Wood Blocking and Plywood Concealed in Partition Construction: Fire retardant treated, refer to Section 06 10 53 "Miscellaneous Rough Carpentry."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board assemblies attach or abut, installed door frames and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840, GA-216, and the gypsum wallboard manufacturer's recommendations, where standards conflict, the more stringent shall apply.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints or avoid them entirely.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
 - b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
- D. Multilayer Application:
1. On Partitions/Walls: Apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 2. On Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply base layers in same sequence. Apply base layers at right angles to framing members and offset face layer joints 1 framing member, 16 inches minimum, from parallel base joints, unless otherwise indicated or required by fire-resistance-rated assembly.
- E. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- F. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- G. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- H. Tile Backing Panels:
1. Moisture/Mold-Resistant Gypsum Backing Board: For substrates indicated to receive thin-set tile having face dimensions of up to and including 8 by 8 inches **in areas other than][showers][and steam rooms]**, install moisture/mold-resistant gypsum backing board panels, unless otherwise indicated.
 2. Cementitious Backer Unit Application: ANSI A108.11 where substrates are indicated to at receive Tile Units having a Face Dimension of Greater than 8 by 8 inches where otherwise indicated.
 3. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.

- I. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- J. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions.
- K. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- L. Attach gypsum panels to framing provided at openings and cutouts.
- M. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Fit gypsum panels around ducts, pipes, and conduits.
 - 2. Where partitions intersect open exterior and interior wall kickers, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by the wall kickers and other structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
 - 3. Where chase walls are shown, provide bracing between parallel rows of studs. Unless otherwise shown, provide gypsum wallboard braces no less than 1/2-inch-thick x 12-inches-wide and cut to width of chase. Locate at quarter points in wall height between each pair of parallel studs. Fasten with not less than 3 screws at each stud.
- N. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- O. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
- P. Cut openings in wallboard for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges will be covered by plates and escutcheons. Cut both face and back paper. Do not install electrical outlets back to back on opposing sides of partitions.
- Q. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
 - 1. Space screws a maximum of 12 inches on center for vertical applications.
 - 2. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

3. Install fasteners not less than 3/8-inch-from ends or edges of wallboard sheets, spacing fasteners opposite each other on adjacent ends or edges.
4. Begin fastening from center of wallboard and proceed toward edges and corners.
5. Apply pressure on surface of wallboard adjacent to fasteners being driven to ensure that wallboard will be secured tightly to supporting members.
 - a. Drive fastener with shank perpendicular to face of board.
 - b. Drive screws with a power screwdriver as recommended by wallboard manufacturer. Set heads of screws slightly below surface of paper without cutting paper.

3.3 INSTALLING TRIM ACCESSORIES

- A. General: Fasten trim accessories according to manufacturer's written instructions for type, length, and spacing of fasteners.
- B. Install corner beads at external corners.
- C. Install interior trim accessories where edge of gypsum panels would otherwise be exposed or semiexposed. Provide interior trim accessories with face flange formed to receive joint compound.
- D. Install aluminum trim accessories where indicated.
- E. Install control joints in locations indicated and where directed by the Architect for visual effect, or if not indicated or directed by the Architect, provide control joints in accordance with ASTM C 840 which is as follows:
 1. Where a partition, wall or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.
 2. Where a wall or a partition runs in an uninterrupted straight plane exceeding 30 linear feet.
 3. Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 feet and total area between control joints does not exceed 2500 square feet.
 4. Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 linear feet and total area between control joints does not exceed 900 square feet.
 5. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.

3.4 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Apply joint treatment at gypsum board joints, flanges of interior trim and aluminum trim accessories, interior angles, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration and levels of gypsum board finish indicated. Produce surfaces free of tool marks and ridges ready for decoration of type indicated. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Cementitious Backer Units: Finish according to manufacturer's written instructions.
- E. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840 , for locations indicated:
 - 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
 - 2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile and where indicated.
 - 3. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.
 - 4. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface [**of gypsum board ceilings and soffits, and**]where wallboard is indicated to receive wall coverings, semi-gloss and high gloss paints, and Italian plaster.

3.5 CLEANING AND PROTECTION

- A. Clean floors of all wallboard debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.
- B. Provide final protection and maintain conditions that ensures gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 29 00

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Tile.
 - 2. Crack isolation membrane.
 - 3. Metal edge strips.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide floor tiles complying with the following standard and performance requirements.
- B. Dynamic Coefficient of Friction (DCOF): For tile installed on walkway surfaces, provide products with the following value as determined by testing identical products by the DCOF AcuTest Method per ANSI A 137.1, 2012 Edition.
 - 1. Walkway Surfaces: Minimum 0.42.

1.3 SUBMITTALS

- A. Product Data: Submit product data for each product indicated.
- B. Shop Drawings: Submit shop drawings showing the extent of each type of movement joint. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples: Submit samples showing full range of color and texture variations expected.
 - 1. Full size units of each type, composition, color, and finish of tile.
 - 2. Assembled samples with grouted joints for each color grout and for each type, composition, color, and finish of tile.
 - 3. Thresholds in 6-inch lengths, each type.
 - 4. Metal edge strip trim in 6-inch lengths, each type.

1.4 INFORMATIONAL SUBMITTALS

- A. Test Reports: Submit test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of tile products with requirements specified for slip resistance.

- B. Master Grade Certificates: Submit master grade certificates for each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: Submit manufacturers' certifications for each type of grout and bonding material being provided are suitable for the intended use and meet or exceed the referenced standards and the requirements of this specification.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Submit maintenance instructions for each type of product specified.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Provide attic stock equal to the following for each type, color, pattern, and size (or fraction thereof) of tile provided for the Project. Supply in manufacture's unopened containers, identified with name, brand type, grade, class and all other qualifying information, to a location where directed by the Owner.
 - 1. Two percent of amount installed but not less than one box.

1.7 QUALITY ASSURANCE

- A. Installer: Engage an installer, with a minimum of 5 years of successful commercial tile installations similar in material, design, and scope to that indicated.
- B. Source Limitations for Tile: Obtain tile from one source or producer, and from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- C. Field-Constructed Sample Installations: Before installing tile, erect sample installations for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build sample installations to comply with the following requirements, using materials indicated for final unit of Work.
 - 1. Locate sample installations on site, in locations and size indicated or, if not shown or indicated, as directed by Architect but not less than 100 sq. ft. area for floors, and not less than 100 sq. ft. area for walls.
 - 2. Retain and maintain sample installations during construction in undisturbed condition as a standard for judging completed unit of Work.
 - 3. Approved sample installations may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.
- B. Maintain temperatures within range recommended by the mortar and grout manufacturer, but not less than 50 deg F or more than 90 deg F, in spaces during tile setting. After installation maintain temperatures within range recommended by the mortar and grout manufacturer
- C. Close spaces to traffic during tile flooring installation.
- D. Close spaces to traffic for 72 hours after tile flooring installation.
- E. Shade all tile, materials and the work area from direct sunlight during the installation as needed to prevent rapid evaporation caused by excessive heat or wind.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS, GENERAL (T##)

- A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1 "Specifications for Ceramic Tile, " and ANSI A137.2, "Specifications for Glass Tile," for types, compositions, and other characteristics indicated.
 - 1. Products and Manufacturers: Provide tile matching the Architect's samples which have been selected from the product lines and manufacturers indicated in [Section 09 06 00 "Schedule for Finishes."] [Finish Schedule on Drawings.]
 - 2. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
- B. Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing where applicable.

- C. Rectified Tile Edges: Provide all tile units having a face dimension of greater than 8" x 8" with factory rectified edges.

2.2 ACCESSORY MATERIALS

- A. Thresholds: Fabricate to provide transition between adjacent floor finishes. Bevel edges at 1:2 slope, limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.
 - 1. Marble Thresholds: ASTM C 503 with a minimum abrasion resistance of 12 per ASTM C 1353 or ASTM C 241 and with honed finish.
 - a. Description: Uniform, fine- to medium-grained white stone with gray veining.
- B. Waterproofing for Toilet Room and Kitchen Tile Installations:
 - 1. Fabric-Reinforced and Unreinforced, Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24)(ASTM D 3960), and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.10; one of the following:
 - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane. which is manufactured in the plant closest to the geographic location of the project.
 - b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane. which is manufactured in the plant closest to the geographic location of the project.
 - c. MAPEI Corporation; Mapelastic AquaDefense, which is manufactured in the plant closest to the geographic location of the project.
 - d. Ardex; Ardex [8+9] [WPC] which is manufactured in the plant closest to the geographic location of the project.
- C. Crack Isolation Membrane for Tile Installations:
 - 1. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24)(ASTM D 3960), and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.12; one of the following:
 - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane. which is manufactured in the plant closest to the geographic location of the project.
 - b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane,. which is manufactured in the plant closest to the geographic location of the project.
 - c. MAPEI Corporation; Mapelastic AquaDefense, which is manufactured in the plant closest to the geographic location of the project.

2.3 SETTING AND GROUTING MATERIALS

- A. Manufacturers and Plant Locations: Provide products manufactured in the plant closest to the geographic location of the project.
- B. Source Limitations: For each tile installation, obtain compatible formulations of setting and grouting materials containing latex or latex additives from a single manufacturer.
- C. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:
 - 1. Reinforcing Wire Fabric: Galvanized, flat, welded wire fabric, 2" x 2" x 0.062 inch diameter; comply with ASTM A1064 and ASTM A 82 except for minimum wire size.
 - 2. Latex Additive: Manufacturer's standard styrene-butadiene-rubber water emulsion, serving as replacement for all gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.
- D. Latex-Portland Cement Mortar (Thin Set):
 - 1. Prepackaged dry-mortar mix combined with dry powder latex additive, one of the following:
 - a. For Thin Set Placed over Slabs on Grade: ANSI A118.4 consisting of the following:
 - 1) Ultraflex 2 Mortar; MAPEI Corporation.
 - 2) Laticrete 253 Gold; Laticrete International Inc.
 - 3) Versabond Flex; Custom Building Products.
 - b. For Thin Set Tile Set over Walls, Membranes and Over Elevated Slabs: ANSI A118.15 consisting of the following:
 - 1) Kerabond Keralastic; MAPEI Corporation.
 - 2) Laticrete 272 mixed with Laticrete 333 Superflex; Laticrete International Inc.
 - 2. For wall applications, provide nonsagging mortar.
 - 3. For glass tile applications where a low temperature coating has not been factory applied to the tile, use mortar that will not show through glass tile bodies. For glass tile installations where a low temperature coating has been factory applied follow the glass tile manufacturer's written recommendations for mortar selection and application.
- E. Dry Set Mortar for Large and Heavy Tile (LHT Mortar): ANSI A118.4 :

1. Prepackaged dry-mortar mix combined with additives to minimize slump and facilitate a thicker bond coat, and specifically manufactured and recommended in writing by the mortar and underlayment manufacturer for use in LHT mortar assemblies; one of the following:
 - a. Ultraflex LFT Mortar; MAPEI Corporation.
 - b. Laticrete 4-XLT; Laticrete International Inc.
 2. For glass tile applications where a low temperature coating has not been factory applied to the tile, use mortar that will not show through glass tile bodies. For glass tile installations where a low temperature coating has been factory applied follow the glass tile manufacturer's written recommendations for mortar selection and application.
- F. Polymer-Modified Tile Grout (For Typical Applications): ANSI A118.7 compounded with calcium aluminate cement, non-shrinking, efflorescence free grout.
1. Polymer Type: Dry, redispersible latex/polymer powder form, prepackaged with other dry ingredients, one of the following:
 - a. Prism; Custom Building Products.
 - b. Permacolor; Laticrete International Inc.
 - c. Ultracolor Plus FA; Mapei Corporation.
 2. Colors: As selected by Architect from manufacturer's standards to match tile being grouted.

2.4 MISCELLANEOUS MATERIALS

- A. Joint Sealants:
1. Typical Surfaces: "Mildew-Resistant Silicone Sealant," as specified in Section 07 92 00 "Joint Sealants. "
 2. Floor Joints: "Two-Part Polyurethane Sealant for Paving Applications," as specified in Section 07 92 00 "Joint Sealants."
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- C. Grout Sealer: Grout manufacturer's recommended product for sealing cementitious grout joints and that does not change color or appearance of grout.
- D. Underlayment Product for Leveling and Patching Floors indicated to receive Tiles :
- Latex-modified, cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
1. Either Ultraplan or Novaplan Underlayment; MAPEI Corporation.

2. NXT Level Plus Underlayment; Laticrete International Inc.
- E. Metal Edge Strips for Wall Applications: Metallic, angle or L-shaped, depth to match tile and setting-bed thickness and having an integral provision for anchorage to substrate; white zinc alloy exposed-edge material; furnish in longest lengths available.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
- F. Divider, Transition, and Movement Joint Strips:
1. Divider and Transition Strips: Stainless steel shapes and flat bar trims fabricated from ASTM A 666 (for flat bar) and ASTM A 276 (for shapes) Type 304 stainless steel, 1/4 inch wide at top edge unless otherwise indicated, depth as required to suit conditions shown and having an integral provision for anchorage to mortar bed or substrate, unless otherwise indicated. Provide NAAMM #4 satin finish at exposed top edge in the long direction, furnish in longest lengths available.
 2. Movement Joint Strips: Laminations of extruded aluminum or formed stainless steel angle shapes, depth as required to finish flush with top surface of adjacent tile flooring fields, back to back installed with full height flexible filler to accommodate movement. Control joints shall have either an exposed approximately 5/8 inch wide interlocking continuous top to conceal prefabricated flexible filler or an exposed custom flexible prefabricated filler to accommodate movement. Joint assembly shall have a total movement capability of approximately 1/4 +1/8 inch/-3/32 /inch. Finish of exposed top to be satin. One of the following:
 - a. Basis of Design: Emseal Series ESF 16 ...|AL; Emseal Joint Systems, Ltd.
 - b. Schluter; Dilex -EDP, fabricated to comply with the specified requirements.
 - c. CTC (Ceramic Tool Company) ; CTC Joint custom fabricate to comply with the specified requirements.
 - d. Vexcolt; Ti-Lock Metal, TAM NL 42151 (for thickset) or TAM NA 1212 (for LHT mortar and thinset).

2.5 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions. Add materials and liquid latex additives in accurate proportions. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 PREINSTALLATION MEETING

- A. Prior to the installation of tile, and at the Contractor's direction, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the Owner, Architect, the Contractor, tile installer, tile and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present.
 - 1. Verify that substrates for setting tile are sound and free of voids, bugholes, rock pockets, honeycombs, and protrusions; and which are dry; clean; free of oil, waxy films, and curing compounds. Grind or scarify concrete substrates to remove existing floor adhesive and mortar residues (if any), laitance, films, sealing and curing compounds if they are determined to be present on the substrate.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in the existing floor substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
 - 4. Do not commence installation of flooring materials until floor substrate is within the following tolerances in all directions. If substrate is not within tolerance, level the substrate with a method and a underlayment product(s) that is compatible with and acceptable to the setting materials manufacturer.
 - a. Subfloor Surfaces to Receive Thinset and LHT Mortar Setting Beds: +/- 1/8 inch in 10 feet
 - b. Subfloor Surfaces to Receive Thickset Setting Beds: +/- 1/4 inch in 10 feet
 - c. No valleys or ridges greater than 1/8 inch
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Remove paint, coatings, including curing compounds and other substances that are incompatible with tile-setting materials.
- B. Blending: Color blend tiles at Project site before installing.

1. Furnish the same lots, batches, etc. within the same contiguous areas of the site (i.e. corridors on the same floors, common rooms which adjoin each other, etc.).

3.4 INSTALLATION, GENERAL

- A. Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" and the TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation." that apply to types of setting and grouting materials and to methods indicated.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
 1. Glass Tile Cutting: Use a blade suitable for cutting glass which must be constantly kept wet with water. Cut tiles with the colored surface turned upwards. Cutting shall not be carried out near the edges of the individual tiles. Smooth off any sharp edges with sandpaper. Holes can be made with a drill bit specifically recommended for drilling glass with a diameter up to 5/16-inch. Apply water continually while drilling.
- D. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area beginning at thresholds. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- E. Finished Surfaces: Unless otherwise accepted in the sample installation(s), if any, finished surfaces shall present a flat, even appearance, free from waver, projections, and depressions.
- F. Movement (Contraction, Control, Expansion, and Isolation Joints) Joints: Locate sealant filled movement joints where recommended by the manufacturer of mortar and grout materials but not less than the requirements of TCNA EJ171 which follows, and as accepted by the Architect. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles. Where movement joints are to be butted, the ends shall touch and align.
 1. Spacing Guidelines:
 - a. 20 to 25 feet in each direction where interior tile work is not exposed to direct sunlight or moisture.

- b. 8 to 12 feet in each direction where interior tile work is exposed to direct sunlight and moisture.
 - c. Where tilework abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials, but not at drain strainers.
 - d. In the joint between tiles making up the inside corner of planes.
 - e. All contraction, control, expansion, isolation, seismic and cold joints in the horizontal structure and vertical surfaces shall continue through the tile surfaces, but not through membranes.
 - f. Vertical and Horizontal Joints Widths: Widths for quarry tile and paver tile shall be the same as the grout joint but not less than 1/4 inch or the width of the contraction, control, expansion, seismic, isolation joint whichever is greater; widths for ceramic mosaic tile and glazed wall tile shall not be less than 1/8 inch or the width of the control, expansion, seismic, joint whichever is greater.
 - g. Keep movement joints free from dirt, debris, grout, mortar, and setting bed materials. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."
- G. Metal Edge Strips: Install where exposed edge of wall tile meets other wall finishes that finish flush with or below face of tile and the manufacturer of the field tile does not manufacture a tile edge transition trim. Where metal edge strips are indicated and full length single units are not available, joints are to be butted, the ends shall touch and align.
- H. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout sealer manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.5 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
 - 1. Do not install tile over waterproofing until waterproofing has cured, and at each horizontal installation, has been tested for water tightness. Test waterproofing membrane for watertightness by damming the floor drain, and creating a dam at the perimeter of the waterproofed basin followed by filling the basin with water, marking the height, and verifying the same height after 48 hours. Repair leaks before continuing with the installation of subsequent tile.

3.6 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.
 - 1. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.7 FLOOR TILE INSTALLATION

- A. Thinset Tile over Concrete Slabs (Typical): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F113.
 - a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch.
 - d. Place tiles onto mortar bed, maintaining 1/8-inchwide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
 - e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
- B. Thinset Tile over Waterproof Membrane (Toilet Rooms): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F122 (on ground) and F122A (above ground).
 - a. Apply the mortar to waterproofed slab with the flat side of the trowel.
 - b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch.
 - e. Place tiles onto mortar bed, maintaining 1/8-inch wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.

- f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
- C. Thinset Tile over Crack Isolation Membrane: Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F125-Full.
 - a. Apply the mortar to crack isolation membrane covered slab with the flat side of the trowel.
 - b. With a trowel, having notches sized as recommended by the mortar manufacturer, place and comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch.
 - e. Place tiles onto mortar bed, maintaining 1/8-inch wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.
 - f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
 3. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.
- D. LHT Set Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F205 (on-ground slabs) and TCNA F205A (above ground slabs) except apply LHT bed in thickness of 3/4" unless otherwise indicated.
 - a. Where required by the conditions indicated, apply underlayment using methods and within time limits recommended by the mortar manufacturer.

- b. With a trowel, having notches sized as recommended by the mortar manufacturer, place and comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch.
 - e. Place tiles onto mortar bed, maintaining 1/8-inchwide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.
 - f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
3. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.
- E. Thickset Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Thickness of mortar bed: Between 1-1/4-inch and 2-inches.
1. Mortar and Bond Coat:
 - a. Latex-Portland Cement Mortar: ANSI A108.1A (Wet Set Method).
 - b. Latex-Portland Cement Bond Coat: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F121.
 - a. Apply 1/2 of the mortar bed to slab and place reinforcing wire fabric. After placing mesh, apply balance of mortar bed. The mortar shall be rodded and compacted with a steel trowel.
 - b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying bond coat to tiles
 - c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile sheets for 100% coverage to thickness of not less than 1/16-inch

- d. Place tile onto the green mortar bed, maintaining 1/8-inchwide joints for typical tile units and 1/4-inchwide joints for quarry tile units if any, and true accurate pattern as shown. Tamp tile with wood block and rubber mallet to produce finish levels of tile matching adjacent tile surfaces. Beating shall take place prior to mortar taking and initial set. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.
- e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3.8 WALL TILE INSTALLATION

- A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.
 1. Latex Portland Cement Mortar Installation (using specified latex portland cement mortar material): ANSI A108.5.
 2. Cementitious Backerboard (Latex Portland Cement Mortar) Method: TCNA W244C, place tiles maintaining 1/8-inchwide joints, and true accurate pattern as shown.
 3. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.9 RECESSED ACCESS DOOR PANEL INSTALLATION

- A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.
 1. Latex Portland Cement Mortar Installation (using specified latex portland cement mortar material): ANSI A108.5 applied to access panel manufacturer supplied metal lath welded to panel substrate.
 2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCNA W243, place tiles maintaining 1/8-inchwide joints, and true accurate pattern as shown.

3. Grout Installation: Do not begin grouting tile units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints flush with the tile unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.10 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.
 1. Remove grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work. Replace all cracked, chipped, and broken tile units with matching tile units; patched tile units will not be permitted.
- C. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with minimum 40 lb kraft paper or other heavy, breathable, covering during construction period to prevent staining, damage, and wear.
- D. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

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SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.

1.2 SUBMITTALS

- A. Product Data: Submit product data for each type of product indicated.
- B. Shop Drawings: Submit shop drawings of reflected ceiling plans drawn accurately to large scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Patterns of ceiling suspension assembly members with setting out/work points.
 - 2. Method of attaching hangers to building structure.
 - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
- C. Samples: Submit samples for each acoustical panel, for each exposed suspension system member, for each exposed molding and trim, and for each color and texture required, prepared on Samples of size indicated below. Samples shall show the full range of color and texture variations to be expected in the final installation.
 - 1. Acoustical Panel: Set of 6-inch square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- long Samples of each type, finish, and color.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an Installer, with not less than 5 years experience in the installation of materials specified, and who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer.
- C. Performance Requirements: In areas where gypsum wallboard partitions are dependent on the ceiling suspension system for lateral support, design and install suspension system components to sustain the imposed load from the completed partition system including a minimum inward and outward pressure of 5 psf normal to the plane of the wall.

- D. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance according to one of the following standards, or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. ASTM E 119 "Test Methods for Fire Tests of Building Construction and Materials."
 - b. Underwriters Laboratory (UL) "Fire Resistance Directory."
 - 1) Fire Rated Acoustical Ceiling Panel Assemblies: Comply with UL Design Number D215 for the fire rating indicated on the drawings.
 2. Identify materials with appropriate markings of applicable testing and inspecting agency.
 3. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with one of the following:
 - a. ASTM E 1264 "Standard Classification for Acoustical Ceiling Products" for Class A materials as determined by testing identical products per ASTM E 84 "Standard Test Method for Surface Burning Characteristics of Building Materials":
 - 1) Smoke-Developed Index: 450 or less.
- E. Sound Transmission Characteristics: For acoustical panel ceilings with STC ratings, provide materials and construction identical to those tested in assembly indicated according to the following standards:
1. ASTM E 90 "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements."
 - a. Classified according to ASTM E 413 "Classification for Rating Sound Insulation" by a qualified independent testing agency.
- F. Sample Installations: Before installing acoustical panel ceilings, install sample installations, for each type of acoustical panel ceiling installation required to demonstrate aesthetic effects and qualities of materials and execution. The sample installation shall be complete in every way and include all attachments to structure, hangers, grids, ceiling panels, moldings and column trims, light fixtures, air outlets and inlets; speakers, sprinklers heads, heat and smoke detectors. Install sample installations to comply with the following requirements, using materials indicated for the completed Work:
1. Size and Location: Provide 250 square foot sample installations in locations as directed by Architect.
 2. Demonstrate the proposed range of aesthetic effects and workmanship.
 3. Obtain Architect's approval of sample installations before starting work.

4. Maintain sample installations during construction in an undisturbed condition as a standard for judging the completed Work.
5. Approved sample installations may become part of the completed Work if undamaged at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until wet work (painting, drywall, interior tilework, and concrete leveling) in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.6 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.7 EXTRA MATERIALS

- A. Furnish and store at the site where directed, 2% of each type of acoustic panel installed in the Project, packaged in manufacturer's unopened cartons and identified as to contents.

PART 2 - PRODUCTS

2.1 METAL SUSPENSION SYSTEMS

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M .

1. Recycled Content: Provide products made from steel sheet with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
 2. Edge Condition of Cross Runners: Unless otherwise indicated, provide mitered type cross runner to main tee runner intersections. Coordinate locations of notches in the main tees with adjacent ceiling, light, and diffuser modules to effect a notch free condition where cross tees are not indicated to intersect with the main tee.
- B. Overhead Deck Hanger Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
1. Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with eyepins, clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling assembly as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
- C. Hangers: As follows:
1. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - a. Size: Select wire diameter so its stress at three times hanger design load ASTM C 635/C 635M, Table 1, "Direct Hung" will be less than yield stress of wire, but provide not less than 12 ga. (0.106-inch)- diameter wire.
 2. Rod Hangers: ASTM A 510, mild carbon steel.
 - a. Diameter: 1/4-inch.
 - b. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
 3. Flat Hangers: Commercial-sheet steel, ASTM A 653/A653M with G60, hot dip galvanized zinc coating.
 - a. Size: 1 by 3/16 inch by length indicated.
- D. Carrying Channels: ASTM C 754 with G60 coated cold rolled steel channels, 1-1/2-inch, 475 pounds per 1000 feet.
- E. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners; provide in longest standard single piece lengths.

1. Shadow (Stepped Moldings): Stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member. Form from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
2. F Moldings: Provide F moldings at ceiling breaks, soffits, bulkheads, and changes in elevation other than vertical walls and columns to the extent indicated. Form from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.

Metal Perimeter Channel Trim: Shapes and profiles to suit conditions indicated; fabricated from extruded aluminum; finished to match exposed flanges of suspension system runners. Provide manufacturer's recommended tee-bar connection clips, and hanging clips, which lock into specially designed bosses on the channel trim and are screw attached to the web of the intersecting suspension system members. Join sections of trim together with manufacturer's standard splice plates and alignment clips.

Perimeter Wing Trim: Shapes and profiles to suit conditions indicated; fabricated from and finished to match exposed panel. Provide manufacturer's recommended connect wing cantilevers, connect splines, connect hooks, connect multi-connection, and installation screws suitable for installation indicated.

- F. Clips: Provide support clips, clamps, fasteners, splines, and other attachment devices as required to align components and to connect components and transfer imposed loads of suspension system.
1. Provide partition attachment clips, and fasteners for areas where partition ceiling runners are secured to the ceiling suspension system.
 2. Provide attachment clips for runner to angle molding to avoid use of pop rivets.
 3. Provide grid converter accessories as required to change main tee direction 90 degrees from adjacent main tee.
 4. Provide light fixture clips.
 5. Provide hold down clips at entryways to reduce flutter as required.
 6. Provide miter closure clips.
- G. Manufacturers and Products: Refer to Drawings and Schedules for extent and types of each metal suspension system required.

2.2 ACOUSTICAL PANELS (APC##)

- A. Manufacturers and Products: Refer to Drawings and Schedules for extent and types of each acoustical panel required.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation, anchorage, with requirements for installation tolerances, and other conditions affecting performance of acoustical panel ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Layout the Work to center board pattern both directions around Work points shown in each major space or room as shown on the drawings or directed and, where possible, adjust pattern so that edge pieces will be not less than 1/2 unit in width.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic requirements indicated, per manufacturer's written instructions, and ASTM C636, and CISCA's "Ceiling Systems Handbook," and as required to match the accepted sample installation.
- B. Suspend ceiling hangers as follows:
 - 1. Fasten hangers to anchors that extend into decks. Space hangers not more than 48 inches along each member supported directly from hangers; and provide hangers not more than 6 inches from ends of each member. Provide additional hangers for support of fixtures and other items including but not limited to light fixtures and diffusers, as required to prevent overloading of deck attachment, eccentric deflection or rotation of supporting runners.
 - 2. Hangers:
 - a. Secure wire hangers to ceiling suspension members and to supports above with a minimum of 3 tight turns. Connect hangers directly to drilled in anchors (eye screws), or other devices that are secure, and are appropriate for substrate.
 - b. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to drilled in anchors, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved.
 - 3. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 4. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of the supporting structure or of the ceiling suspension system.

5. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Typical Edge Molding Attachment: Align moldings accurately and screw attach securely to substrate with concealed fasteners at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system. Miter corners accurately and connect securely.
 - a. Do not use exposed fasteners, including pop rivets, on moldings and trim.
 2. Window and Curtainwall Frame Head Attachment: Unless otherwise indicated, align moldings accurately and secure to window and curtainwall frame heads using manufacturers recommended double sided foam white tape, leveling with ceiling suspension system. Miter corners accurately and adhere securely.
 - a. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension system runners so they are square and securely interlocked with one another. Clip runners to angle moldings do not use exposed fasteners. Finish to lines and levels shown, with maximum deflection not to exceed 1/360 of the span between supports. Laser level accurately in all directions, leveling to a tolerance of 1/8-inch noncumulative. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Run grain of units in one direction as accepted on shop drawings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 3. For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
 4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using sealer and coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 54 43 - STRETCHED-FABRIC CEILING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes site-upholstered ceiling systems.

1.3 DEFINITIONS

- A. NRC: Noise Reduction Coefficient.
- B. SAA: Sound absorption average.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include[fabric facing,] frame edge and trim, core material, and mounting indicated.
- B. Shop Drawings: For each stretched-fabric system.
 - 1. Include reflected ceiling plans, elevations, sections, and installation and system details.
 - 2. Include details at joints and corners; and details at ceiling intersections and intersections with walls. Indicate frame-edge profile and core materials.
 - 3. Include details at cutouts and penetrations for other work.
 - 4. Include direction of fabric weave and pattern matching.
 - 5. Show sewn-seam locations, types, and methods.
- C. Samples for Initial Selection: For each type of fabric facing.
 - 1. Include Samples of accessories involving color or finish selection.
- D. Samples for Verification: For the following products:
 - 1. Fabric: Full-width by approximately [36-inch-] <Insert dimension> long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
 - 2. Frame System: 12-inch- square Sample(s) showing each edge profile and corner.

3. Core Material: 12-inch- square Sample at corner.
4. Assembled System: Approximately 36 by 36 inches , including joints[and seams] in mockup.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 1. Electrical outlets.
 2. Suspended ceiling components above stretched-fabric systems.
 3. Structural members to which suspension devices will be attached.
 4. Items penetrating or covered by stretched-fabric systems including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Alarms.
 - e. Sprinklers.
 - f. Access panels.
 - g. .
 5. Show operation of hinged and sliding components covered by or adjacent to stretched-fabric systems.
- B. Qualification Data: For Installer.
- C. Product Certificates: For each type of stretched-fabric system.
- D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For stretched-fabric systems to include in maintenance manuals. Include fabric manufacturer's written cleaning, stain-removal, restretching, and reupholstering instructions.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Fabric: For each fabric, color, and pattern installed, furnish length equal to 10 percent of amount installed, but no fewer than 10 sq. yd., full width of bolt.

2. Framing and Related Installation Items: Furnish manufacturer's full-length units equal to 5 percent of amount installed, but no fewer than 5 units, including unopened adhesives.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and stretched-fabric system manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install stretched-fabric systems until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install stretched-fabric systems until a permanent level of lighting is provided on surfaces to receive stretched-fabric systems.

1.11 WARRANTY

- A. Special Warranty: Manufacturer and Installer agree to repair or replace components of stretched-fabric systems that fail in performance, materials, or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Acoustical performance.
 - b. Fabric sagging, distorting, or releasing from panel edge.
 - c. Warping of core.
 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain stretched-fabric ceiling systems specified in this Section[and stretched-fabric wall systems specified in Section 09 77 13 "Stretched-Fabric Wall Systems"] from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Stretched-fabric ceiling systems shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency on systems prepared according to ASTM E 2573. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 286.

2.3 STRETCHED-FABRIC CEILING SYSTEMS

- A. Stretched-Fabric Ceiling System <SC##>: Manufacturer's standard system consisting of facing material stretched tightly over a frame and secured in the frame.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings

2.4 INSTALLATION MATERIALS

- A. Installation Products: Concealed on back of system, recommended by stretched-fabric system manufacturer to support weight of system, fabric tension, and as follows:
 - 1. Fasteners: Manufacturer's standard.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fabric, materials, substrates, areas, and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of stretched-fabric systems.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each area and establish layout of panels and joints of sizes indicated on Drawings within a given area.

3.3 INSTALLATION

- A. Install stretched-fabric systems according to system manufacturer's written instructions.
 - 1. Provide continuous perimeter frames of each profile indicated, designed to be inconspicuous when covered by fabric facing, with smooth edges, and with surface finish that will not telegraph through fabric facing.
 - 2. Install framing around penetrations.
 - 3. Tightly fit framing to adjacent construction and securely attach to substrate.
 - 4. Install core material with full coverage, flush with face of stretched-fabric system frame.
 - 5. Attach frame and core to substrate with adhesive or fasteners, or both, to support system and prevent deformation of components.
 - 6. Install stretched-fabric systems true in plane and with fabric square to the grain.
- B. Fabric Installation: Apply fabric monolithically in continuous run over area, without joints or reveals, except where panel joints or midspan frames are indicated.
 - 1. Fabric Direction: Run fabric as indicated on Drawings.
 - 2. Fabric Sequence: Maintain sequence of fabric drops; match and level fabric pattern and grain.
 - 3. Fabric Alignment: Install fabric with patterns or directional weaves so pattern or weave varies from adjacent panels as indicated on Drawings.
 - 4. Fabric Seams: Manufacturer's standard sewn seams, straight and parallel; seam dimensions and locations as indicated on Drawings.
 - 5. Stretch and secure fabric to frame edges and so frame and frame attachment method are concealed by fabric unless otherwise indicated.
 - 6. Stretch fabric tightly and square without puckers, ripples, or distortions. Acclimatize and restretch if recommended by stretched-fabric system manufacturer. Repair distortions, wrinkles, and sagging.

7. Trim Strip: Back-wrap trim strip fabric from the fabric-insertion point over the exposed part of the frame edge where indicated, resulting in a contrasting fabric along the edge.

3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 09 54 43

SECTION 09 65 13 - RESILIENT WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes resilient wall base and accessories.

1.2 SUBMITTALS

- A. Product Data: Submit product data for each product indicated.

1.3 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient wall base and accessories during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.4 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 RESILIENT WALL BASE (RB##)

- A. Products and Manufacturers: Refer to the Finish Schedule and the drawings. Nominal thickness not less than 1/8 inch unless greater thickness is scheduled. All resilient base shall be manufactured from rubber complying with ASTM F 1861, Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic), Group I (solid, homogeneous). Provide all resilient wall base in continuous coils to minimize field butt joints. Provide all resilient wall bases with a straight flat or toeless base style typically, and with coved base toe style at resilient floors, unless otherwise indicated on the Finish Schedule on the drawings.

2.2 RESILIENT MOLDING ACCESSORY

- A. Description: Reducer strip for resilient floor covering
- B. Material: Rubber.
- C. Profile and Dimensions: As indicated on the Drawings.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based formulation provided or approved by resilient product manufacturers for applications indicated.
- B. Adhesives: Water-resistant type recommended by the resilient wall base and accessories manufacturer to suit resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.
- B. Remove paint, sealers, existing floor covering adhesive residues, substrate coatings and other substances that are incompatible with adhesives to be used for installing resilient stair accessories using mechanical methods recommended by manufacturer. Do not use solvents.
- C. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 - 1. Do not install resilient products until they are the same temperature as the space where they are to be installed.
- D. Sweep and vacuum clean substrates to be covered by resilient stair accessories products immediately before installation.

3.3 RESILIENT WALL BASE INSTALLATION

- A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- D. Do not stretch wall base during installation.
- E. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Remove adhesive and other blemishes from exposed surfaces.
- B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

END OF SECTION 09 65 13

SECTION 09 65 19 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes resilient floor tile.

1.2 SUBMITTALS

- A. Product Data: Submit product data for each type of product indicated.
- B. Samples: Submit full-size units of each color and pattern of resilient floor tile required.
- C. Maintenance Data: Submit maintenance data for resilient floor tile and floor finish products.

1.3 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install resilient products after other finishing operations, including painting, have been completed.

1.4 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 RESILIENT FLOOR TILE (RT##)

- A. Products and Manufacturers: Refer to the drawings and the Finish Schedule. Nominal thickness not less than 1/8 inch unless greater thickness is scheduled.
 - 1. DCRA IGCC Requirements: A minimum of 85 percent of the total area of flooring installed within the interior of the building shall comply with the following VOC limits: Individual \leq 1/2 CA Chronic Reference Exposure Level, Formaldehyde \leq 16.5 $\mu\text{g}/\text{m}^3$ or \leq 13.5 ppb.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based formulation provided or approved by resilient product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
- C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.
- D. Vinyl Composition Tile Protective Floor Polish: Product recommended by manufacturer to suit resilient products indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare concrete substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare concrete substrates as follows:
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
- C. Remove paint, sealers, substrate coatings, existing floor covering adhesive residues (if any), and other substances that are incompatible with adhesives using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- E. Apply primer to concrete slabs, if recommended by the flooring manufacturer, prior to application of adhesive.
- F. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 - 1. Do not install resilient products until they are same temperature as space where they are to be installed.
- G. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 INSTALLATION

- A. Lay out tiles so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis unless otherwise indicated. .
- B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
- C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings. Extend unexposed edges of flooring under set on bases and similar trim work.

- D. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- F. Install tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- G. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation which is smooth, clean and free from imperfections such as open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
 - 4. Do not wash or apply floor polishes until flooring adhesives have cured unless otherwise recommended by the flooring manufacturer.
- B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
 - 1. Apply protective floor polish to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes using methods as recommended in writing by the floor polish manufacturer. Apply no fewer than 2 coats of floor polish unless additional coats are recommended by the floor polish manufacturer for the application indicated.
 - a. Use commercially available product acceptable to manufacturer.
 - 2. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.
 - 3. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 09 65 19

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes carpet tile.

1.2 STANDARDS

- A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
 - 1. The Carpet and Rug Institute "CRI 104 Commercial Carpet Installation Standard."

1.3 SUBMITTALS

- A. Product Data: Submit product data, specifications, installation instructions for materials specified herein and other data as may be required to show compliance with the Contract Documents. Include installation recommendations for each type of substrate required.
- B. Shop Drawings: Submit shop drawings showing the following:
 - 1. Existing floor materials to be removed.
 - 2. Existing floor materials to remain.
 - 3. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 4. Carpet tile type, color, and dye lot.
 - 5. Type of subfloor.
 - 6. Type of installation.
 - 7. Pattern of installation, carpet locations, direction, and starting points per floor.
 - 8. Type, color, and location of insets and borders.
 - 9. Type, color, and location of edge, transition, and other accessory strips.
 - 10. Pile direction.
 - 11. Transition and other accessory strips.
 - 12. Transition details to other flooring materials.
- C. Samples: Submit samples showing full range of color, texture, and pattern variations expected. Prepare samples from same material to be used for the Work. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules. Submit the following:
 - 1. Carpet Tile: Full-size Samples.
 - 2. Exposed Edge Stripping and Accessory: 12-inch- long Samples.

- D. Maintenance Data: Submit copies of instructions for care, cleaning, maintenance and repair of carpeting.
 - 1. Each carpet manufacturer shall meet with the authorized Building Services personnel in the presence of the Owner, to review the characteristics of his product and to recommend appropriate maintenance procedures, prior to occupancy of the finished spaces.
- E. Warranty: Submit special warranties specified in this Section.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Materials: Furnish extra materials described below before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. .
- B. Attic Stock: Package and deliver usable remnants of carpet to the Owner's storage room as directed by the Owner at the conclusion of the job. Include any uncut carpet tiles.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage a carpet installer, who has completed a minimum of three (3) projects over the last 10 years which were similar in material, design and extent to that indicated for the project - as determined by the Architect - and which have resulted in construction with a record of successful in service performance.
 - 1. In the case where the Installer is actually a Dealer, it is understood that the terms Installer, Dealer, Carpeting Contractor and Contractor shall be one and the same for purposes of this Contract. He shall assume responsibility for all of the work, including acquisition of the materials from the manufacturers herein specified.
- B. Mill Inspection: The carpeting may be inspected to determine compliance with the Contract Documents with respect to manufacture, materials, pattern and colors. Inspection may be made at the mill by a representative of the Architect and/or Owner at any time during the process of manufacture.
- C. Sample Installations: Before installing carpet, install sample installation, for each type of carpet installation required to demonstrate aesthetic effects and qualities of materials and execution. Install sample installations to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Size and Location: Provide 250 square foot sample installation in location as directed by Architect.
 - 2. Demonstrate the proposed range of aesthetic effects and workmanship.

3. Obtain Architect's approval of sample installations before starting work.
4. Maintain sample installations during construction in an undisturbed condition as a standard for judging the completed Work.
5. Approved sample installations may become part of the completed Work if undamaged at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.
- B. Deliver carpeting in original mill protective wrapping with mill register numbers and tags attached.
- C. Deliver other materials in manufacturers unopened containers identified with name, brand, type, grade, class, and other qualifying information.
- D. Store materials in a dry location, in such a manner as to prevent damage.

1.7 FIELD CONDITIONS

- A. General: Comply with CRI 104.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install carpet tile until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Do not install carpet tile over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

1.9 WARRANTY

- A. Special Carpet Manufacturer's Warranty: Written warranty, signed by carpet tile manufacturer agreeing to replace carpet tile that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, wear, static buildup in excess of 3.0 kV when tested under the Standard Shuffle Test at 70 deg. F and 20% RH, edge raveling without seam sealers, tuft bind loss, zippering (wet or dry), shrinkage, curling, doming, snags, runs, and delamination. Warrantees shall be full term, not pro-rated for the specified warranty period.
 1. Warranty Period: 10 years from date of Substantial Completion.

- B. Special Carpet Tile Installer's Warranty: Written warranty, signed by carpet tile installer agreeing to fix, repair or replace carpet tile that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than edge raveling, shrinkage, curling, doming, and delamination.
1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide all carpet furnished for the project complying with the following performance requirements:
1. Smoke Density: ASTM E662 less than 450, Flaming Mode.
 2. Surface Flammability ASTM D2859/ ISO 6925 Methenamine Pill Test.
 3. Critical Radiant Flux: ASTM E-648 Radiant Panel Test Class I, average minimum 0.45 watts per square centimeter.
 4. Flammability BS 4790 Hot Metal Nut <?20mm Low Radius.
 5. Electrostatic Propensity AATCC 134 / ISO 6356 Permanent Anti-Stat <?3.0KV.
 6. Insect Resistance: Fully Mothproofed.
 7. Stain Resistance: Stain resistance treatment shall be permanent and not removable by commercial cleanings or abrasive wear.

2.2 CARPET TILE (C##)

- A. Carpet Tile Types: Provide manufacturers commercial grade carpet tile for 100% glue down installation as scheduled on the drawings.

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Portland cement-based formulation provided by or recommended by carpet tile manufacturer. Do not use gypsum based compounds.
- B. Carpet Adhesives: Water-resistant, mildew resistant, and nonstaining, high solids, low VOC emitting formulations that are specifically recommended by the carpet manufacturer, as verified through compatibility and adhesion testing for the intended substrate and application, and that comply with flammability requirements for installed carpet.

- C. Carpet Edging: Provide rubber composition carpet edging in single lengths wherever possible, keeping the number of joints or splices to a minimum. Provide in quantities and locations as job required based upon the recommended good practice of the industry; include in every location where carpet terminates and other flooring continues. Color to match adjacent carpet types.
- D. Floor Sealer: Type as recommended and manufactured by the carpet tile manufacturer for the applications indicated.
 - 1. VOC Limits: Provide floor sealer with VOC content not more than 200 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24)(ASTM D 3960).

PART 3 - EXECUTION

3.1 PRE-INSTALLATION MEETING

- A. Prior to the installation, and at the Contractor's direction, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the Owner, Architect, the Contractor, the installer, material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 PREPARATION

- A. Coordinate the installation of carpet so as not to delay the occupancy of the site or interfere with the completion of construction.
- B. Examine the substrates, adjoining construction and the conditions under which the Work is to be installed. Verify recommended limits for moisture content and alkalinity of concrete substrates with carpet manufacturer.
 - 1. Moisture Content: Verify moisture content using a standard calcium chloride crystal test or a 1 square yard clear plastic test. Perform testing at a frequency as recommended by the carpet manufacturer. Perform testing at a frequency of not less than once every 1,000 square feet .
 - 2. Alkalinity Test: Verify alkalinity of concrete substrates by drilling a 3/8 inch diameter hole approximately 1/4 inch deep, remove all residue; fill with distilled water, allow water to stand 3 minutes and test with a calibrated electronic meter or Ph paper. Perform testing at a frequency of not less than once every 1,000 square feet
 - 3. Alternative test procedures for moisture content and alkalinity may be acceptable subject to the carpet manufacturer's review and written acceptance.
- C. Concrete Subfloors: Verify that concrete slabs comply with the following:

1. Provide one of the following:
 - a. Remove coatings, including curing compounds, existing floor covering adhesive residues, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by the carpet manufacturer.
 - b. In lieu of mechanical substrate preparation methods the Contractor may utilize floor sealer materials and methods of the types and methods as recommended, in writing, by the carpet tile manufacturer. Apply sealer in number of coats, and at the spread rate, as required by the carpet tile manufacturer.
 2. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the carpet manufacturer.
 3. Use leveling and patching compounds recommended by flooring manufacturer for filling cracks, holes and depressions in the substrate. Surface shall be smooth, level and at proper elevation. Remove ridges, roughness and protrusions from concrete surfaces by grinding.
- D. For access flooring systems, verify the following:
1. Access floor complies with requirements specified in Division 09 Section "Access Flooring."
 2. Access floor substrate is compatible with carpet tile and adhesive if any.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet.
- F. Carpet installation shall not commence until painting and finishing work are complete and ceiling and overhead work is tested, approved, and completed.
- G. Proceed with installation only after unsatisfactory conditions have been corrected

3.3 INSTALLATION

- A. General: Comply with the manufacturer's instructions, specified industry standards and recommendations, and as required to match the accepted sample installations. Apply adhesive in accordance with adhesive manufacturer's directions.
- B. Adhere all full size, perimeter tiles, and cut tiles, with a full spread of adhesive. Dry fit cut tiles and apply adhesive to tile back after tile has been cut. Use full uncut tiles down the center of corridors and, where necessary, cut perimeter tiles to butt walls.
1. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

2. Cut openings in carpet for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges of carpet will be covered by plates and escutcheons.
 3. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- C. Butt carpet tile tightly together to form seams without gaps or entrapped pile yarns and aligned with adjoining tiles.
- D. Edge Strip Installation: Install edge strip at every location where edge of carpet is exposed to traffic, unless otherwise indicated. Unless otherwise directed by Architect install in single lengths and secure in accordance with manufacturer's directions.
- E. Traffic over adhesive installations shall be restricted until adhesive has properly cured in accordance with the adhesive manufacturers recommendations.

3.4 CLEANING AND PROTECTION

- A. Cleaning: As the carpeting is installed, remove and dispose of all trimmings, excess pieces of carpeting and laying materials from each area as it is completed. Vacuum carpeting with a commercial vacuum, having a cylindrical brush or beater bar and high suction. Remove adhesives, stains, and soil spots in accordance with the carpet manufacturer's recommendations.
- B. Protection: Protect carpeting against damage of every kind as damaged carpeting shall be rejected. Use non-staining cover material for protection. Tape joints of protective covering.
1. Plastic and polyethylene sheet protective coverings shall not be permitted.
 2. Remove and replace rejected carpeting with new carpeting. At the completion of the work and when directed by the Architect, remove covering, vacuum clean carpeting and remove soiling and stains (if any) to the satisfaction of the Architect.

END OF SECTION 09 68 13

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SECTION 09 68 16 - SHEET CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Tufted carpet.
 - 2. Woven carpet.
 - 3. Carpet cushion.
- B. Related Requirements:
 - 1. Section 02 41 19 "Selective Demolition" for removing existing floor coverings.
 - 2. [Section 09 65 13 "Resilient Base and Accessories"] [Section 09 65 19 "Resilient Tile Flooring"] for resilient wall base and accessories installed with carpet.
 - 3. Section 09 68 13 "Tile Carpeting" for modular carpet tiles.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics and durability.
 - 2. Include manufacturer's written installation recommendations for each type of substrate.
- B. Shop Drawings: For carpet installation, showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
 - 2. Carpet type, color, and dye lot.
 - 3. Locations where dye lot changes occur.
 - 4. Seam locations, types, and methods.
 - 5. Type of subfloor.
 - 6. Type of installation.
 - 7. Pattern type, repeat size, location, direction, and starting point.
 - 8. Pile direction.
 - 9. Types, colors, and locations of insets and borders.
 - 10. Types, colors, and locations of edge, transition, and other accessory strips.

11. Transition details to other flooring materials.
 12. Type of carpet cushion.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet: 12-inch- square Sample.
 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- long Samples.
 3. Carpet Cushion: 6-inch- square Sample.
 4. Carpet Seam: 6-inch Sample.
 5. Mitered Carpet-Border Seam: 12-inch- square Sample. Show carpet pattern alignment.
- D. Samples for Initial Selection: For each type of product.
1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.
- E. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet: 12-inch- square Sample.
 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- long Samples.
 3. Mitered Carpet-Border Seam: 12-inch- square Sample. Show carpet pattern alignment.
- F. Product Schedule: For carpet[and carpet cushion]. Use same designations indicated on Drawings.
- G. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet[and carpet cushion], for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
 1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the [Commercial II] [Master II] <Insert description> certification level.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockups at locations and in sizes shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."
- B. Deliver carpet in original mill protective covering with mill register numbers and tags attached.

1.9 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

1.10 WARRANTY

- A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent loss of face fiber, edge raveling, snags, and runs.
 - b. Loss of tuft bind strength.
 - c. Excess static discharge.
 - d. Delamination.
 - e. .
 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET <C##>

- A. Manufacturers: Subject to compliance with requirements, provide the product indicated in our drawings on the finish schedule:
- B. Color: As indicated by manufacturer's designations.
- C. Pattern: [As indicated by manufacturer's designations.
- D. Roll Width: 6 feet.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet and carpet cushion manufacturers.
- C. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with CRI's "CRI Carpet Installation Standard."

- D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- E. Metal Edge/Transition Strips: Extruded aluminum with finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance.
- B. Examine carpet for type, color, pattern, and potential defects.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard" and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch , unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive, carpet, and carpet cushion manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.3 CARPET INSTALLATION

- A. Comply with CRI's "CRI Carpet Installation Standard" and [**carpet manufacturer's**] [**carpet and carpet cushion manufacturers**] written installation instructions for the following:
 - 1. Direct-glue-down installation.
 - 2. Double-glue-down installation.

3. Carpet with attached-cushion installation.
 4. Preapplied adhesive installation.
 5. Hook-and-loop installation.
 6. Stretch-in installation.
 7. Stair installation.
- B. Comply with carpet manufacturer's written instructions and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Install as indicated on Drawings.
- D. Install borders with mitered corner seams.
- E. Do not bridge building expansion joints with carpet.
- F. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- G. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- H. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet as marked on subfloor. Use nonpermanent, nonstaining marking device.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet:
1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 2. Remove yarns that protrude from carpet surface.
 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI's "CRI Carpet Installation Standard."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods recommended in writing by carpet manufacturer .

END OF SECTION 09 68 16

SECTION 09 72 00 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes wall coverings.

1.2 SUBMITTALS

- A. Product Data: Submit product data for each type of product indicated.
- B. Shop Drawings: Include location and extent of each wall covering type, seam locations and termination points.
- C. Samples: Submit wall covering samples in full width by 36-inch- long sections of wall covering for each wall covering indicated and for each color, pattern, and texture required. Include sample sets with specified treatments applied. Samples shall show complete pattern repeat.
- D. Maintenance Data: Submit maintenance data for wall coverings.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has specialized in the installation of wall coverings similar to that required for this project.
- B. Mockups: Install mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Install mockups [as shown on Drawings] <Insert requirements>.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install wall coverings until wet-work in spaces is completed and dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at the levels indicated when the site is occupied for its intended use.
- B. Lighting: Do not install wall covering until a permanent level of lighting is provided on the surfaces to receive wall covering.

- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by the wall covering manufacturer for full drying or curing.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, from the same production run as the wall coverings installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Rolls of Wall Covering Material: Full-width rolls of wall covering equal to 5 percent of amount of each type installed, but not less than 1 full roll.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace wall covering that does not comply with requirements or that fails within two years from date of Substantial Completion. Warranty does not include deterioration or failure of wall covering from failure of substrate, vandalism, or abuse. Failures include, but are not limited to, blistering, fading, fraying, seam delamination, and discoloration.

PART 2 - PRODUCTS

2.1 WALL COVERING PRODUCTS (WC##)

- A. General: Provide rolls of each type of wall covering from the same run number or dye lot. Color and pattern matching Architect's samples.
- B. Products and Manufacturers: As indicated on the drawings and on the Finish Schedule.

2.2 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application, as recommended in writing by wall-covering manufacturer, and with a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24)(ASTM D 3960).
 - 1. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- B. Primer/Sealer: Mildew-resistant primer/sealer recommended in writing by wall-covering manufacturer for intended substrate and with a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24)(ASTM D 3960).
- C. Wall Liner: Nonwoven, synthetic underlayment and adhesive as recommended by wall covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair wall covering's bond, including mold, mildew, oil, grease, incompatible primers, dirt, and dust.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Gypsum Board: Prime with primer recommended by wall-covering manufacturer.
 - 2. Painted Surfaces: Treat areas susceptible to pigment bleeding.
 - 3. Metals: If not factory primed, clean and apply rust-inhibitive zinc primer.
 - 4. Moisture Content: Maximum of 5 percent on new concrete masonry units when tested with an electronic moisture meter.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.
- E. Install wall liner, with no gaps or overlaps, where required by wall covering manufacturer. Form smooth wrinkle-free surface for finished installation. Do not begin wall covering installation until wall liner has dried.
- F. Remove electrical plates and covers, light fixture trims, and similar items.
- G. Acclimatize wall covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
 - 1. Fabric Wrapped Panel Applications: For application of fabrics to stretched fabric wall systems refer to Section 09 77 13 Stretched-Fabric Wall Systems."

3.4 CLEANING

- A. Use cleaning methods recommended in writing by the wall covering manufacturer. Replace strips that cannot be cleaned.
- B. Reinstall electrical plates and covers, light fixture trims, and similar items.
- C. Remove all droppings, trimmings, and other debris, and protect the installation so that it will be clean and without indication of damage at the time of acceptance by the Architect.

END OF SECTION 09 72 00

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field painting of exposed interior items and surfaces.
- B. Paint exposed surfaces. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1.2 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
 - 1. Flat refers to a lusterless or matte finish with a gloss range below 5 when measured at an 60-degree meter.
 - 2. Eggshell refers to low-sheen finish with a gloss range between 5 and 10 when measured at a 60-degree meter.
 - 3. Satin refers to low sheen finish with a gloss range between 10 and 20 when measured at a 60-degree meter.
 - 4. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
 - 5. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.3 SUBMITTALS

- A. Product Data: Submit product data for each paint system indicated. Include block fillers and primers.
- B. Samples: Submit samples for each color and material to be applied, with texture to simulate actual conditions.
 - 1. Provide stepped Samples, defining each separate coat, including primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.

2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
3. Submit paint samples on 12 inches square of hardboard for the Architect's review of each color and texture required.

1.4 QUALITY ASSURANCE

- A. **Applicator Qualifications:** Engage an experienced applicator who has completed painting system applications similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. **Source Limitations:** Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Products:** Subject to compliance with requirements, provide products of one of the following:
 1. Benjamin Moore & Co. (Benjamin Moore). www.benjaminmoore.com
 2. PPG Paints (PPG Architectural Coatings). www.ppgaf.com
 3. Sherwin-Williams Co. (Sherwin-Williams). www.sherwinwilliams.com.

2.2 PAINT MATERIALS, GENERAL

- A. **Material Compatibility:** Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. **VOC Classification:** Provide materials, including primers, undercoats, and finish-coat materials, that meet the following criteria for VOC classification:
 1. 50 grams/liter or less for flat coatings.
 2. 100 grams/liter or less for non-flat coatings.
 3. 150 grams/liter for non-flat, high gloss coatings.
 4. 100 grams/liter or less for primers, sealers, and undercoaters.
- C. **Material Quality:** Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- D. Colors: Provide custom colors of the finished paint systems to match Architect's samples.

2.3 COLOR SCHEDULE

- A. Reference to a particular manufacturer's number or color name is used only as a convenience for the Architect in order to establish the Project color requirements. These references are not intended to describe the required generic paint systems. For generic paint systems requirements, refer to the "Schedule of Interior Painting" as applicable to the respective conditions of use.
- B. The selection of paint colors are indicated on the drawings by manufacturer and color type; designated as "P-__" for interior paint finishes.
1. Furnish the same lots, batches, etc. within the same contiguous areas of the building (i.e. corridors on the same floors, common rooms which adjoin each other, etc.).
- C. Color Schedule: The color schedule shall be considered as a guide only to color requirements; subject to Architect's modification or acceptance. For color schedule, refer to Finish Schedules on Drawings.

2.4 PREPARATORY COATS

- A. Concrete Unit Masonry Block Filler: High-performance latex block filler manufactured by finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
- B. Interior Primers: Interior latex-based primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
1. Ferrous-Metal Primer: Quick drying, rust-inhibitive metal primer.
 2. Zinc-Coated Metal Primer: Galvanized metal primer.
 3. Interior Concrete Primer: Factory-formulated alkali-resistant acrylic-latex interior primer for interior application.
 4. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
 5. Interior Wood Primer: Factory-formulated acrylic-latex-based interior wood primer.
 6. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

2.5 INTERIOR FINISH COATS (P##)

- A. Interior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for interior application.
1. Benjamin Moore; Ultra Spec WB Interior Flat Finish 443: Applied at a dry film thickness of not less than 1.3 mils .
 2. PPG Paints; PPG SPEEDHIDE zero VOC Latex Flat 6-4110 Series: Applied at a dry film thickness of not less than 1.3 mils .
 3. Sherwin-Williams; ProMar 200 Zero VOC Flat B30-2600 Series: Applied at a dry film thickness of not less than 1.5 mils .
- B. Interior Flat Latex-Emulsion Size: Factory-formulated flat latex-based interior paint.
1. Benjamin Moore; Ultra Spec WB Interior Flat Finish 443: Applied at a dry film thickness of not less than 1.3 mils.
 2. PPG Paints; PPG SPEEDHIDE zero VOC Latex Flat 6-4110 Series: Applied at a dry film thickness of not less than 1.3 mils.
 3. Sherwin-Williams; ProMar 200 Zero VOC Flat B30-2600 Series: Applied at a dry film thickness of not less than 1.5 mils.
- C. Interior Low-Luster Acrylic Enamel: Factory-formulated eggshell acrylic-latex interior enamel.
1. Benjamin Moore; Ultra Spec WB Interior Eggshell 444: Applied at a dry film thickness of not less than 1.4 mils.
 2. PPG Paints; PPG SPEEDHIDE zero VOC Latex Eggshell 6-4310 series: Applied at a dry film thickness of not less than 1.4 mils.
 3. Sherwin-Williams; ProMar 200 Zero VOC Eg-Shel B20-2600 Series: Applied at a dry film thickness of not less than 1.4 mils.
- D. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss acrylic-latex enamel for interior application.
1. Benjamin Moore; Ultra Spec WB Interior Semi-Gloss 446: Applied at a dry film thickness of not less than 1.4 mils.
 2. PPG Paints; PPG SPEEDHIDE zero Latex Semigloss 6-4510 series: Applied at a dry film thickness of not less than 1.4 mils.
 3. Sherwin-Williams; ProMar 200 Zero VOC B31-2600 Series: Applied at a dry film thickness of not less than 1.6 mils.
- E. Interior Full-Gloss Acrylic Enamel: Factory-formulated full-gloss acrylic-latex interior enamel.
1. Benjamin Moore; Advance Waterbourne Interior Alkyd High Gloss 794: Applied at a dry film thickness of not less than 1.3 mils.
 2. PPG Paints; PPG Speedhide Interior/Exterior 100% Acrylic Gloss Series 6-8534 : Applied at a dry film thickness of not less than 1.2 mils.

3. Sherwin-Williams; Pro Industrial Acrylic Gloss B66-600: Applied at a dry film thickness of not less than 1.5 mils.
- F. Epoxy Enamel Floor Paint:
1. PPG Paints; PPG Mega-Seal TF, Thin Film Epoxy 99-1001 Series.
 2. Sherwin-Williams; GP AquaArmor C Epoxy Floor Coating.
- G. Interior Epoxy Wall Paint:
1. Benjamin Moore; Super Spec HP Acrylic Epoxy Coating P43 Series: Applied at a dry film thickness of not less than 1.5 mils.
 2. PPG Paints; PPG Pitt Glaze WB Catalyzed Acrylic Epoxy, 16-551 Series: Applied at a dry film thickness of not less than 2.0 mils.
 3. Sherwin-Williams; Pro Industrial Catalyzed Acrylic Epoxy Series B73-300: Applied at a dry film thickness of not less than 4.0 mils.
 4. Jotun Paints; Tankguard 412: Applied at a dry film thickness of not less than 7.87 mils.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.
1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted or provide surface-applied protection before surface preparation and painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified. Provide barrier coats over incompatible primers or remove and reprime.

1. Cementitious Materials: Prepare concrete, concrete unit masonry surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
 - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
 - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
 - c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
 2. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
 3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances in accordance with SSPC SP 1 for "Solvent Cleaning". After solvent cleaning prepare any bare metal surfaces by removing all stratified rust (rust scale), all loose mill scale, all loose or non-adherent rust and detrimental welding deposits by methods specified in SSPC SP-3 for "Power Tool Cleaning."
 - a. Touch up bare areas, heads of bolts, welded surfaces which are unpainted, and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
 4. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents in accordance with SSPC SP-1 for "Solvent Cleaning", and pretreat in accordance with the recommendations of SSPC Good Painting Practice, Vol. 1, Chapter 22.
 5. Gypsum Wallboard: Repair all surfaces in gypsum wallboard with wallboard joint finishing compound or spackling compound, filled out flush and sanded smooth. Clean all surfaces and taped joints of dust, dirt and other contaminants and be sure they are thoroughly dry before applying paint.
- D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. General Application: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces. Access panels, electrical panels, air diffusing outlets, supply and exhaust grilles, louvers, exposed conduit, primed hardware items, primed outlet covers, primed wall and ceiling plates and other items in painted areas shall be painted to match the areas in which they occur unless otherwise directed by the Architect.
 8. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer over metal surfaces that have been shop primed and touchup painted.

3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
1. Mechanical items to be painted include, but are not limited to, the following:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 2. Electrical items to be painted include, but are not limited to, the following:
 - a. Conduits and fittings.
 - b. Switchgear.
 - c. Panelboards.
 - d. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- F. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

- G. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- H. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- I. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 MARKING AND IDENTIFICATION

- A. Mark fire-rated and smoke-rated partitions required to have protective openings or penetrations.
 - 1. Locate markings in accessible concealed floor, floor-ceiling, or attic spaces.
 - 2. Provide markings within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the partition.
 - 3. Marking shall include stenciled lettering not less than 3 inches in height with a minimum 3/8 inch stroke.
 - 4. Apply markings in a contrasting color with the suggested wording "FIRE AND/OR SMOKE BARRIER---PROTECT ALL OPENINGS", or other wording as approved by the Authority Having Jurisdiction.

3.5 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 INTERIOR PAINT SCHEDULE

- A. Concrete and Masonry (Other Than Concrete Unit Masonry): Provide the following paint systems over interior concrete and brick masonry substrates:
1. Flat Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior concrete and masonry primer.
 - b. Finish Coats: Interior flat acrylic paint.
 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior concrete and masonry primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.
 3. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior concrete and masonry primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.
 4. Epoxy Floor Paint Finish: Two coats.
 - a. Finish Coats: Interior, epoxy floor paint. Immediately after the placement of the second coat, cast slip resistant sand grit into the epoxy floor paint to provide a coefficient of friction of not less than 0.42.
- B. Concrete Unit Masonry: Provide the following finish systems over interior concrete masonry:
1. Flat Acrylic Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.
 - b. Finish Coats: Interior flat acrylic paint.
 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.
 - b. Finish Coats: Interior low-luster acrylic enamel.
 3. Semigloss Acrylic-Enamel Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.
 - b. Finish Coats: Interior semigloss acrylic enamel.

4. Epoxy Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.
 - b. Finish Coats: Interior epoxy paint.
- C. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
 1. Flat Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior flat acrylic paint.
 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.
 3. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.
 4. Full-Gloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior full-gloss acrylic enamel.
 5. Epoxy Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior epoxy paint.
- D. Plaster: Provide the following finish systems over new interior plaster surfaces:
 1. Flat Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior plaster primer.
 - b. Finish Coats: Interior flat acrylic paint.
 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior plaster primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.
 3. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior plaster primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.

4. Full-Gloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior plaster primer.
 - b. Finish Coats: Interior full-gloss acrylic enamel.

- E. Wood and Hardboard: Provide the following paint finish systems over new interior wood surfaces:
 1. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior wood primer for acrylic-enamel finishes.
 - b. Finish Coats: Interior low-luster acrylic enamel.

 2. Semigloss Acrylic-Enamel Finish: Two finish coats over a wood undercoater.
 - a. Primer: Interior wood primer for acrylic-enamel finishes.
 - b. Finish Coats: Interior semigloss acrylic enamel.

 3. Full-Gloss Acrylic-Enamel Finish: Two finish coats over a wood primer.
 - a. Primer: Interior wood primer for acrylic-enamel finishes.
 - b. Finish Coats: Interior full-gloss acrylic enamel.

- F. Ferrous Metal: Provide the following finish systems over ferrous metal:
 1. Flat Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior flat acrylic paint.

 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.

 3. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.

 4. Full-Gloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior full-gloss acrylic enamel.

- G. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces:

1. Flat Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior zinc-coated metal primer.
 - b. Finish Coats: Interior flat acrylic paint.
 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior zinc-coated metal primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.
 3. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior zinc-coated metal primer.
 - b. Finish Coats: Interior semigloss acrylic enamel.
 4. Full-Gloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior zinc-coated metal primer.
 - b. Finish Coats: Interior full-gloss acrylic enamel.
- H. All-Service Jacket over Insulation: Provide the following finish system on cotton or canvas insulation covering:
1. Flat Acrylic Finish: Two finish coats. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coats: Interior flat latex-emulsion size.

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SECTION 10 26 00 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Corner guards.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide handrails capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Uniform load of 50 lbf/ft. applied in any direction.
 - 2. Concentrated load of 200 lbf applied in any direction.
 - 3. Uniform and concentrated loads need not be assumed to act concurrently.

1.4 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, impact strength[, fire-test-response characteristics], dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.
- B. Shop Drawings: For each impact-resistant wall protection unit showing locations and extent. Include sections, details, and attachments to other work.
- C. Samples for Initial Selection: For each type of impact-resistant wall protection unit indicated.
 - 1. Include similar Samples of accent strips and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.[Include Samples of accent strips to verify color selected.]
 - 1. [Wall] [and] [Corner] Guards: 12 inches long. Include examples of joinery, corners, [end caps,] [top caps,] and field splices.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified [Installer] [testing agency].
- B. Material Certificates: For each impact-resistant plastic material, from manufacturer.
- C. Material Test Reports: For each impact-resistant plastic material.
- D. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.
 - 1. Include recommended methods and frequency of maintenance for maintaining optimum condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to plastic finishes and performance.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of units installed, but no fewer than two, 4-foot- long units.
- B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated. Refer to Section 01 40 00 "Quality Requirements."
- D. Revise subparagraph below to suit Project.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Surface-Burning Characteristics: Provide impact-resistant, plastic wall protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.
- F. Regulatory Requirements: Comply with applicable provisions in [the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines] [and] [ICC/ANSI A117.1].
- G. Preinstallation Conference: Conduct conference at [Project site] <Insert location>.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
 2. Keep plastic sheet material out of direct sunlight.
 3. Store plastic wall protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.
 - a. Store corner-guard covers in a vertical position.

1.10 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Deterioration of plastic and other materials beyond normal use.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. PVC Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; [extruded] [and] [sheet] material, thickness as indicated.

2.2 CORNER GUARDS

- A. Surface-Mounted, Resilient, Plastic Corner Guards <PR##>: Assembly consisting of snap-on plastic cover installed over continuous retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings Cover: Extruded rigid plastic, minimum wall thickness; in dimensions and profiles indicated on Drawings.
 - a. Height: 8 feet.
 - b. Color and Texture: As selected by Architect from manufacturer's full range.

2.3 FABRICATION

- A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.
- B. Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.
- D. Miter corners and ends of wood handrails for returns.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

- B. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
 - 1. For impact-resistant wall protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
 - 1. Install impact-resistant wall protection units in locations and at mounting heights indicated on Drawings Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.
 - a. Provide anchoring devices to withstand imposed loads.
 - b. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches.
 - c. Adjust top caps as required to ensure tight seams.
- B. Impact-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation.

3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

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END OF SECTION 10 26 00

SECTION 10 28 00 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

PART 2 - PRODUCTS

2.1 TOILET ACCESSORIES

- A. Provide products listed in Toilet Accessory Schedule on the Drawings.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 MATERIALS

- A. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- B. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- C. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

2.4 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 10 28 00

SECTION 10 44 00 - FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fire protection specialties.

1.2 SUBMITTALS

- A. Product Data: Submit product data including construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection specialties.
 - 1. Fire Extinguishers: Include rating and classification.
 - 2. Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, panel style.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain fire extinguishers and fire-protection cabinets through one source from a single manufacturer.
- B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Standard for Portable Fire Extinguishers."
- C. Listing: Fire extinguishers shall be UL listed with UL Listing Mark for type, rating, and classification of extinguisher.

1.4 COORDINATION

- A. Coordinate size of fire-extinguisher cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of portable fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.

- b. Faulty operation of valves or release levers.
- 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. General: Provide fire extinguishers for each fire extinguisher cabinet and at other locations indicated.
 - 1. Mounting Brackets: Manufacturer's standard steel, designed to secure extinguisher indicated and with plated or baked-enamel finish.
 - a. Provide brackets for extinguishers located and not located in cabinets.
- B. Multipurpose Dry-Chemical Type: UL-rated 4-A:60-B:C, 10-lb nominal capacity, in enameled-steel container.

2.2 FIRE-EXTINGUISHER CABINETS

- A. General: Provide fire extinguisher cabinets of suitable size for housing fire extinguishers of types and capacities specified.
- B. Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
 - 1. Fire-Rated Cabinets: Listed and labeled to meet requirements in ASTM E 814 for fire-resistance rating of wall where it is installed.
 - a. Construct fire-rated cabinets with double walls fabricated from 0.0478-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch- thick, fire-barrier material.
 - 2. Cabinet Metal: Enameled-steel sheet.
 - 3. Cabinet Mounting: Recessed unless otherwise indicated.
 - 4. Cabinet Trim Style: Trimless with hidden flange of same metal and finish as box that overlaps surrounding wall finish and that is concealed from view by an overlapping door.
 - 5. Cabinet Trim Material: Manufacturer's standard steel sheet.
 - 6. Door Material: Manufacturer's standard steel sheet.
 - 7. Door Glazing: Manufacturer's standard, as follows:
 - a. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, Class 1 (clear).

8. Door Style: Manufacturer's standard design vertical duo panel with frame with 1/4 inch-thick glass.
9. Door Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.
10. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide exposed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.

C. Products and Manufacturers: One of the following:

1. Larsens Manufacturing Company: Occult Series Fire Extinguisher Cabinets, Model O-2409 with vertical duo door.
2. Potter Roemer: Dana Series Fire Extinguisher Cabinets, 7220-DV.
3. JL Industries, Inc.: Embassy Series Fire Extinguisher Cabinets, Model 5614-Contemporary V door.

2.3 FINISHES

- A. General: Apply finishes in factory after products are assembled. Protect cabinets with plastic or paper covering, prior to shipment.
- B. Painted Finishes: Provide painted finish to comply with requirements indicated below for extent, preparation and type:
 1. Color: Provide color or color matches indicated, or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
 2. Preparation: Clean surfaces of dirt, grease, and loose rust or mill scale.
 3. Field-Paintable Factory Finish: Immediately after cleaning and pretreatment, apply to surfaces indicated below, manufacturer's standard factory-applied paint system which is suitable, after deglossing, as an undercoat for field-applied paint system specified in Section 09 91 23 "Interior Painting."
 - a. Exterior of cabinet except for those surfaces indicated to receive another finish.
 - b. Interior of cabinet.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare recesses for recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.2 INSTALLATION

- A. General: Follow manufacturer's printed instructions for installation.
- B. Install fire-protection specialties in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
 - 1. Fasten cabinets to structure, square and plumb.

3.3 ADJUSTING AND CLEANING

- A. Adjust cabinet doors to operate freely without binding. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged units.
- B. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

END OF SECTION 10 44 00

SECTION 11 31 00 - PANTRY APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes pantry appliances.
 - 1. The extent of pantry appliance work is indicated on the drawings and in the Equipment Schedules.

1.2 SUBMITTALS

- A. Product Data: Submit product data and roughing in diagrams for each type of appliance required indicating compliance with requirements. Include complete operating characteristics, dimensions of individual appliances, finishes for each appliance, and maintenance instructions for each appliance.

1.3 QUALITY ASSURANCE

- A. UL and NEMA Compliance: Provide electrical appliances that are listed and labeled by UL and that comply with applicable NEMA standards.
- B. Energy Ratings: Provide appliances that carry labels indicating energy-cost analysis (estimated annual operating costs) and efficiency information as required by the FTC Appliance Labeling Rule.

1.4 WARRANTY

- A. Submit written warranties, executed by manufacturer of each appliance required agreeing to repair or replace appliances or components that fail in materials or workmanship within the manufacturers standard warranty period.

PART 2 - PRODUCTS

2.1 PANTRY APPLIANCES

- A. Provide product listed in Equipment Schedules and on the Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for plumbing, mechanical, and electrical services, to verify actual locations of services before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions.
- B. Built-in Appliances: Securely anchor to supporting cabinetry or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- C. Freestanding Appliances: Place in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- D. Utilities: Refer to the Drawings and Divisions 22 and 26 for plumbing and electrical requirements.

3.3 ADJUSTING AND CLEANING

- A. Test each item of appliances to verify proper operation. Make necessary adjustments.
- B. Verify that accessories required have been furnished and installed.
- C. Remove packing material from appliances and leave units in clean condition, ready for operation.

END OF SECTION 11 31 00

SECTION 12 22 00 - CURTAINS AND DRAPES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Drapes.
 - 2. Drapery tracks.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Drapery Tracks: Include maximum weights of drapes that can be supported.
 - 2. Fabrics.
 - 3. Textile treatments.
- B. Shop Drawings:
 - 1. Drapery Tracks: Show installation and anchorage details and locations of controls.
 - 2. Drapes: Show sizes, locations, and details of installation.
- C. Samples: As follows:
 - 1. Drapery Tracks: 18 inches long, with carriers, controls, and accessories.
 - 2. Drapery Fabrics: For each color and pattern indicated, full width by 36 inches long, from dye lot to be used for the Work and with specified textile treatments applied. Show complete pattern repeat if any. Mark top and face of fabric.
 - 3. Textile Trims: For each color and pattern indicated, 18 inches long.
 - 4. Drape Fabrication: For each heading, fabric, color, and pattern indicated, a complete full-size panel to verify details of fabrication and thread colors.
- D. Samples for Initial Selection: For each type of product indicated.
- E. Samples for Verification: As follows:
 - 1. Drapery Tracks: 18 inches long, with carriers, controls, and accessories.

2. Drapery Fabrics: For each color and pattern indicated, full width by 36 inches long, from dye lot to be used for the Work and with specified textile treatments applied. Show complete pattern repeat if any. Mark top and face of fabric.
 3. Textile Trims: For each color and pattern indicated, 18 inches long.
 4. Drape Fabrication: For each heading, fabric, color, and pattern indicated, a complete full-size panel to verify details of fabrication and thread colors.
- F. Product Schedule: For [drapes] [and] [drapery tracks]. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For drapery track installation; reflected ceiling plans drawn to scale and coordinating track installation with openings and ceiling-mounted items, on which the following items are shown:
1. Suspended ceiling components.
- B. Product Certificates: For each drapery fabric treated with flame retardant, signed by fabric supplier and indicating treatment durability and cleaning procedures required to maintain treatment effectiveness.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For products installed to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Drapery Track Carriers: For each size indicated, equal to percent of amount installed, but no fewer than 10 of each size.
 2. Drapery Track Controls: For each type indicated, equal to 5 percent of amount installed, but no fewer than 10 of each type.
 3. Drapery Fabrics: For each fabric, color, and pattern indicated, from the same product run, full-width lengths equal to 5 percent of amount installed, but no fewer than 10 yards of each fabric, color, and pattern.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: For drapes and drapery tracks, fabricator of drapes.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockup at location and in size shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before drape fabrication, and indicate measurements on Shop Drawings.
- B. Scheduling: Do not deliver or install drapes until after other finish work, including painting, is complete and spaces are otherwise ready for occupancy.

PART 2 - PRODUCTS

2.1 DRAPERY TRACKS

- A. Manually Operated Track <CT##>:
 1. Manufacturers: Subject to compliance with requirements, provide products as listed on drawings in finish schedule. :

2.2 DRAPES

- A. Manufacturers: Subject to compliance with requirements, provide products as listed on drawings listed in the finish schedule . :
- B. Source Limitations: Obtain each color and pattern of drapery fabric and trim from one dye lot.
- C. Fire-Test-Response Characteristics: For fabrics treated with fire retardants, provide products that pass NFPA 701 as determined by testing of fabrics that were treated using treatment-application method intended for use for this Project by a testing and inspecting agency acceptable to authorities having jurisdiction.

PART 3 - EXECUTION

3.1 DRAPERY TRACK INSTALLATION

- A. Install track systems according to manufacturer's written instructions, level and plumb, and at height and location in relation to adjoining openings as indicated on Drawings.
- B. Isolate metal parts of tracks and brackets from concrete, masonry, and mortar to prevent galvanic action. Use tape or another method recommended in writing by track manufacturer.

3.2 ADJUSTING

- A. After hanging drapes, test and adjust each drapery track to produce unencumbered, smooth operation.
- B. Steam and dress down drapes as required to produce crease- and wrinkle-free installation.
- C. Remove and replace drapes that are stained or soiled.

END OF SECTION 12 22 00

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Manually operated roller shades with single rollers.
- B. Related Requirements:
 - 1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
 - 2. Section 07 92 00 "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
 - 1. Motor-Operated Shades: Include details of installation and diagrams for power, signal, and control wiring.
- C. Samples: For each exposed product and for each color and texture specified, 10 inches long.
- D. Samples for Initial Selection: For each type and color of shadeband material.
 - 1. Include Samples of accessories involving color selection.
- E. Samples for Verification: For each type of roller shade.
 - 1. Shadeband Material: Not less than 10 inches square. Mark interior face of material if applicable.

2. Roller Shade: Full-size operating unit, not less than 16 inches wide by 36 inches long for each type of roller shade indicated.
3. Installation Accessories: Full-size unit, not less than 10 inches long.

F. Product Schedule: For roller shades.[SH1s.]

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of shadeband material.
- C. Product Test Reports: For each type of shadeband material, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Manufacturers: Subject to compliance with requirements, provide products as listed on drawings in finish schedule. :
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Manufacturer's standard .
 - a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.4 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
 - 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch . Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch , plus or minus 1/8 inch .
 - 2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
 - 1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

- B. Roller Shade Locations: As indicated on Drawings.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 12 24 13

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ARCHITECTURAL LIGHTING FIXTURES

PART I – FIXTURE SCHEDULE

Notes:

1. Architect to verify finishes of and mounting conditions for each fixture type.
2. Electrical Engineer to verify voltage & specify emergency fixture types, location and quantities.
3. General Contractor / Electrical Contractor to coordinate mounting details with approved ceiling types to maintain design appearance. Provide field verification of run lengths as required.
4. Distributor/manufacturer to confirm compatibility with the selected Centralized Digital Control System. All LED/Fluorescent fixtures are to have Digital Addressable Drivers/Ballasts. Other sources are to be supplied with appropriate interfaces. The Control System capabilities include but are not limited to; Preset Dimming, Lumen Maintenance, Monitoring Feedback, Open Automated Demand Response (ADR) or Demand Response (DR), Load Shedding and Daylighting
5. Fixtures are specified with a specific wattage and lumen package, some drivers to be tuned accordingly. Manufacturers to provide pricing to include tunable drivers by factory.
6. LED fixtures in a *video conference* or *video camera* environment, shall not be dimmed by Pulse-Width Modulation (PWM) due to potential interference with the visuals. LED boards and components shall be dimmed by Constant Current Reduction (CCR).
7. All display cases (Kitchen, Served, Signage, etc.) or any lighting provided by another consultant to be installed in the same space as SBLD specified fixtures must be coordinated with SBLD.
8. Certain fixture types are considered modified standard due to elongated linear run lengths and configurations integrated into architectural conditions. Lead time is estimated at 10 to 12 week for custom run lengths (TBD with manufacturer.)

Lead-time for modified standard linear fixture types begins at time of factory recognition of receipt of the final shop drawings as signed-off upon by design & construction teams, inclusive of clean unmarked factory drawings (sans revisions or markups.) Factories will then initiate orders for materials & parts initiating the manufacturing lead-time quoted. Upon receiving confirmation from the factory, the distributor is to then issue the final sign-off date & estimated ship dates to the project team. Until receipt of these dates the product is not to be assumed to be signed-off.

Distributor is to provide architectural reflected ceiling plans, enlarged reflected ceiling plans, details, cut sheets, and ceiling types to the factory during the bid process to enable as accurate bidding as possible. Written specification alone does not satisfactorily represent the installation. Inherent to this type of product is the final confirmation of lengths to be determined in the field.

Distributor is to establish a coordination call upon award of project. Participants are to be the manufacturer(s), factory representative(s), distributor, electrical contractor, general contractor, electrical engineer, lighting designer, architect and owner's representation. Agenda is to be the project schedule highlighting critical milestone dates, method of information distribution, sign-off process, shipping methods, project phasing (per floor or by areas) for factory prioritization and clarification of design intent or installation details. Assume all fixtures installed in gypsum board ceilings have priority. Prioritize among trades to establish the field dimensions necessary to begin factory drawings.

Custom run lengths are to be made to the fractional dimensions necessary per field verified dimensions for end-to-end runs. Factory drawings are to be prepared after field verified dimensions are established. Dimensional variations greater than 3" will require redrawing and

- resubmission of factory drawing for review (subject to each manufacturer's requirements.)
Factory drawings are to be accurately represented in a clean format before manufacturing will begin.
9. Provide unit pricing of listed alternate manufacturers for owner / designer's selection.
 10. Provide fixtures (led modules, drivers, components) by manufacturer specified, unless otherwise noted to provide equals per SBLD specifications.
 11. Complete specification includes fixture schedule, fixture cuts, general fixture specification, dimming schedule, details and referenced architectural drawings as indicated.
 12. Revisions to last issue appear in **boldface with hatch**. Non relevant information will be ~~erased~~.

Please note multiple manufacturers are listed wherever possible for competitive bidding.

F1 Description: Recessed linear direct LED slot, nominal 3-13/16"W x 5-1/8"H x LENGTH VARIES PER PLAN, extruded aluminum trim, formed cold rolled 20 gauge steel back box housing, highly reflective die-formed white painted steel reflector, flat regressed white snap-in acrylic lens, LED light engine (60,000 hours minimum lifetime), powder coat matte white painted finish, and integral electronic driver with 0-10V 10% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.
Fixture shall be recessed at tegular ACT.

Lengths: 4'-0", 6'-0", 8'-0", 10'-0", 12'-0", 14'-0"

Manufacturer: #1 Pinnacle: Evolution, EV3-R-835HO-length-GS-U-OLI-circuit-battery/emergency-W

Remarks: Contractor to coordinate fixture mounting trim with approved ceiling specification to enable fixture trim to sit flush with bottom of ceiling tiles. Architect to verify finish to be white. EE to verify voltage, switching and emergency requirements.

Location: Open Offices and Conference Rooms

Supply: 277 volts, (EE to verify)

LED boards: Provided by Manufacturer: 664 Lumens/LF Delivered, 80CRI, 3500K

Driver: Provided by Manufacturer: 0-10V 10% dimming capable

Input Watts: 8.6W/LF

F2 Description: Pendant mounted linear direct LED fixture, nominal 1-5/16"W x 1-1/8"H x 34-1/16"L, extruded aluminum housing, flat frosted extruded acrylic lens, sheet aluminum end caps, field adjustable aircraft cables, 18 gauge power cable, bracket bars, Ø5" white canopies, ceiling couplers, side exit cable grippers, LED light engine (50,000 hours minimum lifetime), and remote electronic driver with 0-10V 1% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.

Fixture shall be cable mounted at open ceiling conditions, and mounted angled. Driver shall be located at separate ceiling channel. Standard finish to be verified by architect.

Length: 3'-0"

Manufacturer: #1 Bartco: BSS840-34-35-7-CM48/96-SIN-finish-DM

Remarks: Contractor to coordinate fixture mounting with approved ceiling specification. Architect to verify finish. EE to verify voltage, switching and emergency requirements. G.C. to verify mounting height and cable length with architect in the field prior to finalizing the installation.

Location: Open Collabs, Public Squares

Supply: 277 volts, (EE to verify)

LED boards: Provided by Manufacturer: 584 Lumens/LF Delivered, 85CRI, 3500K

Driver: Provided by Manufacturer: 0-10V 1% dimming capable

Input Watts: 7.4W/LF

F2A Description: Same as F2 except mounting, fixture shall be surface mounted to ACT ceiling with one pair spring clips and be wired with 10' low voltage lead exiting from the back at an end. Driver shall be located at remote concealed location above ACT ceiling.

Manufacturers: #1 Bartco: BSS840-34-35-7-SI-SIN-finish-DM
Erico: Independent Support Clip as needed

F3 Description: Recessed linear perimeter LED slot, nominal 4-1/2"W x 5-1/4"H x LENGTH VARIES PER PLAN, extruded aluminum trim, formed cold rolled 20 gauge steel back box housing, extruded aluminum module with micro reflector, regressed, white snap-in acrylic lens, LED light engine (60,000 hours minimum lifetime), powder coat matte white painted finish, drywall plaster-in speckle flange trim, and integral electronic driver with 0-10V 10% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.

Lengths: Lengths vary as per plan. Field verify dimensions.
10'-11 15/16", 11'-1 5/16", 18'-9 3/4", 19'-6 13/16", 22'-10 13/16"

Manufacturers: #1 Pinnacle: Evolution, EVL-835HO-length-SF-U-OLI-circuit-battery/emergency-W

Remarks: Contractor to coordinate fixture mounting trim with approved ceiling specification to enable fixture trim to sit flush with bottom of ceiling tiles. Architect to verify finish to be white. EE to verify voltage, switching and emergency requirements.

Location: Pantry Millwork

Supply: 277 volts, (EE to verify)

LED boards: Provided by Manufacturer: 398 Lumens/LF Delivered, 80CRI, 3500K
Driver: Provided by Manufacturer: 0-10V 10% dimming capable
Input Watts: 6.0W/LF

F3A Description: Same as F3 except mounting and length, fixture shall be recessed to ACT ceiling with ACT trim interface.

Lengths: Lengths vary as per plan. Field verify dimensions.
23'-4 ⁵/₁₆" , 23'-4 ¹³/₁₆" , 25'-7 ¹/₄" , 25'-8 ⁷/₈" , 31'-1 ³/₄" , 32'-7" ,
37'-8 ¹/₈" , 37'-10 ¹/₄" , 39'-10" , 40'-2 ⁷/₈"

Manufacturers: #1 Pinnacle: Evolution, EVL-835HO-length-GS-U-OLI-circuit-battery/emergency-W
Location: Work Areas, Conference Rooms

F4 Description: NOT USED

F5 Description: Decorative pendant fixture with sound absorbing acoustic felt fabric shade, nominal Ø23.62" x 32.62"H, 78.74"L to 196.85"L two metal suspension cables, Ø2.76" white powder coated metal canopy, powder coated metal frame, transparent power cable, 100% recycled P.E.T. felt with latex backing, LED disk with (36) low power LEDs and PMMA diffuser without any dottiness, and integral electronic driver with 0-10V dimming. UL listed, and suitable for dry locations.

Manufacturers: #1 BuzziSpace: BuzziBell 110-120V -finish

Remarks: Contractor to verify and coordinate fixture mounting with maximum ceiling thickness. Verify mounting height with architect in the field prior to finalizing the installation. Electrical Engineer to verify voltage, switching, and emergency requirements. Architect to verify finish.

Location: Open Collabs

Supply: 120 volts, (EE to verify)

LED boards: Provided by Manufacturer: 2545 Lumens Delivered, 90CRI, 3000K

Driver: Provided by Manufacturer: 0-10V dimming capable

Input Watts: 29.4W

F6 Description: Decorative pendant fixture with aluminum shade, nominal Ø15.75" x 20.5"H, 118"L-236"L cord, round canopy, steel body, matte black finish, one type A incandescent lamp, E26 medium base socket, and dimming capable. UL listed and suitable for dry locations.

Manufacturers: #1 Caravaggio Pendant Light-Large-Matte Black-cord finish T.B.V.

Remarks: Contractor to verify and coordinate fixture mounting with maximum ceiling thickness. Verify mounting height with architect in the field prior to finalizing the installation. Electrical Engineer to verify voltage, switching, and emergency requirements. Architect to verify cord finish.

Location: Public Squares

Supply: 120 volts, (EE to verify)

Lamp: (1) 100W E26 Type A Incandescent lamp

Input Watts: 100W

F7 Description: Decorative pendant fixture with glass and aluminum shade, nominal Ø14" x 13"H, 8'L cord, Ø5" white finished canopy, steel body, one A19 incandescent bulb or one retrofit A19 frosted LED bulb, E26 socket, and ELV dimming. UL listed and suitable for dry locations.

Manufacturers: #1 Roll & Hill: Bluff City, Pendant-14 inch-finish

Remarks: Contractor to verify and coordinate fixture mounting with maximum ceiling thickness. Verify mounting height with architect in the field prior to finalizing the installation. Electrical Engineer to verify voltage, switching, and emergency requirements. Architect to verify finish.

Location: Open Collabs

Supply: 120 volts, (EE to verify)

Lamp: Provided by Manufacturer:
(1) 60W A19 E26 Incandescent lamp with 550 Lumens, 2700K or
(1) 6W A19 E26 LED lamp with 480 Lumens, 2700K

Driver: Provided by Manufacturer: ELV dimming capable

Input Watts: 60W maximum

F8 Description: Recessed Ø6" open aperture LED downlight, Ø7" overlap trim, Ø6-1/4" cutout, nominal 14"L x 9-1/8"W x 4-3/4"H, 22 gauge one-piece non-corrosive steel platform, clear Alzak semi-diffuse aluminum reflector with white paint finish self-trim, LED light engine (minimum 50,000 hours life with 70% of lumen maintenance) and integral 25watt constant current driver with 0-10V 10% dimming. LM79 and LM80 compliant, UL certification, 5 year warranty and suitable for wet locations.

Manufacturers: #1 Prescolite: LiteFrame, LC6LED-voltage-DM-6LCLED-5-35K-8-WH-WT

Remarks: Contractor to verify and coordinate fixture mounting with maximum ceiling thickness 1-1/4". Fixtures to fit tight to ceiling with no visible gaps or light leaks about the perimeter. Architect to verify finish to be white. Electrical Engineer to verify voltage, switching, and emergency requirements.

Location: General

Supply: 277volts, (EE to verify)

LED module: Provided by Manufacturer: 1000 Delivered Lumens LED, 80CRI, 3500K

Driver: Provided by Manufacturer: 0-10V 10% dimming capable
Input watts: 17.1W

F9 Description: Surface mounted linear LED fixture within luminous lightbox on ceiling, nominal 2-13/16"W x 3-1/2"H x 10'-0"L, cold rolled steel housing with a white polyester powder coating finish, extruded formulated high transmission acrylic diffuser, LED light engine (60,000 hours minimum lifetime), and REMOTE electronic driver with 0-10V 10% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.
10'L runs comprised of (2) 4ft and (1) 2ft lengths. Fixture shall be spaced at 1'-6" on center. Driver shall be located at accessible, ventilated location outside the lightbox.

Length: 10'-0"

Manufacturer: #1 Mercury Lighting: LW4 Series, LW4-(1)2/(2)4-2300/3800-35K-HTA-driver-UNI
#2 Lamar Lighting
#3 Philips Lighting

Remarks: Contractor to coordinate fixture mounting with approved ceiling and light box specification. EE to verify voltage, switching and emergency requirements. G.C. to verify driver location with architect.

Location: Stair Light Box
Supply: 277 volts, (EE to verify)
LED boards: Provided by Manufacturer: 9713 Lumens Delivered, 80+CRI, 3500K
Driver: Provided by Manufacturer: 0-10V 10% dimming capable
Input Watts: 85W

F10 Description: Wall mounted indirect linear LED light, nominal 2-7/8"W x 4-3/4"H x LENGTH VARIES PER PLAN, extruded aluminum housing, highly reflective die-formed white painted reflector, open indirect shielding, LED light engine (60,000 hours minimum lifetime), powder coat matte white painted finish, and integral electronic driver with 0-10V 10% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.
Fixture shall have 1" offset arms.

Lengths: Lengths vary as per plan. Field verify dimensions.
6'-0", 7'-0", 8'-0", 11'-0" (NOT IN 4' INCREMENTS.)

Manufacturer: #1 Pinnacle: Edge, EX2-N-O-835HO-length-WA-U-OLI-circuit-battery/emergency-W

Remarks: Contractor to coordinate fixture mounting with approved wall specification. Architect to verify finish to be white. EE to verify voltage, switching and emergency requirements.

Location: Restroom Stalls

Supply: 277 volts, (EE to verify)

LED boards: Provided by Manufacturer: 973 Lumens/LF Delivered, 80CRI, 3500K

Driver: Provided by Manufacturer: 0-10V 10% dimming capable

Input Watts: 8.6W/LF

F11 Description: Recessed linear perimeter LED slot, nominal 4-1/2"W x 5-1/4"H x LENGTH VARIES PER PLAN, extruded aluminum trim, formed cold rolled 20 gauge steel back box housing, extruded aluminum module with micro reflector, regressed, white snap-in acrylic lens, LED light engine (60,000 hours minimum lifetime), powder coat matte white painted finish, and integral electronic driver with 0-10V 10% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.

Fixture shall be recessed to ACT ceiling with ACT trim interface.

Lengths: Lengths vary as per plan. Field verify dimensions.

Manufacturers: #1 Pinnacle: Evolution, EVL-835HO-length-GS-U-OLI-circuit-battery/emergency-W

Remarks: Contractor to coordinate fixture mounting trim with approved ceiling specification to enable fixture trim to sit flush with bottom of ceiling tiles. Architect to verify finish to be white. EE to verify voltage, switching and emergency requirements.

Location: Restroom Mirrors

Supply: 277 volts, (EE to verify)

LED boards: Provided by Manufacturer: 398 Lumens/LF Delivered, 80CRI, 3500K

Driver: Provided by Manufacturer: 0-10V 10% dimming capable

Input Watts: 6.0W/LF

F12 Description: Wall mounted direct linear LED light, nominal 2-7/8"W x 4-3/4"H x LENGTH VARIES PER PLAN, extruded aluminum housing, highly reflective die-formed white painted reflector, satine lens direct shielding, LED light engine (60,000 hours minimum lifetime), powder coat matte white painted finish, and integral electronic driver with 0-10V 10% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.

Fixture shall make a rectangle pattern and be mounted about brick surfaces with exposed j-boxes and conduit.

Lengths: Lengths vary as per plan. Field verify dimensions.

Manufacturer: #1 Pinnacle: Edge, EX2-A-N-O-835HO-R-length-WA-U-OLI-circuit-battery/emergency-W

Remarks: Provide canopy to cover surface mounted j-box at brick wall and to receive conduit into the top side.
Contractor to coordinate fixture mounting with approved wall specification. Architect to verify finish to be white. EE to verify voltage, switching and emergency requirements.

Location: Brick Elevator Chimney

Supply: 277 volts, (EE to verify)

LED boards: Provided by Manufacturer: 625 Lumens/LF Delivered, 80CRI, 3500K

Driver: Provided by Manufacturer: 0-10V 10% dimming capable

Input Watts: 8.6W/LF

F13 Description: Recessed 2x4 LED troffer, nominal 23-3/4"W x 3"H x 47-3/4"L, die-formed metal housing, ribbed opal acrylic diffuser, LED light engine (70,000 hours minimum lifetime), polyester powder coat matte white finish, and integral electronic driver with 0-10V 1% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.

Manufacturers: #1 Philips Day-Brite: FluxGrid LED 2x4, 2-FG-G-38L-835-4-D-voltage-DIM (31.8W, 3816 Lumens Delivered)
#2 Pinnacle: Adeo, AD24-A-835MO-GS-U-OLI-circuit-battery/emergency-W (32.1W, 3969 Lumens Delivered)

Remarks: Provide working sample/mock-up for owner's review and approval of fixture brightness.
Contractor to coordinate fixture mounting trim with approved ceiling specification to enable fixture trim to sit flush with bottom of ceiling tiles. Architect to verify finish to be white. EE to verify voltage, switching and emergency requirements.

Location: Offices

Supply: 277 volts, (EE to verify)

LED boards: Provided by Manufacturer: 3816 Lumens Delivered, 80CRI, 3500K

Driver: Provided by Manufacturer: 0-10V 1% dimming capable

Input Watts: 32.1W maximum, varies per manufacturer

F14 Description: Recessed linear direct LED slot, nominal 3-13/16"W x 4"H x LENGTH VARIES PER PLAN, extruded aluminum trim, formed cold rolled 20 gauge steel back box housing, highly reflective die-formed white painted steel reflector, flat white snap-in satine acrylic lens flushed, LED light engine (60,000 hours minimum lifetime), powder coat matte white painted finish, and integral electronic driver with 0-10V 10% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.
Fixture shall make illuminated corners and be recessed at tegular ACT.

Lengths: Lengths vary as per plan. Field verify dimensions.

Manufacturer: #1 Pinnacle: Evolution, EV3-R-835HO-length-GS-U-OLI-circuit-battery/emergency-W-Illuminated Corners

Remarks: Contractor to coordinate fixture mounting trim with approved ceiling specification to enable fixture trim to sit flush with bottom of ceiling tiles. Architect to verify finish to be white. EE to verify voltage, switching and emergency requirements.

Location: Corridors

Supply: 277 volts, (EE to verify)

LED boards: Provided by Manufacturer: 625 Lumens/LF Delivered, 80CRI, 3500K

Driver: Provided by Manufacturer: 0-10V 10% dimming capable

Input Watts: 8.6W/LF

F15 Description: Recessed 2x2 LED troffer, nominal 23-3/4"W x 3"H x 23-3/4"L, die-formed metal housing, ribbed opal acrylic diffuser, LED light engine (70,000 hours minimum lifetime), polyester powder coat matte white finish, and integral electronic driver with 0-10V 1% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.

Manufacturers: #1 Philips Day-Brite: FluxGrid LED 2x2, 2-FG-G-38L-835-2-D-voltage-DIM (33.4W, 3674 Lumens Delivered)
#2 Pinnacle: Adeo, AD22-A-835MO-GS-U-OLI-circuit-battery/emergency-W (30.9W, 3424 Lumens Delivered)

Remarks: Provide working sample/mock-up for owner's review and approval of fixture brightness.
Contractor to coordinate fixture mounting trim with approved ceiling specification to enable fixture trim to sit flush with bottom of ceiling tiles. Architect to verify finish to be white. EE to verify voltage, switching and emergency requirements.

Location: Offices

Supply: 277 volts, (EE to verify)

LED boards: Provided by Manufacturer: 3674 Lumens Delivered, 80CRI, 3500K

Driver: Provided by Manufacturer: 0-10V 1% dimming capable

Input Watts: 33.4W maximum, varies per manufacturer

F16 Description: LED undercabinet task light, nominal 4-3/16"W x 1-3/16"H x LENGTH VARIES PER PLAN, extruded aluminum housing, acrylic textured lens, LED light engine (50,000 hours minimum lifetime with 70% of lumen maintenance), polyester powder coat paint finish, and integral electronic driver with ELV dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.

Lengths: Lengths vary as per plan. Field verify dimensions.

Manufacturers: #1 Philips Day-Brite: LINCS LED undercabinet, LINCS100E-length-935-voltage-finish-DIM

Remarks: Contractor to coordinate fixture mounting with approved millwork specification. Architect to verify finish. EE to verify voltage, switching and emergency requirements.

Location: Print/Copy, Offices

Supply: 277 volts, (EE to verify)

LED boards: Provided by Manufacturer: 210 Lumens/LF Delivered, 90CRI, 3500K

Driver: Provided by Manufacturer: ELV dimming capable

Input Watts: 3.12W/LF

F17 Description: LED linear tape light, nominal 0.89"W x 0.62"H x CONTINUOUS END-TO-END LENGTH, individual aluminum channel and square opal snap-in diffuser shall be cut in the field and abutted together with seamless joints to create the custom lengths aligning to architecture. Constant voltage LED tape adhered inside the aluminum channels is to be provided with overlap at joints for seamless illumination. Remote 0-10V dimmable driver compatible with control system. LM79 and LM80 compliant, UL certification and 5 year warranty.

Lengths: Lengths vary as per plan. Field verify dimensions.

Manufacturers: #1 Luminii: LL Series, LL36-35K-Connectors-Length-24V-EldoLED
-Slim Wide 15

- Remarks:
1. Contractor to verify and coordinate fixture mounting. Provide blocking or aluminum beading as required.
 2. Contractor shall assemble and cut the channel and lens in the field to achieve custom configuration of continuous lengths with seamless joints.
 3. Contractor shall coordinate the modular cutting of the LED tape and ensure it is positioned in the channel to achieve a homogenous lit appearance throughout the installation by extending beyond the channel or tucked into the wall or ceiling as required, see detail. Field solder in place electrical feeds to LED tape as required for adjusted lengths.
 4. Contractor to ensure remote driver is installed in an accessible and well ventilated location. Refer to manufacturer's recommendations for wiring and remote distance limits.
 5. Electrical engineer to verify voltage, switching, and emergency requirements.
 6. Emergency use requires a remote inverter system by others.

Location: Glass Partition Under Stair

Supply: 24volts DC / 277 volts, (EE to verify)

LED tape: Provided by Manufacturer, 253 Lumens/LF, 95CRI, 3500K
Driver: Provided by Manufacturer, EldoLED 0-10V, 1% dimming
Input Watts 3W/LF

F18 Description: Recessed Ø6" open aperture LED wallwash, Ø7" overlap trim, Ø6-1/4" cutout, nominal 14"L x 9-1/8"W x 4-3/4"H, 22 gauge one-piece non-corrosive steel platform, clear Alzak semi-diffuse aluminum reflector with white paint finish self-trim, LED light engine (minimum 50,000 hours life with 70% of lumen maintenance) and integral 25watt constant current driver with 0-10V 10% dimming. LM79 and LM80 compliant, UL certification, 5 year warranty and suitable for wet locations.

Manufacturers: #1 Prescolite: LiteFrame, LC6SL-DM-6LCSL-10L-35K-8-WH-WW

Remarks: Contractor to verify and coordinate fixture mounting with maximum ceiling thickness 1-1/4". Fixtures to fit tight to ceiling with no visible gaps or light leaks about the perimeter. Architect to verify finish to be white. Electrical Engineer to verify voltage, switching, and emergency requirements.

Location: General
Supply: 277volts, (EE to verify)
LED module: Provided by Manufacturer: 1000 Delivered Lumens LED, 80CRI, 3500K
Driver: Provided by Manufacturer: 0-10V 10% dimming capable
Input watts: 13.4W

F19 Description: Surface mounted linear LED fixture, nominal 2-13/16"W x 3-1/2"H x 4'-0"L, cold rolled steel housing with a white polyester powder coating finish, extruded formulated high transmission acrylic diffuser, LED light engine (60,000 hours minimum lifetime), and integral electronic driver with 0-10V 10% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.

Length: 4'-0"

Manufacturer: #1 Mercury Lighting: LW4 Series, LW4-4-600 Lumens/LF-35K-HTA-driver-UNI
 #2 Lamar Lighting
 #3 Philips Lighting

Remarks: Contractor to coordinate fixture mounting with approved ceiling or wall. EE to verify voltage, switching and emergency requirements. G.C. to verify driver location with architect.

Location: Stair
Supply: 277 volts, (EE to verify)
LED boards: Provided by Manufacturer: 600 Lumens/LF Delivered, 80+CRI, 3500K
Driver: Provided by Manufacturer: 0-10V 10% dimming capable
Input Watts: 8W/LF Maximum

F19A	<u>Description:</u>	Surface mounted linear LED fixture, nominal 2-13/16"W x 3-1/2"H x 2'-0"L, cold rolled steel housing with a white polyester powder coating finish, extruded formulated high transmission acrylic diffuser, LED light engine (60,000 hours minimum lifetime), and integral electronic driver with 0-10V 10% dimming. LM79 and LM80 certification, UL listed, 5 year warranty, and suitable for damp locations.
	<u>Length:</u>	2'-0"
	<u>Manufacturer:</u>	#1 Mercury Lighting: LW4 Series, LW4-2-600 Lumens/LF-35K-HTA-driver-UNI #2 Lamar Lighting #3 Philips Lighting
	<u>Remarks:</u>	Contractor to coordinate fixture mounting with approved ceiling or wall. EE to verify voltage, switching and emergency requirements. G.C. to verify driver location with architect.
	<u>Location:</u>	Stair
	<u>Supply:</u>	277 volts, (EE to verify)
	<u>LED boards:</u>	Provided by Manufacturer: 600 Lumens/LF Delivered, 80+CRI, 3500K
	<u>Driver:</u>	Provided by Manufacturer: 0-10V 10% dimming capable
	<u>Input Watts:</u>	8W/LF Maximum

END OF FIXTURE SCHEDULE

(SEE ATTACHED FIXTURE CUTSHEETS)

PART 2 – GENERAL SPECIFICATION

2.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the Work of this Section.

2.02 SUMMARY

- A. This Section includes architectural lighting fixtures.
- B. Related Work Specified Elsewhere
 - 1. Related sections of electrical work.
 - 2. Air terminal units and air distribution accessories for air handling lighting fixtures.
 - 3. Lighting fixtures other than architectural lighting fixtures.

2.03 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings showing details of all conditions, size and arrangement of parts, adjacent construction and other pertinent data. Clearly indicate the drawing number of fixture details used as reference in the development of the shop drawings. Indicate finished dimensions and required clearances, metal thicknesses and gauges, material finishes, electrical and mechanical connections, fasteners, weld locations, joint locations, relationship to ceiling supports and provisions for the work of others. For fixtures specified as "continuous runs", provide scale drawings showing fixture and lamp layout for the actual length of run. Catalog cuts lacking sufficient detail to indicate compliance with contract document will not be acceptable.
 - 2. Provide listing on shop drawing containing the fixture type, manufacturer's catalog number, applied voltage, and lamp and ballast types. Manufacturer's catalog cuts may be submitted in lieu of shop drawings only if they contain sufficient detail and information to indicate compliance with the Contract Documents.
 - 3. Coordinate lighting fixture shop drawings with details of the architectural, structural, electrical, mechanical and other related work to assure a perfect & efficient installation.
 - 4. Indicate variations from the general arrangement and details shown on the Contract Documents required suiting actual conditions at the site.
 - 5. For air handling fixtures, submit CFM and total pressure data for end slots and side slots used for return air and/or supply air for review by mechanical engineer.
 - 6. Shop drawing shall be submitted in reproducible form for all lighting fixtures and shall be received no later than sixty days after award of Contract.
- B. Photometric Data
 - 1. When indicated on the fixture schedule or elsewhere, submit complete photometric data for the fixture, including optical performance rendered by independent testing laboratory

developed according to methods of the Illuminating Engineering Society of North America (I.E.S.) as follows:

- a. For Down and Semi-Down Lights Used for General Illumination
 - 1) Coefficients of utilization.
 - 2) Visual comfort probability data (fluorescent only for 100 footcandles), rooms with reflectances of 80% (ceiling), 50% (walls), and 20% (floor), including a 20 ft. x 20 ft. room with 10 ft. ceiling and luminaires lengthwise.
 - 3) Candlepower data, presented graphically and numerically, in 5 deg. increments (5 deg., 10 deg., 15 deg., etc.) for vertical planes. Data developed for up and down hemispheres in a singular azimuthally plane for fixtures with axially symmetric distributions and in 22-1/2 deg. increments for as many quadrants as required to completely describing fixtures with quadrilaterally symmetric, bilaterally symmetric and asymmetric distributions.
 - 4) Zonal lumens stated numerically in 10 deg. increments (5 deg., 15 deg., etc.).
 - b. For Area and Roadway Luminaires: Isocandela charts, coefficients of utilization and IES roadway distribution classification.
2. Submit photometric data for any fixture offered in substitution for a specified fixture. Submission shall include above information plus I.E.S. formatted electronic photometric file.

C. Samples

1. Submit for review one (1) working sample (complete with plug and cord for standard 120 volt service) of each fixture where sample requirement is noted on the fixture schedule, complete with specified lamp(s), ready for hanging and energizing. Samples are not returnable or included in quantities listed for the Project. Where a fixture sample is submitted or requested, do not fabricate that fixture type until sample is reviewed and accepted.
2. Submit samples of lenses, louvers or diffusers as requested.
3. Submit sample for any fixture offered in substitution for a specified fixture, according to guidelines listed in item 1 above.
4. Two weeks from date received shall be allowed for thorough examination of the samples by the lighting consultant.

D. Guarantees

1. 1. Provide a written guarantee stating that each architectural lighting fixture including finishes, light sources (if it is part of the fixture), and all component parts, shall be free from defects in materials or workmanship. Upon notification of such defects, within the guarantee period, provide the necessary repairs or replacements at the convenience of the Owner without any additional cost.
 - A. For Light fixtures with integrated LED light sources provided shall have five (5) years guarantee from date of final acceptance.

2. Acrylic plastic lenses and diffusers shall remain free of dimensional instability, discoloration, embitterment, or loss of light transmittance for a minimum of fifteen (15) years.
- E. Maintenance Manual: Submit two copies of a bound maintenance manual, describing the materials, tools required, replacement parts identification list and procedures for cleaning and maintaining each type of architectural lighting fixture. Include manufacturer's data describing the materials and finishes used in the work.

2.04 QUALITY ASSURANCE

- A. Manufacturers: Manufacturers listed in the fixture schedule shall be assumed capable of supplying the listed fixtures unless exceptions are set forth in their quotations. Any such exceptions shall immediately be brought to the attention of the Contractor, the Architect and the Lighting Consultant. Manufacturers not listed must be pre-qualified to bid as follows:
 1. Experience: Manufacturer(s) shall have not less than five years' experience in design and manufacture of lighting fixtures of the type and quality shown. Pre-qualification submissions must include a list of completed projects and dated catalog pages or drawings indicating length of experience.
 2. Samples: Manufacturer(s) shall also submit a sample of each fixture upon lighting designer's request for review. Samples shall be sufficiently detailed and operational to allow evaluation of compliance with the salient features of the specification. Preliminary design or shop drawings shall not be accepted in place of samples.
 3. The Architect and the Lighting Consultant shall be the sole judges in determining whether the prototype sample complies with the specifications, and shall reserve the right to disqualify any bidders.
- B. Standards
 1. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
 - i. AEIC - Association of Edison Illuminating Companies
 - ii. IES - Illuminating Engineering Society
 - iii. UL - Underwriters Laboratories
 - iv. ANSI - American National Standards Institute
 - v. ASME - American Society of Mechanical Engineers
 - vi. ASTM - American Society for Testing Materials
 - vii. NEMA - National Electrical Manufacturers Association
 - viii. NESC - National Electrical Safety Code
 - ix. NECA - National Electrical Contractors Association
 - x. NEC - National Electrical Code 2008
 - xi. NFPA - National Fire Protection Association
 - xii. OSHA - Occupational Safety and Health Administration Regulations
 - xiii. IEEE - Institute of Electronics and Electrical Engineers
 - xiv. CBM - Certified Ballast Manufacturers
 - xv. ICEA - Insulated Cable Engineers Association
 - xvi. IBC - International Building Code
 2. Listing: Provide fixtures manufactured and listed in strict accordance with the appropriate requirements of the National Electric Code as verified by Underwriter's Laboratories, Inc., or

other testing agency acceptable to local authorities having jurisdiction. Provide listings for each fixture type, and the appropriate label or labels affixed to each fixture in a position concealed from normal view.

2.05 PRODUCT HANDLING

- A. Deliver architectural lighting fixtures, components and assemblies in fully sealed protective cartons and identified as to contents. Protect fixtures from damage from any source. Provide removable protection as required.
- B. Instructions: Each lighting fixture shall be packaged with complete instructions and illustrations indicating installation method.
- C. Store materials in accordance with manufacturer's instructions, properly protected from weather and construction activities.

2.06 EXTRA STOCK

- A. Furnish to the Owner and store at the site where directed, extra stock of each type of lighting fixture type and lamp type installed in the Project in quantities as required by Owner, packaged in manufacturer's unopened cartons and identified as to contents by fixture type.
- B. Furnish items above with an appropriate quantity of each exposed trim, fastener, bracket and other items as required for a complete installation.

2.07 DECORATIVE CUSTOM FIXTURE

- A. Decorative custom fixture manufacturers listed in the fixture schedule shall be assumed capable of supplying the detailed fixtures. Manufacturers not listed must be pre-qualified based on their Experience. Manufacturers not listed in the fixture schedule shall also submit a sample of each fixture upon lighting designer's request for review.
- B. The Architect and the Lighting Consultant shall be the sole judges in determining whether the prototype sample complies with the specifications, and shall reserve the right to disqualify any bidders.
- C. Furnish to the Owner and store extra stock at the site where directed of certain type of lighting fixture type and lamp type installed in the Project. The fixture type and quantities as required by Owner.

PART 3 - PRODUCTS

3.01 MATERIALS

- A. Standard with the manufacturer and complying with requirements of referenced standards.

3.02 FIXTURE FABRICATION, GENERAL

- A. Provide architectural lighting fixtures completely factory assembled, wired and equipped with necessary sockets, ballasts, wiring, shielding, reflectors, channels, lenses, brackets, fasteners and other parts necessary to complete the fixture installation.

- B. Sheet Metal Work: Sheet metal work shall be free from tool marks and dents, and shall have accurate angles bent as sharp as is compatible with the gauge and material of the required metal. All intersections and joints shall be formed true, of adequate strength and structural rigidity to prevent any distortion after assembly. Return or clean edges free of all burrs or sharp spots.
- C. Castings: Provide cast or extruded metal fixtures parts, of ample weight and thickness that are close grained, smoothly finished and buffed, rigid and free from imperfections, sand pits, blemishes, scales, rust or discolorations. Provide for tolerance of shrinkage of the metal castings so as to allow the finished castings to accurately fit in their designated locations.
- D. Hinged door closure frames shall operate smoothly without binding. Fabricate frames to allow lamp installation and/or removal without the use of tools. Hinge mechanism shall be designed to preclude accidental falling of hinged door closure frames during re-lamping operations and while secured in the operating position.
- E. Weld exposed metal at joints, fill with compatible weld material, grind smooth and make free from light leaks. Construct fixtures with the minimum number of joints. Fabricate unexposed joints utilizing welding, brazing, screwing or bolting. Soldered joints are unacceptable. Do not utilize self-tapping methods or rivets for fastening parts, which require removal to gain access to electrical components requiring service or replacement, or for fastening any electrical components or their supports. Gasket incandescent fixtures with overlapping trim. Weld ballast support studs, socket saddle studs and reflector support studs to fixture body. Ventilate ballast compartments and firmly secure ballasts to conducting metal surface.
- F. Light leaks between ceiling trims of recessed lighting equipment and the ceilings will not be allowed. If fixtures are used in partially transparent ceilings, light leaks above the ceiling line will not be allowed. Interior light reflecting surfaces shall have reflectance of not less than 85% for white surfaces, 83% for specular surfaces and 75% for specular diffusing surfaces.
- G. Provide yokes, brackets and supplementary supporting members needed to mount lighting fixtures to carrier channels or other suitable ceiling members.
- H. Temperature: All fixtures and ballasts must operate within the temperature limits of their design and as specified by Underwriters' Laboratories, Inc. in the applications and mounting conditions specified herein.

3.03 FIXTURE FABRICATION, SPECIFIC ITEMS

- A. Enclosures: Fabricate fixture enclosures with minimum 20 ga. thick cold rolled sheet steel. Enclosures may be constructed of other metals, provided they are equivalent in mechanical strength and acceptable for the purpose. Fabricate lighting fixtures with vitreous porcelain enamel finish from minimum 20 ga. enameling steel.
- B. Housings: Fabricate housings so that all electrical components are easily accessible and replaceable without removing fixtures from their mountings, or altering adjacent construction. Provide recess & semi-recess fixtures using bottom re-lamping unless otherwise noted.
- C. Mounting Frames and Rings: If required for installation in specified ceiling system, provide each recessed and semi-recessed fixture with a mounting frame or ring compatible with the ceiling system in which they are to be installed. Frames and rings shall be one piece or constructed with electrically welded butt joints, and of sufficient size and strength to sustain the weight of the

fixture. Ceiling opening frames shall either be manufactured of non-ferrous metal or be suitably rust proofed after fabrication.

- D. Fasteners and Hardware: For steel and aluminum fixtures, all screws, bolts, nuts and other fastening and latching hardware shall be cadmium or equivalent plated. For stainless steel fixtures, all hardware shall be stainless steel. For bronze fixtures, all hardware shall be stainless steel or bronze. Where exposed in the finish work, fasteners shall be of color and finish, matching base metal and finish.
- E. Lamp Sockets: Provide lamp sockets in lighting fixtures suitable for the specified lamps and set so that lamps are positioned in optically correct relation to all lighting fixture components. If adjustable socket positions are provided, preset socket in factory for lamp specified. If different socket positions are specified for same fixture, preset sockets for each type, and mark cartons accordingly.
- F. Adjustable Angle Fixtures: Provide each lighting fixture, which has a beam angle adjustment with a reliable angle-locking device. Fixture re-lamping shall not disturb preset focus.
- G. Oval Beam Fixtures: Each lighting fixture which has a lamp with an oval shape beam pattern shall contain lamp orientation locking devices to insure that beam orientation is not disturbed during future lamp replacement or cleaning.
- H. Spread Lens Fixtures: Each light fixture, which has a spread lens, shall contain lens orientation locking devices to insure that lens orientation is not disturbed during future lamp replacement or cleaning.
- I. Outdoor Fixtures: Fixtures for use outdoors or in areas designated as damp locations shall be suitably gasketed to prevent the entrance of moisture. Provide approved wire mesh screens for ventilation openings.

3.04 FIXTURE FINISHES

- A. General: As shown for the respective units and matching the Architect's samples. Remove scratches, abrasions, dents, die markings and other defects prior to finishing operations. Perform this work in addition to finish treatment specified. Unless otherwise noted, colors and finishes shall be as selected by the Architect and Lighting Consultant.
- B. Shop Finishes
 - 1. Ferrous Metals: Except for stainless steel, give ferrous metal surfaces a five stage phosphate treatment or other acceptable base bonding treatment before final painting and after fabrication.
 - 2. Anodized Aluminum Surfaces: Finish interior aluminum trims with an anodized coating of not less than 7 mg. per sq. in. of a color and surface finish as selected by the Architect and Lighting Consultant. Finish exterior aluminum and aluminum trims with an anodized coating of not less than 35 mg. per sq. in. of a color and surface finish as selected by the Architect and Lighting Consultant.
 - 3. Porcelain Enamel Surfaces: Apply porcelain finishes smoothly. Finish shall be not less than 7.5 mm thick of non-yellowing, white, vitreous porcelain enamel with a reflectance of not less than 85% except as noted otherwise.

4. Unpainted non-reflecting surfaces shall receive a mechanically applied satin finish and shall be coated with a baked-on clear lacquer to preserve the surface. Where aluminum surfaces are treated with an anodic process, the clear lacquer coating may be omitted.

C. Field Painting

1. Painted Surfaces: Synthetic enamel, with acrylic, alkyd, epoxy, polyester or polyurethane base, light stabilized, baked-on at 350 deg. F. minimum, catalytically or photo chemically polymerized after application.
2. White Finishes: Minimum of 85% reflectance.

3.05 LED FIXTURES

A. General: LED luminaires are an electromechanical system that includes the essential light-emitting source, provisions for heat transfer, electrical control, optical conditioning, mechanical support, protection, as well as aesthetic design elements. LEDs themselves are expected to have long life, all of the other components, adhesives, and materials must be equally long-lived. The LED Luminaire manufacturer shall be responsible for providing tight control on the LED luminaires' system components and operating conditions to provide optimum performance.

B. Properly measured, Luminaire Efficacy combines both the light source system efficacy and luminaire efficiency, allowing for a true comparison of a luminaire regardless of the light source. The Luminaire efficacy is the preferred metric for LED fixtures. The Luminaire efficacy shall measure the net light output from the luminaire divided by power into the system, accounting for driver, optical, and thermal losses. The LED luminaire manufacturer shall list the luminaire's efficacy, not the LED sources efficacy.

C. Life of the LED Light source

1. Life is the length of time during which a LED Light source, LED Module or LED Luminaire provides more than claimed percentage x of the initial luminous flux, under standard conditions. The LED luminaire's Life shall always be published as combination of life at claimed lumen maintenance and failure fraction, F_y applying at the time of reaching the claimed percentage of the initial luminous flux (L_x). The LED Luminaire manufacturer shall always state the life of the LED source as:

- a. Light Loss - Usually either L90 or L70 (L50 for decorative luminaires) – no. of hours
- b. Physical Failures - LED Life F10 – no. of hours

2. Example: If the rated life of a product is 50,000 hours, this means light loss of L70 and physical failures of F_x (where x is the percentage no. of failures) at the rated life of 50,000 hours. (Note: it should be assumed that the manufacturer has tested to a maximum of 6000 hrs and extrapolated beyond that – unless they explicitly state differently.)

D. Optical performance

The LEDs are directional light sources and the use of reflectors, lenses and diffusers, or a combination thereof. The LED Luminaire manufacturer shall always state the efficiency of the optical system and overall efficiency value of the lamp or luminaire.

E. Thermal Management

The interface between an LED and heat-sink called PCB is a thermal resistance value that represents the capability of the soaking away heat from the LED, this may well impact on the LED

lumen output performance and ultimately the life, lumen maintenance and/or catastrophic failure of the LED. Luminaires mechanical components shall have IPxx rating to suit the application, heat-sinking shall not become compromised with time and or lack of maintenance, vibration resistance, specifically. The heat-sink shall be appropriately secured to the LED source, and bonding mechanisms are suitable for the life of the lamp or luminaire.

Electrical overstress can cause of catastrophic failure of LEDs. The provided LEDs shall contain an on board Transient Voltage Suppression chip (TVS) to minimize damage at installation or power-up.

F. LED Light Source

1. The LED die (or chip) is contained in a suitable package allowing simplified electrical connection or assembly.
2. LED Module: The LED source with mechanical and optical components making a replaceable item for use in luminaries.
3. LED Luminaire: The complete lighting fixture system consisting of all elements including; LED source, Heat sinks, optical components, drivers, housing, etc.

The Luminaries manufacturer shall indicate the basis of life projections and list LM-80 data available for the proposed LED Module or calculates lifetime data based upon the LM-80 data to ensuring the LED Module or Luminaire could be reliable.

The Luminaries manufacturer shall define Life as the length of time it takes an LED Module or LED Luminaire to reach (depending on the application) 90% or 70% of its initial light output (L90 or L70). For decorative lighting applications, it is recommended to define useful life as the length of time it takes to reach 50% of its initial output. Lifetime (Lx) shall be published in combination with the failure fraction, (Fx.)

4. Color Rendering Index (CRI) for the LED
The preferred measure of CRI is Ra14 (as the additional test colors compared to Ra8) will give a more accurate representation of the LEDs ability to reproduce colors.
5. LED Measured Output: The power factor should be clearly stated in all cases. Total luminaries power including drivers should be measured under standard conditions and expressed in Watts. The initial luminous flux shall be measured after thermal stabilization of the LED luminaire. The measured data for the luminaire should be presented for an ambient temperature of 25°C. (15°C for Exterior luminaires). This shall be done using relative photometry in a temperature controlled cabinet.
6. Lumen depreciation
The lumen depreciation rate shall be judged by the light output at 25% of rated life (with a maximum duration of 6000 h) compared to the initial output. The depreciation classification is:
 - Light output > 90% of initial Cat 1
 - Light output > 80% of initial Cat 2
 - Light output > 70% of initial Cat 3Light Loss Maintenance Factor (LLMF) shall be indicated as the light lost at rated life.

7. **Color Temperature**
The initial color point (x & y) of the LED and the color temperature derived from it or bin class related to C78.377-2008 where color temperature values are recommended as 2700K, 3000K, 3500K, 4000K, 5000K, 6500K. Refer to lighting fixture specifications for selected luminaires' LED source's color temperatures.
 8. **Color Maintenance**
The color shift is judged by the color point shift at 6,000 hours compared to the initial color point (x & y) of the luminaire.
 9. **Color Temperature Tolerance**
Tolerance (categories) on nominal x & y values shall be measured for both initial and at 25% of rated life (with a maximum duration of 6000 h)
 - All measured x & y's within a 1-step ellipse
 - All measured x & y's within a 3-step ellipse
 - All measured x & y's within a 5-step ellipseTolerances beyond a 4-step ellipse are unacceptable for general illumination purposes.
 10. **Color Rendering Index for the Luminaire**
The initial Color Rendering Index (CRI) of a luminaire shall be measured. A second measurement is made after a total operation time of 25% of rated life (with a maximum duration of 6000 h). The measured CRI values shall not have decreased by more than 3 points from the rated CRI value for initial CRI values and 5 points from the rated CRI value for maintained CRI values. The preferred measure of CRI is Ra14.
 11. **Intensity Distribution (Photometric data)**
The manufacturer should state the format in which the photometric data is supplied.
 12. **Relative Photometry**
Relative Photometry (format) requires the LED package flux to be quoted. Relative photometry should be conducted according to EN13032-1 (2004) Light and lighting - Measurement and presentation of photometric data of lamps and luminaires - Part 1: Measurement and file format
 13. **Absolute Photometry**
Photometry does not require the use of a separate lumen output for the light source. Absolute photometry of LED luminaires should be conducted according to IES LM-79-08 Photometric Measurements of Solid-State Lighting Products.
- G. LED Evaluation**
1. The Luminaire manufacturer shall perform several performance tests to ensure the operation of the LED Luminaire is optimized, stabilized, etc.
 - Temperature cycling shock test
 - Supply voltage switching test
 - Thermal Endurance Test
 2. The Luminaire manufacturer shall provide data required for performance evaluation, specification, etc.
 - Initial Luminaire Lumen Output L100
 - Light Output Depreciation Category (1, 2 or 3)
 - Luminaire life L(x) (where x is the percentage of L100 at the declared life)
 - Failure Fraction F(x) (where x is the percentage of failures at L(x))
 - Color Temperature Category both at initial and 25% of rated life (max duration of 6000 h)

- Color Rendering Index Value
- Color Rendering Index Value Shift
- Luminaire Electrical Characteristics
- Total power consumed
- Initial power factor
- Power Factor @ at initial and 25% of rated life (with a maximum duration of 6000 h)

H. LED Drivers

1. Driver should be UL Recognized under the component program and shall be modular for simple field replacement. Drivers that are not UL Recognized or not suited for field replacement will not be considered.
2. Integral driver to be UL 8750 compliant, which states the safety standard for light emitting diode (LED) equipment for use in lighting products AND specifies the minimum safety requirements for SSL components, including LEDs and LED arrays, power supplies, and control circuitry.
3. Remote driver to be UL 2108 compliant, which applies to low voltage lighting systems and components intended for permanent installation and for use in locations in accordance with the National Electrical Code, ANSI/NFPA 70, Article 411.
4. Driver to have Ten-year expected life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
5. Driver to meet or exceed NEMA 410 driver inrush standard of 430 Amps per 10 Amps load with a maximum of 370 Amps² – seconds.
6. Driver to meet or exceed 30mA²s at 277VAC for up to 50 watts of load and 75A at 240us at 277VAC for 100 watts of load.
7. Driver to be able to withstand up to a 1,000 volt surge without impairment of performance as defined by ANSI C62.41 Category A.
8. Driver to show no visible change in light output with a variation of plus/minus 10 percent line voltage input.
9. Driver and luminaire electronics shall deliver illumination that is free from objectionable flicker as measured by flicker index ((ANSI/IES RP-16-10). At all points within the dimming range from 100-0.1 percent luminaire shall have a flicker index less than 5% at all frequencies below 1000 Hz.
10. Driver must be able to operate for a (+/- 10%) supply voltage of 120V through 277VAC at 60Hz
11. Driver and power cable to have sound rating inaudible 27 dB ambient or quieter.
12. Driver types
 - a. Constant current (e.g. 350mA, 700mA, 1050mA)
 - b. Constant voltage (12V or 24V)
13. Dimming LED Drivers.

- a. LED dimming shall be equal in range and quality to a commercial grade incandescent dimmer. Quality of dimming to be defined by dimming range, freedom from perceived flicker or visible stroboscopic flicker, smooth and continuous change in level (no visible steps in transitions), natural square law response to control input, and stable when input voltage conditions fluctuate over what is typically experience in a commercial environment. Demonstration of this compliance to dimming performance will be necessary for substitutions or prior approval.
 - b. Total Harmonic Distortion to be less than 20% percent and meet ANSI C82.11 maximum allowable THD requirements at full output. THD shall at no point in the dimming curve allow imbalance current to exceed full output THD.
 - c. Dimming LED Driver Types
 - 1) 2-Wire (Forward Phase) Dimming Drivers
 - 2) 2-Wire (Reverse Phase) Dimming Drivers
 - 3) 3-Wire (Lutron) Dimming Drivers
 - 4) 4-Wire (0-10V DC Voltage Controlled) Dimming Drivers
 - 5) Digital (Dali Low Voltage Controlled) Dimming Drivers
 - 6) Digital Multiplex (DMX 512 Low Voltage Controlled) Dimming Drivers
 - d. Dimming LED Driver Control Input types
 - 1) Switched (ON/OFF)
 - 2) 2 Wire (Forward Phase) Must meet NEMA SSL-7A-2013 to ensure inter-compatibility between LED load and phase control dimmers.
 - 3) 2-Wire (Reverse Phase) Must meet NEMA SSL-7A-2013 to ensure inter-compatibility between LED load and phase control dimmers.
 - 4) 3-Wire (Lutron)
 - 5) 4-Wire (0-10V DC Voltage Controlled) Dimming Drivers Must meet IEC 60929 Annex E for General White Lighting LED drivers Connect to devices compatible with 0 to 10V Analog Control Protocol, Class 2, capable of sinking 0.6 ma per driver at a low end of 0.3V. Limit the number of drivers on each 0-10V control output based on voltage drop and control capacity. Must meet ESTA E1.3 for RGBW LED drivers
 - 6) Digital (DALI Low Voltage Controlled) Dimming Drivers Must meet IEC 62386
 - 7) Digital Multiplex (DMX Low Voltage Controlled) Dimming Drivers Must meet DMX / RDM: USITT DMX512A and ANSI E1.20 (Explore & Address) Capable of signal interpolation and smoothing of color and intensity transitions
14. Driver installation
- a. Drivers are to be installed per manufacturers prescribed methods.
 - b. Driver shall be installed such that 0-10V inputs are protected from line voltage missfire, and are immune and output unresponsive to induce AC voltage on the control leads.
 - c. Driver may be remote mounted according to manufacturer's recommendations to include, but not be limited by the following.

- 1) When pairing a driver with an LED fixture, a recognized UL listed driver with the proper loading must be used. Refer to manufacturers list of recommended compatible drivers.
- 2) Distance of driver to LED fixture to be determined according to manufacturer's recommendations depending on power level and wire gauge.
- 3) Driver must be installed in an accessible and well ventilated location.

3.06 FLUORESCENT LIGHTING FIXTURES

- A. General Construction and Materials: Conform to UL 1570 except for damp and wet locations conform to UL 57. Housing end plates, socket bridges, reflectors, wiring channels and ballast covers shall be die formed of not less than 20 ga. cold-rolled steel unless otherwise specified.
- B. Lamp holders shall be heavy white thermoset urea plastic with definite locking feature and silver-plated contacts for proper lamp operation and life. Outdoor lamp holders shall be neoprene gasketed and compression type. Sockets with open circuit voltage over 300 volts shall be safety type and designed to open supply circuit on lamp removal.
- C. Construct fixtures so that ballast may be serviced or replaced without removal of fixture housing.

3.07 FLUORESCENT BALLASTS

- A. General: Use single-lamp, two-lamp or three-lamp ballasts in each fluorescent fixture as scheduled or shown. Fluorescent lighting fixture ballasts (except single reactor type) shall be equipped with an internal, automatic resetting thermal protector adjacent to the coils, and on-time non-resetting thermal device to protect the capacitor. Provide identical ballasts within each fixture type. Ballasts within the same luminaire shall be from the same manufacturer.
 1. Ballast shall operate at a frequency greater than 20 khz without any discernible flicker.
 2. Ballast shall operate at a minimum power factor of 95% and a lamp current crest factor not to exceed 1.7.
 3. Ballast shall have input current total harmonic distortion not to exceed 10% THD of the fundamental harmonic (60 Hz).
 4. Ballast shall have a minimum BF of .96 unless otherwise indicated in the specifications.
 5. Ballast shall maintain constant light output over operating ranges of 108-132 volts on a 120-volt circuit and 250-305 volts on a 277-volt circuit. The universal input voltage ballasts will operate satisfactorily between 108 and 305 on 50or 60 HZ supply.
 6. Ballast will be capable of starting the standard lamps at zero degrees F.
 7. Ballast shall be UL listed; Class P; sound rating A and contain non-PCB material.
 8. Ballast shall comply with FCC part 18 Non-Consumer Equipment for EMI and RFI
 9. Ballast shall provide transient immunity as recommended by ANSI C62.41-1991 location Category A2.
 10. Ballast shall tolerate sustained open circuit and short circuit output conditions without damage.
 11. Ballast shall be a dedicated ballast to operate a specific lamp, i.e., T-8 ballast specifically for a T-8 lamp; multi-lamp ballast (same ballast operating a T-8, T-10 and T-12 lamp) will not be acceptable.
 12. Ballasts shall be encapsulated to ensure maximum thermal and structural integrity.
 13. Ballasts shall be warranted for five years from date of manufacture against defects in material and workmanship including replacement.

14. Manufacturer shall have been manufacturing electronic ballasts for at least fifteen years in USA.
15. Ballasts shall be manufactured in an ISO 9002 certified facility.
16. Ballasts for T5 and CFL lamps shall incorporate auto resetting lamp shutdown circuitry for end of lamp life protection thereby allowing for re-lamping without the need to cycle power.
17. Program Rapid start ballasts will be used when the lamps are to be frequently turned on /off. Otherwise ballasts shall provide instant starting sequence consistent with ANSI standard C82.11-1993
18. Multiple lamp ballasts shall be connected to maintain full light output on surviving lamps if one or more lamps fail.
19. Ballasts intended for use outdoors or in low temperature environments shall be electronic type and have the lowest temperature rating available in standard manufacture for its particular type but not higher than 0 deg. F.

3.08 METAL HALIDE BALLASTS

A. Ballasts- The Ballast shall be designed in accordance with all applicable ANSI specifications including ANSI C82.4 and shall comply with UL 1029.

1. Minimum Starting Temperature: Minus 40 degrees C for High Pressure Sodium and Pulse start Metal Halide and minus 30 degrees C for Metal Halide at minimum rated line voltage.
2. Normal Ambient Operating Temperature: 104 deg F.
3. Core and coil ballasts shall be designed to operate at least 180 cycles of 12 hours on and 12 hours off, with the lamp circuit in an open or short - circuited condition and without undue reduction in ballast life.
4. Capacitors shall not contain PCBs or other hazardous fluids and will have a self-contained internal bleeder resistor.
5. The igniters shall so designed to provide six months of lamp open circuit operation without failure.
6. Ballasts shall be warranted for two years from the date of manufacture.
7. All coils shall be precision wound.
8. The core and coil ballasts shall be designed with class H (180 degrees C) or higher insulation system and vacuum impregnated with 100% solid based resin.
9. The light output shall not vary more than 11% with a plus minus 5 % voltage variation in high reactance circuit and not more than 5% with a plus minus 10 % voltage variation in CWA circuit.
10. Lamp drop out voltage shall not exceed minus 25 % of the rated voltage for the high reactance circuit and minus 30 % for the CWA circuit.

B. Capacitors

1. All capacitors will be oil-filled with self-contained internal trip fault protection and bleed resistor.
2. All capacitors will be housed in corrosion resistant steel cans and contain .25" quick disconnect terminals.

3.09 HALOGEN LIGHTING FIXTURES

A. Incandescent light source shall not be used.

B. Tungsten Halogen: The lighting fixtures utilizing tungsten halogen sources shall be designed and constructed so that lamp seal temperatures do not exceed 350 deg. C. at an ambient temperature of 25 deg. C. when tested in accordance with UL Standard No. 57 and shall maintain an operating bulb wall temperature of approximately 600 deg. C. and not less than 250 deg. C.

- C. Aluminum reflectors shall be Alzak (finish as selected) or as authorized, and not less than 0.057 in. thick unless otherwise specified.
- D. Lamp holders shall be UL listed, and heavy-duty type constructed of high-grade porcelain. Provide medium base sockets for lamps up to and including 250 watts and mogul based sockets from 300 watts up to 1500 watts (rated for 1500 watts, 600 volt service) unless specified otherwise.
- E. Lead wires for fixtures utilizing tungsten halogen sources shall be rated for not less than 200 deg. C. operation, unless temperature warrants rating of 250 deg. C.
- F. Temperature on reflectors shall not exceed 205 deg. C. at any point.
- G. Junction Boxes: All fixtures supplied for recessing in suspended ceilings shall be supplied with pre-wired junction boxes.

3.10 LAMP HOLDERS

- A. Incandescent: Porcelain body, nickel-plated brass screw-shell, pre-lubricated with silicone compound.
- B. Fluorescent: White urea plastic body, silver-plated phosphor bronze contacts.
- C. High Intensity Discharge: Porcelain Body, nickel-plated brass screw-shell, pre-lubricated with silicone compound, spring-loaded silver-plated phosphor bronze contacts.

3.11 LAMPS

- A. Accepted light source manufactures listed below. The same manufacturer shall supply all lamps of a given type, unless otherwise specified.
 - General Electric
 - Philips
 - Osram Sylvania
 - Nichia (for LED sources)
 - Cree (for LED sources)
 - Samsung (for LED sources)
- B. If a specific manufacturer is noted in the schedule, only that manufacturer shall be acceptable.
- C. Provide lamps for all lighting fixtures (furnished as part of the electric work).
- D. Tungsten halogen lamps shall not be operated, other than for initial testing, prior to final inspection.

3.12 REFLECTORS

- A. Aluminum reflectors shall be finished specular, semi-specular or diffuse as required and shall meet or exceed Alzak specifications. A minimum requirement of reflector finishes for interior and exterior service shall be as follows:

Description of Service	Min. Weight of Coating Mg. Per Sq. In.	Min. Reflectance Specular %	Min. Reflectance Diffuse %
Normal interior commercial service.	5.0	83	75
General interior industrial and exterior work reflector protected by glass covering.	7.5	82	73
Exterior industrial and commercial reflector not protected.	10.0	78	75
Exterior marine service reflector not protected.	13.0	78	65

3.13 LENSES

- A. Plastic for lenses and diffusers shall be formed of colorless 100% virgin acrylic as manufactured by Rohm & Haas, DuPont or approved equal. The quality of the raw material must exceed IES, SPI and NEMA Specifications by at least 100%, which, as a minimum standard, shall not exceed a yellowness factor of 3 after 2,000 hrs. of exposure in the Fadeometer or as tested by an independent test laboratory. Acrylic plastic lenses and diffusers shall be properly cast, molded or extruded as specified, and shall remain free of dimensional instability, discoloration, embrittlement, or loss of light transmittance for a minimum of 15 years.
- B. Glass used for lenses, refractors and diffusers in halogen lighting fixtures shall be tempered for high impact and heat resistance; the glass shall be crystal clear in quality with a transmittance of not less than 88%. For exterior fixtures use tempered Borosilicate glass tempered Corning No. 7740 or approved equal. For fixtures directly exposed to the elements and aimed above the horizontal with a radiant energy of 4.16 watts per sq. in., or greater, use Vycor glass.
- C. Where optical lenses are used, they shall be free from spherical and chromatic aberrations and other imperfections, which may hinder the functional performance of the lenses.
- D. All lenses, louvers or other light diffusing elements shall be removable, but positively held so that hinging or other normal motion will not cause them to drop out.

3.14 LUMINOUS CEILINGS & LIGHT BOXES

- A. Vinyl plastic diffusers shall be formed of colorless 100% virgin acrylic as manufactured by NewMat, Barrisol or approved equal. The quality of the raw material must exceed IES, SPI and NEMA Specifications by at least 100%, which, as a minimum standard, shall not exceed a yellowness factor of 3 after 2,000 hrs. of exposure in the Fadeometer or as tested by an independent test laboratory.

- B. Acrylic plastic diffusers shall be properly stretched as specified, and shall remain free of dimensional instability, discoloration, embitterment, or loss of light transmittance for a minimum of 15 years.
- C. All luminous ceiling components including the light fixture and diffuser's structural frames shall have matt white finish.
- D. The luminous ceiling shall not have light fixture image or socket shadows, nor shadows caused by any other device within rendered on the diffuser. Appropriate testing and mockup shall be provided to confirm the system.
- E. Manufacturers shall submit a sample of the luminous ceiling components including the light fixture and diffuser's structural for lighting designer's review.
- F. The Architect and the Lighting Consultant shall be the sole judges in determining whether the luminous ceiling sample complies with the specifications, and shall reserve the right to disqualify any bidders.
- G. Light fixtures within the Luminous ceiling shall be run for 100 hours, fully tested and operational with the specified control system, free of flickering and defect prior to closing of the luminous ceiling. Prior to removal of scaffolding the installation shall be run for 100 hours to verify ventilation is adequate. Installation shall be reviewed and approved by the architect & lighting designer before removal of scaffolding. Illumination shall be flicker free.
- H. Luminous ceilings shall be constructed with appropriate static or mechanical ventilation necessary to maintain manufacturer's recommended operating temperatures of light fixture components within the installation ie. lamps, LED modules, ballasts, drivers, power supplies, etc.
- I. Light boxes & Luminous ceilings require future maintenance access. The frequency is variable upon the components within the system. It shall be noted future access may require scaffolding and or genie lifts, removal of diffusers, etc. to access the devices within the system.
- J. All components within the system shall be maintained at the same time to limit frequency of access required.

PART 4 - EXECUTION

4.01 CONDITION OF SURFACES

- A. Examine the substrates, adjoining construction and the conditions under which the Work is to be installed. Do not proceed with the Work until unsatisfactory conditions have been corrected.

4.02 INSTALLATION

- A. Comply with the referenced standards and in strict conformance with the manufacturer's written instructions and recommendations, unless otherwise shown or specified.
- B. Coordinate the work of this Section with the work of other Trades as required for a complete installation.

- C. The architectural reflected ceiling plans indicate the proper locations of lighting fixtures. Do not scale electrical drawings for exact location of the lighting fixtures. Verify dimensions in field.
- D. Install fixtures, finishing plates, reflectors, reflector cones, baffles, aperture plates, light controlling elements for air handling fixtures, decorative items and visible trim for recessed fixtures only after all plastering, ceiling tile work, and general cleanup work is finished. Do not install items not scheduled to be field painted until after painting is complete.
- E. Install each fixture properly, plumb, true, in alignment and free of distortion.
- F. Provide hangers, rods, mounting brackets, miscellaneous framing, supporting or attaching devices, frames and other components or equipment as required for a complete installation, and as required to properly support imposed loads including fixture weight. Secure lighting fixtures to supports. Support all lighting fixtures independently of ductwork, piping, ceiling supports or other items occurring within the ceiling.
- G. Support surface mounted fixtures greater than 2 feet in length at a second point in addition to the outlet box fixture stud.
- H. Where a fixture or its hanger canopy is applied to a surface mounted outlet box, a finishing ring shall be utilized to conceal the outlet box.
- I. Align continuous rows of lighting fixtures rigidly, for true in-line appearance.
- J. Pendant Fixtures: Install pendant lighting fixtures plumb and at a height above the finished floor as shown. Provide individually mounted pendant fixtures longer than two feet with a minimum of two stem hangers. Use ball aligners and canopies on pendant fixtures unless otherwise noted.
- K. Mechanical Rooms: Lighting fixture locations in mechanical and electrical equipment rooms are approximate. Coordinate mounting height and location of lighting fixtures to clear mechanical, electrical and plumbing equipment and to adequately illuminate meters, gauges and equipment.
- L. Splices in internal wiring shall be made with approved insulated "wire nut" type mechanical connectors, suitable for the temperature and voltage conditions to which they are subjected.
- M. Wiring utilized for connections to or between individual lamp sockets and lamp auxiliaries (i.e. wires which do not constitute "through circuit" wiring) shall be suitable for temperature, current and voltage conditions to which it is subjected.
- N. Mount fluorescent lamps on rapid-start circuits within 1 in. of grounded metal, minimum 1 in. wide, as long as lamp.
- O. Provide equipment grounding connections for interior lighting fixtures. Tighten connections to comply with the tightening torques specified in UL 486A to assure permanent and effective grounds.
- P. Mount fluorescent lamps free of conditioned air below the recommended ambient room temperature for the lamp/ballast system. Adjacency to cool air temperatures will adversely affect the lamp operation causing reduced output, discoloration and flicker. Coordinate mounting locations of mechanical air supply such that it is not directed toward or located directly above exposed fluorescent lamps. This is particularly true at cove lighting locations.
- Q. Provide secondary fixture support in addition to standard mounting procedures, i.e. additional cable ties to black iron or additional hangers and rods to the building structure, to secure light

fixtures mounted in floating acoustical ceiling systems. Such that should the floating ceiling system move out of alignment the light fixture will not be in danger of falling from the ceiling.

4.03 AIMING AND ADJUSTMENT

- A. After the installation is complete; aim, focus, and lock adjustable lighting units as directed by Architect and/or Lighting Consultant. Provide ladders, scaffolds, and other equipment required to perform the Works. During aiming and adjustment, tighten locking setscrews, bolts and nuts securely.
- B. Night Work: Where possible, focus units during the normal working day. However; where daylight interferes with vision, perform work at night.

4.04 CLEANING

- A. Prior to final acceptance by the Owner, clean lighting fixtures thoroughly with materials and methods recommended by the manufacturers. Clean fingerprints and smudges from the lenses. Replace broken parts and replace lamps, which are dim or have burned out.
- B. Do not remove protective coverings of louvers or diffusers, which are delivered in protective coverings until area is clean. Replace blemished, damaged or unsatisfactory fixtures as directed.

END OF GENERAL SPECIFICATION

(SEE ATTACHED FIXTURE CUTSHEETS)

END OF SECTION 26 51 00

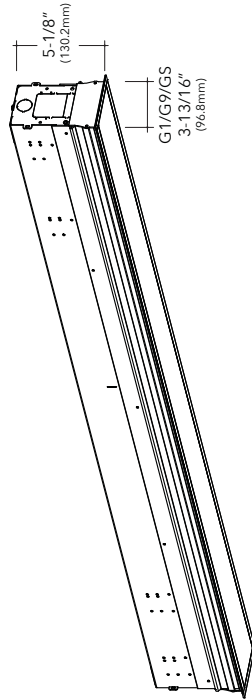
Project Name _____ Type _____
Date _____

EDGE Evolution 3

P I N N A C L E
ARCHITECTURAL LIGHTING®



RECESSED LINEAR LUMINAIRE



- Extruded aluminum trim with formed cold rolled 20 gauge steel back box housing
- Highly reflective die-formed white painted steel reflector
- 5-year limited warranty covers LED, driver and fixture
- UL and cUL listed. IC rated
- Approved for dry/damp location unless otherwise noted
- Maximum fixture weight is 15lbs per 4ft fixture
- Room-Side Maintenance for LED system
- Buy American Act compliant



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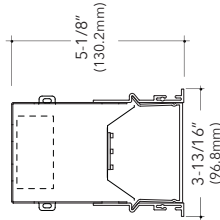
EV3 LED SPEC MAY2017

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P I N N A C L E ARCHITECTURAL LIGHTING® **EDGE** Evolution 3 Recessed Linear Luminaire



Project Name _____
Date _____ Type _____

EV3 _____

Shielding CRI, CCT & Output _____
Length OR Pattern _____
Mounting Voltage Driver Circuiting _____
Battery & Finish _____
Emergency _____
Controls _____
Fixture Options _____

Example Part #: EV3HE-827-8-G1G-U-OL1-1-0-W

SHIELDING pg. 3	CRI, CCT & OUTPUT pg. 4	LENGTH OR PATTERN pg. 5-6	MOUNTING pg. 7	VOLTAGE pg. 8	DRIVER pg. 8	CIRCUITING pg. 9	BATTERY & EMERGENCY pg. 10	FINISH pg. 11	FIXTURE OPTIONS pg. 11	CONTROLS pg. 12
A Satine	27 2700K <small>Example: 827HO is 8 = 80 CRI; 27 = 2700K; HO = High Output</small>	H Arched Regress	AL Drop	HE High Efficiency	R Flat Regress	V Path	CL Custom Lumens	CW Custom Watts	U Universal (120/240V/277V)	More Options on pg. 3
G1 Individual Fixture - 2', 3', 4', 5', 6', 7', 8'	35 3500K	L L-Shape	30 3000K	40 4000K	S Square	U U-Shape	U U-Shape	U U-Shape	U U-Shape	More Options on pg. 4
G1 T-Bar	GS Slotted T-Bar	R Rectangle	3 347V	FL Flanged	SF Spackle Flange	NF Flangeless	G.C. TO VERIFY	G.C. TO VERIFY	G.C. TO VERIFY	More Options on pg. 5-6
U Universal (120/240V/277V)	EE TO VERIFY	GS Slotted T-Bar	3 347V	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	Details on pg. 7
OL1 Osram Dimming 0-10V, 10%	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	Details on pg. 8
1 Single	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	Details on pg. 8
0 None	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	Details on pg. 9
W Matte White	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	More Options on pg. 10
QS Quick Ship	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	Details on pg. 11
PD1 Philips Luxesense Daylight Sensor	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	EE TO VERIFY	More Options on pg. 12

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EV3_LED_SPEC_MAY2017 2 of 13

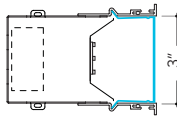
<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 8.6W/LF LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer, 0-10V Dimming Capable</p>	<p>FI</p>
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P I N N A C L E Evolution

ARCHITECTURAL LIGHTING®

EV3

Shielding



- White snap-in acrylic lens with matte finish, removable for maintenance
- Highly reflective die-formed white painted reflector
- Wiring access available on top of housing

Ordering Code

A Satine Lens

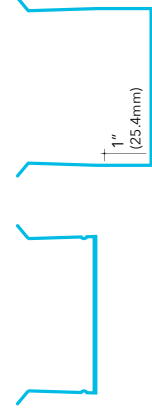
AL Drop Lens

H Arched Regress

HE High Efficiency

R Flat Regress

V Path Lens

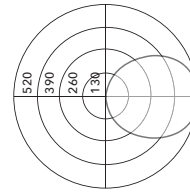


SHIELDING

Photometrics

Satine Lens

Test #	ITL66382
Catalog #	EV3A-840-4
Lumens	1406 lm
Watts	16.4 W
Efficacy	76 LPW



Candela Distribution

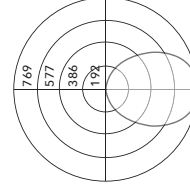
Vert. Angle	Horizontal Angle	Average C-Deg	Average 45-Deg	Average 90-Deg
0	0	127.5	45	147.5
0	520	57.5	520	57.5
0	517	51.6	515	515
5	510	505	504	504
10	496	492	491	490
15	479	471	472	470
20	455	446	447	444
25	397	389	388	384
30	327	321	320	316
35	290	285	284	279
40	214	210	209	206
45	175	172	170	168
50	138	135	132	131
55	100	98	97	96
60	64	62	61	61
65	32	31	30	29
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

Luminaire Data (cd/sq.m)

Angle In Degrees	Average C-Deg	Average 45-Deg	Average 90-Deg
45	3080	4970	4891
55	4552	4422	4329
65	4238	4108	4065
85	3981	3724	3595

High Efficiency Lens

Test #	ITL6440
Catalog #	EV3HE-840-4
Lumens	1653 lm
Watts	18.4 W
Efficacy	90 LPW



Candela Distribution

Vert. Angle	Horizontal Angle	Average C-Deg	Average 45-Deg	Average 90-Deg
0	0	225	45	67.5
0	749	749	749	749
5	785	744	763	761
10	751	747	742	736
15	728	718	708	697
20	694	678	663	645
25	650	631	609	584
30	601	578	550	522
35	543	520	488	458
40	482	459	426	395
45	419	397	365	337
50	357	337	308	284
55	298	279	255	235
60	240	226	206	191
65	187	176	161	149
70	140	131	120	112
75	97	92	84	78
80	59	56	51	48
85	29	26	24	22
90	0	0	0	0

Luminaire Data (cd/sq.m)

Angle In Degrees	Average C-Deg	Average 45-Deg	Average 90-Deg
45	6505	3666	3096
55	4872	4184	3740
65	4108	3544	3243
85	3595	3082	2697

For all available IES files, please visit our website at pinnacle-ltg.com. Photometry testing in accordance to IESNA LM-79-08 at an NPLAP accredited testing laboratory. Testing conducted at 25°C ambient conditions. Specifications and dimensions subject to change without notice. Specification sheets that appear on pinnacle-ltg.com are the most recent version and supersede all other previously printed or electronic versions.

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EV3_LED_SPEC_MAY2017

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P I N N A C L E Evolution

EV3

CRI, CCT & Output

- 25°C test environment. Lumen output has a margin of +/- 5%.
- All luminaire configurations tested in accordance with IES LM-79
- Diodes tested in accordance with IES LM-80
- Minimum lifetime greater than 60,000 hours
- Lifetime Projection L70 = 125,600 hours and L90 = 37,400 hours
- LED binned within MacAdam 3-Step Ellipses
- Specify either 80 or 90 CRI
- 80 CRI = R9≥19 and 90 CRI = R9≥61

Custom Output- Lumens OR Wattage

Ordering Code _____ Specify CRI, CCT and desired lumens (i.e. CL835500) | Specify lumens between standard offering listed below. Lumens are specified per color temp.
 CL _____ Specify CRI, CCT and desired wattage (i.e. CW9407) | Specify watts between standard offering listed below
 CW _____

80 CRI

Color	Output	Watts	Shielding		AL Drop Lumens	HE High Efficiency Lumens	V Path Lumens	H Arched Regress Lumens	R Regressed Lumens					
			A Satine Lumens	LPW										
830	Standard	4.6	335	72.9	401	87.2	394	85.7	352	76.5	29.6	64.3	354	76.9
830HO	High	8.6	612	71.0	739	85.7	727	84.3	649	75.2	54.0	62.6	646	74.9
835	Standard	4.6	345	75.0	413	89.7	406	88.2	362	78.7	30.4	66.2	364	79.1
835HO	High	8.6	630	73.0	760	88.1	748	86.8	668	77.4	55.5	64.4	664	77.0
840	Standard	4.6	352	76.4	421	91.4	413	89.8	369	80.2	31.0	67.4	371	80.6
840HO	High	8.6	642	74.4	775	89.8	763	88.4	680	78.9	56.6	65.6	677	78.5

90 CRI

927	Standard	4.6	265	57.6	317	68.9	312	67.7	278	60.4	23.4	50.8	280	60.8
927HO	High	8.6	484	56.1	584	67.7	575	66.6	513	59.4	42.6	49.4	510	59.1
930	Standard	4.6	309	67.2	370	80.4	364	79.1	325	70.7	27.3	59.3	326	70.9
930HO	High	8.6	564	65.4	681	79.0	670	77.7	598	69.3	49.8	57.7	595	69.0
935	Standard	4.6	311	67.6	371	80.7	365	79.3	326	70.9	27.4	59.6	328	71.3
935HO	High	8.6	566	65.6	684	79.3	673	78.0	601	69.7	50.0	58.0	598	69.3
940	Standard	4.6	314	68.3	376	81.7	369	80.2	330	71.7	27.7	60.2	331	72.0
940HO	High	8.6	573	66.4	691	80.1	681	79.0	607	70.4	50.5	58.6	604	70.0

CRI, CCT & OUTPUT



See Lighting Facts Spec Sheet for tables
Not all products are Lighting Facts listed

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P I N N A C L E Evolution

EV3

Length

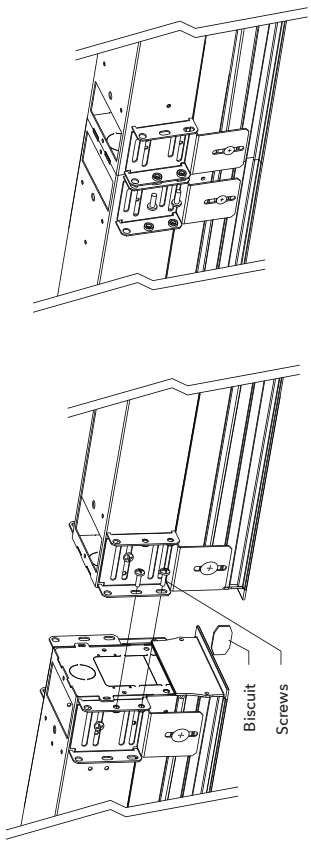
- All individual units cannot be joined, end trims are factory installed and cannot be removed
- Refer to Pattern section for specification and ordering options
- Continuous Rows are made up of even and odd length fixtures; designed to fall on-grid
- Choose fixture length for Individual or Continuous Row length; for patterns refer to Pattern section on page 6

Ordering Code	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Continuous Run Specify nominal overall row length to the 1/8". (Example: 16' run is comprised of 96" x 95" units.)
2	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture
	2' or 23" (584.2mm)	3' or 35" (889mm)	4' or 47" (1193.8mm)	5' or 59" (1498.6mm)	6' or 71" (1803.4mm)	7' or 83" (2108.2mm)	8' or 95" (2413mm)	

LENGTH OR PATTERN Specify to the 1/8"

Connection Detail

- Incorporating biscuits and screws not only creates a secure joint but also aids in fixture alignment
- At every joint, the addition of grid retention brackets results in a sturdy connection between the fixtures and the grid
- Insert screws through the bracket into the grid to secure



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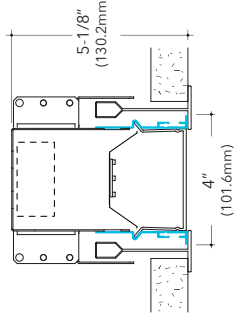
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P I N N A C L E Evolution

EV3

Mounting



- Specify G_G, FLF, SES, NFN for individual, unjoinable units (individual units will fall on-grid)
- Specify G_FL, SF, NF for continuous runs (runs designed to fall on-grid)
- All individual units cannot be joined, end trims are factory installed and cannot be removed
- Designed to install into acoustical grid and inaccessible ceilings
- Grid retention brackets integral to housing and require mechanical attachment
- Each housing contains 4 grid retention brackets
- Tie off fixture to structure with retention wires
- NF and NFN to be utilized for metal pan or millwork ceiling
- Approved for dry/damp location unless otherwise noted
- Maximum fixture weight is 15lbs per 4ft fixture

Grid center to center spacing

Ordering Code

G1G Individual Unit

G1 Continuous Run or Pattern

G99 1" (15/16") T-Bar

For regular tile installations, fixture position will not be flush to bottom of the tile

G9G 9/16" T-Bar

For regular tile installations, fixture position will not be flush to the bottom of the tile

GBG 9/16" T-Bar

Rail has bevel edge details. For regular tile installations, fixture position will be flush to the bottom of the tile

GS Bolt Slot & 9/16" T-Bar

For 9/16" installations with regular tile, fixture position will be flush to the bottom of the tile

FLF Exposed Standard

1/2" Flange Detail

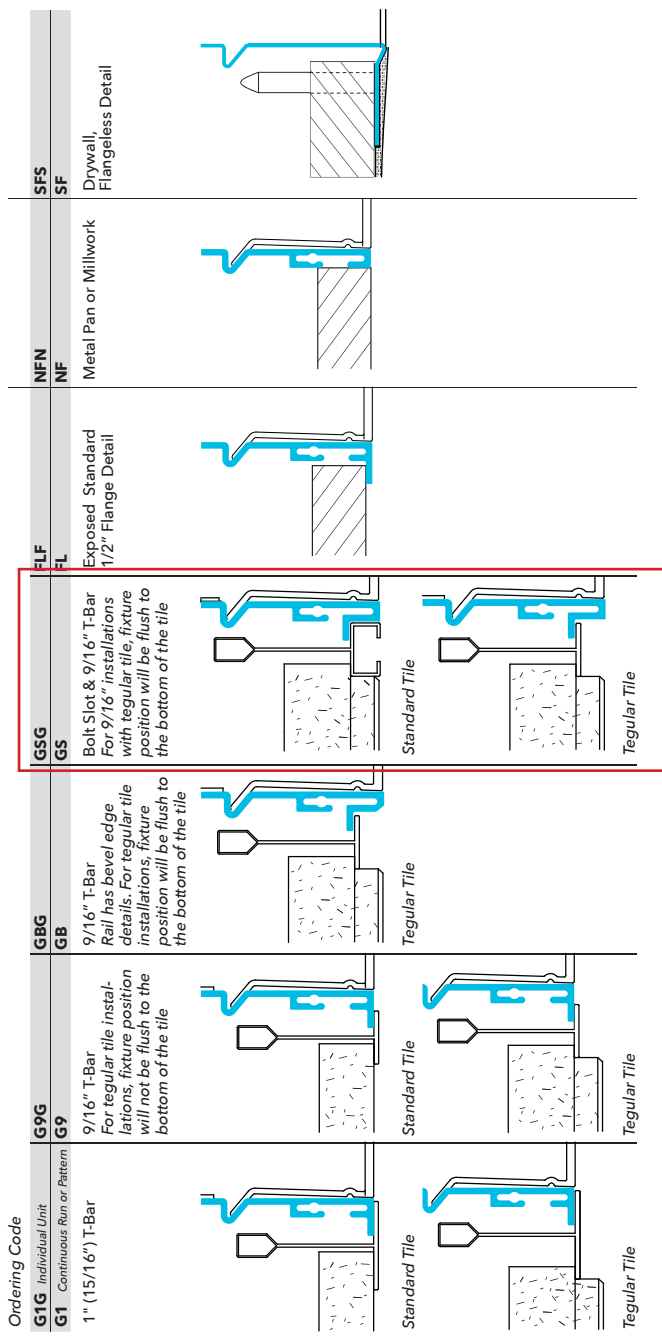
NFN Metal Pan or Millwork

Drywall, Flangeless Detail

SFS Drywall, Flangeless Detail

SF Drywall, Flangeless Detail

MOUNTING



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P I N N A C L E Evolution

EV3

Voltage

- Some EV3 configurations will not accommodate all voltage options; consult with factory

Ordering Code

U	Universal	120 to 277 volt
1	120 volt	
2	277 volt	
3	347 volt	0-10 volt dimming only; requires OL3 specification in Driver section of part number

Driver

- Standard Driver Option = OL1
- Electronic driver, Power factor is >0.9 with a THD <20%.
- Driver Lifetime: 50,000 hours at 25°C ambient operating conditions
- Ambient operating range: -20°F/-30°C to 83°F/28°C
- For more driver options see Pinnacle Resource Guide
- Some EV3 configurations will not accommodate all driver options; consult with factory

OL1	Osram 0-10v, 10%	Standard driver option
OL3	Osram 347 volt, 0-10v, 10%	Requires 347V option in the Voltage section of the part number
EE1	eldLED ECOdrive 1%, 0-10v	Logarithmic Dimming
ED1	eldLED DUALdrive 0%, DALI	Logarithmic Dimming
ES1	eldLED SOLOdrive 0-10v, 0%	Logarithmic Dimming
PS1	Philips Advance Xitanium Step Dimming	50%/100%
PM1	Philips Advance Mark 10 5%, Line	120v or 277v required
LH1	Lutron Hi-lume EcoSystem, 1% Soft on, Fade-to-Black	Lutron-LDE1
LH3	Lutron Hi-lume 1%, 3-wire	Lutron-L3DA3W
L51	Lutron 5-Series 5%, EcoSystem Digital	Lutron-LDE5

VOLTAGE

DRIVER

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P I N N A C L E
ARCHITECTURAL LIGHTING®
EDGE

Approvals & Certifications

Construction: Extruded aluminum trim with formed cold rolled 20 gauge steel back box housing. Highly reflective die-formed white painted steel reflector.

Shielding: Diffuse snap-in acrylic lens, removable for maintenance.

Mountings: Evolution is designed to install into acoustical grid and inaccessible ceilings. Specify GXG, FLF, SFS, NFN for individual, unjoinable units (individual units will fall on-grid). Specify GX, FL, SF, NF for continuous runs (runs designed to fall on-grid). Grid retention brackets are integral to housing. Each housing contains 4 grid retention brackets. Consult factory for detailed installation instructions. Maximum luminaire fixture weight is 15lbs per 4' fixture.

LED: 25°C test environment. Lumen output/wattage has a margin of +/- 5%. All luminaire configurations tested in accordance with IES LM-79. Diodes tested in accordance with IES LM-80. Minimum lifetime greater than 60,000 hours. Lifetime Projection L70 = 125,600 hours and L90 = 37,400 hours. MacAdam 3-Step Ellipses. Not all products are Lighting Facts listed. For all available IES files, please visit our website at pinnacle-ltg.com.

CRI, CCT & Lumen Output: Two lumen packages available. Standard and High (HO). Custom outputs are available. Specify custom lumens or watts between standard offering listed on CRI, CCT & Output page. 80 CRI is available for 3000K, 3500K, and 4000K. 90 CRI is available for 2700K, 3000K, 3500K, and 4000K. 80 CRI = R9≥19 and 90 CRI = R9≥61.

Voltage: Universal (U), 120 volt (1), 277 volt (2) and 347 volt (3) options available. Must specify OL3 in Driver section when 347 volt (3) is selected. Some Evolution configurations will not accommodate all voltage options; consult with factory.

Driver: Standard Driver Option is Osram 0-10V, 10% = OL1. Electronic driver, Power factor is >0.9 with a THD <20%. Driver Lifetime: 50,000 hours at 25°C ambient operating conditions. Ambient operating range: -20°F/-30°C to 83°F/28°C. For more driver options, see Pinnacle Resource Guide. Some Evolution configurations will not accommodate all driver options.

Circuiting: Select from single circuit (1), Emergency circuit (E) or Night Light circuit (N). Some Evolution configurations will not accommodate all circuiting options; consult with factory.

Battery & Emergency: Select battery or emergency options if required. If battery or emergency option is not required, enter 0. Battery duration is 90 minutes as standard. Test button is remote to fixture. For more Battery options, see Pinnacle Resource Guide.

Finish: Standard powder-coat textured white, metallic silver, textured black,

graphite or bronze painted finish; consult factory for chip of standard paint finishes or for additional custom color and finish options.

MR16: Ideal for conference rooms, corridors, wall washing, retail spaces and training facilities where accent lighting is required. Fully enclosed compartment eliminates light from entering into our fixture areas. For LED and Halogen lamps (lamps are not included). Consult factory for other lamp types. Standard 60 watt max LED electronic transformer (120v or 277v). 50 watt max halogen lamp transformer (120v or 277v). MR16 installed as an independent circuit. MR16 to match fixture voltage. 277v dimmer must be sourced. Consult factory for MR16 configurations.

Controls: Specify PD for daylight sensor; requires 0-10v driver. Some Evolution configurations will not accommodate all control options; consult with factory.

Labels: UL and cUL Listed. Standard and HO lumen packages are IC Rated, approved for dry/damp location unless otherwise noted.

Fixture Weight: Maximum fixture weight is 15lbs per 4' fixture.

Buy American Act Compliant

Warranty: Evolution LED offered with a 5-year limited warranty. Covers LED, driver and fixture.

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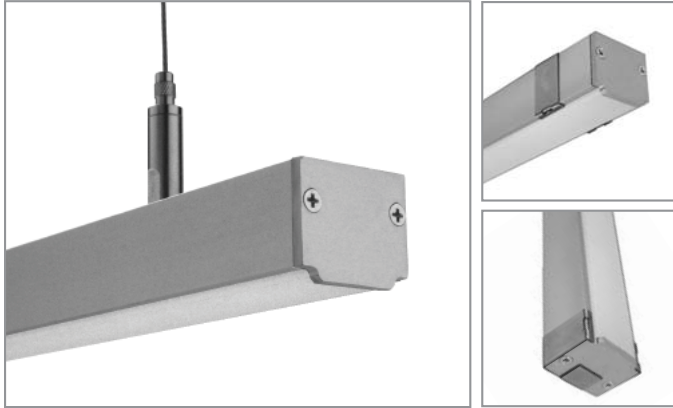


BSS840 | GENERAL INFORMATION

Miniature rectilinear LED fixture with flat frosted lens and remote driver



Project: _____ Type: _____



FEATURES

The BSS840 is a miniature profile, remote driven, linear LED luminaire for general lighting applications. The 1-1/8" tall by 1-5/16" wide extruded aluminum housing is capped with a flat, frosted lens that produces diffuse illumination.

SPECIFICATIONS

Fixture constructed of an extruded aluminum housing, frosted extruded acrylic lens and sheet aluminum end caps

Model variations offered for surface and cable suspended applications

Standard finishes include satin anodize, or Fluoroscope White (semi-matte), white (semi-gloss), black (semi-matte), matte black, silver, platinum*, bronze and primer powder coat, applied post production (consult factory for custom finishes)

Surface mount models are available in nominal lengths of 23"-90" as single fixtures only

Cable suspended models are available in nominal lengths of 23"-90" as single fixtures and continuous runs

Surface mount models install with spring clips and are wired with 10' low voltage leads, exiting from the end cap or the back at an end

Requires a remote driver and enclosure (ordered separately, refer to supplemental driver sheet for general information and consult factory for details and specification model number)

Remote mounted emergency battery backup available (ordered separately, consult factory for details)

Standard outputs are 5W, 7W, and 12W nominal per foot

LEDs available in 3000K, 3500K, 4000K, 5000K, all with a typical 84-85 CRI and color consistency within a 3 step MacAdam ellipse

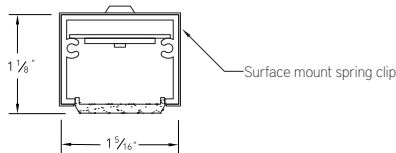
Lamp life rated at 50,000 hours

Limited five year warranty

UL and C-UL listed for dry and damp locations

IBEW manufactured and assembled

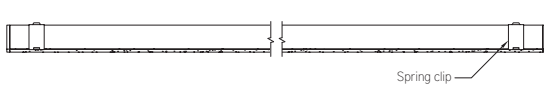
SECTION



PLAN



SIDE



PERFORMANCE

NOMINAL LENGTH	WATTS/FT.	TOTAL WATTS	LUMINAIRE LUMENS	EFFICACY
45"	7.4	28.1	2192	78

*Note: All data reflects fixtures with 3000K LEDs

BSS840

NOMINAL FIXTURE LENGTH** 23: 22-7/8" 34: 34-1/16" 45: 45-1/4" 56: 56-7/16" 68: 67-5/8" 79: 78-13/16" 90: 90"	COLOR TEMPERATURE 30: 3000K - 84 CRI 35: 3500K - 85 CRI 40: 4000K - 85 CRI 50: 5000K - 85 CRI	WATTS/FOOT 5: 5W/ft. 7: 7.4W/ft. 12: 12W/ft. CF: consult factory for custom wattage	MOUNT S1: surface mount back feed (SIN only) S2: surface mount end feed (SIN only) CM48: cable mount 48" cable length CM96: cable mount 96" cable length CF: consult factory for custom mounting	RUN CONFIGURATION SIN: single STA: starter ADD: adder TER: terminator	FINISH SA: satin anodize FW: Fluoroscope white (semi-matte) WH: white (semi-gloss) BL: black (semi-matte) MB: matte black SL: silver PT: platinum* BZ: bronze PR: primer CF: consult factory for custom finish
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Note: Remote driver ordered separately, refer to supplemental driver sheet for general information and consult factory for details and specification model number
** Actual dimension dependent on run configuration

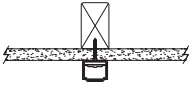
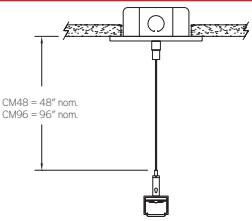
F2A **F2** **G.E.TO VERIFY FEED LOCATION & CABLE LENGTH** **ARCH.TO VERIFY**

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 7.4W/LF LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer, 0-10V Dimming Capable</p>	<p>F2/F2A</p>
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BSS840 | GENERAL INFORMATION



MOUNTING

	ORDERING CODE	DESCRIPTION
F2A		<p>S1 SURFACE MOUNT - BACK FEED</p> <p>Mounting option includes:</p> <ul style="list-style-type: none"> • 10' low voltage leads exiting from the fixture back at an end • One pair spring mounting clips for horizontal and vertical mounting (natural finish, requires #6 flat head screws by others)
	S2	<p>SURFACE MOUNT- END FEED</p> <p>Mounting option includes:</p> <ul style="list-style-type: none"> • 10' low voltage leads exiting from the fixture end • One pair spring mounting clips for horizontal and vertical mounting (natural finish, requires #6 flat head screws by others)
F2		<p>CM48 and CM96 CABLE MOUNT</p> <p>Mounting option includes:</p> <ul style="list-style-type: none"> • \varnothing 1/16" x 48" (CM48) or 96" (CM96) aircraft cables • 18 gauge x 60" (CM48) or 102" (CM96) SJT power cable (in coordinating finish) • Bracket bars • \varnothing 5" white canopies • Ceiling couplers • Side exit cable grippers

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Remote Driver | GENERAL INFORMATION

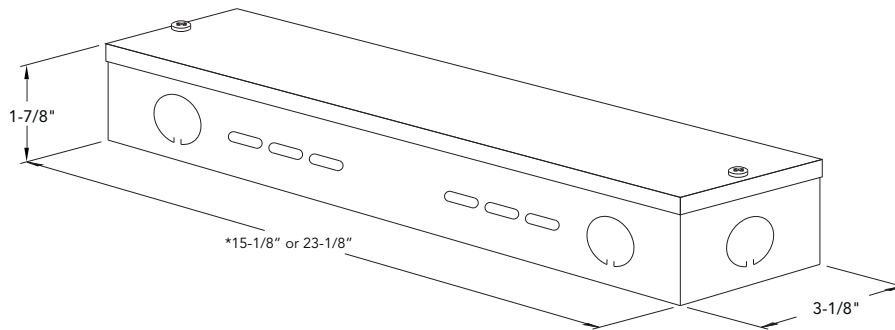


General Note

Specify driver ordering code. Factory will provide a driver matched to the performance requirements of specific fixtures.

Driver Enclosure

Remote driver supplied in a vented aluminum, surface mount enclosure with ample knockouts. Enclosure dimensions vary depending on the specific driver installed. In some cases, two driver assemblies will be required to operate a luminaire.



*Length dependent on specific driver model used

REMOTE DRIVER OPTIONS

Consult factory for other options.

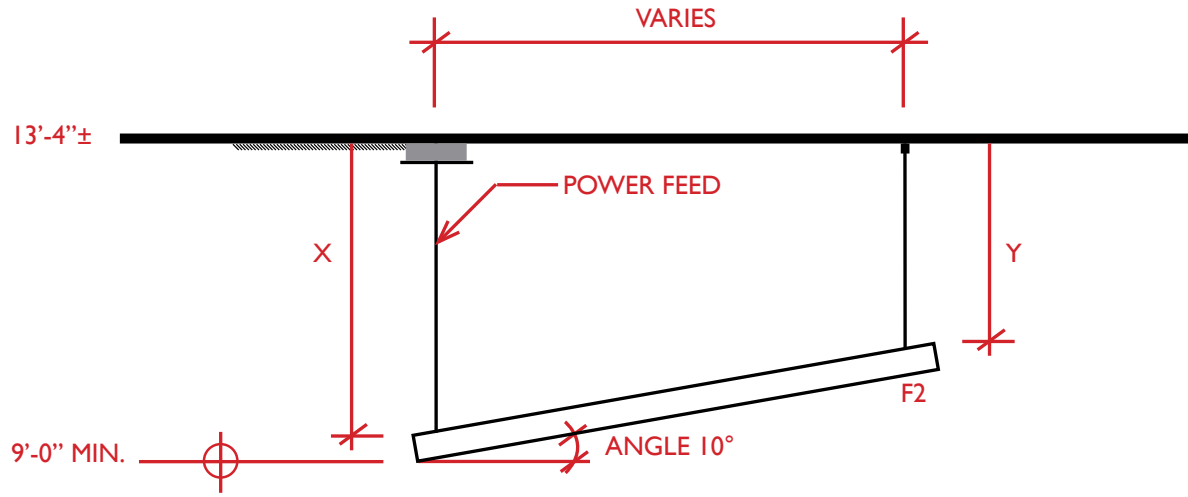
DRIVER TYPE	ORDERING CODE	DRIVER MFG./MODEL	DIMMING METHOD	DIMMING RANGE
Non-dimming		Various	NA	
Dimming	DM	Various	0-10V	1-100%
	HE	Lutron EcoSystem	EcoSystem digital	1-100%
	HES	Lutron EcoSystem - soft-on/fade/fade-to-black	EcoSystem digital	1-100%
	H2	Lutron Hi-lume	2-wire forward phase (120V only)	1-100%
	H3	Lutron Hi-lume	3-wire	1-100%
	EL	EldoLED-ECODrive	0-10V	1-100%

For dimming installations, customer is responsible for compatibility between driver and control system

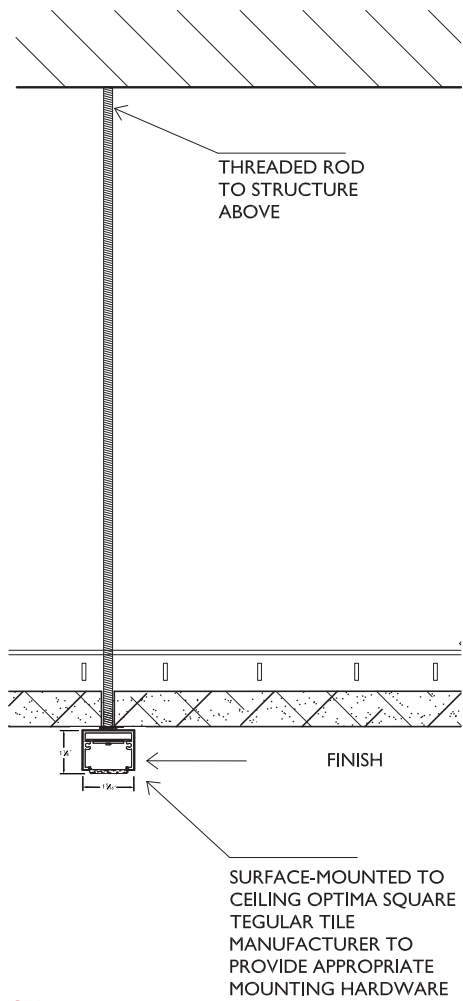
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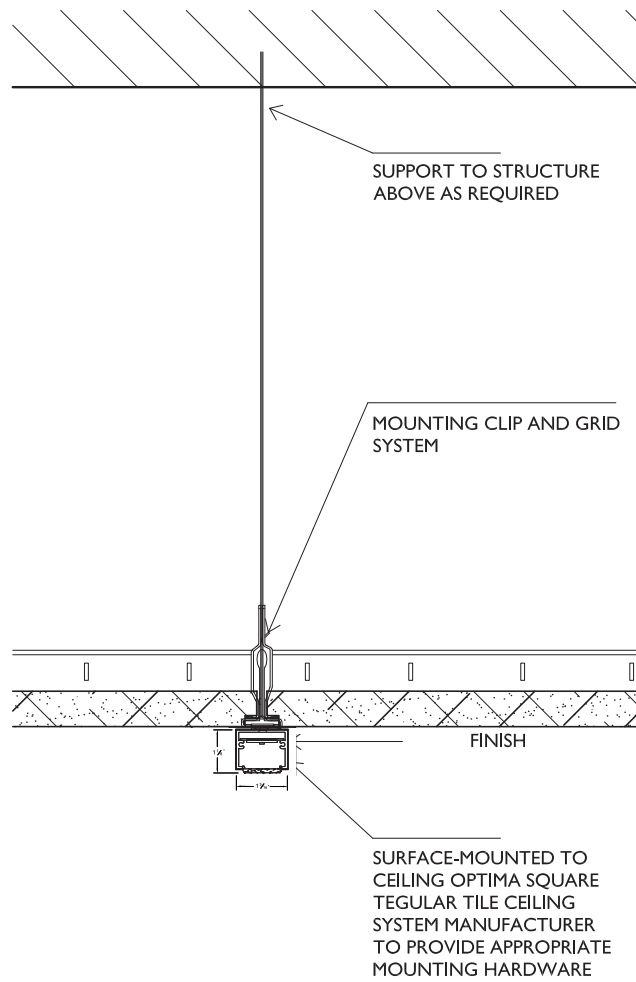
<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	F2/F2A
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<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p style="text-align: right;">F2</p>
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THROUGH THE TILE



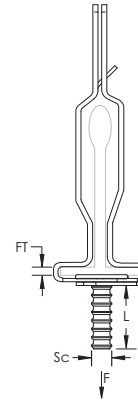
ATTACHED TO CEILING GRID

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Independent Support Clip



- Provides a means of independent support of fixtures
- No tools required for installation
- Includes mounting hardware



Material: Spring Steel
Finish: CADDY® ARMOUR

Part Number	T-Grid Size	Flange Thickness FT	Screw Diameter Sc	Screw Length L	Static Load F	Included Components	Certifications
IDS	15/16"	1/16"	1/4"	5/8"	65 lb	Washer-Wing Nut	UL
IDS15	15/16"	1/16"	1/4"	1 1/2"	65 lb	Washer-Wing Nut	UL
IDS2	15/16"	1/16"	1/4"	2"	65 lb	Washer-Wing Nut	UL
IDS9	9/16"	1/16"	1/4"	5/8"	65 lb	Washer-Wing Nut	UL
IDS915	9/16"	1/16"	1/4"	1 1/2"	65 lb	Washer-Wing Nut	–
IDS95	9/16"	5/16"	1/4"	5/8"	65 lb	Washer-Wing Nut	UL
IDS95LN	9/16", 15/16"	5/16"	1/4"	5/8"	65 lb	–	–
IDS95T	9/16"	5/16"	#8	9/16"	65 lb	Pal Nut, Washer-Wing Nut	–
IDS95TWB	9/16", 15/16"	5/16"	#8	9/16"	65 lb	Brass Barrel Nut	–
IDS9LN	9/16"	1/16"	1/4"	5/8"	65 lb	–	–
IDS9T	9/16"	1/16"	#8	9/16"	65 lb	Pal Nut	–
IDS9TWB	9/16"	1/16"	#8	9/16"	65 lb	Brass Barrel Nut	–

Part Number	T-Grid Size	Flange Thickness FT	Screw Diameter Sc	Screw Length L	Static Load F	Included Components	Certifications
IDSLN	15/16"	1/16"	1/4"	5/8"	65 lb	–	–
IDST	15/16"	1/16"	#8	9/16"	65 lb	Pal Nut	–
IDSTWB	15/16"	1/16"	#8	9/16"	65 lb	Brass Barrel Nut	–

IDS9 for use with Ultra Line 3500, AWW Ultra Line 3600 (a trademark product of Chicago Metallics Corp.)

UL, UR, cUL, cUR, cULus and cURus are registered certification marks of UL LLC.

WARNING
ERICO products shall be installed and used only as indicated in ERICO's product instruction sheets and training materials. Instruction sheets are available at www.erico.com and from your ERICO customer service representative. Improper installation, misuse, misapplication or other failure to completely follow ERICO's instructions and warnings may cause product malfunction, property damage, serious bodily injury and death.

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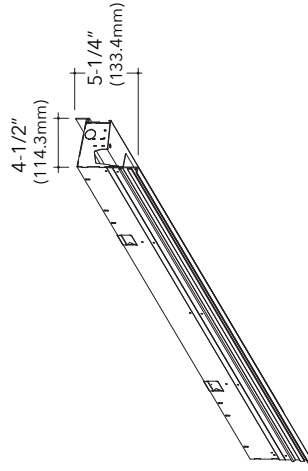


<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	F2A
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Project Name _____
Date _____ Type _____

P I N N A C L E ARCHITECTURAL LIGHTING® Evolution Outline



RECESSED LINEAR PERIMETER OUTLINE SLOT SYSTEM

- Extruded aluminum trim with formed cold rolled 20 gauge steel back box housing
- Extruded aluminum module for perfect perimeter illumination
- EVL LED offered with a 5-year limited warranty. Covers LED, driver and fixture
- UL and cUL listed, IC rated
- Approved for dry/damp location unless otherwise noted
- Room-Side Maintenance for LED system
- Buy American Act compliant



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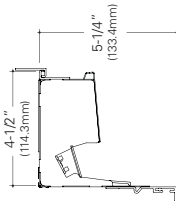
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A brand of **legrand**

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P I N N A C L E ARCHITECTURAL LIGHTING® Evolution Outline Linear Perimeter Slot Luminaire



LENGTHS VARY AS PER PLAN,
FIELD VERIFY DIMENSIONS

Project Name _____ Type _____
Date _____



Example Part #: EVL-827-12-G9-U-OL1-10-W

HOUSING pg. 3	EV_L_	EVLS Outline Shallow	30_ 3000K	40_ 4000K	CL_ Custom Lumens	CW_ Custom Watts	Details on pg. 3
CR/CCT & OUTPUT pg. 4	27_ 2700K	35_ 3500K	R_ Rectangle Inside or Outside	S_ Square Inside or Outside	U_ U-Shape Inside or Outside	LF Flangeless	Lumens Outputs 80 & 90 CRI pg. 4
LENGTH OR PATTERN pg. 5-6	G1_ 1" T-Bar	L_ L-Shape Inside or Outside	FL Flanged	SF Spackle Flange F3	NF Flangeless	More Options on pg. 5-6	
MOUNTING pg. 7	3_ 347V	GS Slotted T-Bar F3A	EE_ TO VERIFY			Details on pg. 7	
VOLTAGE pg. 8	OL1 Osram Dimming 0-10V, 10%	EE_ TO VERIFY				Details on pg. 8	
DRIVER pg. 8	1_ Single	L_ Lutron Dimming	E_ eLdoLED Dimming	P_ Philips Dimming		Details on pg. 8	
CIRCUITING pg. 9	0_ None	M_ Multi	E_ Emergency entire fixture	N_ Night Light entire fixture	EE_ TO VERIFY	Details on pg. 9	
BATTERY & EMERGENCY pg. 10	W_ Matte White	B_ # of Bodine 10W	J_ # of Iota 10W	EE_ TO VERIFY		More Options on pg. 10	
FINISH pg. 11	CP Chicago Plenum	S_ Metallic Silver	BL Textured Black	BR Bronze	GR Graphite	CC Custom Color	Details on pg. 11
FIXTURE OPTIONS pg. 11		PROVIDE FROSTED LENS					More Options on pg. 11
CONTROLS pg. 12		Consult Factory					More Options on pg. 12

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EVL_LED_SPEC_MAR2017 2 of 13

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 6W/LF LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer, 0-10V Dimming Capable</p>	<p>F3/F3A</p>
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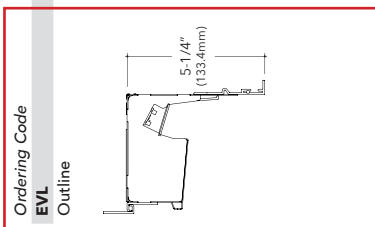


P I N N A C L E Evolution

EVL

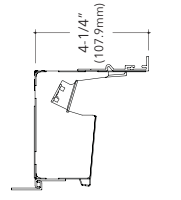
Housing

- Extruded aluminum module with micro reflector for perfect wall wash illumination
- Clear lens and baffle are optional accessories. Specify in the Options section
- Wiring access available on bottom of housing



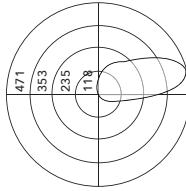
Ordering Code
EVL
Outline

EVLS
Outline Shallow



Photometrics

Test # ITL84678
Catalog # EVL-840-4
Lumens 856 lm
Watts 12.5 W
Efficacy 68 lP/W



Candela Distribution

Vert Angle	Horizontal Angle	0	22.5	45	67.5	90
0	242	442	442	442	442	442
5	463	458	439	425	416	
10	465	466	435	393	342	
15	446	458	428	318	210	
20	416	438	416	219	88	
25	377	411	383	120	44	
30	329	371	340	82	10	
35	283	327	306	35	3	
40	242	293	336	8	2	
45	206	251	308	5	1	
50	179	210	278	4	0	
55	157	174	245	3	0	
60	144	145	210	2	0	
65	131	122	174	2	0	
70	120	108	136	1	0	
75	110	93	98	1	0	
80	98	80	61	1	0	
85	88	68	26	1	0	
90	77	55	3	1	0	
95	65	43	0	1	0	
100	47	26	0	1	0	
105	30	16	0	0	0	
110	21	9	0	0	0	
115	13	3	0	0	0	
120	7	1	0	0	0	
125	1	0	0	0	0	
130	0	0	0	0	0	
135	0	0	0	0	0	
140	0	0	0	0	0	
145	0	0	0	0	0	
150	0	0	0	0	0	
155	0	0	0	0	0	
160	0	0	0	0	0	
165	0	0	0	0	0	
170	0	0	0	0	0	
175	0	0	0	0	0	
180	0	0	0	0	0	

Luminance Data (cd/sq.m)

Angle in Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	1632	2444	7390
55	1180	1648	7027
65	968	1157	6441
75	818	915	5341
85	686	709	2775

HOUSING

For all available IES files, please visit our website at pinnacle-ltg.com. Photometry testing in accordance to IESNA LM-79-08 at an NPLAP accredited testing laboratory. Testing conducted at 25°C ambient conditions. Specifications and dimensions subject to change without notice. Specification sheets that appear on pinnacle-ltg.com are the most recent version and supersede all other previously printed or electronic versions.

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EVL_LED_SPEC_MAR2017 3 of 13



P I N N A C L E
ARCHITECTURAL LIGHTING®
Evolution

EVL_

Color Temperature & Output

- 25° C test environment. Lumen output has a margin of +/- 5%
- All luminaire configurations tested in accordance with IES LM-79
- Diodes tested in accordance with IES LM-80
- Minimum lifetime greater than 60,000 hours
- Lifetime Projections: L70 = 136,200 hours and L90 = 41,100 hours
- Specify either 80 or 90 CRI
- LED binned within McAdams 3-Step Ellipse
- 80 CRI = R9≥19 and 90 CRI = R9≥61

Custom Output- Lumens OR Wattage

CL _____ Specify CRI, CCT and desired lumens (i.e. CL835400) | Specify lumens between standard offering listed below. Lumens are specified per color temp
 CW _____ Specify CRI, CCT and desired wattage (i.e. CW9405) | Specify watts between standard offering listed below

80 CRI

	Color	Output	Watts	Shielding	LPW
				Outline Lumens	
830	3000K	Standard	3.1	200	64.0
830HO	3000K	High	6.0	381	63.5
830VHO	3000K	Very High	8.1	492	60.9
835	3500K	Standard	3.1	209	66.9
835HO	3500K	High	6.0	398	66.3
835VHO	3500K	Very High	8.1	514	63.7
840	4000K	Standard	3.1	214	68.5
840HO	4000K	High	6.0	409	68.2
840VHO	4000K	Very High	8.1	527	65.3

90 CRI

927	2700K	Standard	3.1	164	52.5
927HO	2700K	High	6.0	313	52.2
927VHO	2700K	Very High	8.1	404	50.0
930	3000K	Standard	3.1	185	59.2
930HO	3000K	High	6.0	351	58.5
930VHO	3000K	Very High	8.1	454	56.2
935	3500K	Standard	3.1	188	60.2
935HO	3500K	High	6.0	358	59.7
935VHO	3500K	Very High	8.1	463	57.3
940	4000K	Standard	3.1	191	61.1
940HO	4000K	High	6.0	365	60.8
940VHO	4000K	Very High	8.1	471	58.3

CRI, CCT & OUTPUT



See Lighting Facts Spec Sheet for tables
Not all products are Lighting Facts listed

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SBLD Studio
132 W 36th St.
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212.391.4230

F3/F3A



P I N N A C L E
ARCHITECTURAL LIGHTING®
Evolution

EVL- - - - -

Length

- All individual units cannot be joined, end trims are factory installed and cannot be removed
- Refer to Pattern section for specification and ordering options
- Continuous Rows are made up of even and odd length fixtures; designed to fall on-grid
- Choose fixture length for Individual or Continuous Row length; for patterns refer to Pattern section on page 6
- For joining detail see installation instructions

Ordering Code	3	4	5	6	8	
Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Continuous Run Specify nominal overall / row length to the 1'. (Example: 16' run is comprised of 96 "x 95" units.)
2' or 23" (584.2mm)	3' or 35" (889mm)	4' or 47" (1193.8mm)	5' or 59" (1498.6mm)	6' or 71" (1803.4mm)	8' or 95" (2413mm)	
						Specify to the 1'

LENGTH OR
PATTERN

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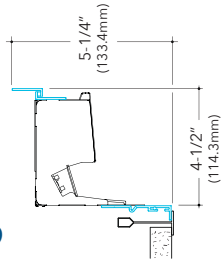
EVL_LED_SPEC_MAR2017 5 of 13

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<h1>F3/F3A</h1>
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P I N N A C L E
ARCHITECTURAL LIGHTING®
Evolution

Mounting



- Specify GXG, FLF, SFS, NFN for individual, unjoinable units (individual units will fall on-grid)
- Specify GX, FL, SF, NF for continuous runs (runs designed to fall on-grid)
- Outline must be installed prior to ceiling installation. Consult factory for detailed installation instructions
- Individual units shipped with end plates uninstalled
- Designed to install into acoustical grid and inaccessible ceilings
- Tie off fixture to structure with retention wires
- NF and NFN to be utilized for metal pan or millwork ceiling
- Approved for dry/damp location unless otherwise noted

Ordering Code	Individual Unit	Continuous Run or Pattern	GBG GB	GSG GS	FLF FL	NFN NF	SFS SF
G1G G1	1" (15/16") T-Bar		9/16" T-Bar Rail has bevel edge details. For tegular tile installations, fixture position will be flush to the bottom of the tile	Bolt Slot & 9/16" T-Bar For 9/16" installations with tegular tile, fixture position will be flush to the bottom of the tile	Exposed Standard 1/2" Flange Detail	Metal Pan or Millwork	Drywall, Flangeless Detail
G9G G9	9/16" T-Bar For tegular tile installations, fixture position will not be flush to the bottom of the tile						

MOUNTING

F3

F3A

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<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<h1>F3/F3A</h1>
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P I N N A C L E
ARCHITECTURAL LIGHTING
Evolution EVL

Voltage

- Some Outline configurations will not accommodate all voltage options; consult with factory

Ordering Code	
U	Universal
1	120 volt
2	277 volt
3	347 volt

120 to 277 volt

Must specify OL3 under driver section of part number

Driver

- Standard Driver Option = OL1
- Electronic driver, power factor is >0.9 with a THD <20%
- Driver Lifetime: 50,000 hours at 25C ambient operating conditions
- Ambient operating range: -20F/-30C to 96F/35C
- For more Driver options, see Pinnacle Resource Guide
- Some Outline configurations will not accommodate all driver options; consult with factory

OL1	Osram 0-10v, 10%	Standard driver option
OL3	Osram 347 volt, 0-10v, 10%	Requires 347V option in the Voltage section of the part number
LH1	Lutron Hi-lume EcoSystem, 1% Soft on, Fade-to-Black	Lutron-LDE1
LH3	Lutron Hi-lume 1%, 3-wire	Lutron-L3DA3W
L51	Lutron 5-Series 5%, EcoSystem Digital	Lutron-LDE5
EE1	eldoLED ECOdrive 1%, 0-10v	Logarithmic Dimming
ED1	eldoLED DUALdrive 0%, DALI	Logarithmic Dimming
ES1	eldoLED SOLOdrive 0-10v, 1%	Logarithmic Dimming
PS1	Philips Advance Xitanium Step Dimming	50% / 100%
PM1	Philips Advance Mark 10 5%, Line	120v or 277v required



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EVL_LED_SPEC_MAR2017 8 of 13

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>F3/F3A</p>
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P I N N A C L E ARCHITECTURAL LIGHTING® Evolution Outline

Approvals & Certifications

Construction Extruded aluminum trim with formed cold rolled 20 gauge steel back box housing.

Shielding Extruded aluminum module with for perfect perimeter illumination.

Mounting Outline is designed to install into acoustical grid and inaccessible ceilings. Specify GXG, FLF, SFS, NFN for individual, unjoinable units (individual units will fall on-grid). Specify GX, FL, SF, NF for continuous runs (runs designed to fall on-grid). Grid retention brackets are integral to housing. Consult factory for detailed installation instructions.

LED 25°C test environment. Lumen output/wattage has a margin of +/- 5%. All luminaire configurations tested in accordance with IES LM-79. Diodes tested in accordance with IES LM-80. Minimum lifetime greater than 60,000 hours. Lifetime Projection L70 = 136,200 hours and L90 = 41,100 hours. MacAdam 3-Step Ellipses. Not all products are Lighting Facts listed. For all available IES files, please visit our website at pinnacle-ltg.com.

CRI, CCT & Lumen Output Three lumen packages available. Standard, High (HO) and Very High (VHO). Custom outputs are available. Specify custom lumens or watts between standard offering listed on CRI, CCT & Output page. 80 CRI is available for 3000K, 3500K, and 4000K. 90 CRI is available for 2700K, 3000K, 3500K, and 4000K. 80 CRI = R9≥19 and 90 CRI = R9≥61.

Voltage Universal (U), 120 volt (1), 277 volt (2) and 347 volt (3) options available. Must specify OL3 in Driver section when 347 volt (3) is selected. Some Outline configurations will not accommodate all voltage options; consult with factory.

Driver Standard Driver Option is Osram 0-10V, 10% = OL1. Electronic driver, Power factor is >0.9 with a THD <20%. Driver Lifetime: 50,000 hours at 25°C ambient operating conditions. Ambient operating range: -20°F/-30°C to 96°F/35°C. For more driver options, see Pinnacle Resource Guide. Some Outlining configurations will not accommodate all driver options.

Circuiting Select from single circuit (1), Emergency circuit (E) or Night Light circuit (N). Some Outline configurations will not accommodate all circuiting options; consult with factory.

Battery & Emergency Select battery or emergency options if required. If battery or emergency option is not required, enter 0. Battery duration is 90 minutes as standard. Test button is remote to fixture. For more Battery options, see Pinnacle Resource Guide.

Finish Standard powder-coat textured white, metallic silver, textured black, graphite or bronze painted finish; consult factory for chip of standard paint finishes or for additional custom color and finish options.

Controls Consult Factory.

Labels UL and cUL Listed. Standard, HO and VHO lumen packages are IC Rated, approved for dry/damp location unless otherwise noted.

Buy American Act Compliant

Warranty Evolution LED offered with a 5-year limited warranty. Covers LED, driver and fixture.

SBLD Studio

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F3/F3A

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>NOT USED</p>	<p>F4</p>
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<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>F5</p>
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Acoustical lighting solution

Stretching the BuzziFelt to its limits, BuzziBell is recognized by the harmonious curve of its bell-shape. Its design adds softness to a room with the textural look of felt and a delicate, diffused light source or high performance LED engine. BuzziBell is offered in the 12 BuzziFelt colors, has a metal feature and will be CE and UL listed. BuzziBell makes a statement in offices, restaurants, hotels, institutions and residences.

Design by Chris Hardy

General

-  Ceiling Suspended
 - Cover in BuzziFelt
-  2 metal suspension cables
 - White powder coated metal ceiling canopy
 - Transparent power cable
-  Wattage: 29,4W
 - Input Voltage: 110 - 120V
 - Input Frequency: 50/60Hz
 - Lumen output: 2545 lumen
-  Color Temperature: 3000K
 - Color Rendering Index: 90
 - Unified glare rating: 22 (version with prismatic diffusor UGR 19 on request)
 - Efficacy: 87 Lm/W
 - Dimmable: 1-10V Protocol
-  IP20 Dry usage
-  W Ø 23.62" H 23.62"
-  Powder coated metal frame in Black (RAL 9005), White (RAL 9010) or Fluo Yellow (RAL 1016)
 - Fixing System Screw with 2 cables of 78.74" or 196.85" in Black or Alu color
-  Assembled

Certifications

UL Listed

Acoustics



Absorption

Content

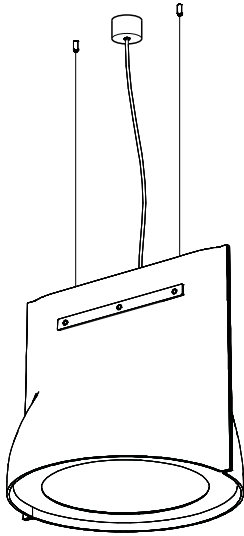
Configurations	3	Finishes	5
Composition	4	Dimensions	6
Fabrics	5	Acoustics	7

2 | BuzziSpace | BuzziBell 110-120V

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 29.4W LED, Provided by Manufacturer, 3000K DRIVER: Provided by Manufacturer, 0-10V Dimming Capable</p>	<p>F5</p>
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Configurations

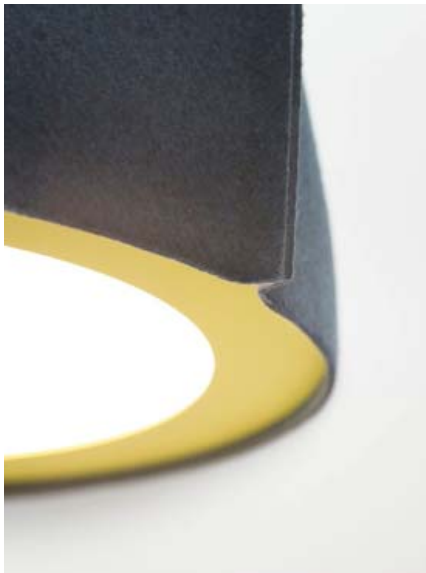
BuzziBell



- ◆ Ceiling Suspended
- ◆ Cover in BuzziFelt
- ◆ 2 metal suspension cables
- ◆ White powder coated metal ceiling canopy
- ◆ Transparant power cable
- ✂ W Ø 23.62" H 23.62"
- ⚖ 24.25 lbs
- ◆ Powder coated metal frame in Black (RAL 9005), White (RAL 9010) or Fluo Yellow (RAL 1016)
- ◆ Fixing System Screw with 2 cables of 78.74" or 196.85" in Black or Alu color
- ⚠ If installing on suspended ceiling, verify load capacity prior to installation.

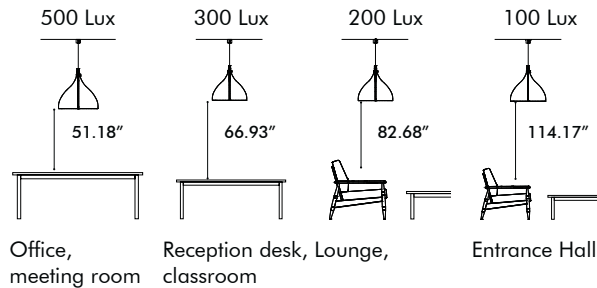
Composition

LED Disk



The LED disk has a PMMA diffuser which ensures an optimal light spread and efficiency. It creates a very diffuse light surface without any dottiness. The light source of the BuzziBell is a LED PCB, containing 36 low power LED's.

To enlight your workplace or room with optimal lux levels take following measures into account.

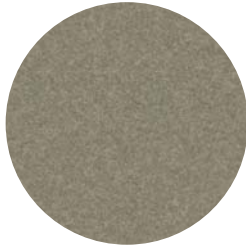


* According to EN12464

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<h1 style="font-size: 48px; margin: 0;">F5</h1>
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Fabrics

Felt*

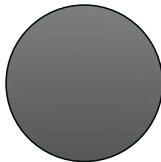


Composition 100% Recycled PE.T. Felt, latex backing
Weight 1.000 g/m² | 29.49 oz/yd²
Abrasion resistance >7.000 Martindale
Flammability EU: EN 13501.1 + A1/2009 Class B-s1,d0
 USA: ASTM E84 Class A certified
Fastness to light USA 5

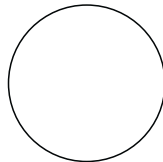


* Due to the process of thermoforming colors may vary slightly

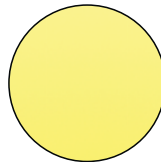
Finishes



Black
(RAL 9005)



White
(RAL 9010)

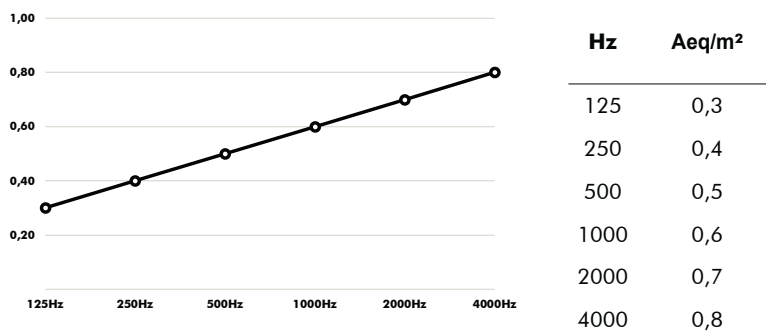


Fluo Yellow
(RAL 1016)

Acoustics

BuzziBell

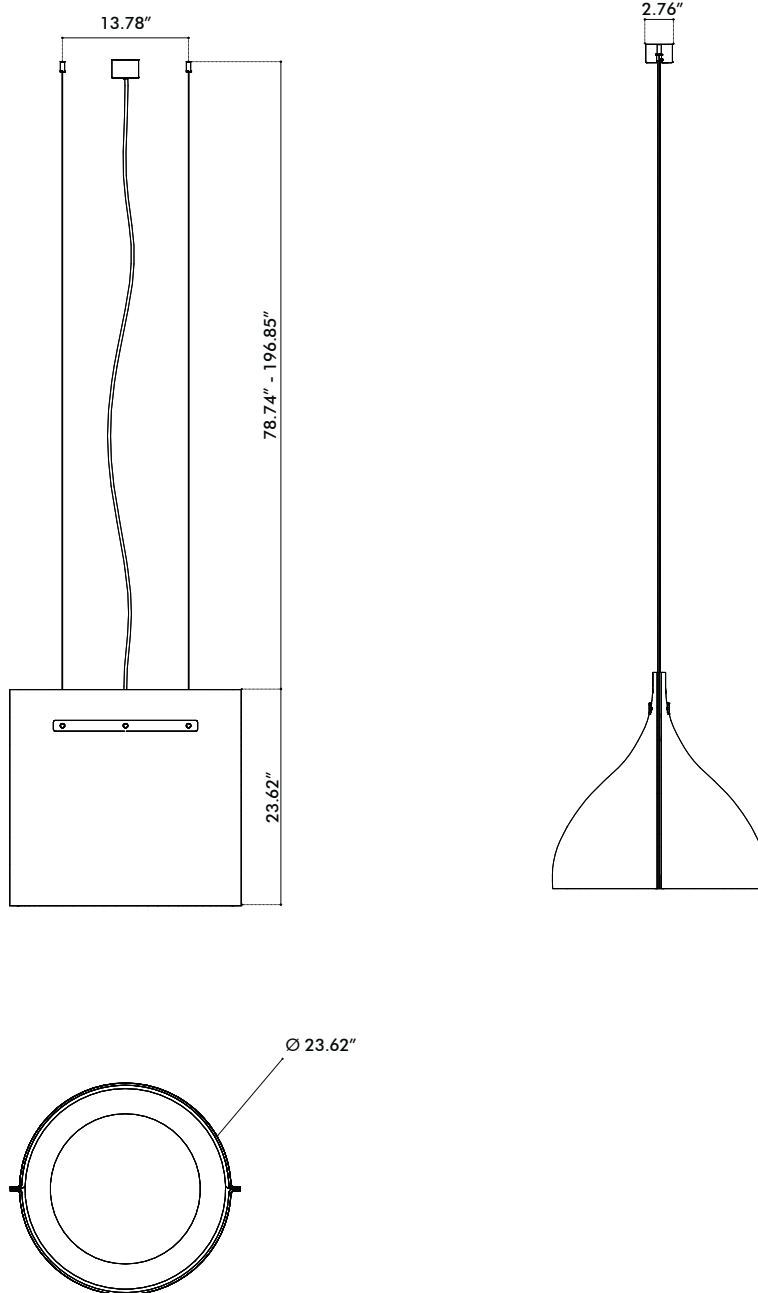
Equivalent sound absorption area in m² per object



5 | BuzziSpace | BuzziBell 110-120V

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<h1>F5</h1>
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Dimensions



6 | BuzziSpace | BuzziBell 110-120V

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[Click here to print this page](#)



Caravaggio Pendant Light

Item Code: LTY-CARAVAGGIO-PENDANT-LIGHT

Description: **Material(s):** Steel, Aluminum

Dimensions:

- Small:
- Shade: 6.5"D X 8.5"H
- Black Gloss, White Gloss & Opal Cord: 118"L
- Matte Black, Matte White & Matte Grey Cord: 236"L
- Medium:
- Shade: 10.25"D X 13.25"H
- Black Gloss, White Gloss & Opal Cord: 118"L
- Matte Black, Matte White & Matte Grey Cord: 236"L
- Large:
- Shade: 15.75"D X 20.5"H
- Black Gloss, White Gloss & Opal Cord: 118"L
- Matte Black, Matte White & Matte Grey Cord: 236"L
- XL:
- Shade: 21.75"D X 27.75"H
- Cord: 236"L

Lamp Type: INCANDESCENT

Bulbs:

- Small: 1 X 42W 120V E12 (candelabra base) Type G incandescent lamp (not included)
- Medium: 1 X 100W 120V E26 (medium base) Type A incandescent lamp (not included)
- Large: 1 X 100W 120V E26 (medium base) Type A incandescent lamp (not included)
- XL: 1 X 150W 120V E26 (medium base) Type A incandescent lamp (not included)

Listing: UL

Price: Price: \$450.00
+ Free Shipping

Options: Size:

- Small
- Medium
- Large
- XL

Color:

- Black
- White
- Matte Black
- Matte Grey
- Matte White
- Opal

Highly versatile with its simple yet iconic shape, the Caravaggio Pendant Light is a timeless light fixture designed to easily assimilate into a variety of interiors. Suspended from a round canopy by a single cord, the bell-shaped shade of this modern pendant light features smooth, soft lines that are beautifully contrasted by an industrial-style, chrome-plated suspension. The single light source is housed within the shade which prevents any glare from the light. Available in four different sizes and five different colors, this Danish modern pendant light is ideal for use as a single light fixture or arranged in multiples of the same size or various sizes to create a compelling installation. The Caravaggio Pendant Light is ideal for providing direct light in bedrooms, dining rooms, kitchens, and living rooms.

If you have questions, call (866) 428 9289

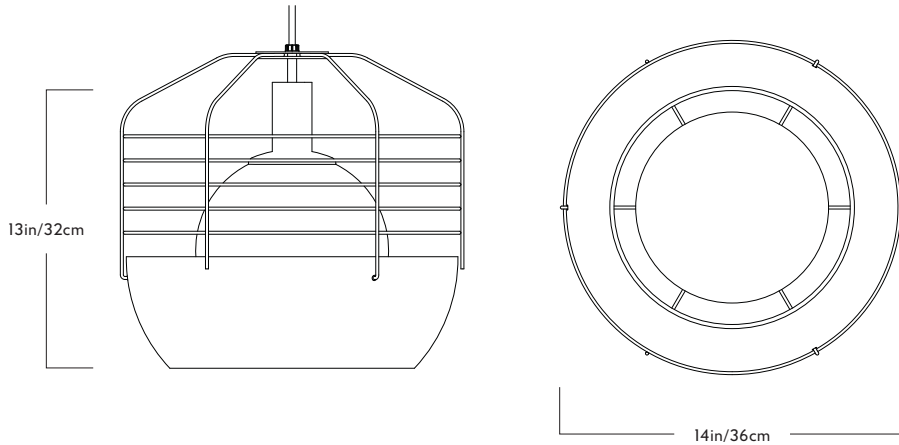
<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: (1) 100W E26 TypeA Incandescent lamp</p>	<p>F6</p>
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<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>F7</p>
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Roll & Hill

32 33rd Street, Unit 10, Brooklyn, NY 11232
T +1 718 387 6132 F +1 718 387 6104
www.rollandhill.com



Bluff City

Pendant - 14 inch

Series
Bluff City

Materials
Steel, aluminum, glass

120V Incandescent Illumination
Socket: E26

Product
Pendant - 14 inch

Finishes
Mint/red, cream/brown, white/brass

Bulb: 60 Watt A19
Wattage: 60 Watts
Lumens: 550 Lumens
Color Temperature: 2700 Kelvin
Dimming: Triac or ELV

Dimensions
Dia 14in/36cm x H 13in/32cm

Suspension
8-foot cord

240V Incandescent Illumination

Weight
4lb/1.8kg

Canopy
5-inch round in white

Socket: E27
Bulb: 60 Watt A19
Wattage: 60 Watts
Lumens: 550 Lumens
Color Temperature: 2700 Kelvin
Dimming: Triac or ELV

Certifications
UL, cUL (120V) CE, CB (240V)
UL, cUL, CE, CB (Universal)

LED Alternative
Socket: E26/E27
Bulb: 6 Watt A19 frosted LED
Wattage: 6 Watts
Lumens: 480 Lumens
Color Temperature: 2700 Kelvin
Dimming: ELV

Designed by Jonah Takagi, 2010

SBLD Studio

132 W 36th St.
NY, NY 10018
212.391.4230

LAMP: Provided by Manufacturer,
(1) 60W A19 E26 Incandescent lamp, 2700K or
(1) 6W A19 E26 LED lamp, 2700K
DRIVER: Provided by Manufacturer, ELV Dimming Capable

F7



6" LED Downlight
LC6LED
120 or 277V
0-10V Dimming Option

APPLICATIONS:

LiteFrame Commercial (LC6LED) is a 6" commercial grade LED downlight with available outputs between 900-1600 lumens. This is suitable to replace most CFL downlighting applications, while realizing substantial energy and maintenance savings. Rated for a minimum of 50,000 hours life (70% lumen maintenance) with ambient plenum temperatures up to 35°C (LED5), 28°C (LED6), 25°C (LED7). Free Air Flow around fixture is required for optimal life performance.

HOUSING:

One-piece 22 gauge non-corrosive steel platform. Pre-wired J-box with snap-on cover for easy access. Snap-in connection from driver compartment allows easy installation of light engine/trim assembly and can be upgraded to accommodate technology improvements. Approved for 8 (4 in/4 out) No. 12 AWG conductors rated for 90°C through wiring.

REFLECTOR:

High purity aluminum, Alzak, iridescence suppressed, semi-diffuse reflector. Self-trim standard. Painted white self-trim (WT) available as option.

LED LIGHT ENGINE:

The LC6LED uses either 36, 54, 72 low power Nichia LED's, specifically mixed to provide a minimum of 80 CRI with 3 SCDM color consistency. The use of multiple low power LED's allows for optimal thermal management by effectively spreading the heat over a larger area and eliminating hot spots on the LED's. A diffuse, yet highly transmissive lens obscures the view of the LED's and creates a smooth, even look from

below. The light engine is available in multiple Kelvin temperatures and the system is designed to provide optimal life and lumen maintenance (50,000 hours at 70% lumen maintenance). The reflector/light engine assembly is mechanically retained to the housing.

LED DRIVER:

The LC6LED utilizes a 25 watt constant current Thomas Research Products LED driver. This same driver is capable of running all three different lumen outputs, resulting in a reduction of housing sku's and simplified specification. The driver is UL8750 and Class II compliant.

DIMMING:

A 0-10V dimming option is available (DM), providing flicker-free dimming down to 10%. See list of compatible dimmers on page (3). For the sizing of the control circuit, the dimming circuit may require up to 1.2mA of sink current.

INSTALLATION:

Light commercial bar hangers included. Universal adjustable mounting brackets also accept 1/2" EMT conduit or 1 1/2" or 3/4" lathing channel (by others) or Prescolite 24" bar hangers (B24 or B6).

CERTIFICATIONS:

CSA certified to US and Canadian safety standards. Suitable for wet locations. ENERGY STAR qualified.

WARRANTY:

5 year warranty. See www.prescolite.com for details.

DATE: _____ TYPE: _____

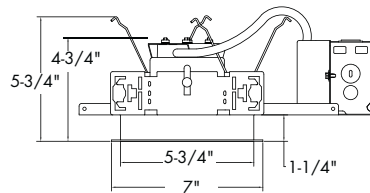
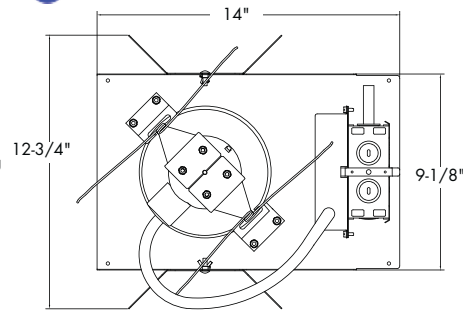
FIRM NAME: _____

PROJECT: _____

LiteFrame



Ceiling Cutout: 6 1/4"
Maximum Ceiling Thickness 1 1/4"
For conversion to millimeters,
multiply inches by 25.4
Not to Scale



6LCLED 5 & 6

*See page 4 for 6LCLED 7 line art

Order housing, reflector, and accessories separately

CATALOG NUMBER:

EXAMPLE: LC6LED120DM - 6LCLED535K8WT

HOUSING	VOLTAGE	HOUSING OPTIONS	TRIM APERTURE	OUTPUT	KELVIN	CRI	REFLECTOR FINISH	REFLECTOR COLOR	REFLECTOR OPTIONS	ACCESSORIES
<input checked="" type="checkbox"/> LC6LED 6" LED Housing	<input checked="" type="checkbox"/> 120 120V <input checked="" type="checkbox"/> 277 277V	<input checked="" type="checkbox"/> Blank No Dimming <input checked="" type="checkbox"/> DM 0-10V dimming to 10% <input checked="" type="checkbox"/> WH Wi-Hubb Enabled	<input checked="" type="checkbox"/> 6LCLED 6" Open Reflector/ Light Engine Assembly,	<input checked="" type="checkbox"/> 5 Nominal 1000 Delivered lumens <input checked="" type="checkbox"/> 6 Nominal 1400 Lumens Delivered <input checked="" type="checkbox"/> 7 Nominal 1600 Lumens Delivered	<input checked="" type="checkbox"/> 27K 2700 Kelvin <input checked="" type="checkbox"/> 30K 3000 Kelvin <input checked="" type="checkbox"/> 35K 3500 Kelvin <input checked="" type="checkbox"/> 40K 4000 Kelvin	<input checked="" type="checkbox"/> 8 80+ CRI	<input checked="" type="checkbox"/> Blank Clear Alzak, Semi- Diffuse	<input checked="" type="checkbox"/> WH ¹ White Paint <input checked="" type="checkbox"/> WT White Trim	<input checked="" type="checkbox"/> B24 Set of two(2) 24" bar hangers for T-bar ceilings <input checked="" type="checkbox"/> B6 Set of two (2) bar hangers for ceiling joist up to 24" centers <input checked="" type="checkbox"/> LG15 ² Dual-Lite 100VA Surface Wall Mount LiteGear Emergency Lighting Inverter <input checked="" type="checkbox"/> LG1R ² Dual-Lite 100VA Recessed Wall Mount LiteGear Emergency Lighting Inverter <input checked="" type="checkbox"/> LG1T ² Dual-Lite 100VA Recessed Ceiling T-Grid LiteGear Emergency Lighting Inverter <input checked="" type="checkbox"/> LG25 ² Dual-Lite 250 VA Surface Wall Mount LiteGear Emergency Lighting Inverter <input checked="" type="checkbox"/> SCA6D Sloped ceiling adapter (see note on page 4)	

E.E. TO
VERIFY

¹ Requires WT option
² See LC6LED and LiteGear Compatibility on page 3



In a continuing effort to offer the best product possible we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product.
Web: www.prescolite.com • Tech Support: (888) 777-4832

LFR-LED-013

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 17.1W LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer, 0-10V Dimming Capable</p>	<p>F8</p>
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PHOTOMETRIC DATA

LiteFrame - 6" LC6LED Downlight

DRIVER DATA	6LCLED5xxx	6LCLED6xxx	6LCLED7xxx
Input Voltage	120-277V	20-277V	120-277V
Input Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Input Current	0.143 (120v) 0.062 (277v)	0.200 (120v) 0.087 (277v)	0.148 (120v) 0.108 (277v)
Input Power	17.1W	24.0W	29.8W
Constant Current Output	700mA	700mA	700mA
Power Factor	≥0.90	≥0.90	≥0.90
THD	<25%	<20%	<20%
EMI Filtering	FCC 47CFR Part 15, Class A	FCC 47CFR Part 15, Class A	FCC 47CFR Part 15, Class A
Operating Temperature	-30°C to +35°C	-30°C to +28°C	-30°C to +25°C
Dimming	0-10V	0-10V	0-10V
Over-voltage, over-current, short-circuit protected			

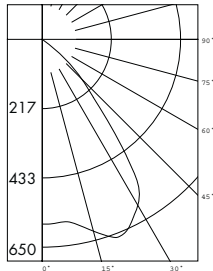
Lumen Multiplier Table

Photometrics for the LC6LED are published below at a nominal 3500 Kelvin temperature. This table may be used to approximate the lumen values at different Kelvin temperatures. Power consumption would stay the same.

5000 Kelvin	1.14
4000 Kelvin	1.03
3500 Kelvin	1.00
3000 Kelvin	1.00
2700 Kelvin	0.91

LC6LED120 6LCLED535K8

LED Light Engine: 3500K, 80+ CRI
System Wattage: 17.1W
Fixture Delivered Lumens: 925
Fixture Efficacy: 54.0
Spacing Criteria: 1.3



CANDELA DISTRIBUTION

DEG	CANDELA
0	560
5	552
15	593
25	621
35	444
45	161
55	10
65	2
75	1
85	0
90	0

Test No. 1911.6074

Tested at 25°C Ambient in accordance to IESNA LM-79-2008

ZONAL LUMEN SUMMARY

ZONE	LUMENS
0-60	920.4
0-90	925.1
90-180	0.0
0-180	925.1

LUMINANCE DATA IN CANDELA/SQ. METER

Angle in Vertical	Average - 0°
45°	12691
55°	873
65°	326
75°	164
85°	62

COEFFICIENTS OF UTILIZATION Zonal Cavity Method

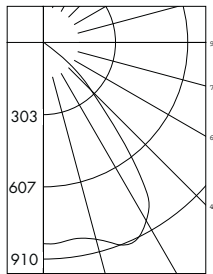
Room Cavity Ratio	% Effective Ceiling Cavity Reflectance					% Effective Floor Cavity Reflectance											
	80%		70%		50%		30%		10%								
	70	50	30	10	70	50	30	10	70	50	30	10					
1	113	110	107	105	110	108	105	103	104	102	100	100	98	97	96	95	94
2	106	101	96	93	104	99	95	92	96	93	90	89	88	87	86	85	84
3	100	93	87	83	98	91	86	82	89	84	81	80	80	79	78	77	76
4	94	86	79	75	92	84	79	74	82	77	73	73	72	71	70	69	68
5	88	79	72	68	87	78	72	67	76	71	67	67	66	65	64	63	62
6	83	73	66	62	82	72	66	61	71	66	61	61	60	59	58	57	56
7	78	68	61	56	77	67	61	56	66	60	56	56	55	54	53	52	51
8	74	63	56	52	72	62	56	51	61	56	51	51	50	49	48	47	46
9	69	59	52	47	68	58	52	47	57	51	47	47	46	45	44	43	42
10	65	55	48	44	64	54	48	44	53	48	44	44	43	42	41	40	39

LC6LED120 6LCLED535K8

Test No. 1911.6074

LC6LED120 6LCLED635K8

LED Light Engine: 3500K, 80+ CRI
System Wattage: 24.0W
Fixture Delivered Lumens: 1375
Fixture Efficacy: 57.3
Spacing Criteria: 1.3



CANDELA DISTRIBUTION

DEG	CANDELA
0	836
5	824
15	847
25	869
35	649
45	249
55	16
65	4
75	1
85	0
90	0

Test No. 1910.6073

Tested at 25°C Ambient in accordance to IESNA LM-79-2008

ZONAL LUMEN SUMMARY

ZONE	LUMENS
0-60	1369.3
0-90	1375.2
90-180	0.0
0-180	1375.2

LUMINANCE DATA IN CANDELA/SQ. METER

Angle in Vertical	Average - 0°
45°	19982
55°	1447
65°	541
75°	244
85°	89

COEFFICIENTS OF UTILIZATION Zonal Cavity Method

Room Cavity Ratio	% Effective Ceiling Cavity Reflectance					% Effective Floor Cavity Reflectance											
	80%		70%		50%		30%		10%								
	70	50	30	10	70	50	30	10	70	50	30	10					
1	113	110	107	105	110	108	105	103	103	102	100	100	98	97	96	95	94
2	106	101	96	92	104	99	95	91	96	92	89	88	87	86	85	84	83
3	100	93	87	83	98	91	86	82	89	84	81	80	80	79	78	77	76
4	94	86	79	74	92	84	78	74	82	77	73	73	72	71	70	69	68
5	88	79	72	67	86	78	72	67	76	71	67	67	66	65	64	63	62
6	83	73	66	61	82	72	66	61	71	66	61	61	60	59	58	57	56
7	78	67	60	56	76	66	60	55	65	59	55	55	54	53	52	51	50
8	73	62	56	51	72	62	56	51	61	56	51	51	50	49	48	47	46
9	69	58	51	47	68	57	51	47	57	51	47	47	46	45	44	43	42
10	65	54	47	43	64	54	47	43	53	47	43	43	42	41	40	39	38

LC6LED120 6LCLED635K8

Test No. 1910.6073



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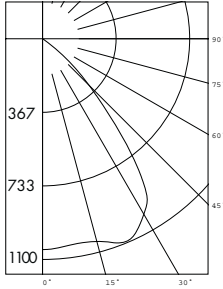


<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	F8
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PHOTOMETRIC DATA

LiteFrame - 6" LC6LED Downlight

LC6LED120 6LCLED735K8
LED Light Engine: 3500K, 80+ CRI
System Wattage: 29.8W
Fixture Delivered Lumens: 1598
Fixture Efficacy: 53.6
Spacing Criteria: 1.3



Test No. 1912.6072
Tested at 25°C Ambient in accordance to IESNA LM-79-2008

CANDELA DISTRIBUTION

DEG	CANDELA
0	1003
5	996
15	998
25	1020
35	822
45	314
55	25
65	5
75	2
85	0
90	0

ZONAL LUMEN SUMMARY

ZONE	LUMENS
0-60	1590.1
0-90	1597.6
90-180	0
0-180	1597.6

LUMINANCE DATA IN CANDELA/ SQ. METER

Angle in Vertical	Average - 0°
45°	22934
55°	1376
65°	538
75°	272
85°	75

COEFFICIENTS OF UTILIZATION Zonal Cavity Method

Room Cavity Ratio	% Effective Ceiling Cavity Reflectance				% Effective Floor Cavity Reflectance				% Wall Reflectance								
	80%	70%	50%	10%	80%	70%	50%	10%	70	50	30	10					
	1	113	110	107	105	110	108	105	103	103	101	100	98	97	96	95	94
2	106	101	96	93	104	99	95	91	96	92	89	93	90	88	90	88	86
3	100	93	87	83	98	91	86	82	89	84	81	86	82	79	84	81	78
4	94	85	79	74	92	84	78	74	82	77	73	80	76	72	78	74	71
5	88	79	72	67	86	78	72	67	76	70	66	74	69	66	73	68	65
6	83	73	66	61	81	72	66	61	70	65	60	69	64	60	67	63	60
7	78	67	61	56	76	67	60	56	65	59	55	64	59	55	63	58	55
8	73	63	56	51	72	62	55	51	61	55	51	60	54	50	59	54	50
9	69	58	52	47	68	58	51	47	57	51	47	56	50	47	55	50	46
10	65	54	48	43	64	54	48	43	53	47	43	52	47	43	51	46	43

DIMMING COMPATIBILITY TABLE

Control Manufacturer	Wallbox Dimmer	Power Booster Available
Douglas Lighting Controls	WPC 5721	
Entertainment Technology	Tap Glide TG600FAM120 (120V) Tap Glide Heatsink TGH1500fam120 (120V) Qasis QAZ000FAMU (120/277V)	
Honeywell, Inc.	EL731A1019 and EL7315A1009	EL7305A1010
HUNT Dimming	Preset Slide: PS-010-IV-120V and PS-010-WH-120V Preset Slide: PS-010-3W-IV-120V and PS-010-3W-WH-120V Preset Slide: PS-010-IV-277V and PS-010-WH-277V Preset Slide: PS-010-3W-IV-277V and PS-010-3W-WH-277V Preset Slide, controls FD-010: PS-IFC-010-IV- and PS-IFC-010-3W-WH-120/277V Preset Slide, controls FD-010: PS-IFC-010-3W-IV- and PS-IFC-010-3W-WH-120/277V Remoted mounted unit: FD-010120V and FD-010-277V	
Lehigh Electric Products Co.	Solitaire	PBX
Leviton Lighting Controls Div.	Leviton Centura Fluorescent Control System IllumaTech™ IP7 Series	CN100 PE300
Lutron Electronics Co., Inc.	Visit www.lutron.com/advance for the latest control information and selection	
PDM Electrical products	WPC-5721	
Starfield Controls	TR61 with DALI Interface port	RT03 DALInet Router
The Watt Stopper, Inc.	LS-4 used with LCD-101 and LCD-103	

Central Inverters

For fixture full light output in back-up mode, Prescolite and Dual-lite have jointly tested the LiteFrame Commercial LED with the 100 (LG1) and 250 (LG2) VA LiteGear inverters. For more information on LiteGear go to http://www.dual-lite.com/resources/litegear_luminaire_loading_chart/

wiHUBB®

Fixture comes with a pre-installed In-Fixture Module (1 relay, 0-10V) compatible with the HBA wiHUBB system. Actual dimming requires the selection of 0-10V dimming ballast as well. Consult factory for compatibility with EM fixtures.

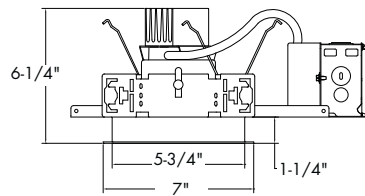
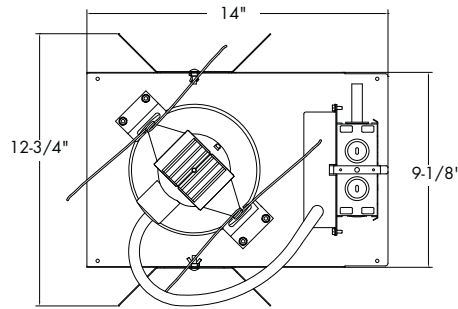


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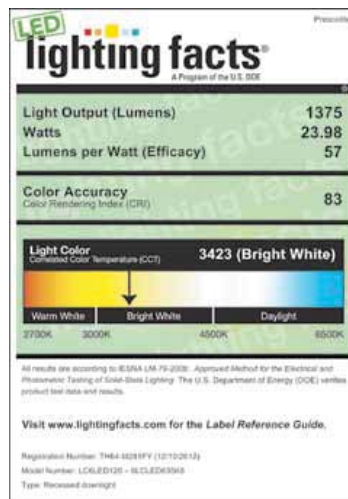
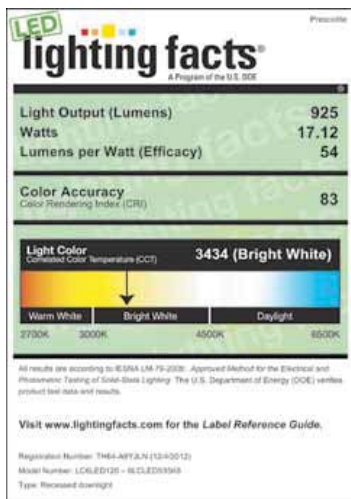
PHOTOMETRIC DATA



6LCLED 7

SCA6D

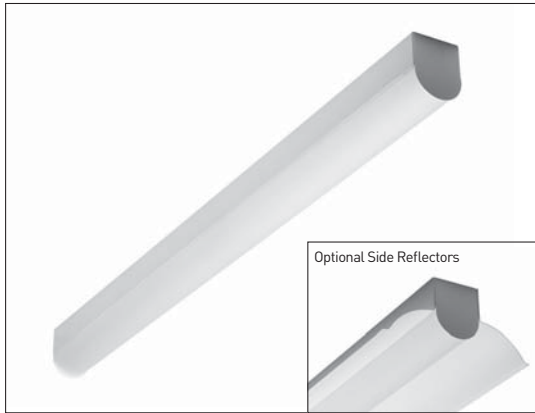
When ordering a sloped ceiling adapter, specify the degree of slope in 5° increments, maximum of 35°. For a more precise degree or wet ceiling applications, please contact factory. Sloped ceiling adapter and housing must be installed at the same time.



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<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	F8
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LW4 SERIES

Architectural Linear Ambient LED Luminaire

Fixture Type: _____

Job Information: _____

SPECIFICATIONS:

LED MODULES:

- High performance linear configured LED module boards.
- Each board consists of multiple mid-power, high efficacy LEDs in a precise layout eliminating the need for supplemental heat sinking.
- The boards produce an even and diffuse light which maximizes optical efficiency.
- Compatible with the dimming performance of the LED driver.
- Color temperatures available: 3000K, 3500K and 4000K.
- Upon request: 5000K.

LED DRIVERS:

- Factory programmable constant current LED power supply.
- Multiple standard drive current outputs (factory set by Mercury) are cataloged with their corresponding lumen package offerings. Upon request, custom drive current outputs and lumen packages are available.
- Note: Certain cataloged lumen packages may be provided with a non-programmable constant current LED power supply at Mercury's discretion. Contact factory if critical.
- Universal voltage input, 120V-277V, 50HZ-60HZ.
- Specification grade dimming down to 10% on 0-10V dimming controls.

LED LUMEN PACKAGES:

- Cataloged standard lumen packages. See attached chart for full details.
- Custom lumen packages pre-set are optional with programmable drivers only. Contact factory for details.

HOUSING:

- Fabricated from heavy gauge code grade cold rolled steel with a white polyester powder coating finish for long lasting durability.
- Housing ends are welded into place.
- Sufficient electrical knockouts are provided on the housing back and ends.

REFLECTOR OPTIONS:

- Side reflectors are factory installed or can be field installed to the housing.
- May be used individually for one-side asymmetric function or in pairs for dual-side symmetric function.
- Aperture option; a series of architectural apertures allows a segment of up lighting.

DIFFUSER:

- Small-scale rounded profile design.
- Extruded from custom formulated high transmission acrylic material.
- Linear ribbing for high LED performance.

STANDBY LIGHTING OPTION:

- Self contained module, 5W, 7W, 10W or 12W as specified. Battery backup upon loss of power. Available 4Ft. and 8Ft. modules only.

OPTIONAL INTEGRAL LIGHTING CONTROLS:

- Self-contained motion sensors mount directly to luminaire.
- Passive infrared (PIR) technology for individual luminaire control.
- On/Off control with optional delay features.
- See ordering matrix for available sensors.
- System lighting controls available. Contact factory.

INSTALLATIONS:

- May be installed in any direction, individually or in continuous run applications.
- May be surface mounted or suspended.
- End knockouts for surface conduit entry.

CERTIFICATE OF SAFETY

COMPLIANCE AND LISTINGS:

- Luminaire: UL and CUL listed 1598 and bears their label. Suitable for damp locations.
- DesignLights Consortium (DLC) qualified product. Not all versions of this product may be DLC qualified. Check at www.designlights.org/QPL to confirm.

WARRANTY:

- 5-year limited warranty is standard. Special 10-year warranty available on a job-to-job basis. Complete LED warranty terms available at www.mercltg.com.
- Actual performance may differ as a result of end-user environment and application.
- Most LED luminaires are suitable to operate in ambient temperatures from -20C (-4F) to 25C (77F).
- The following exclusions apply: Luminaires with optional standby lighting option, integral lighting controls options, or wireless control options. Consult factory.
- LM-79 testing was measured under a controlled 25C (77F) ambient operating temperature.

FEATURES:

- Shallow form linear ambient LED luminaire.
- Small-scale rounded profile acrylic diffuser evenly surrounds the LED light source enabling a very wide and near-perfect light distribution.
- Compact design complies with all ADA requirements for public areas.
- Custom formulated high diffusion acrylic material allows for maximum light transmission while eliminating pixilation and hot spots.
- Optional integral side reflectors add both function and architectural contour.
- Nominal 2Ft., 4Ft. or 8Ft. long modules.
- Digital LED technology provides high efficacy and energy efficiency.
- Multiple power and light levels are offered as standard to allow meeting design and energy needs per application. Custom factory set levels available on request.
- Lumen maintenance; Reported L70 (hours) & L80 (hours) > 60,000.
- CRI greater than 80.
- Fixture lumens per watt ratios 105 or higher.
- American Made.



MERCURY LIGHTING
PRODUCTS CO. INC.

20 Audrey Place • Fairfield, NJ 07004 • Tel: 800.637.2584 • Fax: 973.244.9522
www.mercltg.com

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LW4 SERIES

Fixture Type:

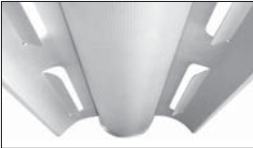
ORDERING DATA: Fill in boxes below with corresponding bold options.

Example: LW4-4-3800-35K-HTA-___-UNI-EM7

LW4	NOMINAL LENGTH (FT)	NOMINAL LUMENS	COLOR TEMP	HTA	DRIVER*	UNI	OPTIONS
LW4	2	24" L 2100 2300 2500 2700 45" L 2100 3800 4500 5000 96" L 6000 8000 10000 XXXX Custom Lumen Package. Contact Factory.	30K 35K 40K 50K Upon Request	HTA High Transmission Acrylic	Factory Selected Driver.	UNI	Side Reflectors SR Symmetric Function Set of 2 Side Reflectors AR Asymmetric Function 1 Side Reflector SRA Symmetric Function Aperture Reflectors Standby Modules EM5 EM7 EM10 EM12 Available 4ft. and 8ft. Modules Only Optional Integral Lighting Controls 01 Leviton OSFHU mounts externally, for higher ceilings. 04 Wattstopper FS-155-1 mounts internally with only the PIF dome visible. 05 Leviton OSF10 mounts internally with only the PIF dome visible.

10'L runs comprised of (2) 4ft and (1) 2ft lengths. Remote drivers at accessible, ventilated location outside the lightbox.

* NOTE: Certain cataloged lumen packages may be provided with a non-programmable constant current LED power supply at Mercury's discretion. Contact factory if critical.

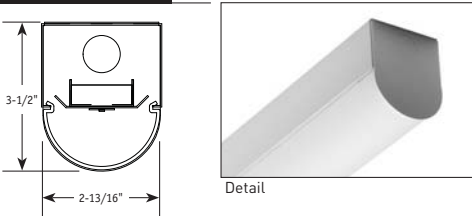


Aperture Reflectors

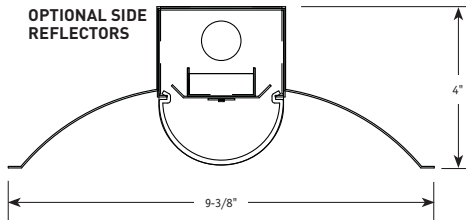
PHOTOMETRICS:

All photometric reports are available at www.mercltg.com.

CROSS SECTIONS:



OPTIONAL SIDE REFLECTORS



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www.mercltg.com

LUMEN PACKAGE

SERIES	NOMINAL LENGTH (FT)	Nominal Lumen Package	Color	Fixture Power (W)	Delivered Lumens	Fixture LPW	DLC	SR OPTION DLC		
LW4	2	2100	3000K	18	2035	111	✓	✓		
		2100	3500K	18	2067	113	✓	✓		
		2100	4000K	18	2131	116	✓	✓		
		2100	5000K	18	2195	120	✓	✓		
		2300	3000K	21	2265	108	✓	✓		
		2300	3500K	21	2301	110	✓	✓		
	4	2100	2100	3000K	18	2025	114	✓	✓	
			2100	3500K	18	2056	116	✓	✓	
			2100	4000K	18	2120	119	✓	✓	
			2100	5000K	18	2184	123	✓	✓	
		3800	3000K	32	3649	113	✓	✓		
		3800	3500K	32	3706	115	✓	✓		
		3800	4000K	32	3821	119	✓	✓		
		3800	5000K	32	3935	122	✓	✓		
		8	6000	6000	3000K	49	5798	118	–	–
				6000	3500K	49	5889	120	–	–
6000	4000K			49	6071	123	–	–		
6000	5000K			49	6253	127	✓	✓		
8000	3000K			69	7701	112	✓	✓		
8000	3500K			69	7822	114	✓	–		
10,000	10,000	10,000	4000K	69	8064	117	✓	✓		
		10,000	5000K	69	8306	121	✓	✓		
		10,000	3000K	89	9557	107	–	–		
		10,000	3500K	89	9707	108	–	–		
		10,000	4000K	89	10,008	112	–	–		
		10,000	5000K	89	10,308	115	✓	✓		

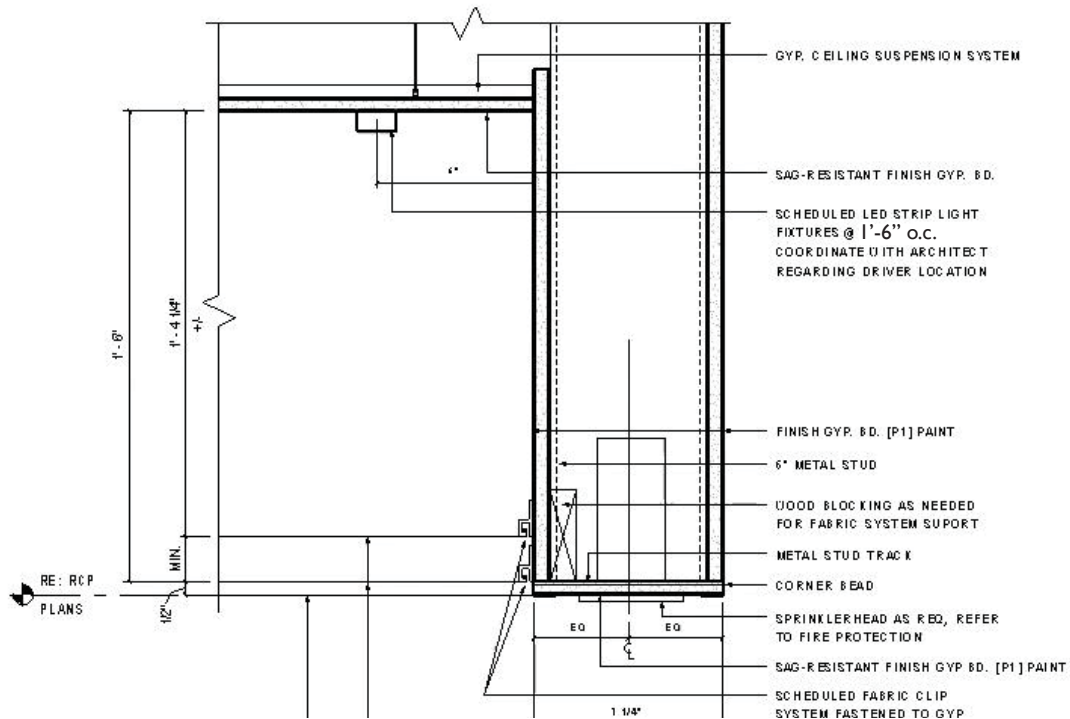
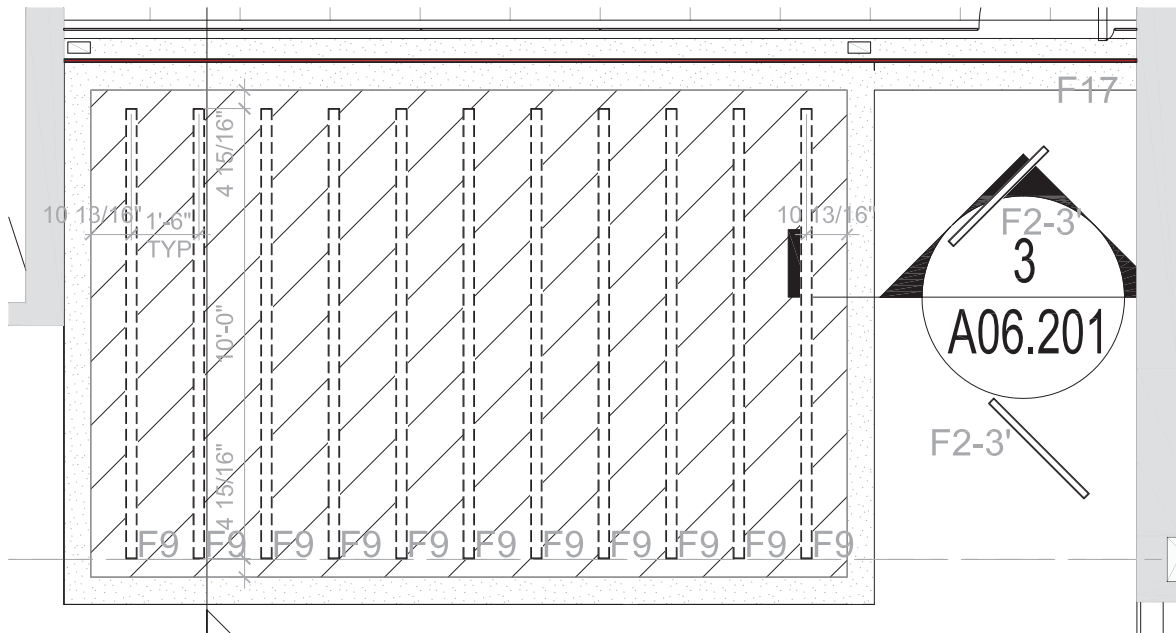
Actual wattage may differ by +/- 5% when operating between 120V-277V +/- 10%.

HANGING ACCESSORIES

PART #	DESCRIPTION	PART #	DESCRIPTION
HWPFCSS/2T	Cable Hanger-Grid Ceiling/5" J-Box Feed Canopy, 2" Non-Feed Grid Canopy	ACXX	Aircraft Cable/ XX= 48"L, 96"L, 150"L **Other lengths available.
HWNPFCS2	Cable Hanger-Grid Ceiling/2" Non-Feed Grid Canopy	VH-XX	"V" Hanger w/XX= 48"L or 72"L Chain & "S" Hook ** Other lengths available.
HWPFCSSJ	Cable Hanger-J-Box/5" J-Box Feed Canopy	CPYS-1	S-1 Single Stem 5" Dia. Canopy
HWNPFCSJ	Cable Hanger-J-Box/5" J-Box Non-Feed Canopy	STMXX	XX= 12"L, 24"L, 48"L Stem/ 3/8" IPS-5/8" OD ** Other lengths available.

SPECIFICATIONS SUBJECT TO CHANGE, 02/17
CONSULT FACTORY WHEN CRITICAL.

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 85W LED @ 10'L, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer, 0-10V Dimming Capable</p>	<p>F9</p>
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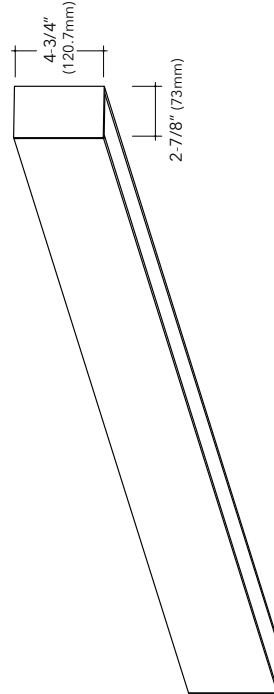


Project Name _____ Type _____
Date _____

P I N N A C L E
ARCHITECTURAL LIGHTING®
EDGE EX2N



**SUSPENDED
INDIRECT
LINEAR
LUMINAIRE**



- 6063-T5 Extruded aluminum housing
- Highly reflective die-formed white painted reflector
- Wiring access available through top of housing
- 5-year limited warranty covers LED, driver and fixture
- UL and cUL listed
- Approved for dry/damp location unless otherwise noted
- Maximum weight is 15 lbs. for a standard 4' fixture
- Buy American Act Compliant

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EX2N LED SPEC MAY2017

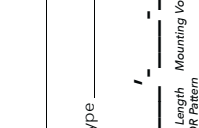
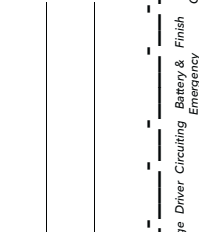
A brand of **legrand**

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PINNACLE ARCHITECTURAL LIGHTING

EDGE EX2N

Suspended Indirect Linear Luminaire



Project Name _____
Date _____ Type _____

EX2-N-O

Shielding CRI, CCT & Output Length OR Pattern Mounting Voltage Driver Circuiting Battery & Finish Options Controls

Example Part #: EX2-N-O-827-8-AC48G9-U-OL1-1-0-W

DIRECT SHIELDING <small>pg. 3</small>	N None																			<small>More Options on pg. 3</small>
INDIRECT SHIELDING <small>pg. 3</small>	O Open																			<small>Details on pg. 3</small>
CRI, CCT & OUTPUT <small>pg. 4</small>	27 2700K <small>Example: 827HO is 8 = 80 CRI; 27 = 2700K; HO = High Output</small>	35 3500K	40 4000K																	<small>Lumen Output, 80 & 90 CRI pg. 4</small>
LENGTH <small>pg. 5</small>	Continuous Row <small>in 4' increments</small>	LENGTHS VARY AS PER PLAN, (NOT IN 4' INCREMENTS)																		
MOUNTING <small>pg. 6</small>	AC_G1 1"-T-Bar	AC_G9 9/16"-T-Bar	AC_GS Slotted T-Bar	AC_JB Junction Box	AC_ST Structure	WA Wall														<small>More Options on pg. 5</small>
VOLTAGE <small>pg. 7</small>	U Universal <small>(120 thru 277V)</small>	3 347V	E.E. TO VERIFY																	
DRIVER <small>pg. 7</small>	OL1 Osram Dimming <small>0-10V, 10%</small>	L Lutron Dimming	E eidoLED Dimming	P Philips Dimming																<small>Details on pg. 6</small>
CIRCUITING <small>pg. 8</small>	1 Single	M Multi	E Emergency <small>entire fixture</small>	N Night Light <small>entire fixture</small>	E.E. TO VERIFY															<small>Details on pg. 8</small>
BATTERY & EMERGENCY <small>pg. 9</small>	0 None	B # of Bodine 10W	I # of Iota 10W	E.E. TO VERIFY																<small>More Options on pg. 9</small>
FINISH <small>pg. 10</small>	W Matte White	S Metallic Silver	BL Textured Black	BR Bronze	GR Graphite	CC Custom Color														<small>Details on pg. 10</small>
FIXTURE OPTIONS <small>pg. 10</small>	CCC Canopy Custom Color																			
CONTROLS <small>pg. 11</small>	Consult Factory																			

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LAMP: 8.6W/LF LED, Provided by Manufacturer, 3500K
DRIVER: Provided by Manufacturer, 0-10V Dimming Capable

F10

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P I N N A C L E
ARCHITECTURAL LIGHTING
EDGE

EX2-N-O

Shielding

- Clear dust guard standard for indirect component

Direct

Indirect

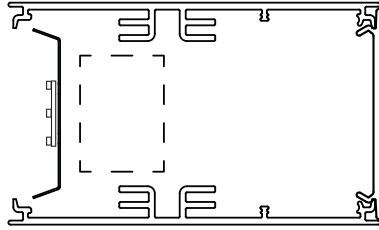
Ordering Code

N

None

O

Open
(Clear Dust Guard)



DIRECT SHIELDING
INDIRECT SHIELDING

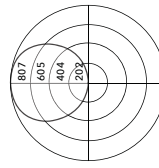
Photometrics

Open

Test # ITL86767
Catalog # EX2N-O-40-4
Lumens 2073 lm
Watts 18.5 W
Efficacy 112 LPW

Candela Distribution

Vert Angle	Horizontal Angle	0	22.5	45	67.5	90
90	0	0	0	0	0	0
95	9	5	5	6	6	6
100	34	17	18	19	19	19
105	115	35	35	35	35	35
110	180	60	60	60	60	60
115	277	265	198	202	169	169
120	556	352	252	263	266	266
125	831	428	330	314	317	317
130	996	495	476	364	362	362
135	559	553	561	485	434	434
140	612	608	615	611	590	590
145	665	655	661	656	658	658
150	704	696	699	696	695	695
155	738	729	731	730	729	729
160	763	755	757	754	754	754
165	782	776	779	775	775	775
170	796	794	794	792	793	793
175	804	804	803	803	804	804
180	807	807	807	807	807	807



For all available IES files, please visit our website at pinnacle-igt.com. Photometry testing in accordance to IESNA-LM-79-08 at an NVLAP accredited testing laboratory. Testing conducted at 25°C ambient conditions. Specifications and dimensions subject to change without notice. Specification sheets that appear on pinnacle-igt.com are the most recent version and supersede all other previously printed or electronic versions.

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P I N N A C L E
ARCHITECTURAL LIGHTING®
EDGE

EX2-N-O

CRI, CCT & Output

- 25°C test environment. Lumen output has a margin of +/- 5%
- Lifetime Projection L70 = 136,200 hours and L90 = 41,100 hours
- All luminaire configurations tested in accordance with IES LM-79
- LED binned within MacAdam 3-Step Ellipses
- Diodes tested in accordance with IES LM-80
- Specify either 80 or 90 CRI
- Minimum lifetime greater than 60,000 hours
- 80 CRI = R9≥19 and 90 CRI = R9≥61

Custom Output- Lumens OR Wattage

Ordering Code _____ Specify CRI, CCT and desired lumens (i.e. CL835700) _____ Specify lumens between standard offering listed below. Lumens are specified per color temp
 CW_----- Specify CRI, CCT and desired wattage (i.e. CW9407) _____ Specify watts between standard offering listed below

80 CRI

	Color	Output	Watts	Shielding	
				Open Lumens LPW	o
830	3000K	Standard	4.3	512	118.7
830HO	3000K	High	8.6	946	110.0
835	3500K	Standard	4.3	527	122.2
835HO	3500K	High	8.6	973	113.1
840	4000K	Standard	4.3	537	124.5
840HO	4000K	High	8.6	992	115.3

90 CRI

927	2700K	Standard	4.3	405	93.9
927HO	2700K	High	8.6	748	87.0
930	3000K	Standard	4.3	472	109.4
930HO	3000K	High	8.6	872	101.4
935	3500K	Standard	4.3	474	109.9
935HO	3500K	High	8.6	875	101.7
940	4000K	Standard	4.3	480	111.3
940HO	4000K	High	8.6	885	102.9

CRI, CCT & OUTPUT



See Lighting Facts Spec Sheet for tables
Not all products are Lighting Facts listed

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F I O



P I N N A C L E
ARCHITECTURAL LIGHTING®
EDGE

EX2-N-O

Length

- All individual units cannot be joined, end trims are factory installed and cannot be removed
- Add 1/16" for each end plate or 1/8" to the overall length of the row
- Choose fixture length for Individual or Continuous Row length



**LENGTHS VARY AS PER PLAN,
(NOT IN 4' INCREMENTS)**

LENGTH

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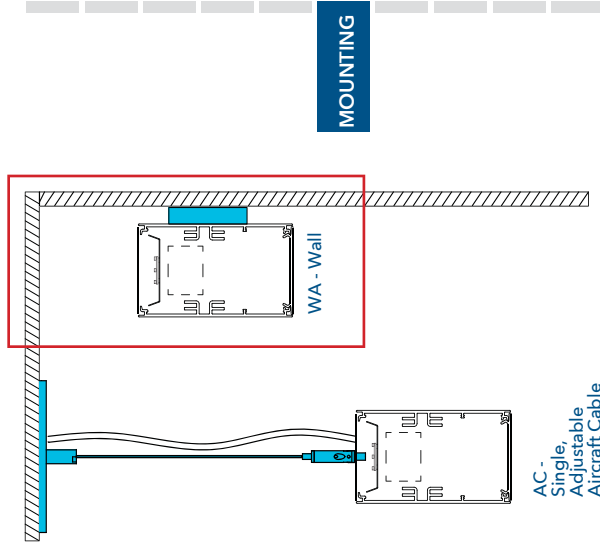
<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>F10</p>
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Mounting

- Specify cable length in ordering code (AC48G1)
- Standard 48" adjustable cable. Specify up to 350"
- End trims and power cord attached at factory
- Aircraft Cable (AC) mounts on 4'-0" (1219.2mm) and 8'-0" (2438.4mm) centers
- Aircraft Cable supplied with 5" (127mm) power and 2" (50.8mm) non-power canopies
- Canopies are painted white unless otherwise specified
- Canopy color specified on Fixture Options page
- Approved for dry/damp location unless otherwise noted
- Refer to installation instructions during installation at the jobsite
- Maximum fixture weight is 15 lbs for a standard 4' fixture

Ordering Code	Description
AC_G1	1" (15/16") T-Bar
AC_G9	9/16" T-Bar
AC_G5	Slotted T-Bar
AC_JB	Junction Box
AC_ST	Structure
AC5_G	5" (127mm) Non-Power Canopy
AC5_JB	5" (127mm) Non-Power Canopy
SQ_G	5" (127mm) Square Canopy
SQ_JB	5" (127mm) Square Canopy
WA	Wall Mount



AC -
Single,
Adjustable
Aircraft Cable

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P I N N A C L E
ARCHITECTURAL LIGHTING®

EX2-N-O

Voltage

- Some EX2N configurations will not accommodate all voltage options; consult with factory

Ordering Code

U	Universal	120 to 277 volt
1	120 volt	
2	277 volt	
3	347 volt	0-10 volt dimming only; requires OL3 specification in Driver section of part number

Driver

- Standard Driver Option = OL1
- Electronic driver, Power factor is >0.9 with a THD <20%
- Driver Lifetime: 50,000 hours at 25°C ambient operating conditions
- Ambient operating range: -20°F/-30°C to 107°F/42°C
- For more driver options see Pinnacle Resource Guide
- Some EX2N configurations will not accommodate all driver options; consult with factory

OL1	Osram 0-10v, 10%	Standard driver option
OL3	Osram 347 volt, 0-10v, 10%	Requires 347V option in the Voltage section of the part number.
EE1	eldoLED ECOdrive 1%, 0-10v	Logarithmic Dimming
ED1	eldoLED DUALdrive 0%, DALI	Logarithmic Dimming
ES1	eldoLED SOLOdrive 0-10v, 0%	Logarithmic Dimming
LH1	Lutron Hi-lume EcoSystem, 1% Soft on, Fade-to-Black	Lutron-LDE1
LH3	Lutron Hi-lume 1%, 3-wire	Lutron-L3DA3W
LS1	Lutron 5-Series 5%, EcoSystem Digital	Lutron-LDE5
PS1	Philips Advance Xitanium Step Dimming	50% / 100%
PM1	Philips Advance Mark 10 5%, Line	120v or 277v required



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P I N N A C L E ARCHITECTURAL LIGHTING®
EDGE EX2N

Approvals & Certifications

Construction: 6063-T5 Extruded aluminum housing. Highly reflective die-formed white painted reflector.

Shielding: Clear dust guard standard for indirect component.

Mounting: Aircraft cable and wall mount available. The aircraft cable mounts on 4'-0" (1219.2mm) and 8'-0" (2438.4mm) centers. Aircraft Cable supplied with 5" (127mm) power and 2" (50.8mm) non-power canopies. Refer to installation instructions for appropriate ceiling detail. Canopies are painted white unless otherwise specified. Maximum fixture weight is 15 lbs for a standard 4' fixture.

LED: 25°C test environment. Lumen output/wattage has a margin of +/- 5%. All luminaire configurations tested in accordance with IES LM-79. Diodes tested in accordance with IES LM-80. Minimum lifetime greater than 60,000 hours. L70 = 136,200 hours and L90 = 41,100 hours. MacAdam 3-Step Ellipses. Not all products are Lighting Facts listed. For all available IES files, please visit our website at pinnacle-ltg.com.

CRI, CCT & Lumen Output: Two lumen packages available. Standard and High (HO). Custom outputs are available. Specify custom lumens or watts between standard offering listed on CRI, CCT & Output page. 80 CRI is available for 3000K, 3500K, and 4000K. 90 CRI is available for 2700K, 3000K, 3500K, and 4000K. 80 CRI = R9≥19 and 90 CRI = R9≥61.

Voltage: Universal (U), 120 volt (1), 277 volt (2) and 347 volt (3) options available. Must specify OL3 in Driver section when 347 volt (3) is selected. Some EX configurations will not accommodate all voltage options; consult with factory.

Driver: Standard Driver Option is Osram 0-10V, 10% = OL1. Electronic driver, Power factor is >0.9 with a THD <20%. Driver Lifetime: 50,000 hours at 25°C ambient operating conditions. Ambient operating range: -20°F/-30°C to 107°F/42°C. For more driver options, see Pinnacle Resource Guide. Some EX configurations will not accommodate all driver options.

Circuiting: Select from single circuit (1), Emergency circuit (E) or Night Light circuit (N). Some EX configurations will not accommodate all circuiting options; consult with factory.

Battery & Emergency: Select battery or emergency options if required. If battery or emergency option is not required, enter 0. Battery duration is 90 minutes as standard. Test button is remote to fixture. For more Battery options, see Pinnacle Resource Guide.

Finish: Standard powder-coat textured white, metallic silver, graphite, textured black or bronze painted finish; consult factory for chip of standard paint finishes. Canopies painted white unless specified differently in the options section of the

part number. Contact factory for additional custom color and finish options.

Controls: Consult factory.

Labels: UL and cUL Listed. Standard and HO lumen packages are approved for dry/damp location unless otherwise noted.

Fixture Weight: Maximum fixture weight is 15 lbs for a standard 4' fixture.

Buy American Act Compliant

Warranty: EX LED offered with a 5-year limited warranty. Covers LED, driver and fixture.

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212.391.4230

F10

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EX2N_LED_SPEC_MAY2017 12 of 12

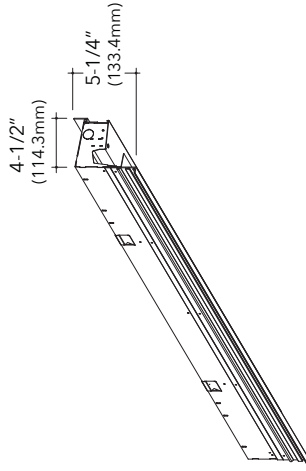


Project Name _____
Date _____ Type _____

P I N N A C L E
ARCHITECTURAL LIGHTING®
Evolution Outline



**RECESSED
LINEAR PERIMETER
OUTLINE SLOT SYSTEM**



- Extruded aluminum trim with formed cold rolled 20 gauge steel back box housing
- Extruded aluminum module for perfect perimeter illumination
- EVL LED offered with a 5-year limited warranty. Covers LED, driver and fixture
- UL and cUL listed, IC rated
- Approved for dry/damp location unless otherwise noted
- Room-Side Maintenance for LED system
- Buy American Act compliant



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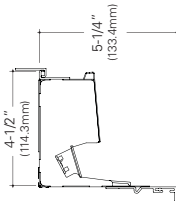
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P I N N A C L E ARCHITECTURAL LIGHTING® Evolution Outline Linear Perimeter Slot Luminaire



**LENGTHS VARY AS PER PLAN,
FIELD VERIFY DIMENSIONS**

Project Name _____ Type _____
Date _____



Example Part #: EVL-827-12-G9-U-OL1-10-W

HOUSING pg. 3	EV_L_	EV_L_	EVLS	Outline Shallow	30_ 3000K	40_ 4000K	CL_	Custom Lumens	CW_	Custom Watts	Details on pg. 3
CR/CCT & OUTPUT pg. 4	EV_L_	EVLS	Outline Shallow	35_ 3500K	40_ 4000K	CL_	Custom Lumens	CW_	Custom Watts	Lumens Outputs 80 & 90 CRI pg. 4	
LENGTH OR PATTERN pg. 5-6	EV_L_	EVLS	Outline Shallow	L_x_ L-Shape Inside or Outside	R_x_ Rectangle Inside or Outside	S_	Square Inside or Outside	U_x_ U-Shape Inside or Outside	More Options on pg. 5-6	Details on pg. 7	
MOUNTING pg. 7	EV_L_	EVLS	Outline Shallow	G9 9/16" T-Bar	FL Flanged	SF	Spackle Flange	NF Flangeless	Details on pg. 7	Details on pg. 8	
VOLTAGE pg. 8	EV_L_	EVLS	Outline Shallow	3 347V	EE.TO VERIFY	P_	Philips Dimming	EE.TO VERIFY	Details on pg. 8	Details on pg. 8	
DRIVER pg. 8	EV_L_	EVLS	Outline Shallow	OL1 Osram Dimming 0-10V, 10%	E_ eLdoLED Dimming	N	Night Light entire fixture	EE.TO VERIFY	Details on pg. 8	Details on pg. 9	
CIRCUITING pg. 9	EV_L_	EVLS	Outline Shallow	1 Single	M Multi	E	Emergency entire fixture	J # of BodaLine 10W	EE.TO VERIFY	More Options on pg. 10	
BATTERY & EMERGENCY pg. 10	EV_L_	EVLS	Outline Shallow	0 None	B # of BodaLine 10W	J	# of BodaLine 10W	EE.TO VERIFY	Details on pg. 10	Details on pg. 11	
FINISH pg. 11	EV_L_	EVLS	Outline Shallow	W Matte White	S Metallic Silver	BL	Textured Black	BR Bronze	CC Custom Color	Details on pg. 11	
FIXTURE OPTIONS pg. 11	EV_L_	EVLS	Outline Shallow	GP Chicago Plenum	PROVIDE FROSTED LENS	GR	Graphite	GR Graphite	More Options on pg. 11	More Options on pg. 12	
CONTROLS pg. 12	EV_L_	EVLS	Outline Shallow	Consult Factory	Consult Factory	Consult Factory	Consult Factory	Consult Factory	More Options on pg. 12	More Options on pg. 12	

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EVL_LED_SPEC_MAR2017 2 of 13

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LAMP: 6W/LF LED, Provided by Manufacturer, 3500K
DRIVER: Provided by Manufacturer, 0-10V Dimming Capable



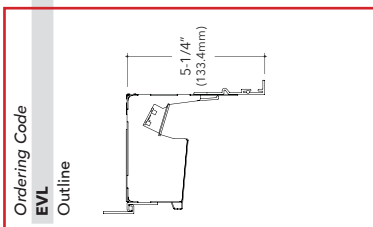


P I N N A C L E Evolution

EVL

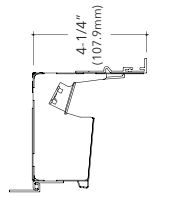
Housing

- Extruded aluminum module with micro reflector for perfect wall wash illumination
- Clear lens and baffle are optional accessories. Specify in the Options section
- Wiring access available on bottom of housing



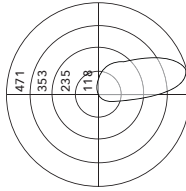
Ordering Code
EVL
Outline

EVLS
Outline Shallow



Photometrics

Test # ITL84678
Catalog # EVL-840-4
Lumens 856 lm
Watts 12.5 W
Efficacy 68 LPW



Candela Distribution

Vert Angle	Horizontal Angle	0	22.5	45	67.5	90
0	242	442	442	442	442	442
5	463	458	439	425	416	
10	466	458	435	393	342	
15	446	438	428	318	210	
20	416	438	416	219	88	
25	377	411	383	120	44	
30	329	371	340	82	10	
35	283	337	316	35	3	
40	242	293	336	8	2	
45	206	251	308	5	1	
50	179	210	278	4	0	
55	157	174	245	3	0	
60	144	145	210	2	0	
65	131	122	174	2	0	
70	120	108	136	1	0	
75	110	93	98	1	0	
80	98	80	61	1	0	
85	88	68	26	1	0	
90	77	55	3	1	0	
95	65	43	0	1	0	
100	47	26	0	1	0	
105	30	16	0	0	0	
110	21	9	0	0	0	
115	13	3	0	0	0	
120	7	1	0	0	0	
125	1	0	0	0	0	
130	0	0	0	0	0	
135	0	0	0	0	0	
140	0	0	0	0	0	
145	0	0	0	0	0	
150	0	0	0	0	0	
155	0	0	0	0	0	
160	0	0	0	0	0	
165	0	0	0	0	0	
170	0	0	0	0	0	
175	0	0	0	0	0	
180	0	0	0	0	0	

Luminance Data (cd/sq.m)

Angle in Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	1632	2444	7390
55	1180	1648	7027
65	968	1157	6441
75	818	915	5341
85	686	709	2775

HOUSING

For all available IES files, please visit our website at pinnacle-ltg.com. Photometry testing in accordance to IESNA LM-79-08 at an NPLAP accredited testing laboratory. Testing conducted at 25°C ambient conditions. Specifications and dimensions subject to change without notice. Specification sheets that appear on pinnacle-ltg.com are the most recent version and supersede all other previously printed or electronic versions.

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P I N N A C L E
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Evolution

EVL_

Color Temperature & Output

- 25° C test environment. Lumen output has a margin of +/- 5%
- All luminaire configurations tested in accordance with IES LM-79
- Diodes tested in accordance with IES LM-80
- Minimum lifetime greater than 60,000 hours
- Lifetime Projections: L70 = 136,200 hours and L90 = 41,100 hours
- Specify either 80 or 90 CRI
- LED binned within McAdams 3-Step Ellipse
- 80 CRI = R9≥19 and 90 CRI = R9≥61

Custom Output- Lumens OR Wattage

Ordering Code
 CL _____ Specify CRI, CCT and desired lumens (i.e. CL835400) | Specify lumens between standard offering listed below. Lumens are specified per color temp
 CW _____ Specify CRI, CCT and desired wattage (i.e. CW9405) | Specify watts between standard offering listed below

80 CRI

Color	Output	Watts	Shielding	Outline Lumens	LPW
830	3000K	Standard	3.1	200	64.0
830HO	3000K	High	6.0	381	63.5
830VHO	3000K	Very High	8.1	492	60.9
835	3500K	Standard	3.1	209	66.9
835HO	3500K	High	6.0	398	66.3
835VHO	3500K	Very High	8.1	514	63.7
840	4000K	Standard	3.1	214	68.5
840HO	4000K	High	6.0	409	68.2
840VHO	4000K	Very High	8.1	527	65.3

90 CRI

927	2700K	Standard	3.1	164	52.5
927HO	2700K	High	6.0	313	52.2
927VHO	2700K	Very High	8.1	404	50.0
930	3000K	Standard	3.1	185	59.2
930HO	3000K	High	6.0	351	58.5
930VHO	3000K	Very High	8.1	454	56.2
935	3500K	Standard	3.1	188	60.2
935HO	3500K	High	6.0	358	59.7
935VHO	3500K	Very High	8.1	463	57.3
940	4000K	Standard	3.1	191	61.1
940HO	4000K	High	6.0	365	60.8
940VHO	4000K	Very High	8.1	471	58.3



See Lighting Facts Spec Sheet for tables
 Not all products are Lighting Facts listed

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ARCHITECTURAL LIGHTING®
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EVL

Length

- All individual units cannot be joined, end trims are factory installed and cannot be removed
- Refer to Pattern section for specification and ordering options
- Continuous Rows are made up of even and odd length fixtures; designed to fall on-grid
- Choose fixture length for Individual or Continuous Row length; for patterns refer to Pattern section on page 6
- For joining detail see installation instructions

Ordering Code	3	4	5	6	8	
Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Continuous Run Specify nominal overall / row length to the 1'. (Example: 16' run is comprised of 96 "x 95" units.)
2' or 23" (584.2mm)	3' or 35" (889mm)	4' or 47" (1193.8mm)	5' or 59" (1498.6mm)	6' or 71" (1803.4mm)	8' or 95" (2413mm)	
						Specify to the 1'

LENGTH OR
PATTERN

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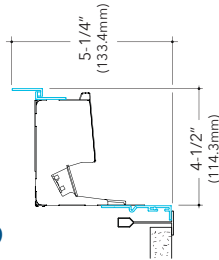
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Evolution

EVL

Mounting



- Specify GXG, FLF, SFS, NFN for individual, unjoinable units (individual units will fall on-grid)
- Specify GX, FL, SF, NF for continuous runs (runs designed to fall on-grid)
- Outline must be installed prior to ceiling installation. Consult factory for detailed installation instructions
- Individual units shipped with end plates uninstalled
- Designed to install into acoustical grid and inaccessible ceilings
- Tie off fixture to structure with retention wires
- NF and NFN to be utilized for metal pan or millwork ceiling
- Approved for dry/damp location unless otherwise noted

Ordering Code	FLF	FL	FLF	FL	FLF	FL	FLF	FL	FLF	FL	FLF	FL	FLF	FL	FLF	FL	FLF	FL
GTG Individual Unit																		
G1 Continuous Run or Pattern																		
G9G 9/16" T-Bar																		
G9 For regular tile installations; fixture position will not be flush to the bottom of the tile																		
GBG 9/16" T-Bar																		
GB Rail has bevel edge details. For regular tile installations; fixture position will be flush to the bottom of the tile																		
GSG Bolt Slot & 9/16" T-Bar																		
GS For 9/16" installations with regular tile; fixture position will be flush to the bottom of the tile																		
FLF Exposed Standard																		
FL 1/2" Flange Detail																		
NFN Metal Pan or Millwork																		
NF Flangeless Detail																		
SFS Drywall,																		
SF Flangeless Detail																		

MOUNTING

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P I N N A C L E
ARCHITECTURAL LIGHTING
Evolution EVL

Voltage

- Some Outline configurations will not accommodate all voltage options; consult with factory

Ordering Code	
U	Universal
1	120 volt
2	277 volt
3	347 volt

120 to 277 volt

Must specify OL3 under driver section of part number

Driver

- Standard Driver Option = OL1
- Electronic driver, power factor is >0.9 with a THD <20%
- Driver Lifetime: 50,000 hours at 25C ambient operating conditions
- Ambient operating range: -20F/-30C to 96F/35C
- For more Driver options, see Pinnacle Resource Guide
- Some Outline configurations will not accommodate all driver options; consult with factory

OL1	Osram 0-10v, 10%	Standard driver option
OL3	Osram 347 volt, 0-10v, 10%	Requires 347V option in the Voltage section of the part number
LH1	Lutron Hi-lume EcoSystem, 1% Soft on, Fade-to-Black	Lutron-LDE1
LH3	Lutron Hi-lume 1%, 3-wire	Lutron-L3DA3W
L51	Lutron 5-Series 5%, EcoSystem Digital	Lutron-LDE5
EE1	eldoLED ECOdrive 1%, 0-10v	Logarithmic Dimming
ED1	eldoLED DUALdrive 0%, DALI	Logarithmic Dimming
ES1	eldoLED SOLOdrive 0-10v, 1%	Logarithmic Dimming
PS1	Philips Advance Xitanium Step Dimming	50% / 100%
PM1	Philips Advance Mark 10 5%, Line	120v or 277v required



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P I N N A C L E ARCHITECTURAL LIGHTING® Evolution Outline

Approvals & Certifications

Construction Extruded aluminum trim with formed cold rolled 20 gauge steel back box housing.

Shielding Extruded aluminum module with for perfect perimeter illumination.

Mounting Outline is designed to install into acoustical grid and inaccessible ceilings. Specify GXG, FLF, SFS, NFN for individual, unjoinable units (individual units will fall on-grid). Specify GX, FL, SF, NF for continuous runs (runs designed to fall on-grid). Grid retention brackets are integral to housing. Consult factory for detailed installation instructions.

LED 25°C test environment. Lumen output/wattage has a margin of +/- 5%. All luminaire configurations tested in accordance with IES LM-79. Diodes tested in accordance with IES LM-80. Minimum lifetime greater than 60,000 hours. Lifetime Projection L70 = 136,200 hours and L90 = 41,100 hours. MacAdam 3-Step Ellipses. Not all products are Lighting Facts listed. For all available IES files, please visit our website at pinnacle-ltg.com.

CRI, CCT & Lumen Output Three lumen packages available. Standard, High (HO) and Very High (VHO). Custom outputs are available. Specify custom lumens or watts between standard offering listed on CRI, CCT & Output page. 80 CRI is available for 3000K, 3500K, and 4000K. 90 CRI is available for 2700K, 3000K, 3500K, and 4000K. 80 CRI = R9≥19 and 90 CRI = R9≥61.

Voltage Universal (U), 120 volt (1), 277 volt (2) and 347 volt (3) options available. Must specify OL3 in Driver section when 347 volt (3) is selected. Some Outline configurations will not accommodate all voltage options; consult with factory.

Driver Standard Driver Option is Osram 0-10V, 10% = OL1. Electronic driver, Power factor is >0.9 with a THD <20%. Driver Lifetime: 50,000 hours at 25°C ambient operating conditions. Ambient operating range: -20°F/-30°C to 96°F/35°C. For more driver options, see Pinnacle Resource Guide. Some Outlining configurations will not accommodate all driver options.

Circuiting Select from single circuit (1), Emergency circuit (E) or Night Light circuit (N). Some Outline configurations will not accommodate all circuiting options; consult with factory.

Battery & Emergency Select battery or emergency options if required. If battery or emergency option is not required, enter 0. Battery duration is 90 minutes as standard. Test button is remote to fixture. For more Battery options, see Pinnacle Resource Guide.

Finish Standard powder-coat textured white, metallic silver, textured black, graphite or bronze painted finish; consult factory for chip of standard paint finishes or for additional custom color and finish options.

Controls Consult Factory.

Labels UL and cUL Listed. Standard, HO and VHO lumen packages are IC Rated, approved for dry/damp location unless otherwise noted.

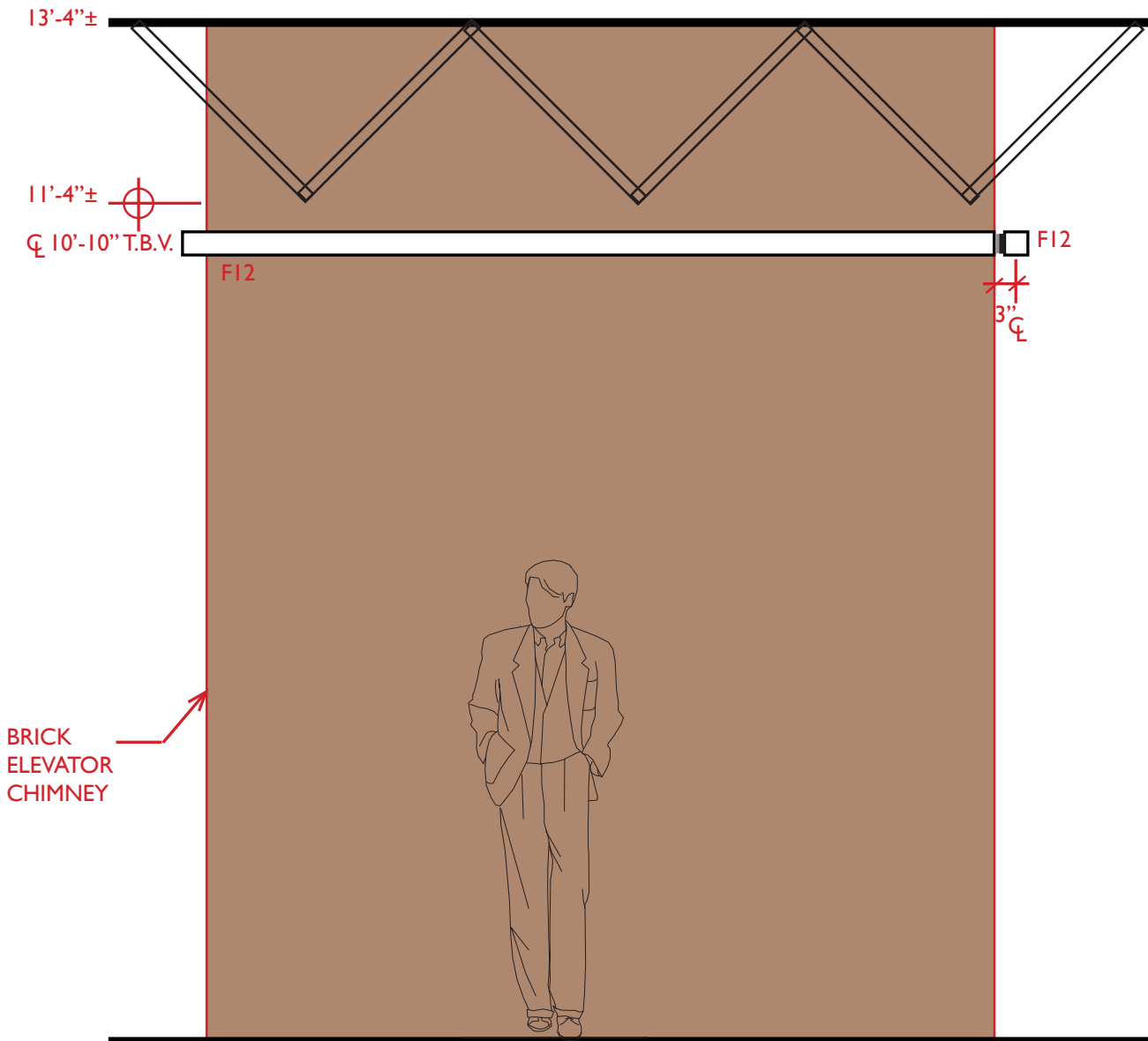
Buy American Act Compliant

Warranty Evolution LED offered with a 5-year limited warranty. Covers LED, driver and fixture.

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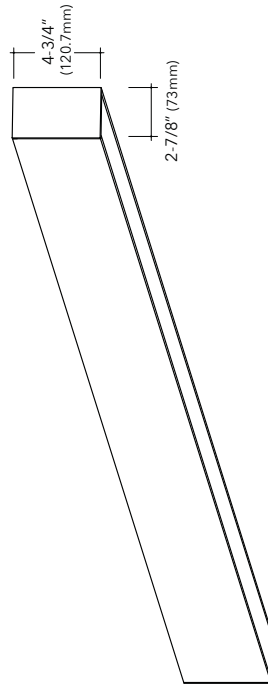
<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<h1>FI2</h1>
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Project Name _____
Date _____ Type _____

PINNACLE ARCHITECTURAL LIGHTING®
EDGE EX2



**SUSPENDED
DIRECT
LINEAR
LUMINAIRE**



- 6063-T5 Extruded aluminum housing
- Highly reflective die-formed white painted reflector
- Wiring access available through bottom of housing
- 5-year limited warranty covers LED, driver and fixture
- UL and cUL listed
- Approved for dry/damp location unless otherwise noted
- Maximum weight is 10 lbs. for a standard 4' fixture
- Buy American Act compliant



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P I N N A C L E ARCHITECTURAL LIGHTING® **EDGE** EX2 Suspended Linear Luminaire



Project Name _____ Type _____
Date _____

EX2-A-N-
Shielding CRI, CCT & Length OR Mounting Voltage Driver Circulating Battery & Finish Fixture Controls
Output Pattern Emergency Options

Example Part #: EX2-A-N-827-8-AC48G1-U-OL1-1-0-W

DIRECT SHIELDING pg. 3	EX2-	A Satine	30 3000K Continuous Row in 4' increments	40 4000K	CW Custom Watts	More Options on pg. 3
INDIRECT SHIELDING pg. 3		N None				Details on pg. 3
CRI, CCT & OUTPUT pg. 4		27 2700K Example: 827HO is 8 = 80 CRI; 27 = 2700K; HO = High Output	35 3500K			Lumen Outputs, 80 & 90 CRI pg. 4
LENGTH OR PATTERN pg. 5		Individual Fixture 4', 8' and 12'	L_X L-Shape	S Square	U_X U-Shape	More Options on pg. 5
MOUNTING pg. 6		AC_G1 1" T-Bar	AC_G9 9/16" T-Bar	AC_G5 Slotted T-Bar	AC_ST Structure	Details on pg. 6
VOLTAGE pg. 7		U Universal (120 thru 277V)	3 347V EE.TO VERIFY	AC_JB Junction Box	WA Wall	Details on pg. 7
DRIVER pg. 8		OL1 Osram Dimming 0-10V, 10%	L Lutron Dimming	E eidoLED Dimming	P Philips Dimming	Details on pg. 8
CIRCUITING pg. 9		1 Single	M Multi	E Emergency entire fixture	N Night Light entire fixture	Details on pg. 9
BATTERY & EMERGENCY pg. 10		0 None	B # of Bodine 10W	J # of Iota 10W	EE.TO VERIFY	More Options on pg. 10
FINISH pg. 11		W Matte White	S Metallic Silver	BL Textured Black	BR Bronze	Details on pg. 11
FIXTURE OPTIONS pg. 11		CC-C Canopy Custom Color			GR Graphite	More Options on pg. 11
CONTROLS pg. 12		PD1 Philips Luxsense DS			CC Custom Color	More Options on pg. 12

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LAMP: 8.6W/LF LED, Provided by Manufacturer, 3500K
DRIVER: Provided by Manufacturer, 0-10V Dimming Capable

F12



P I N N A C L E EDGE

ARCHITECTURAL LIGHTING®

EX2-A-N

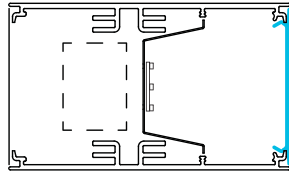
Shielding

- Diffuse snap-in acrylic lens, removable for maintenance

Direct Indirect



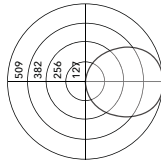
Satinee Lens



DIRECT SHIELDING
INDIRECT SHIELDING

Photometrics

Test # ITR6376
Catalog # EX2-A-N-B40-4
Lumens 1372 lm
Watts 18.3 W
Efficacy 75 LPW



Candela Distribution

Vert Angle	Horizontal Angle	0	22.5	45	67.5	90
0	509	509	509	509	509	509
5	506	506	506	506	506	506
10	498	497	497	496	496	496
15	490	482	482	481	479	479
20	468	462	464	460	457	457
25	444	438	438	433	433	433
30	417	411	411	406	403	403
35	387	380	379	376	373	373
40	353	348	347	342	341	341
45	318	314	312	308	307	307
50	281	278	276	274	273	273
55	244	241	240	238	237	237
60	206	204	203	202	201	201
65	168	166	167	165	165	165
70	129	129	130	129	129	129
75	93	94	93	94	93	93
80	59	60	59	60	60	60
85	28	29	28	28	28	28
90	0	0	0	0	0	0

Luminance Data (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	5154	5057	4976
55	4875	4795	4735
65	4556	4529	4474
75	4118	4118	4118
85	3682	3682	3682

For all available IES files, please visit our website at pinnacle-igt.com. Photometry testing in accordance to IESNA-LM-79-08 at an NVLAP accredited testing laboratory. Testing conducted at 25°C ambient conditions. Specifications and dimensions subject to change without notice. Specification sheets that appear on pinnacle-igt.com are the most recent version and supersede all other previously printed or electronic versions.

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212.391.4230

F12



CRI, CCT & Output

- 25°C test environment. Lumen output has a margin of +/- 5%
- Lifetime Projection L70 = 136,200 hours and L90 = 41,700 hours
- All luminaire configurations tested in accordance with IES LM-79
- LED binned within MacAdam 3-Step Ellipses
- Diodes tested in accordance with IES LM-80
- Specify either 80 or 90 CRI
- Minimum lifetime greater than 60,000 hours
- 80 CRI = R9≥19 and 90 CRI = R9≥61

Custom Output - Lumens OR Wattage

Ordering Code: Specify CRI, CCT and desired lumens (i.e. CL835500) | Specify lumens between standard offering listed below. Lumens are specified per color temp
 CW_ _ _ _ _ Specify CRI, CCT and desired wattage (i.e. CW9407) | Specify watts between standard offering listed below

Color	Output	Watts	Shielding	
			A	Satine Lumens LPW
830	3000K Standard	4.6	327	71.5
830HO	3000K High	8.6	608	70.7
835	3500K Standard	4.6	337	73.7
835HO	3500K High	8.6	625	72.7
840	4000K Standard	4.6	343	75.0
840HO	4000K High	8.6	637	74.1
90 CRI				
927	2700K Standard	4.6	259	56.6
927HO	2700K High	8.6	480	55.8
930	3000K Standard	4.6	302	66.0
930HO	3000K High	8.6	560	65.1
935	3500K Standard	4.6	303	66.2
935HO	3500K High	8.6	562	65.3
940	4000K Standard	4.6	306	66.9
940HO	4000K High	8.6	569	66.2

CRI, CCT & OUTPUT



See Lighting Facts Spec Sheet for tables
 Not all products are Lighting Facts listed

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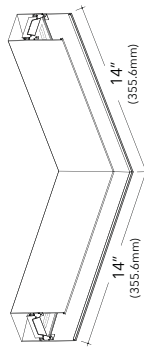
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P I N N A C L E ARCHITECTURAL LIGHTING® EDGE

EX2-A-N

Pattern



- Specify pattern shape and overall dimensions (includes corner dimensions)
- Refer to dimensions table below for available standard lengths
- 90 degree corners are 14"x14" (overall, outside dimension)
- Angles and shapes not shown require Mod Pattern; contact factory

S_	R_x	U_x_x	L_x	M	LENGTH OR PATTERN
<p>Square Provide A dimension Example: S4 Nominal lengths 4'x4' Actual Length 4'4"x4'4"</p>	<p>Rectangle Provide A1xA2 dimensions Example: R4'x8' Nominal lengths 4'x8' Actual Length 4'4"x8'4"</p>	<p>U-Shape Provide AxB1xB2 dimensions Example: U4'x8'x8' Nominal lengths 4'x8'x8' Actual Length 4'4"x8'2"x8'2"</p>	<p>L-Shape Provide B1xB2 dimensions Example: L4'x8' Nominal lengths 4'x8' Actual Length 4'2"x8'2"</p>	<p>Mod Layout For patterns or lengths not shown or standard</p>	

STANDARD A1 & A2	
Ordering Code	Actual Length
4'	4'4"
5'	5'4"
6'	6'4"
7'	7'4"
8'	8'4"
Etc...	

STANDARD B1 & B2	
Ordering Code	Actual Length
3'	3'2"
4'	4'2"
5'	5'2"
6'	6'2"
7'	7'2"
Etc...	

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P I N N A C L E
ARCHITECTURAL LIGHTING®
EDGE

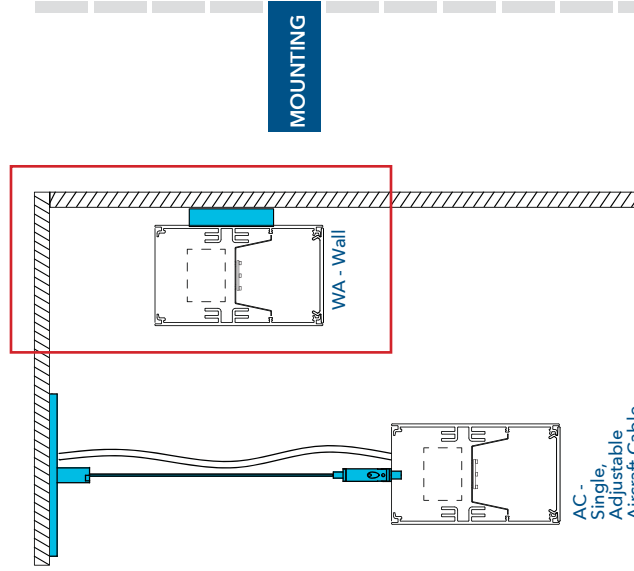
EX2-A-N

Mounting

- Specify cable length in ordering code (AC48G1)
- Standard 48" adjustable cable. Specify up to 350"
- End trims and power cord attached at factory
- Aircraft Cable (AC) mounts on 4'-0" (1219.2mm) and 8'-0" (2438.4mm) centers
- Aircraft Cable supplied with 5" (127mm) power and 2" (50.8mm) non-power canopies
- Canopies are painted white unless otherwise specified
- Canopy color specified on Fixture Options page
- Approved for dry/damp location unless otherwise noted
- Refer to installation instructions during installation at the jobsite
- Maximum fixture weight is 10 lbs for a standard 4' fixture

Ordering Code	Description	Notes
AC_G1	1" (15/16") T-Bar	
AC_G9	9/16" T-Bar	
AC_G5	Slotted T-Bar	Works with screw slot and bolt slot grid ceiling types
AC_JB	Junction Box	
AC_ST	Structure	
AC5_G	5" (127mm) Non-Power Canopy	Replaces standard 2" canopy
AC5_JB	5" (127mm) Non-Power Canopy	Replaces standard 2" canopy
SQ_G	5" (127mm) Square Canopy	Replaces round canopies with 5" square canopies
SQ_JB	5" (127mm) Square Canopy	Replaces round canopies with 5" square canopies
WA	Wall Mount	ADA Compliant

**PROVIDE CANOPY TO COVER
SURFACE MOUNTED J-BOX AT
BRICK WALL AND TO RECEIVE
CONDUIT INTO THE TOP SIDE**



AC -
Single,
Adjustable
Aircraft Cable

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Voltage

- Some EX2 configurations will not accommodate all voltage options; consult with factory

Ordering Code

U	Universal	120 to 277 volt
1	120 volt	
2	277 volt	
3	347 volt	0-10 volt dimming only; requires OL3 specification in Driver section of part number

Driver

- Standard Driver Option = OL1
- Electronic driver, Power factor is >0.9 with a THD <20%
- Driver Lifetime: 50,000 hours at 25°C ambient operating conditions
- Ambient operating range: -20°F/-30°C to 107°F/42°C
- For more driver options see Pinnacle Resource Guide
- Some EX2 configurations will not accommodate all driver options; consult with factory

OL1	Osram 0-10v, 10%	Standard driver option
OL3	Osram 347 volt, 0-10v, 10%	Requires 347V option in the Voltage section of the part number.
EE1	eldLED ECOdrive 1%, 0-10v	Logarithmic Dimming
ED1	eldLED DUALdrive 0%, DALI	Logarithmic Dimming
ES1	eldLED SOLOdrive 0-10v, 0%	Logarithmic Dimming
LH1	Lutron Hi-lume EcoSystem, 1% Soft on, Fade-to-Black	Lutron-LDE1
LH3	Lutron Hi-lume 1%, 3-wire	Lutron-L3DA3W
L51	Lutron 5-Series 5%, EcoSystem Digital	Lutron-LDES
PS1	Philips Advance Xitanium Step Dimming	50% / 100%
PM1	Philips Advance Mark 10 5%, Line	120v or 277v required



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P I N N A C L E ARCHITECTURAL LIGHTING® **EDGE EX2**

Approvals & Certifications

Construction: 6063-T5 Extruded aluminum housing. Highly reflective die-formed white painted reflector.

Shielding: Diffuse snap-in acrylic lens, removable for maintenance.

Mountings: Aircraft cable and wall mount available. The aircraft cable mounts on 4'-0" (1219,2mm) and 8'-0" (2438,4mm) centers. Aircraft Cable supplied with 5" (127mm) power and 2" (50,8mm) non-power canopies. Refer to installation instructions for appropriate ceiling detail. Canopies are painted white unless otherwise specified. Maximum fixture weight is 10 lbs for a standard 4' fixture.

LED: 25°C test environment. Lumen output/wattage has a margin of +/- 5%. All luminaire configurations tested in accordance with IES LM-79. Diodes tested in accordance with IES LM-80. Minimum lifetime greater than 60,000 hours. L70 = 136,200 hours and L90 = 41,100 hours. MacAdam 3-Step Ellipses. Not all products are Lighting Facts listed. For all available IES files, please visit our website at pinnacle-ltg.com.

CRI, CCT & Output: Two lumen packages available. Standard and High (HO). Custom outputs are available. Specify custom lumens or watts between standard offering listed on CRI, CCT & Output page. 80 CRI is available for 3000K, 3500K, and 4000K. 90 CRI is available for 2700K, 3000K, 3500K, and 4000K. 80 CRI = R9≥19 and 90 CRI = R9≥61.

Voltage: Universal (U), 120 volt (1), 277 volt (2) and 347 volt (3) options available. Must specify OL3 in Driver section when 347 volt (3) is selected. Some EX configurations will not accommodate all voltage options; consult with factory.

Driver: Standard Driver Option is Osram 0-10V, 10% = OL1. Electronic driver, Power factor is >0.9 with a THD <20%. Driver Lifetime: 50,000 hours at 25°C ambient operating conditions. Ambient operating range: -20°F/-30°C to 107°F/42°C. For more driver options, see Pinnacle Resource Guide. Some EX configurations will not accommodate all driver options.

Circuiting: Select from single circuit (1), Emergency circuit (E) or Night Light circuit (N). Some EX configurations will not accommodate all circuiting options; consult with factory.

Battery & Emergency: Select battery or emergency options if required. If battery or emergency option is not required, enter 0. Battery duration is 90 minutes as standard. Test button is remote to fixture. For more Battery options, see Pinnacle Resource Guide.

Finish: Standard powder-coat textured white, metallic silver, textured black graphite or bronze painted finish, consult factory for chip of standard paint finishes. Canopies painted white unless specified differently in the options section of

the part number. Contact factory for additional custom color and finish options.
Controls: Specify PD for daylight sensor, requires 0-10v driver. Some EX configurations will not accommodate all control options; consult with factory.

Labels: UL and cUL Listed. Standard and HO lumen packages are approved for dry/damp location unless otherwise noted.

Fixture Weight: Maximum fixture weight is 10 lbs for a standard 4' fixture.

Buy American Act Compliant

Warranty: EX LED offered with a 5-year limited warranty. Covers LED, driver and fixture.

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EX2 LED SPEC MAY2017 13 of 13

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F12



Project: _____
 Location: _____
 Cat.No: _____
 Type: _____
 Lumens: _____ Qty: _____
 Notes: _____

The Philips Day-Brite / Philips CFI Recessed FluxGrid LED offers architectural appeal with "must have" features. Two different lens styles, discrete air handling, integral emergency, and access to the boards and driver from below make FluxGrid an ideal solution for a wide range of applications.

Ordering guide

Example: 2FGG42B840-4-D-UNV-DIM

Width	Family	Ceiling Type	Air Function	Lumens	Color	Length	Center Diffuser	Voltage	Driver	Options
2	FG	G				4				
2 2'	FG FluxGrid	G Grid	Blank ¹ Static H Air return	Standard Configurations 38L 3800 nominal delivered lumens 43L 4300 nominal delivered lumens 48L 4800 nominal delivered lumens 54L 5400 nominal delivered lumens 74L 7400 nominal delivered lumens Base Configurations 42B ¹ 4200 nominal delivered lumens	830 80 CRI, 3000K 835 ² 80 CRI, 3500K 840 ³ 80 CRI, 4000K 850 80 CRI, 5000K	4 4'	D ⁴ Diffuse (ribbed) DS ⁵ Diffuse (smooth)	UNV ⁶ Universal voltage 120-277V 120 ³ 120V 277 ³ 277V 347 347V	DIM ⁷ 0-10V dimming SDIM ³ Step dimming to 40% input power XDIM ³ MarkX phase dimming L3D ⁴ Lutron Hi-lume A 1% dimming LDE Lutron LDE5 5% dimming DALI DALI	F1 ¹ 3/8" flex, 3 wire 18 gauge 6' F2 ¹ 3/8" flex, 4 wire 18 gauge 6' F1/D ¹ 3/8" twin flex, 3 wire 18 gauge 6' for dimmable luminaires F2/SW ¹ 3/8" single flex, 5 wire 18 gauge 6' for dimmable luminaires F2/6W ¹ 3/8" single flex, 6 wire 18 gauge 6' for dimmable and EMLED luminaires GLR ¹ Fusing, fast blow integral emergency battery pack EMLED ¹⁶ DAYOCC ⁵ Integral sensor, daylighting and occupancy, Philips EasySense SNS102 CHIC ¹ Chicago Plenum rated

Footnotes:

1. Base configurations available with noted options.
2. Consult factory for SDIM on 74L package.
3. XDIM requires 120V or 277V specification. Not available on 30L package.
4. Specify up to 43L package. Consult factory for higher lumen packages.
5. Specify DIM driver option only with DAYOCC controls option. Dimming via wall switch.
6. Philips Bodine BSL310, 1100lm nominal delivered.
7. 0-10v dimming to 1% for Standard, and 5% for Base configurations.

Accessories (order separately)

- FMA24 – 2'x4' "F" mounting frame for NEMA "F" mounting
- FGD4L – FG 4' ribbed replacement lens
- FGDS4L – FG 4' smooth replacement lens
- FGHD4L – FG 4' air return ribbed replacement lens
- FGHDS4L – FG 4' air return smooth replacement lens

Energy data

Luminaire	Catalog Number	Input Power	Efficacy
	2FGG38L840	31.8	120
	2FGG43L840	36.2	119
2x4 Standard	2FGG48L840	41.5	116
	2FGG54L840	48.9	114
	2FGG74L840	69.2	106
2x4 Base	2FGG42B840	33.9	124

PROVIDE WORKING SAMPLE/MOCK-UP FOR OWNER'S REVIEW AND APPROVAL OF FIXTURE BRIGHTNESS



<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 31.8W LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer, 0-10V Dimming Capable</p>	<p>F13</p>
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2FG Recessed FluxGrid LED 2x4

3800, 4200, 4300, 4800, 5400, or 7400 lumens

Application

- 3" deep low profile configuration provides minimal penetration into the plenum space
- Acrylic diffuser available in ribbed and smooth configurations provides even illumination with comfortable appeal
- Standard and base configurations available in multiple lumen packages to suit the needs of various applications
- Lambertian distribution creates uniform horizontal and vertical illuminance on the work plane and reduces scalloping on the walls
- CRI 80 minimum color rendering with balanced spectrum
- LEDs coupled with standard dimming provide prolonged lumen maintenance. Optional integral sensors contribute further to LED lumen maintenance
- Designed for use with standard Grid (NEMA "G") or Narrow Grid (NEMA "NFG" ceiling T-bars. Drywall or plaster applications require use with the FMA24 "F" mounting frame accessory (sold and shipped separately)
- Continuous row mounting is possible with a 1" gap between fixtures accommodated by others

Construction/Finish

- Uncomplicated design is 3" deep with minimal material overlap creating several benefits:
 - Less material required
 - Less packaging required
 - Reduced weight for ease of handling and transit
 - Less energy required for construction and assembly
 - More luminaires can be shipped per truck to reduce fuel consumption
- Metal side covers are die formed with a conical shape to enhance light distribution and visual aesthetic
- Injection molded lens retainers allow for easy, tool-free access to the LED boards and driver from below, and provide positive lens retention
- Luminaire finish is matte white polyester powder coat for high quality, durable finish
- T-bar grid clips are integral to the body
- Air return option provides air flow through a unique lens retainer design. Air passes through architectural forms in the lens retainers (each end), and through the end plate of the luminaire. A cover plate is provided to control air flow through the luminaire, or make it static as required
- Integral controls options include sensor mounted in one lens retainer. Controls are commissioned via intuitive Philips app on a Droid smartphone either through NFC or an IR blaster
- EMLED option requires the emergency battery pack be installed with a top side cover. Access from above

Electrical

- Integral sensor options for occupancy sensing and/or daylight harvesting are available for additional energy savings with no reduction of life or increase in installation labor
- Standard configurations provide up to 120 lumens per watt and are available with 5 lumen packages and 3000, 3500, 4000, and 5000K color temperatures
- Base configurations provide up to 124 lumens per watt and are available in 4200 lumen flux and 3500K and 4000K color temperatures
- LED boards are accessible from below by removal of the lens. Lens removal is tool-free by compressing the sides and pushing to one end
- LED driver is accessible from below by removal of the lens and integral wireway cover. The wireway cover is easily removed with a flat head screwdriver
- Other driver options including step dimming (SDIM, 100%/40%), DALI, phase dimming (XDIM), and Lutron are available
- Five year limited luminaire warranty includes LED boards and driver (emergency driver and batteries have a three year warranty in models so equipped). Visit www.philips.com/warranties for complete warranty information
- TM-21 predicted L70 lumen maintenance up to 70,000 hours
- cETLus listed to UL and CSA standards, suitable for damp locations
- FluxGrid luminaires are DesignLights Consortium qualified. Please see the DLC QPL list for exact catalog numbers (<http://www.designlights.org/QPL>)

Enclosure

- Opal acrylic diffuser provides visually comfortable lumenance without compromise to luminaire efficacy.
- Diffuser requires no frames or fasteners and can be easily removed from below without the use of tools

General notes

- All options are factory installed
- All accessories are field installed
- Many luminaire components, such as reflectors, refractors, lenses, sockets, lampholders, and LEDs are made from various types of plastics which can be adversely affected by airborne contaminants. If sulfur based chemicals, petroleum based products, cleaning solutions, or other contaminants are expected in the intended area of use, consult factory for compatibility

DAYOCC

- Integrated fixture mount Philips EasySense sensor featuring daylight and PIR occupancy sensing
- Compatibility with Philips Advance Xitanium SR Sensor Ready LED drivers
- Features automatic or manual on/off scenarios for code compliance and to realize full energy savings potential
- Basic grouping to a wireless switch via an IR interface with the Philips Field App
- Self-powered single rocker switch Illumra #ZBT-SIAWH (sourced by others), up to 40 luminaires may be grouped to a single switch
- Register for the commissioning app at <http://registration.componentcloud.philips.com/appregistration/>
- For more information visit www.philips.com/EasySense

FluxGrid_LED_2x4 10/16 page 2 of 5

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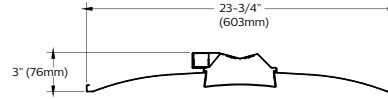
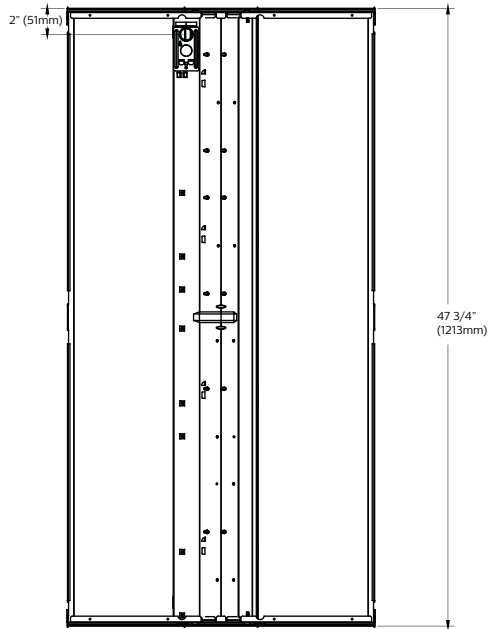
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F13

2FG Recessed FluxGrid LED 2x4

3800, 4200, 4300, 4800, 5400, or 7400 lumens

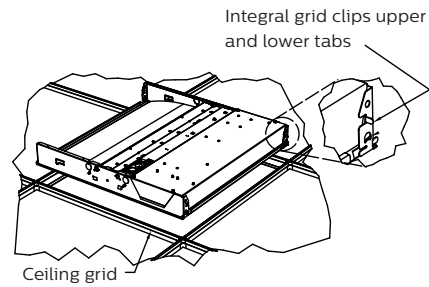
Dimensions



Controls sensor integrated into one lens retainer.



The air return option allows air to flow through vents in the lens retainers on each end. Air blades are provided on each end of the luminaire to control air flow to the plenum.



2FG Recessed FluxGrid LED 2x4

3800, 4200, 4300, 4800, 5400, or 7400 lumens

Photometry

2x4 FluxGrid recessed LED, base configuration, 4200 nominal delivered lumens

LER - 124

<p>Catalog No. 2FGG42B840-4-D-UNV-DIM Test No. 36564 S/MH 1.2 Lamp Type LED Lumens 4212 Input Watts 34</p> <p>Comparative yearly lighting energy cost per 1000 lumens – \$1.94 based on 3000 hrs. and \$0.08 pwr KWH.</p> <p>The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology.</p> <p>Photometric values based on test performed in compliance with LM-79.</p>	<p>Candlepower</p> <table border="1"> <thead> <tr> <th>Angle</th> <th>End</th> <th>45</th> <th>Cross</th> <th>Back-45</th> </tr> </thead> <tbody> <tr><td>0</td><td>1567</td><td>1567</td><td>1567</td><td>1567</td></tr> <tr><td>5</td><td>1541</td><td>1556</td><td>1559</td><td>1556</td></tr> <tr><td>15</td><td>1467</td><td>1473</td><td>1476</td><td>1473</td></tr> <tr><td>25</td><td>1323</td><td>1330</td><td>1339</td><td>1330</td></tr> <tr><td>35</td><td>1124</td><td>1147</td><td>1165</td><td>1147</td></tr> <tr><td>45</td><td>896</td><td>949</td><td>978</td><td>949</td></tr> <tr><td>55</td><td>659</td><td>737</td><td>779</td><td>737</td></tr> <tr><td>65</td><td>404</td><td>534</td><td>587</td><td>534</td></tr> <tr><td>75</td><td>203</td><td>323</td><td>365</td><td>323</td></tr> <tr><td>85</td><td>43</td><td>104</td><td>108</td><td>104</td></tr> </tbody> </table>	Angle	End	45	Cross	Back-45	0	1567	1567	1567	1567	5	1541	1556	1559	1556	15	1467	1473	1476	1473	25	1323	1330	1339	1330	35	1124	1147	1165	1147	45	896	949	978	949	55	659	737	779	737	65	404	534	587	534	75	203	323	365	323	85	43	104	108	104	<p>Light Distribution</p> <table border="1"> <thead> <tr> <th>Degrees</th> <th>Lumens</th> <th>% Linaire</th> </tr> </thead> <tbody> <tr><td>0-30</td><td>1176</td><td>27.9</td></tr> <tr><td>0-40</td><td>1833</td><td>44.9</td></tr> <tr><td>0-60</td><td>3273</td><td>77.6</td></tr> <tr><td>0-90</td><td>4215</td><td>100</td></tr> <tr><td>0-180</td><td>4216</td><td>100</td></tr> </tbody> </table> <p>Average Luminance</p> <table border="1"> <thead> <tr> <th>Zone</th> <th>End</th> <th>45'</th> <th>Cross</th> </tr> </thead> <tbody> <tr><td>45</td><td>8102</td><td>8584</td><td>8845</td></tr> <tr><td>55</td><td>7349</td><td>8219</td><td>8685</td></tr> <tr><td>65</td><td>6120</td><td>8077</td><td>8890</td></tr> <tr><td>75</td><td>5025</td><td>7991</td><td>9014</td></tr> <tr><td>85</td><td>3186</td><td>7597</td><td>7905</td></tr> </tbody> </table>	Degrees	Lumens	% Linaire	0-30	1176	27.9	0-40	1833	44.9	0-60	3273	77.6	0-90	4215	100	0-180	4216	100	Zone	End	45'	Cross	45	8102	8584	8845	55	7349	8219	8685	65	6120	8077	8890	75	5025	7991	9014	85	3186	7597	7905
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2x4 FluxGrid recessed LED, standard configuration, 4300 nominal delivered lumens

LER - 119

<p>Catalog No. 2FGG43L840-4-D-UNV-DIM Test No. 36563 S/MH 1.2 Lamp Type LED Lumens 4318 Input Watts 36</p> <p>Comparative yearly lighting energy cost per 1000 lumens – \$2.02 based on 3000 hrs. and \$0.08 pwr KWH.</p> <p>The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology.</p> <p>Photometric values based on test performed in compliance with LM-79.</p>	<p>Candlepower</p> <table border="1"> <thead> <tr> <th>Angle</th> <th>End</th> <th>45</th> <th>Cross</th> <th>Back-45</th> </tr> </thead> <tbody> <tr><td>0</td><td>1613</td><td>1613</td><td>1613</td><td>1613</td></tr> <tr><td>5</td><td>1587</td><td>1602</td><td>1604</td><td>1602</td></tr> <tr><td>15</td><td>1511</td><td>1517</td><td>1520</td><td>1517</td></tr> <tr><td>25</td><td>1362</td><td>1369</td><td>1380</td><td>1369</td></tr> <tr><td>35</td><td>1157</td><td>1182</td><td>1199</td><td>1182</td></tr> <tr><td>45</td><td>922</td><td>978</td><td>1006</td><td>978</td></tr> <tr><td>55</td><td>679</td><td>759</td><td>800</td><td>759</td></tr> <tr><td>65</td><td>416</td><td>514</td><td>605</td><td>514</td></tr> <tr><td>75</td><td>209</td><td>332</td><td>377</td><td>332</td></tr> <tr><td>85</td><td>44</td><td>106</td><td>111</td><td>106</td></tr> </tbody> </table>	Angle	End	45	Cross	Back-45	0	1613	1613	1613	1613	5	1587	1602	1604	1602	15	1511	1517	1520	1517	25	1362	1369	1380	1369	35	1157	1182	1199	1182	45	922	978	1006	978	55	679	759	800	759	65	416	514	605	514	75	209	332	377	332	85	44	106	111	106	<p>Light Distribution</p> <table border="1"> <thead> <tr> <th>Degrees</th> <th>Lumens</th> <th>% Linaire</th> </tr> </thead> <tbody> <tr><td>0-30</td><td>1210</td><td>28.0</td></tr> <tr><td>0-40</td><td>1948</td><td>45.1</td></tr> <tr><td>0-60</td><td>3367</td><td>77.9</td></tr> <tr><td>0-90</td><td>4320</td><td>100</td></tr> <tr><td>0-180</td><td>4321</td><td>100</td></tr> </tbody> </table> <p>Average Luminance</p> <table border="1"> <thead> <tr> <th>Zone</th> <th>End</th> <th>45'</th> <th>Cross</th> </tr> </thead> <tbody> <tr><td>45</td><td>8341</td><td>8843</td><td>9099</td></tr> <tr><td>55</td><td>7569</td><td>8460</td><td>8924</td></tr> <tr><td>65</td><td>6302</td><td>7782</td><td>9152</td></tr> <tr><td>75</td><td>5161</td><td>8208</td><td>9321</td></tr> <tr><td>85</td><td>3259</td><td>7773</td><td>8155</td></tr> </tbody> </table>	Degrees	Lumens	% Linaire	0-30	1210	28.0	0-40	1948	45.1	0-60	3367	77.9	0-90	4320	100	0-180	4321	100	Zone	End	45'	Cross	45	8341	8843	9099	55	7569	8460	8924	65	6302	7782	9152	75	5161	8208	9321	85	3259	7773	8155
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Philips Lighting Canada Ltd.
281 Hillmount Rd, Markham, ON, Canada L6C 2S3
Tel. 800-668-9008

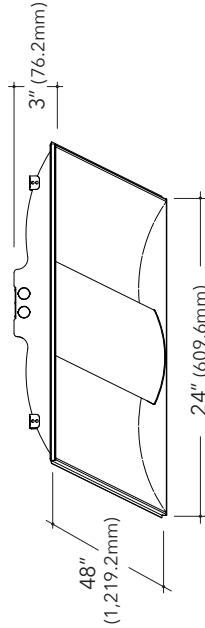
Project Name _____
Date _____ Type _____



P I N N A C L E
ARCHITECTURAL LIGHTING®
ADEO 2x4



ARCHITECTURAL
RECESSED
LUMINAIRE



- Formed 20 gauge cold rolled steel housing
- Highly reflective die-formed white painted reflector
- Wiring access available on top of housing
- LED offered with a 5-year limited warranty. Covers LED, driver and fixture
- UL and cUL Listed, LO, MO, and HO lumen packages are IC Rated
- Approved for dry/damp location unless otherwise noted
- Maximum fixture weight is 28 lbs - Surface Mount box adds 10 lbs
- Room-Side Maintenance for LED system
- Buy American Act compliant

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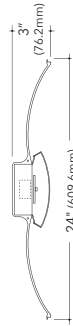
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A brand of **Legrand**

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<h1>F I 3 Alt.</h1>
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P I N N A C L E ARCHITECTURAL LIGHTING® ADEO 2x4 Architectural Recessed Luminaire



Project Name _____
Date _____ Type _____

AD24 --- Shielding --- CRI/CCT/Output --- Mounting --- Voltage --- Driver --- Circulating --- Battery/EM --- Finish --- Fixture Options --- Controls
Example Part #: AD24A-830HO-G9-U-OL1-1-0-W-FW6

SHIELDING pg. 3	A Satine Lens	R Round Perf	L Linear Perf	Details on pg. 3
CRI/CCT & OUTPUT pg. 4 & 5	-27 2700K	-30 3000K	-35 3500K	Lumen Outputs, 80 & 90 CRI pg. 4 & 5
MOUNTING pg. 6	G1 1" Grid	G9 9/16" Grid	G5 Screw Slot Grid	CL Custom Lumens
VOLTAGE pg. 7	U Universal (120 thru 277V)	3 347 Volt	FL Flanged	S Surface Mount
DRIVER pg. 7	OL1 Osram Dimming 0-10V, 10%	L Lutron Dimming	E eLdLED Dimming	CW Custom Watts
CIRCUITING pg. 8	1 Single Circuit	E Emergency Circuit entire fixture	N Night Light entire fixture	Details on pg. 6
BATTERY & EMERGENCY pg. 8	0 None	1B Bodine 10W Integral	1I iota 10W Integral	Details on pg. 7
FINISH pg. 9	W White	CP Chicago Plenum	AR Air Return	Details on pg. 7
FIXTURE OPTIONS pg. 9	QS QuickShip	FW6 6' Flexwhip	GLR GLR Fusing	More Options on pg. 9
CONTROLS pg. 10	PD1 Philips Luxsense DS	AR Air Return	GLR GLR Fusing	More Options on pg. 10

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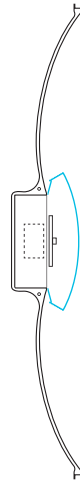
<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 32.1W LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer, 0-10V Dimming Capable</p>	<p>F I 3 Alt.</p>
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P I N N A C L E
ARCHITECTURAL LIGHTING®
ADEO

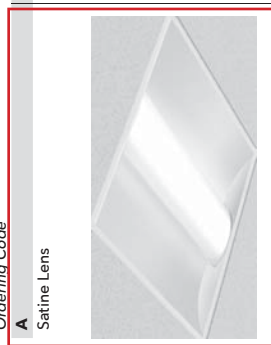
AD24

Shielding

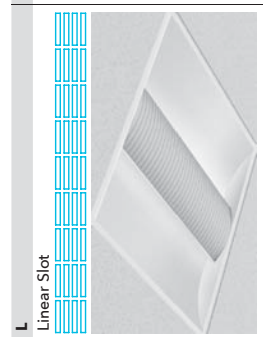


- Captive and hinged center lens
- Co-extruded acrylic lens with ribbed side channels evenly illuminates the side reflector giving the appearance of a fully lensed luminaire
- Highly reflective die-formed white painted reflector
- Wiring access available on top of housing

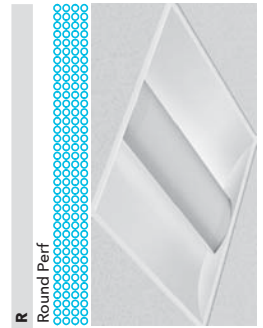
Ordering Code



A
Satine Lens



L
Linear Slot



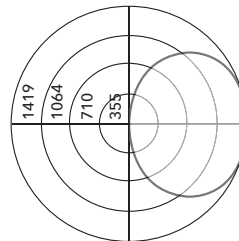
R
Round Perf

SHIELDING

Photometrics AD24A

Satine Lens

Test #: ITL8895A
Part #: AD24A-840MO
Total Lumens: 4195 lm
Total Watts: 32.1 W
Efficacy: 131 LPW



Candela Distribution

Vert. Angle	Horizontal Angle	0	22.5	45	67.5	90
0	1419	1419	1419	1419	1419	1419
5	1413	1412	1413	1413	1413	1413
10	1393	1390	1395	1396	1396	1394
15	1360	1354	1364	1367	1364	
20	1313	1304	1319	1324	1323	
25	1251	1244	1262	1270	1271	
30	1180	1175	1196	1207	1209	
35	1098	1097	1121	1134	1138	
40	1009	1011	1037	1054	1060	
45	912	920	953	974	974	
50	811	820	853	876	884	
55	705	716	752	779	785	
60	594	610	649	679	686	
65	481	501	542	576	585	
70	364	391	436	474	488	
75	253	283	332	373	389	
80	150	182	232	264	276	
85	62	90	114	134	142	
90	0	0	0	0	0	

Luminance Data (cd/sq.m)

Angle in Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	1838	1908	1963
55	1751	1868	1950
65	1622	1827	1972
75	1392	1828	2141
85	1014	1864	2321

For all available IES files, please visit our website at pinnacle-igt.com. Photometry testing in accordance to IESNA-LM-79-08 at an NALAP accredited testing laboratory. Testing conducted at 25°C ambient conditions. Specifications and dimensions subject to change without notice. Specification sheets that appear on pinnacle-igt.com are the most recent version and supersede all other previously printed or electronic versions.

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P I N N A C L E
ARCHITECTURAL LIGHTING®
ADEO

AD24

CRI, CCT & Output

- 25° C test environment. Lumen output has a margin of +/- 5%
- All luminaire configurations tested in accordance with IES LM-79
- Diodes tested in accordance with IES LM-80
- Minimum lifetime greater than 60,000 hours
- Lifetime Projections: L70 = 134,700 hours and L90 = 40,100 hours
- LED binned within MacAdam 3-Step Ellipses
- Specify either 80 or 90 CRI below
- 80 CRI = R9≥19 and 90 CRI = R9≥61

Custom Output- Lumens OR Wattage

Ordering Code
CL _____ Specify CRI, CCT and desired lumens (i.e. CL8351200) | Specify lumens between standard offering listed below. Lumens are specified per color temp
CW _____ Specify CRI, CCT and desired wattage (i.e. CW94015) | Specify watts between standard offering listed below

80 CRI

Color	Output	Watts	Shielding		L		R	
			Satline Lumens	LPW	Linear Slot Lumens	LPW	Round Perf Lumens	LPW
830LO	Low	24.2	2922	120.7	1736	71.7	1484	61.3
830MO	Middle	32.1	3862	120.3	2294	71.5	1962	61.1
830HO	High	40.7	4801	118.0	2852	70.1	2439	59.9
830VHO	Very High	63.7	6874	107.9	4083	64.1	3492	54.8
835LO	Low	24.2	3003	124.1	1784	73.7	1526	63.0
835MO	Middle	32.1	3969	123.6	2358	73.4	2016	62.8
835HO	High	40.7	4934	121.2	2931	72.0	2506	61.6
835VHO	Very High	63.7	7065	110.9	4197	65.9	3589	56.3
840LO	Low	24.2	3165	130.8	1880	77.7	1608	66.4
840MO	Middle	32.1	4195	130.7	2492	77.6	2131	66.4
840HO	High	40.7	5220	128.3	3101	76.2	2652	65.2
840VHO	Very High	63.7	7541	118.4	4479	70.3	3831	60.1

CRI, CCT & OUTPUT



See Lighting Facts Spec Sheet for tables
Not all products are Lighting Facts listed

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NY, NY 10018
212.391.4230

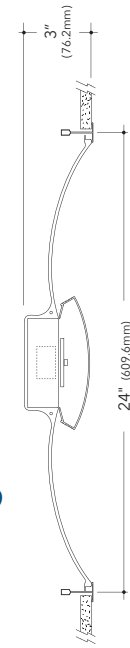
F I 3 Alt.



P I N N A C L E
ARCHITECTURAL LIGHTING®
A D E O

AD24

Mounting



- Designed to install into acoustical grid and inaccessible ceilings
- Grid retention clips integral to housing and require mechanical attachment
- Tie off fixture to structure with retention wires
- Maximum fixture weight is 28 lbs - Surface Mount Box adds 10 lbs
- Refer to installation instructions during installation at the job site
- Approved for dry/damp location unless otherwise noted

Grid center to center spacing

Ordering Code

G1

1" Grid Mount:
Works with 15/16" grid ceiling types. See profile for fixture position in relation to ceiling grid and tile.

G9

9/16" Grid Mount:
Works with 9/16" grid ceiling type. For regular tile installations, fixture position will not be flush to the bottom of the tile. See regular tile profile image below.

GS

Screw Slot Mounting:
Works with screw slot, bolt slot and 9/16" grid ceiling types. For 9/16" installations with regular tile, fixture position will be flush to the bottom of the tile. See bottom profile image of 9/16" with regular tile. Consult factory for detailed installation instructions.

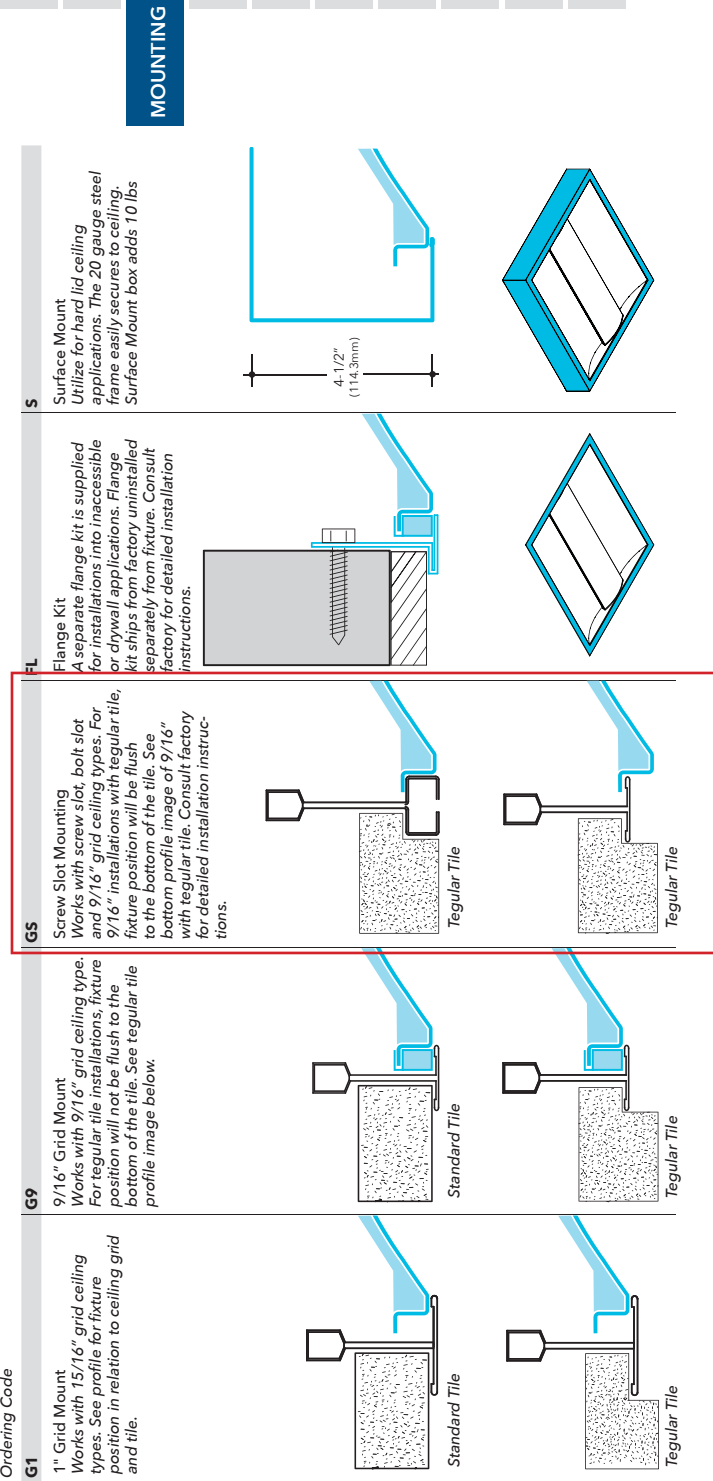
FL

Flange Kit:
A separate flange kit is supplied for installations into inaccessible or drywall applications. Flange kit ships from factory uninstalled separately from fixture. Consult factory for detailed installation instructions.

S

Surface Mount:
Utilize for hard lid ceiling applications. The 20 gauge steel frame easily secures to ceiling. Surface Mount box adds 10 lbs

MOUNTING



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AD24_LED_SPEC_APR2017 6 of 11

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FI3 Alt.



P I N N A C L E
ARCHITECTURAL LIGHTING®
ADEO

AD24

Voltage

- Some ADEO configurations will not accommodate all voltage options; consult with factory

Ordering Code

U	Universal	120 to 277 volt
1	120 volt	
2	277 volt	
3	347 volt	0-10 volt dimming only; must specify OL3 under Driver section of part number

Driver

- Standard Driver Option = OL1
- Electronic driver, power factor is >0.9 with a THD <20%
- Driver Lifetime: 50,000 hours at 25°C ambient operating conditions
- Ambient operating range: -20°F/-30°C to 95°F/35°C
- For more Driver options, see Pinnacle Resource Guide
- Some ADEO configurations will not accommodate all driver options; consult with factory

OL1	Osram 0-10v, 10%	Standard driver option
OL3	Osram 347 volt, 0-10v, 10%	Requires 347V option in the Voltage section of the part number
LH1	Lutron Hi-lume EcoSystem, 1% Soft on, Fade-to-Black	Lutron-LDE1
LS1	Lutron 5-Series 5%, EcoSystem Digital	Lutron-LDE5
EE1	eldoLED ECOdrive 1%, 0-10v	Logarithmic Dimming
ED1	eldoLED DUALdrive 0%, DALI	Logarithmic Dimming
ES1	eldoLED SOLOdrive 0-10v, 0%	Logarithmic Dimming
PS1	Philips Advance Xitanium Step Dimming	50%/100%
PM1	Philips Advance Mark 10 5%, Line	120v or 277v required

VOLTAGE

DRIVER

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P I N N A C L E ARCHITECTURAL LIGHTING® ADEO 2x4

Approvals & Certifications

Construction: Formed 20 gauge cold rolled steel housing. Highly reflective die-formed white painted reflector. Wiring access available on top of housing. Captive and hinged center lens swings open for room-side maintenance of lens, driver and LED boards.

Shielding: Co-extruded acrylic lens with ribbed side channels evenly illuminates the side reflector giving the appearance of a fully luminous aperture. Available with standard satine lens or optional clear lens with linear slot or round perf insert.

Mounting: Designed to install into acoustical grid and inaccessible ceilings. Specify G1, G9 or GS for acoustical grid ceiling. Specify FL for inaccessible ceilings. Grid retention clips integral to housing and require mechanical attachment. Tie off fixture to structure with retention wires. Maximum fixture weight is 28 lbs. - Surface Mount box adds 10 lbs

LED: 25°C test environment. Lumen output/wattage has a margin of +/- 5%. All luminaire configurations tested in accordance with IES LM-79. Diodes tested in accordance with IES LM-80. Minimum lifetime greater than 60,000 hours. L70 = 107,300 hours and L90 = 32,000 hours. MacAdam 3-Step Ellipses. Not all products are lighting facts listed. For all available IES files, please visit our website at pinnacle-ltg.com.

CRI, CCT & Output: Four lumen packages available. Low (LO), Medium (MO), High (HO) and Very High (VHO). Custom outputs are available. Specify custom lumens or watts between standard offering listed on Color Temperature & Output page. 80 CRI is available for 3000K, 3500K, and 4000K. 90 CRI is available for 2700K, 3000K, 3500K, and 4000K. 80 CRI = R9≥19 and 90 CRI = R9≥61.

Voltage: Universal (U), 120 volt (1), 277 volt (2) and 347 volt (3) options available. Must specify OL3 in Driver section when 347 volt (3) is selected. Some ADEO configurations will not accommodate all voltage options; consult with factory.

Driver: Standard Driver Option is Osram 0-10V, 10% = OL1. Electronic driver, Power factor is >0.9 with a THD <20%. Driver Lifetime: 50,000 hours at 25C ambient operating conditions. Ambient operating range: -20°F/-30°C to 91°F/33°C. For more driver options, see Pinnacle Resource Guide. Some ADEO configurations will not accommodate all driver options.

Circuiting: Select from single circuit (1), Emergency circuit (E) or Night Light circuit (N). Some ADEO configurations will not accommodate all circuiting options, consult with factory.

Battery & Emergency: Select battery or emergency options if required. If battery or emergency option is not required, enter 0. Battery duration is 90 minutes as standard. Test button is integral to fixture. For more Battery options, see Pinnacle Resource Guide.

Finish: Powder-coat white painted finish on exposed trim.
Controls: Specify PD1 for daylight sensor, requires 0-10v driver. Some ADEO configurations will not accommodate all control options, consult with factory.

Labels: UL and cUL Listed. LO, MO, HO and VHO lumen packages are IC Rated, approved for dry/damp location unless otherwise noted.

Fixture Weight: 28 lbs maximum

Buy American Act Compliant

Warranty: ADEO LED offered with a 5-year limited warranty. Covers LED, driver and fixture.

Specifications and dimensions subject to change without notice. Specification sheets that appear on pinnacle-ltg.com are the most recent version and supersede all other previously printed or electronic versions.

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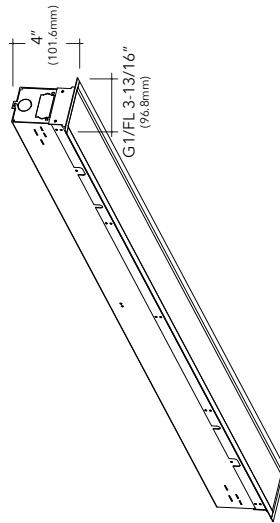


Project Name _____
Date _____ Type _____

P I N N A C L E
ARCHITECTURAL LIGHTING®
EDGE 2



**RECESSED
LINEAR
LUMINAIRE**



- Formed cold-rolled 20 gauge steel housing
- Highly reflective die-formed white painted steel reflector
- 5-year limited warranty covers LED, driver and fixture
- UL and cUL listed, IC rated
- Approved for dry/damp location unless otherwise noted
- Maximum fixture weight is 10lbs per 4ft fixture
- Room-Side Maintenance for LED system
- Buy American Act compliant

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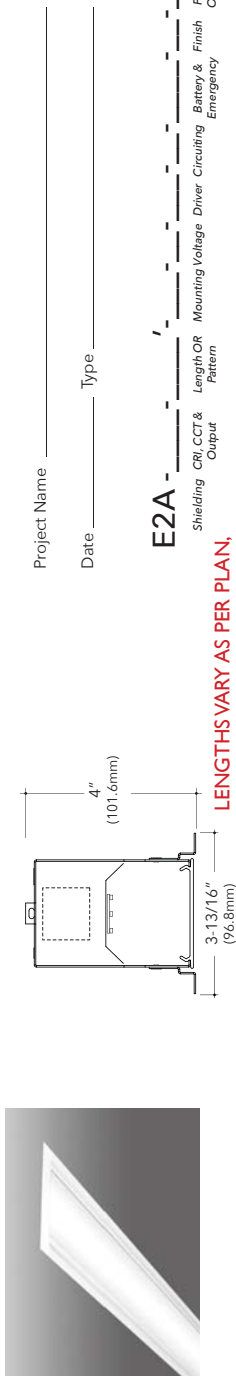
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P I N N A C L E ARCHITECTURAL LIGHTING® EDGE 2 Recessed Linear Luminaire



Project Name _____ Type _____
Date _____

E2A Shielding CR CCT & Length OR Mounting Voltage Driver Circulating Battery & Finish Fixture Controls
Output Pattern

Example Part #: E2A-827-8-G1G-U-OL1-1-0-W
LENGTHS VARY AS PER PLAN, FIELD VERIFY DIMENSIONS

SHIELDING <small>Pg. 3</small>	A Satine									More Options on Pg. 3
CR CCT & OUTPUT <small>Pg. 4</small>	E2A 27 2700K <small>Example: 827HO/5/8 = 80 CRI; 27 = 2700K; HO = High Output</small>	30 3000K	35 3500K	40 4000K	CL Custom Lumens	CW Custom Watts				Lumen Outputs, 80 & 90 CRI Pg. 4
LENGTH OR PATTERN <small>Pg. 5-6</small>	Individual Fixture - 2', 3', 4', 5', 6', 7', & 8'	Continuous Row to 1'	L.X. L Shape	R.X. Rectangle	S. Square	U.X. U-Shape				More Options on Pg. 5-6
MOUNTING <small>Pg. 7</small>	G1 1" T-Bar	G9 9/16" T-Bar	G5 Slotted T-Bar	FL Flanged	SF Spackle Flange	NF Flangeless				Details on Pg. 7
VOLTAGE <small>Pg. 8</small>	U Universal 0-120V, 100-277V	3 347V EE: TO VERIFY								Details on Pg. 8
DRIVER <small>Pg. 8</small>	OL1 Osram Dimming 0-10V, 10%	L Lutron Dimming	E eLdLED Dimming	P Philips Dimming						Details on Pg. 8
CIRCUITING <small>Pg. 9</small>	1 Single	M Multi	E Emergency entire fixture	N Nightlight entire fixture	EE: TO VERIFY					Details on Pg. 9
BATTERY & EMERGENCY <small>Pg. 10</small>	0 None	B # of Bodine 10W	J # of lota 10W EE: TO VERIFY							More Options on Pg. 10
FINISH <small>Pg. 11</small>	W Matte White	S Metallic Silver	BL Textured Black	BR Bronze	GR Graphite	CC Custom Color				Details on Pg. 11
FIXTURE OPTIONS <small>Pg. 11</small>	CP Chicago Plenum	PM Perimeter Mount	RC Rotating Crossbar							More Options on Pg. 11
CONTROLS <small>Pg. 12</small>	PD1 Philips Luxesense Daylight Sensor									More Options on Pg. 12

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LAMP: 8.6W/LF LED, Provided by Manufacturer, 3500K
DRIVER: Provided by Manufacturer, 0-10V Dimming Capable

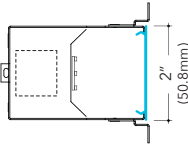
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P I N N A C L E
ARCHITECTURAL LIGHTING®
EDGE

E2A

Shielding



- White snap-in acrylic lens with matte finish, removable for maintenance
- Highly reflective die-formed white painted reflector
- Wiring access available on top of housing

Ordering Code
A
Satine Lens

SHIELDING

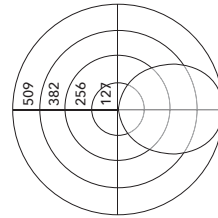
Photometrics

Satine Lens

Test # ITL&376
Catalog # E2A-840-4
Lumens 1372 lm
Watts 18.3 W
Efficacy 75 LPW

Candela Distribution

Vert. Angle	Horizontal Angle	0	22.5	45	67.5	90
0	509	509	509	509	509	509
5	506	506	506	506	506	506
10	498	497	497	496	496	496
15	490	482	482	481	479	479
20	468	462	464	460	457	457
25	445	438	438	435	433	433
30	417	410	410	406	404	404
35	387	380	379	376	373	373
40	353	348	347	342	341	341
45	318	314	312	308	307	307
50	284	281	280	276	275	275
55	244	241	240	238	237	237
60	206	204	203	202	201	201
65	168	166	167	165	165	165
70	129	129	130	129	129	129
75	93	94	93	94	93	93
80	59	60	59	60	60	60
85	28	29	28	28	28	28
90	0	0	0	0	0	0



Luminaire Data (cd/sq.m)

Angle In Degrees	Average O.Deg	Average 45-Deg	Average 90-Deg
45	5154	5057	4976
55	4875	4795	4735
65	4556	4529	4474
75	4118	4118	4118
85	3682	3682	3682

For all available IES files, please visit our website at pinnacle-igt.com. Photometry testing in accordance to IESNA-LM-79-08 at an NVLAP accredited testing laboratory. Testing conducted at 25°C ambient conditions. Specifications and dimensions subject to change without notice. Specification sheets that appear on pinnacle-igt.com are the most recent version and supersede all other previously printed or electronic versions.

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P I N N A C L E
ARCHITECTURAL LIGHTING®
EDGE

E2A-

CRI, CCT & Output

- 25°C test environment. Lumen output has a margin of +/- 5%.
- All luminaire configurations tested in accordance with IES LM-79
- Diodes tested in accordance with IES LM-80
- Minimum lifetime greater than 60,000 hours
- Lifetime Projection L70 = 115,850 hours and L90 = 34,500 hours
- LED binned within MacAdam 3-Step Ellipses
- Specify either 80 or 90 CRI
- 80 CRI = R9≥19 and 90 CRI = R9≥61

Custom Output- Lumens OR Wattage

Ordering Code
 CL _____ Specify CRI, CCT and desired lumens (i.e. CL835500) | Specify lumens between standard offering listed below. Lumens are specified per color temp
 CW _____ Specify CRI, CCT and desired wattage (i.e. CW9407) | Specify watts between standard offering listed below

80 CRI

	Color	Output	Watts	Shielding	
				A	Satine
830	3000K	Standard	4.6	327	171.5
830HO	3000K	High	8.6	608	70.7
835	3500K	Standard	4.6	337	73.7
835HO	3500K	High	8.6	625	72.7
840	4000K	Standard	4.6	343	75.0
840HO	4000K	High	8.6	637	74.1

90 CRI

927	2700K	Standard	4.6	259	56.6
927HO	2700K	High	8.6	480	55.8
930	3000K	Standard	4.6	302	66.0
930HO	3000K	High	8.6	560	65.1
935	3500K	Standard	4.6	303	66.2
935HO	3500K	High	8.6	562	65.3
940	4000K	Standard	4.6	306	66.9
940HO	4000K	High	8.6	569	66.2

CRI, CCT & OUTPUT



See Lighting Facts Spec Sheet for tables
Not all products are Lighting Facts listed

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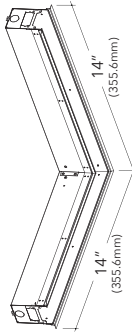
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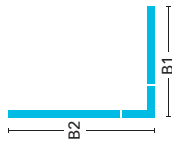
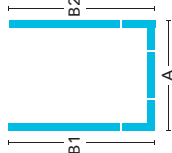
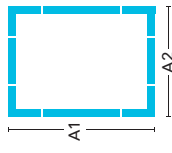
E2A

Pattern



- Specify pattern shape and overall dimensions (includes corner dimensions)
- Refer to dimensions table below for available standard lengths
- 90 degree corners are 14"x14"
- Angles and shapes not shown require Mod Pattern; consult factory
- For inside and outside corner patterns, consult factory

S.	Square Provide A dimension Example: 54" Nominal Lengths 4"x4" Actual Length- 4'4"x4'4"	R.X.	Rectangle Provide A1xA2 dimensions Example: R4"x8" Nominal lengths 4"x8" Actual Length- 4'4"x8'4"	U.X.X.	U-Shape Provide AxB1xB2 dimensions Example: U4"x8"x8" Nominal Lengths 4"x8"x8" Actual Length- 4'4"x8'2"x8'2"	L.X.	L-Shape Provide B1xB2 dimensions Example: L4"x8" Nominal Lengths 4"x8" Actual Length- 4'2"x8'2"	M	Mod Layout For patterns or lengths not shown or standard
-----------	---	-------------	--	---------------	---	-------------	--	----------	---



LENGTH OR
PATTERN

Ordering Code	Actual Length
4'	4'4"
5'	5'4"
6'	6'4"
7'	7'4"
8'	8'4"
Etc...	

Ordering Code	Actual Length
3'	3'2"
4'	4'2"
5'	5'2"
6'	6'2"
7'	7'2"
Etc...	

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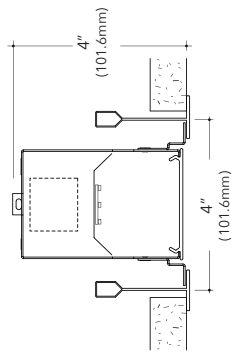
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P I N N A C L E
ARCHITECTURAL LIGHTING®
EDGE

E2A-

Mounting



Grid center to center spacing

- Specify G_G, FLF, SFS, NFN for individual, unjoinable units (individual units will fall on-grid)
- Specify G_ FL, SF, NF for continuous runs (runs designed to fall on-grid)
- All individual units cannot be joined, end trims are factory installed and cannot be removed
- Designed to install into acoustical grid and inaccessible ceilings
- Grid retention brackets integral to housing and require mechanical attachment
- Each housing contains 4 grid retention brackets
- Tie off fixture to structure with retention wires
- NF and NFN to be utilized for metal pan or millwork ceiling
- Approved for dry/damp location unless otherwise noted
- Maximum fixture weight is 10lbs per 4ft fixture

Ordering Code	Individual Unit	Continuous Run or Pattern	GSG GS	FLF FL	NFN NF	SFS SF	MOUNTING
G1G	1" (15/16") T-Bar		Bolt Slot & 9/16" T-Bar For 9/16" installations with tegular tile, fixture position will be flush to the bottom of the tile	Exposed Standard 1/2" Flange Detail	Metal Pan or Millwork	Drywall, Flangeless Detail	
G1	9/16" T-Bar For tegular tile installations, fixture position will not be flush to the bottom of the tile		Standard Tile	Standard Tile			
			Tegular Tile	Tegular Tile			
			Standard Tile	Standard Tile			

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F14



P I N N A C L E ARCHITECTURAL LIGHTING® EDGE

E2A

Voltage

- Some E2 configurations will not accommodate all voltage options; consult with factory

Ordering Code

U	Universal	120 to 277 volt
1	120 volt	
2	277 volt	
3	347 volt	0-10 volt dimming only; requires OL3 specification in Driver section of part number

Driver

- Standard Driver Option = OL1
- Electronic driver, Power factor is >0.9 with a THD <20%.
- Driver Lifetime: 50,000 hours at 25°C ambient operating conditions
- Ambient operating range: -20°F/-30°C to 81°F/27°C
- For more driver options see Pinnacle Resource Guide
- Some E2 configurations will not accommodate all driver options; consult with factory

OL1	Osram 0-10v, 10%	Standard driver option
OL3	Osram 347 volt, 0-10v, 10%	Requires 347V option in the Voltage section of the part number
EE1	eldLED ECOdrive 1%, 0-10v	Logarithmic Dimming
ED1	eldLED DUALdrive 0%, DALI	Logarithmic Dimming
ES1	eldLED SOLOdrive 0-10v, 0%	Logarithmic Dimming
PS1	Philips Advance Xitanium Step Dimming	50%/100%
PM1	Philips Advance Mark 10 5%, Line	120v or 277v required
LH1	Lutron Hi-lume EcoSystem, 1% Soft on, Fade-to-Black	Lutron-LDE1
LH3	Lutron Hi-lume 1%, 3-wire	Lutron-L3DA3W
L51	Lutron 5-Series 5%, EcoSystem Digital	Lutron-LDE5

VOLTAGE

DRIVER

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P I N N A C L E ARCHITECTURAL LIGHTING® EDGE

Approvals & Certifications

Construction Formed cold-rolled 20 gauge steel housing. Highly reflective die-formed white painted aluminum reflector.

Shielding Diffuse snap-in acrylic lens, removable for maintenance.

Mounting EDGE is designed to install into acoustical grid and inaccessible ceilings. Specify GXG, FLF, SFS, NFN for individual, unjoinable units (individual units will fall on-grid). Specify GX, FL, SF, NF for continuous runs (runs designed to fall on-grid). Consult factory for detailed installation instructions. Maximum fixture weight is 10lbs per 4' fixture.

LED 25°C test environment. Lumen output/wattage has a margin of +/- 5%. All luminaire configurations tested in accordance with IES LM-79. Diodes tested in accordance with IES LM-80. Minimum lifetime greater than 60,000 hours. Lifetime Projection L70 = 115,850 hours and L90 = 34,500 hours. MacAdam 3-Step Ellipses. Not all products are Lighting Facts listed. For all available IES files, please visit our website at pinnacle-ltg.com.

CRI, CCT & Lumen Output Two lumen packages available. Standard and High (HO). Custom outputs are available. Specify custom lumens or watts between standard offering listed on CRI, CCT & Output page. 80 CRI is available for 3000K, 3500K, and 4000K. 90 CRI is available for 2700K, 3000K, 3500K, and 4000K. 80 CRI = R9≥19 and 90 CRI = R9≥61.

Voltage Universal (U), 120 volt (1), 277 volt (2) and 347 volt (3) options available. Must specify OL3 in Driver section when 347 volt (3) is selected. Some EDGE configurations will not accommodate all voltage options; consult with factory.

Driver Standard Driver Option is Osram 0-10V, 10% = OL1. Electronic driver. Power factor is >0.9 with a THD <20%. Driver Lifetime: 50,000 hours at 25°C ambient operating conditions. Ambient operating range: -20°F/-30°C to 81°F/27°C. For more driver options, see Pinnacle Resource Guide. Some EDGE configurations will not accommodate all driver options.

Circuiting Select from single circuit (1), Emergency circuit (E) or Night Light circuit (N). Some EDGE configurations will not accommodate all circuiting options; consult with factory.

Battery & Emergency Select battery or emergency options if required. If battery or emergency option is not required, enter 0. Battery duration is 90 minutes as standard. Test button is remote to fixture. For more Battery options, see Pinnacle Resource Guide.

Finish Standard powder-coat textured white, metallic silver, textured black, graphite or bronze painted finish; consult factory for chip of standard paint finishes or for additional custom color and finish options.

Controls Specify PD for daylight sensor, requires 0-10v driver. Some EDGE configurations will not accommodate all control options; consult with factory.

Labels UL and cUL Listed. Standard and HO lumen packages are IC Rated, approved for dry/damp location unless otherwise noted.

Fixture Weight Maximum fixture weight is 10lbs per 4' fixture.

Buy American Act Compliant

Warranty EDGE LED offered with a 5-year limited warranty. Covers LED, driver and fixture.

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F14

CORNERS

Function Follows Form

Pinnacle Lighting's corner offering is limited only by your imagination. Accent architecture by wrapping light up walls, across ceilings and around corners to create unique design patterns. Combine horizontal, inside and outside corners with Edge and Edge Evolution products.

Recessed
Horizontal Corner



RECESSED HORIZONTAL CORNER (CH)

The 90 degree horizontal recessed corner allows for long lines of recessed lighting within a space. The recessed corner is specified as a CH (Corner Horizontal) unit. The adjoining fixtures are specified separately. Available on all recessed staggered and LED Edge Evolution (EV3, EV6) and Edge (E2, E4) products with the satine lens.



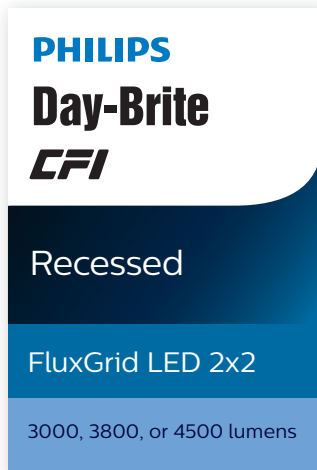
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Project: _____
 Location: _____
 Cat.No: _____
 Type: _____
 Lumens: _____ Qty: _____
 Notes: _____

The Philips Day-Brite / Philips CFI Recessed FluxGrid LED offers architectural appeal with “must have” features. Two different lens styles, discrete air handling, integral emergency, and access to the boards and driver from below make FluxGrid an ideal solution for a wide range of applications.

Ordering guide

Example: 2FGG38B840-2-D-UNV-DIM

Width	Family	Ceiling Type	Air Function	Lumens	Color	Length	Center Diffuser	Voltage	Driver	Options
2	FG	G				2				
2 2'	FG FluxGrid	G Grid	Blank ¹ Static H Air return	Standard Configurations 30L 3000 nominal delivered lumens 38L 3800 nominal delivered lumens 45L 4500 nominal delivered lumens Base Configurations 38B ¹ 3800 nominal delivered lumens	830 80 CRI, 3000K 835 ³ 80 CRI, 3500K 840 ³ 80 CRI, 4000K 850 80 CRI, 5000K	2 2'	D ¹ Diffuse (ribbed) DS ¹ Diffuse (smooth)	UNV ¹ Universal voltage 120-277V 120 ² 120V 277 ² 277V 347 347V	DIM ¹ 0-10V dimming SDIM Step dimming to 40% input power XDIM ³ MarkX phase dimming L3D ³ Lutron Hi-lume A 1% dimming LDE Lutron LDE5 5% dimming DALI DALI	F1 ¹ 3/8" flex, 3 wire 18 gauge 6' F2 ¹ 3/8" flex, 4 wire 18 gauge 6' F1/D ¹ 3/8" twin flex, 3 wire 18 gauge 6' for dimmable luminaires F2/5W ¹ 3/8" single flex, 5 wire 18 gauge 6' for dimmable luminaires F2/6W ¹ 3/8" single flex, 6 wire 18 gauge 6' for dimmable and EMLED luminaires GLR ¹ Fusing, fast blow EMLED ^{1,5} Integral emergency battery pack DAYOCC ⁴ Integral sensor, daylighting and occupancy, Philips EasySense SNS102 CHIC ¹ Chicago Plenum rated

Footnotes:

1. Base configurations available with noted options.
2. XDIM requires 120V or 277V specification.
3. Specify 38L or 45L lumen packages only.
4. Specify DIM driver option only with DAYOCC controls option. Dimming via wall switch.
5. Philips Bodine BSL310, 1100lm nominal delivered.

Accessories (order separately)

- FMA22 – 2x2" "F" mounting frame for NEMA "F" mounting
- FGD2L – FG 2' ribbed replacement lens
- FGD52L – FG 2' smooth replacement lens

Energy data

Luminaire	Catalog Number	Input Power	Efficacy
	2FGG30L840	27.1	112
2x2 Standard	2FGG38L840	33.4	110
	2FGG45L840	44.6	106
2x2 Base	2FGG42B840	33.6	114

PROVIDE WORKING SAMPLE/MOCK-UP FOR OWNER'S REVIEW AND APPROVAL OF FIXTURE BRIGHTNESS



<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 33.4W LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer, 0-10V Dimming Capable</p>	<p>F15</p>
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2FG Recessed FluxGrid LED 2x2

3000, 3800, or 4500 lumens

Application

- 3" deep low profile configuration provides minimal penetration into the plenum space
- Acrylic diffuser available in ribbed and smooth configurations provides even illumination with comfortable appeal
- Standard and base configurations available in multiple lumen packages to suit the needs of various applications
- Lambertian distribution creates uniform horizontal and vertical illumination on the work plane and reduces scalloping on the walls
- CRI 80 minimum color rendering with balanced spectrum
- LEDs coupled with standard dimming provide prolonged lumen maintenance. Optional integral sensors contribute further to LED lumen maintenance
- Designed for use with standard Grid (NEMA "G") or Narrow Grid (NEMA "NFG" ceiling T-bars. Drywall or plaster applications require use with the FMA24 "F" mounting frame accessory (sold and shipped separately)
- Continuous row mounting is possible with a 1" gap between fixtures accommodated by others

Enclosure

- Opal acrylic diffuser provides visually comfortable lumenance without compromise to luminaire efficacy.
- Diffuser requires no frames or fasteners and can be easily removed from below without the use of tools

Construction/Finish

- Uncomplicated design is 3" deep with minimal material overlap creating several benefits:
 - Less material required
 - Less packaging required
 - Reduced weight for ease of handling and transit
 - Less energy required for construction and assembly
 - More luminaires can be shipped per truck to reduce fuel consumption
- Metal side covers are die formed with a conical shape to enhance light distribution and visual aesthetic
- Injection molded lens retainers allow for easy, tool-free access to the LED boards and driver from below, and provide positive lens retention
- Luminaire finish is matte white polyester powder coat for high quality, durable finish
- T-bar grid clips are integral to the body
- Air return option provides air flow through a unique lens retainer design. Air passes through architectural forms in the lens retainers (each end), and through the end plate of the luminaire. A cover plate is provided to control air flow through the luminaire, or make it static as required
- Integral controls options include sensor mounted in one lens retainer. Controls are commissioned via intuitive Philips app on a Droid smartphone either through NFC or an IR blaster
- EMLED option requires the emergency battery pack be installed with a top side cover. Access from above

General notes

- All options are factory installed
- All accessories are field installed
- Many luminaire components, such as reflectors, refractors, lenses, sockets, lampholders, and LEDs are made from various types of plastics which can be adversely affected by airborne contaminants. If sulfur based chemicals, petroleum based products, cleaning solutions, or other contaminants are expected in the intended area of use, consult factory for compatibility

Electrical

- Integral sensor options for occupancy sensing and/or daylight harvesting are available for additional energy savings with no reduction of life or increase in installation labor
- Standard configurations provide up to 120 lumens per watt and are available with 5 lumen packages and 3000, 3500, 4000, and 5000K color temperatures
- Base configurations provide up to 124 lumens per watt and are available in 4200 lumen flux and 3500K and 4000K color temperatures
- LED boards are accessible from below by removal of the lens. Lens removal is tool-free by compressing the sides and pushing to one end
- LED driver is accessible from below by removal of the lens and integral wireway cover. The wireway cover is easily removed with a flat head screwdriver
- Other driver options including step dimming (SDIM, 100%/40%), DALI, phase dimming (XDIM), and Lutron are available
- Five year limited luminaire warranty includes LED boards and driver (emergency driver and batteries have a three year warranty in models so equipped). Visit www.philips.com/warranties for complete warranty information
- TM-21 predicted L70 lumen maintenance up to 85,000 hours
- cETLus listed to UL and CSA standards, suitable for damp locations
- FluxGrid luminaires are DesignLights Consortium qualified. Please see the DLC QPL list for exact catalog numbers (<http://www.designlights.org/QPL>)

DAYOCC

- Integrated fixture mount Philips EasySense sensor featuring daylight and PIR occupancy sensing
- Compatibility with Philips Advance Xitanium SR Sensor Ready LED drivers
- Features automatic or manual on/off scenarios for code compliance and to realize full energy savings potential
- Basic grouping to a wireless switch via an IR interface with the Philips Field App
- Self-powered single rocker switch Illumra #ZBT-SIAWH (sourced by others), up to 40 luminaires may be grouped to a single switch
- Register for the commissioning app at <http://registration.componentcloud.philips.com/appregistration/>
- For more information visit www.philips.com/EasySense

FluxGrid_LED_2x2 10/16 page 2 of 5

SBLD Studio

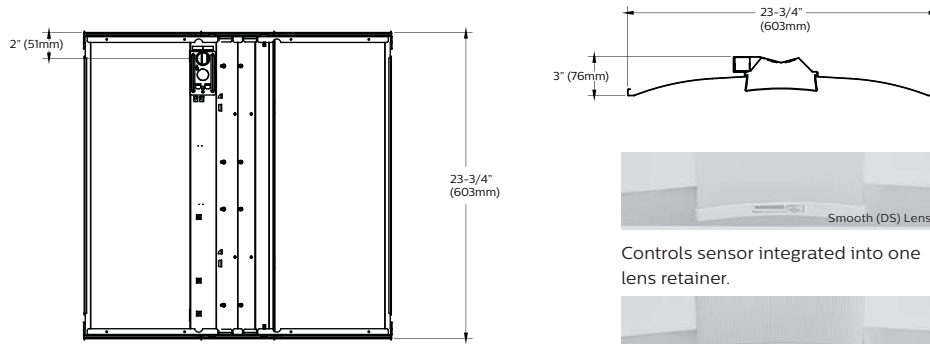
132 W 36th St.
NY, NY 10018
212.391.4230

F15

2FG Recessed FluxGrid LED 2x2

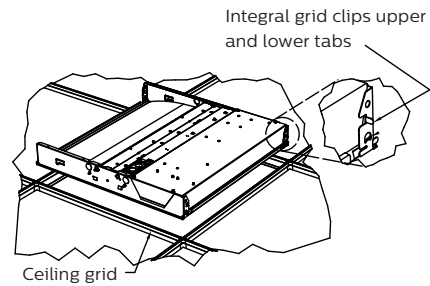
3000, 3800, or 4500 lumens

Dimensions



Controls sensor integrated into one lens retainer.

The air return option allows air to flow through vents in the lens retainers on each end. Air blades are provided on each end of the luminaire to control air flow to the plenum.



<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<h1>F15</h1>
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2FG Recessed FluxGrid LED 2x2

3000, 3800, or 4500 lumens

Photometry

2x2 FluxGrid recessed LED, base configuration, 3800 nominal delivered lumens

LER - 114

Catalog No. 2FGG38B840-2-D-UNV-DIM Test No. 36779 S/MH 1.2 Lamp Type LED Lumens 3828 Input Watts 34 Comparative yearly lighting energy cost per 1000 lumens – \$2.11 based on 3000 hrs. and 5.08 pwr KWH. The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology. Photometric values based on test performed in compliance with LM-79.	Candlepower <table border="1"> <thead> <tr> <th>Angle</th> <th>End</th> <th>45</th> <th>Cross</th> <th>Back-45</th> </tr> </thead> <tbody> <tr><td>0</td><td>1465</td><td>1465</td><td>1465</td><td>1465</td></tr> <tr><td>5</td><td>1444</td><td>1458</td><td>1460</td><td>1458</td></tr> <tr><td>15</td><td>1371</td><td>1377</td><td>1376</td><td>1377</td></tr> <tr><td>25</td><td>1227</td><td>1229</td><td>1240</td><td>1229</td></tr> <tr><td>35</td><td>1033</td><td>1052</td><td>1073</td><td>1052</td></tr> <tr><td>45</td><td>816</td><td>861</td><td>896</td><td>861</td></tr> <tr><td>55</td><td>599</td><td>666</td><td>718</td><td>666</td></tr> <tr><td>65</td><td>364</td><td>481</td><td>542</td><td>481</td></tr> <tr><td>75</td><td>181</td><td>277</td><td>332</td><td>277</td></tr> <tr><td>85</td><td>35</td><td>77</td><td>89</td><td>77</td></tr> </tbody> </table>	Angle	End	45	Cross	Back-45	0	1465	1465	1465	1465	5	1444	1458	1460	1458	15	1371	1377	1376	1377	25	1227	1229	1240	1229	35	1033	1052	1073	1052	45	816	861	896	861	55	599	666	718	666	65	364	481	542	481	75	181	277	332	277	85	35	77	89	77	Light Distribution <table border="1"> <thead> <tr> <th>Degrees</th> <th>Lumens</th> <th>% Luminaire</th> </tr> </thead> <tbody> <tr><td>0-30</td><td>1092</td><td>28.5</td></tr> <tr><td>0-40</td><td>1750</td><td>45.7</td></tr> <tr><td>0-60</td><td>3005</td><td>78.5</td></tr> <tr><td>0-90</td><td>3830</td><td>100</td></tr> <tr><td>0-180</td><td>3830</td><td>100</td></tr> </tbody> </table>	Degrees	Lumens	% Luminaire	0-30	1092	28.5	0-40	1750	45.7	0-60	3005	78.5	0-90	3830	100	0-180	3830	100	Average Luminance <table border="1"> <thead> <tr> <th>Zone</th> <th>End</th> <th>45'</th> <th>Cross</th> </tr> </thead> <tbody> <tr><td>45</td><td>14765</td><td>15577</td><td>16218</td></tr> <tr><td>55</td><td>13366</td><td>14854</td><td>16007</td></tr> <tr><td>65</td><td>11026</td><td>14550</td><td>16415</td></tr> <tr><td>75</td><td>8928</td><td>13683</td><td>16392</td></tr> <tr><td>85</td><td>5123</td><td>11304</td><td>13036</td></tr> </tbody> </table>	Zone	End	45'	Cross	45	14765	15577	16218	55	13366	14854	16007	65	11026	14550	16415	75	8928	13683	16392	85	5123	11304	13036																																									
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2x2 FluxGrid recessed LED, standard configuration, 3000 nominal delivered lumens

LER - 112

Catalog No. 2FGG30L840-2-D-UNV-DIM Test No. 36780 S/MH 1.2 Lamp Type LED Lumens 3023 Input Watts 27 Comparative yearly lighting energy cost per 1000 lumens – \$2.14 based on 3000 hrs. and 5.08 pwr KWH. The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology. Photometric values based on test performed in compliance with LM-79.	Candlepower <table border="1"> <thead> <tr> <th>Angle</th> <th>End</th> <th>45</th> <th>Cross</th> <th>Back-45</th> </tr> </thead> <tbody> <tr><td>0</td><td>1171</td><td>1171</td><td>1171</td><td>1171</td></tr> <tr><td>5</td><td>1154</td><td>1165</td><td>1166</td><td>1165</td></tr> <tr><td>15</td><td>1095</td><td>1099</td><td>1100</td><td>1099</td></tr> <tr><td>25</td><td>980</td><td>982</td><td>990</td><td>982</td></tr> <tr><td>35</td><td>825</td><td>840</td><td>858</td><td>840</td></tr> <tr><td>45</td><td>652</td><td>688</td><td>717</td><td>688</td></tr> <tr><td>55</td><td>447</td><td>497</td><td>555</td><td>497</td></tr> <tr><td>65</td><td>292</td><td>359</td><td>405</td><td>359</td></tr> <tr><td>75</td><td>144</td><td>222</td><td>266</td><td>222</td></tr> <tr><td>85</td><td>28</td><td>62</td><td>72</td><td>62</td></tr> </tbody> </table>	Angle	End	45	Cross	Back-45	0	1171	1171	1171	1171	5	1154	1165	1166	1165	15	1095	1099	1100	1099	25	980	982	990	982	35	825	840	858	840	45	652	688	717	688	55	447	497	555	497	65	292	359	405	359	75	144	222	266	222	85	28	62	72	62	Light Distribution <table border="1"> <thead> <tr> <th>Degrees</th> <th>Lumens</th> <th>% Luminaire</th> </tr> </thead> <tbody> <tr><td>0-30</td><td>873</td><td>28.9</td></tr> <tr><td>0-40</td><td>1398</td><td>46.2</td></tr> <tr><td>0-60</td><td>2381</td><td>78.7</td></tr> <tr><td>0-90</td><td>3024</td><td>100</td></tr> <tr><td>0-180</td><td>3024</td><td>100</td></tr> </tbody> </table>	Degrees	Lumens	% Luminaire	0-30	873	28.9	0-40	1398	46.2	0-60	2381	78.7	0-90	3024	100	0-180	3024	100	Average Luminance <table border="1"> <thead> <tr> <th>Zone</th> <th>End</th> <th>45'</th> <th>Cross</th> </tr> </thead> <tbody> <tr><td>45</td><td>11803</td><td>12452</td><td>12964</td></tr> <tr><td>55</td><td>9978</td><td>11082</td><td>12387</td></tr> <tr><td>65</td><td>8831</td><td>10868</td><td>12264</td></tr> <tr><td>75</td><td>7133</td><td>10950</td><td>13125</td></tr> <tr><td>85</td><td>4081</td><td>9131</td><td>10540</td></tr> </tbody> </table>	Zone	End	45'	Cross	45	11803	12452	12964	55	9978	11082	12387	65	8831	10868	12264	75	7133	10950	13125	85	4081	9131	10540																																									
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SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230	<h1>F15</h1>
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2FG Recessed FluxGrid LED 2x2

3000, 3800, or 4500 lumens

Photometry

2x2 FluxGrid recessed LED, standard configuration, 3800 nominal delivered lumens

LER - 110

Catalog No. 2FGG38L840-2-D-UNV-DIM Test No. 36781 S/MH 1.2 Lamp Type LED Lumens 3682 Input Watts 33 Comparative yearly lighting energy cost per 1000 lumens – \$2.18 based on 3000 hrs. and \$ 08 pwr KWH. The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology. Photometric values based on test performed in compliance with LM-79.	Candlepower <table border="1"> <thead> <tr> <th>Angle</th> <th>End</th> <th>45</th> <th>Cross</th> <th>Back-45</th> </tr> </thead> <tbody> <tr><td>0</td><td>1419</td><td>1419</td><td>1419</td><td>1419</td></tr> <tr><td>5</td><td>1398</td><td>1411</td><td>1414</td><td>1411</td></tr> <tr><td>15</td><td>1326</td><td>1333</td><td>1333</td><td>1333</td></tr> <tr><td>25</td><td>1187</td><td>1191</td><td>1200</td><td>1191</td></tr> <tr><td>35</td><td>998</td><td>1019</td><td>1039</td><td>1019</td></tr> <tr><td>45</td><td>790</td><td>834</td><td>868</td><td>834</td></tr> <tr><td>55</td><td>580</td><td>644</td><td>695</td><td>644</td></tr> <tr><td>65</td><td>353</td><td>434</td><td>491</td><td>434</td></tr> <tr><td>75</td><td>174</td><td>268</td><td>321</td><td>268</td></tr> <tr><td>85</td><td>33</td><td>76</td><td>85</td><td>76</td></tr> </tbody> </table>	Angle	End	45	Cross	Back-45	0	1419	1419	1419	1419	5	1398	1411	1414	1411	15	1326	1333	1333	1333	25	1187	1191	1200	1191	35	998	1019	1039	1019	45	790	834	868	834	55	580	644	695	644	65	353	434	491	434	75	174	268	321	268	85	33	76	85	76	Light Distribution <table border="1"> <thead> <tr> <th>Degrees</th> <th>Lumens</th> <th>% Luminaire</th> </tr> </thead> <tbody> <tr><td>0-30</td><td>1057</td><td>28.7</td></tr> <tr><td>0-40</td><td>1694</td><td>46</td></tr> <tr><td>0-60</td><td>2903</td><td>78.8</td></tr> <tr><td>0-90</td><td>3683</td><td>100</td></tr> <tr><td>0-180</td><td>3683</td><td>100</td></tr> </tbody> </table>	Degrees	Lumens	% Luminaire	0-30	1057	28.7	0-40	1694	46	0-60	2903	78.8	0-90	3683	100	0-180	3683	100	Average Luminance <table border="1"> <thead> <tr> <th>Zone</th> <th>End</th> <th>45'</th> <th>Cross</th> </tr> </thead> <tbody> <tr><td>45</td><td>?</td><td>?</td><td>?</td></tr> <tr><td>55</td><td>?</td><td>?</td><td>?</td></tr> <tr><td>65</td><td>?</td><td>?</td><td>?</td></tr> <tr><td>75</td><td>?</td><td>?</td><td>?</td></tr> <tr><td>85</td><td>?</td><td>?</td><td>?</td></tr> </tbody> </table>	Zone	End	45'	Cross	45	?	?	?	55	?	?	?	65	?	?	?	75	?	?	?	85	?	?	?																																																																							
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2x2 FluxGrid recessed LED, standard configuration, 4500 nominal delivered lumens

LER - 106

Catalog No. 2FGG45L840-2-D-UNV-DIM Test No. 36782 S/MH 1.2 Lamp Type LED Lumens 4704 Input Watts 45 Comparative yearly lighting energy cost per 1000 lumens – \$2.26 based on 3000 hrs. and \$08 pwr KWH. The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology. Photometric values based on test performed in compliance with LM-79.	Candlepower <table border="1"> <thead> <tr> <th>Angle</th> <th>End</th> <th>45</th> <th>Cross</th> <th>Back-45</th> </tr> </thead> <tbody> <tr><td>0</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td></tr> <tr><td>5</td><td>1774</td><td>1791</td><td>1794</td><td>1791</td></tr> <tr><td>15</td><td>1684</td><td>1691</td><td>1692</td><td>1691</td></tr> <tr><td>25</td><td>1507</td><td>1512</td><td>1523</td><td>1512</td></tr> <tr><td>35</td><td>1268</td><td>1294</td><td>1319</td><td>1294</td></tr> <tr><td>45</td><td>1003</td><td>1058</td><td>1103</td><td>1058</td></tr> <tr><td>55</td><td>736</td><td>818</td><td>882</td><td>818</td></tr> <tr><td>65</td><td>447</td><td>590</td><td>666</td><td>590</td></tr> <tr><td>75</td><td>221</td><td>340</td><td>407</td><td>340</td></tr> <tr><td>85</td><td>42</td><td>96</td><td>108</td><td>96</td></tr> </tbody> </table>	Angle	End	45	Cross	Back-45	0	1800	1800	1800	1800	5	1774	1791	1794	1791	15	1684	1691	1692	1691	25	1507	1512	1523	1512	35	1268	1294	1319	1294	45	1003	1058	1103	1058	55	736	818	882	818	65	447	590	666	590	75	221	340	407	340	85	42	96	108	96	Light Distribution <table border="1"> <thead> <tr> <th>Degrees</th> <th>Lumens</th> <th>% Luminaire</th> </tr> </thead> <tbody> <tr><td>0-30</td><td>1342</td><td>28.5</td></tr> <tr><td>0-40</td><td>2150</td><td>45.7</td></tr> <tr><td>0-60</td><td>3692</td><td>78.4</td></tr> <tr><td>0-90</td><td>4706</td><td>100</td></tr> <tr><td>0-180</td><td>4706</td><td>100</td></tr> </tbody> </table>	Degrees	Lumens	% Luminaire	0-30	1342	28.5	0-40	2150	45.7	0-60	3692	78.4	0-90	4706	100	0-180	4706	100	Average Luminance <table border="1"> <thead> <tr> <th>Zone</th> <th>End</th> <th>45'</th> <th>Cross</th> </tr> </thead> <tbody> <tr><td>45</td><td>18141</td><td>19143</td><td>19949</td></tr> <tr><td>55</td><td>16417</td><td>18253</td><td>19674</td></tr> <tr><td>65</td><td>13545</td><td>17871</td><td>20175</td></tr> <tr><td>75</td><td>10900</td><td>16807</td><td>20115</td></tr> <tr><td>85</td><td>6210</td><td>14034</td><td>15825</td></tr> </tbody> </table>	Zone	End	45'	Cross	45	18141	19143	19949	55	16417	18253	19674	65	13545	17871	20175	75	10900	16807	20115	85	6210	14034	15825																																																																							
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Philips Lighting North America Corporation
200 Franklin Square Drive, Somerset, NJ 08873
Tel. 855-486-2216

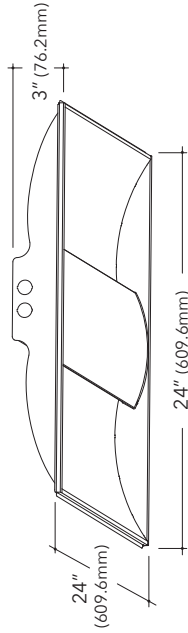
Philips Lighting Canada Ltd.
281 Hillmount Rd, Markham, ON, Canada L6C 2S3
Tel. 800-668-9008

Project Name _____
Date _____ Type _____

P I N N A C L E
ARCHITECTURAL LIGHTING®
ADEO 2x2



**ARCHITECTURAL
RECESSED
LUMINAIRE**



- Formed 20 gauge cold rolled steel housing
- Highly reflective die-formed white painted reflector
- Wiring access available on top of housing
- LED offered with a 5-year limited warranty. Covers LED, driver and fixture
- UL and cUL Listed, LO, MO, and HO lumen packages are IC Rated
- Approved for dry/damp location unless otherwise noted
- Maximum fixture weight is 15 lbs - Surface Mount Box adds 10 lbs
- Room-Side Maintenance for LED system
- Buy American Act compliant



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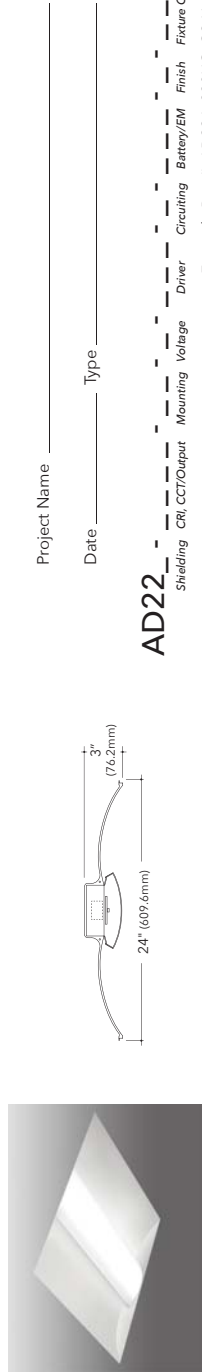
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AD22_LED_SPEC_APR2017

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P I N N A C L E ARCHITECTURAL LIGHTING®
ADEO 2x2 Architectural Recessed Luminaire



Project Name _____
Date _____ Type _____

AD22 --- Shielding --- CCT/Output --- Mounting --- Voltage --- Driver --- Circulating --- Battery/EM --- Finish --- Fixture Options --- Controls
Example Part #: AD22A-830HO-G9-U-OL1-1-0-W-FW6

SHIELDING Pg. 3	A Satine Lens	R Round Perf	L Linear Perf	Details on Pg. 3
CRI, CCT & OUTPUT Pg. 4	AD22 -27 2700K	30 3000K	35 3500K	Lumen Outputs, 80 & 90 CRI Pg. 4
MOUNTING Pg. 5	G1 1" Grid	G9 9/16" Grid	G5 Screw Slot Grid	CW Custom Watts
VOLTAGE Pg. 6	U Universal (120 thru 277V)	3 347 Volt	FL Flanged	S Surface Mount
DRIVER Pg. 6	OL1 Osram Dimming 0-10V, 10%	L Lutron Dimming	E eLdLED Dimming	Details on Pg. 6
CIRCUITING Pg. 7	1 Single Circuit	E Emergency Circuit entire fixture	N Night Light entire fixture	Details on Pg. 6
BATTERY & EMERGENCY Pg. 7	0 None	1B Bodine 10W Integral	1I iota 10W Integral	More Options on Pg. 7
FINISH Pg. 8	W White	CP Chicago Plenum	AR Air Return	More Options on Pg. 7
FIXTURE OPTIONS Pg. 8	QS QuickShip	FW6 6' Flexwhip	GLR GLR Fusing	Details on Pg. 8
CONTROLS Pg. 9	PD1 Philips Luxsense DS	AR Air Return	GLR GLR Fusing	More Options on Pg. 8

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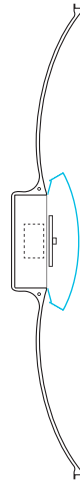
<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 41.7W LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer, 0-10V Dimming Capable</p>	<p>F I 5 Alt.</p>
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ADEO

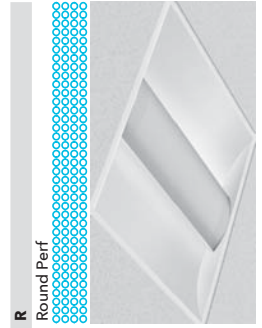
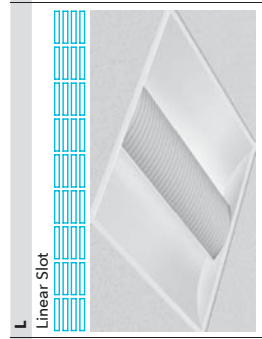
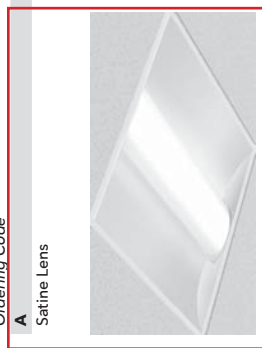
AD22

Shielding



- Captive and hinged center lens
- Co-extruded acrylic lens with ribbed side channels evenly illuminates the side reflector giving the appearance of a fully lensed luminaire
- Highly reflective die-formed white painted reflector
- Wiring access available on top of housing

Ordering Code

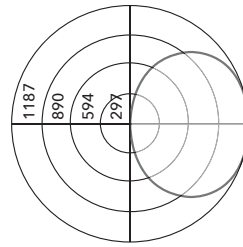


SHIELDING

Photometrics
AD22A

Satinne Lens

Test #: IT1089941
Part #: AD22A-840MO
Total Lumens: 3635 lm
Total Watts: 30.9 W
Efficacy: 118 LPW



Candela Distribution

Vert. Angle	Horizontal Angle	
	0	22.5
0	1187	1187
5	1183	1184
10	1170	1169
15	1146	1144
20	1109	1108
25	1061	1062
30	1006	1007
35	941	945
40	868	878
45	791	798
50	706	716
55	618	630
60	525	540
65	429	447
70	332	351
75	234	257
80	144	165
85	65	80
90	0	0

Luminaire Data (cd/sq.m)

Angle in Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	3266	3373	3485
55	3146	3339	3507
65	2964	3309	3606
75	2659	3339	3959
85	2177	3383	4187

For all available IES files, please visit our website at pinnacle-igt.com. Photometry testing in accordance to IESNA-LM-79-08 at an NVLAP accredited testing laboratory. Testing conducted at 25°C ambient conditions. Specifications and dimensions subject to change without notice. Specification sheets that appear on pinnacle-igt.com are the most recent version and supersede all other previously printed or electronic versions.

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ADEO

AD22

CRI, CCT & Output

- 25° C test environment. Lumen output has a margin of +/- 5%
- All luminaire configurations tested in accordance with IES LM-79
- Diodes tested in accordance with IES LM-80
- Minimum lifetime greater than 60,000 hours
- Lifetime Projections: L70 = 107,300 hours and L90 = 32,000 hours
- LED binned within MacAdam 3-Step Ellipses
- Specify either 80 or 90 CRI below
- 80 CRI = R9≥19 and 90 CRI = R9≥61

Custom Output- Lumens OR Wattage

CL _____ Specify CRI, CCT and desired lumens (i.e. CL8351200) | Specify lumens between standard offering listed below. Lumens are specified per color temp
 CW _____ Specify CRI, CCT and desired wattage (i.e. CW94015) | Specify watts between standard offering listed below

80 CRI

Color	Output	Watts	Shielding		L		R	
			A Satine Lens Lumens	LPW	Linear Slot Lumens	LPW	Round Perf Lumens	LPW
830LO	3000K Low	19.6	2131	108.7	1266	64.6	1082	55.2
830MO	3000K Middle	30.9	3332	107.8	1979	64.0	1692	54.8
830HO	3000K High	41.7	4311	103.4	2561	61.4	2190	52.5
835LO	3500K Low	19.6	2190	111.7	1301	66.4	1113	56.8
835MO	3500K Middle	30.9	3424	110.8	2034	65.8	1739	56.3
835HO	3500K High	41.7	4431	106.3	2632	63.1	2251	54.0
840LO	4000K Low	19.6	2328	118.8	1383	70.6	1183	60.3
840MO	4000K Middle	30.9	3635	117.6	2160	69.9	1845	59.7
840HO	4000K High	41.7	4713	113.0	2800	67.1	2394	57.4

90 CRI

927LO	2700K Low	19.6	1867	95.3	1109	56.6	948	48.4
927MO	2700K Middle	30.9	2915	94.3	1732	56.0	1481	47.9
927HO	2700K High	41.7	3780	90.6	2245	53.8	1920	46.0
930LO	3000K Low	19.6	1963	100.2	1166	59.5	997	50.9
930MO	3000K Middle	30.9	3069	99.3	1823	59.0	1559	50.5
930HO	3000K High	41.7	3971	95.2	2359	56.6	2017	48.4
935LO	3500K Low	19.6	1969	100.5	1170	59.7	1000	51.0
935MO	3500K Middle	30.9	3079	99.6	1829	59.2	1564	50.6
935HO	3500K High	41.7	3984	95.5	2366	56.8	2024	48.5
940LO	4000K Low	19.6	2077	106.0	1234	62.9	1055	53.8
940MO	4000K Middle	30.9	3243	105.0	1926	62.3	1647	53.3
940HO	4000K High	41.7	4204	100.8	2497	59.9	2136	51.2

CRI, CCT
& OUTPUT



See Lighting Facts Spec Sheet for tables
Not all products are Lighting Facts listed

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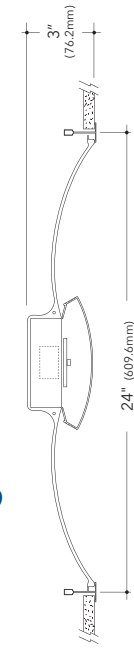
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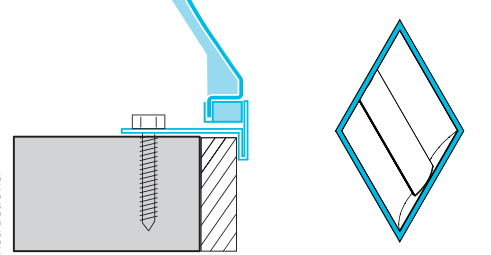
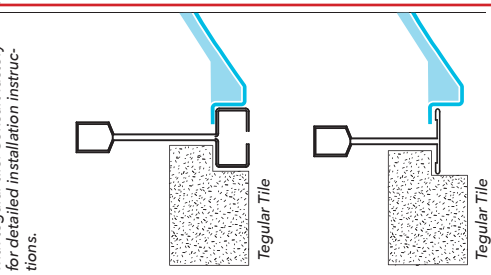
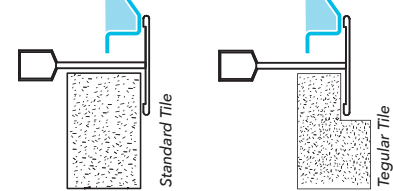
AD22

Mounting



- Designed to install into acoustical grid and inaccessible ceilings
- Grid retention clips integral to housing and require mechanical attachment
- Tie off fixture to structure with retention wires
- Maximum fixture weight is 15 lbs - Surface Box adds 10 lbs
- Refer to installation instructions during installation at the job site
- Approved for dry/damp location unless otherwise noted

MOUNTING	
G1	1" Grid Mount Works with 15/16" grid ceiling types. See profile for fixture position in relation to ceiling grid and tile.
G9	9/16" Grid Mount Works with 9/16" grid ceiling type. For regular tile installations, fixture position will not be flush to the bottom of the tile. See regular tile profile image below.
GS	Screw Slot Mounting Works with screw slot, bolt slot and 9/16" grid ceiling types. For 9/16" installations with regular tile, fixture position will be flush to the bottom of the tile. See bottom profile image of 9/16" with regular tile. Consult factory for detailed installation instructions.
FL	Flange Kit A separate flange kit is supplied for installations into inaccessible or drywall applications. Flange kit ships from factory uninstalled separately from fixture. Consult factory for detailed installation instructions.
S	Surface Mount Utilize for hard lid ceiling applications. The 20 gauge steel frame easily secures to ceiling.



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ADEO 2x2

AD22

Voltage

- Some ADEO configurations will not accommodate all voltage options; consult with factory

Ordering Code

U	Universal	120 to 277 volt
1	120 volt	
2	277 volt	
3	347 volt	0-10 volt dimming only; must specify OL3 under Driver section of part number

Driver

- Standard Driver Option = OL1
- Electronic driver, power factor is >0.9 with a THD <20%
- Driver Lifetime: 50,000 hours at 25C ambient operating conditions
- Ambient operating range: -20°F/-30°C to 91°F/33°C
- For more Driver options, see Pinnacle Resource Guide
- Some ADEO configurations will not accommodate all driver options; consult with factory

OL1	Osram 0-10v, 10%	Standard driver option
OL3	Osram 347 volt, 0-10v, 10%	Requires 347V option in the Voltage section of the part number
LH1	Lutron Hi-lume EcoSystem, 1% Soft on, Fade-to-Black	Lutron-LDE1
LS1	Lutron 5-Series 5%, EcoSystem Digital	Lutron-LDE5
EE1	eldoLED ECOdrive 1%, 0-10v	Logarithmic Dimming
ED1	eldoLED DUALdrive 0%, DALI	Logarithmic Dimming
ES1	eldoLED SOLOdrive 0-10v, 0%	Logarithmic Dimming
PS1	Philips Advance Xitanium Step Dimming	50%/100%
PM1	Philips Advance Mark 10 5%, Line	120v or 277v required

VOLTAGE

DRIVER

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ADEO 2x2

Approvals & Certifications

Construction: Formed 20 gauge cold rolled steel housing. Highly reflective die-formed white painted reflector. Wiring access available on top of housing. Captive and hinged center lens swings open for room-side maintenance of lens, driver and LED boards.

Shielding: Co-extruded acrylic lens with ribbed side channels evenly illuminates the side reflector giving the appearance of a fully luminous aperture. Available with standard satine lens or optional clear lens with linear slot or round perf insert.

Mounting: Designed to install into acoustical grid and inaccessible ceilings. Specify G1, G9 or GS for acoustical grid ceiling. Specify FL for inaccessible ceilings. Grid retention clips integral to housing and require mechanical attachment. Tie off fixture to structure with retention wires. Maximum fixture weight is 15 lbs. - Surface Mount box adds 10 lbs

LED: 25°C test environment. Lumen output/wattage has a margin of +/- 5%. All luminaire configurations tested in accordance with IES LM-79. Diodes tested in accordance with IES LM-80. Minimum lifetime greater than 60,000 hours. L70 = 107,300 hours and L90 = 32,000 hours. MacAdam 3-Step Ellipses. Not all products are lighting facts listed. For all available IES files, please visit our website at pinnacle-ltg.com.

CRI, CCT & Output: Three lumen packages available. Low (LO), Medium (MO) and High (HO). Custom outputs are available. Specify custom lumens or watts between standard offering listed on Color Temperature & Output page. 80 CRI is available for 3000K, 3500K, and 4000K. 90 CRI is available for 2700K, 3000K, 3500K, and 4000K. 80 CRI = R9≥19 and 90 CRI = R9≥61.

Voltage: Universal (U), 120 volt (1), 277 volt (2) and 347 volt (3) options available. Must specify OL3 in Driver section when 347 volt (3) is selected. Some ADEO configurations will not accommodate all voltage options; consult with factory.

Driver: Standard Driver Option is Osram 0-10V, 10% = OL1. Electronic driver, Power factor is >0.9 with a THD <20%. Driver Lifetime: 50,000 hours at 25°C ambient operating conditions. Ambient operating range: -20°F/-30°C to 91°F/33°C. For more driver options, see Pinnacle Resource Guide. Some ADEO configurations will not accommodate all driver options.

Circuiting: Select from single circuit (1), Emergency circuit (E) or Night Light circuit (N). Some ADEO configurations will not accommodate all circuiting options, consult with factory.

Battery & Emergency: Select battery or emergency options if required. If battery or emergency option is not required, enter 0. Battery duration is 90 minutes as standard. Test button is integral to fixture. For more Battery options, see Pinnacle Resource Guide.

Finish: Powder-coat white painted finish on exposed trim.
Controls: Specify PD1 for daylight sensor, requires 0-10v driver. Some ADEO configurations will not accommodate all control options, consult with factory.

Labels: UL and cUL Listed. LO, MO, and HO lumen packages are IC Rated, approved for dry/damp location unless otherwise noted.

Fixture Weight: 15 lbs maximum

Buy American Act Compliant

Warranty: ADEO LED offered with a 5-year limited warranty. Covers LED, driver and fixture.

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F I 5 Alt.



Project: _____
 Location: _____
 Cat.No: _____
 Type: _____
 Lamps: _____ Qty: _____
 Notes: _____

Philips Day-Brite / Philips CFI LINC LED undercabinets enable flexibility to suit the needs of many applications including office, healthcare, educational, and residential. The state of the art LED system provides high resolution lighting with excellent color rendering for high visual acuity on the task plane. The modular design allows field application of control options and continuous connectivity for ease of configuration and installation. LINC LED is an ideal choice where high performing undercabinet lighting is specified.

Ordering guide

Example: LINC100EL28935UNVWHGDM

Family	Length	Color	Voltage	Finish	Driver	Options
LINC100E					DIM	
LINC100E LINC LED Energy Star	L10 10" L19 19" L28 28"	930 3000K, 90 CRI 935 3500K, 90 CRI	UNV Universal Voltage 120-277V 120 120V 277 277V	WHG White Glossy MB Matte Black SA Satin Aluminum SWH Antimicrobial White	DIM Trailing edge phase dimming (ELV)	CSJT3 ^{1,2} SJT cord set hard-wired into back of fixture. UL listed as a portable fixture for use in office workstations (120V only) OSC ^{3,4} Integral occupancy sensor control for UNV linking OSHL ^{3,4} Integral occupancy sensor control for UNV, hard wired RSW ^{4,5} Rocker switch (on/off) for linked input power, controls only this fixture RSL ^{4,5} Rocker switch for hard linked input power, controls fixtures in the linked circuit RSH ^{4,5} Rocker switch for hard wired input power, controls only this fixture RSHL ^{4,5} Rocker switch for hard wired input power, controls fixtures in linked circuit SBF Slow blow fuse

Accessories (order separately)

Specify Qty of Connectors Needed

QTY: _____	LINC1001 ⁶	Wiring module
QTY: _____	LINC1001RSW ⁶	Wiring module with rocker switch
QTY: _____	LINC1002CO ^{2,6}	Wiring module with duplex outlet
QTY: _____	LINC100PC3W	3' Straight power cord, white
QTY: _____	LINC100PC6W	6' Straight power cord, white
QTY: _____	LINC100ICSW	6" Straight interconnect cord, white

Note: Power cords plug into left end of the luminaires.

Notes

- LINC fixtures with CSJT3 option can not be modularly connected.
- 120V only.
- OSC is not available with LINC100EL10.
- See controls table page 3.
- Specify 120V or 277V only.
- Specify voltage and finish for these accessories. Include voltage and finish codes from catalog matrix after "1" or "2", i.e. LINC1001120WHGRSW.



<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 3.12W/LF LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer, ELV Dimming Capable</p>	<p>F16</p>
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LINCS100E LINCS LED undercabinet

10", 19", or 28" lengths

Features

- Miniature 1" deep profile
- Modular design with accommodating accessories for ease of installation and flexibility in the field.
- Optional wiring module with master on/off switch, duplex convenience outlet, or occupancy sensor
- Extruded aluminum design is durable, lightweight and corrosion resistant
- Available in a white, black, satin aluminum, or antimicrobial white

Specifications

- **Construction:** .060" extruded aluminum housing with injection molded polycarbonate endcaps and covers.
- **Reflector and Lens:** Acrylic textured lens to minimize lamp image on task surface.

- **Finish:** LINCS is available in either a white or black polyester powder-coat paint finish. In addition, LINCS can be selected with an anodized satin aluminum finish. Standard white painted and antimicrobial finishes have matching white end caps. Black endcaps are provided with the black painted or satin aluminum finishes.

- **Lamps:** LINCS is supplied with high efficiency LEDs with a color temperature of 3000K or 3500K and 90 CRI. 70% of initial illumination at 50,000 hours at 25°C ambient. The LED board is field replaceable.

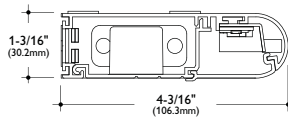
- **Listings:** cETLus Listed for direct-wire or portable installations. Damp rated. Energy Star® certified.

- **Electrical:** Luminaires are supplied with an integral, electronic Class "A" LED driver for 120V to 277V applications. Optional passive infrared occupancy sensor control (OSC) available.

- **Installation:** LINCS include male and female grounded connectors on each end to allow power conductivity with linking connector cord accessories. A UL recognized 3/8" flexible metal conduit/non-metallic sheathed wiring connector is supplied with the luminaire for direct-wiring into knockout in the back of the housing or through adapter plate at the left end. LINCS100-L19 and LINCS100-L28 models have a wiring access panel with a knockout to allow quick wiring of the first luminaire without opening the wireway cover. For portable installations, the LINCS100PC power cord plugs directly into the left end of the luminaire. It is not recommended that LINCS be plugged into a GFCI receptacle.

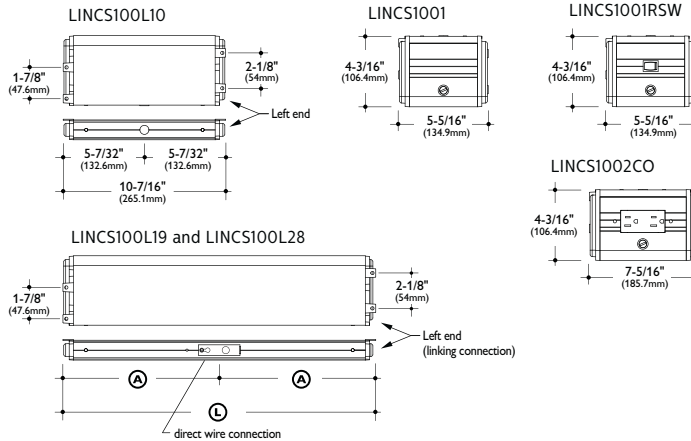
- **Warranty:** All luminaire components (except for the LED board and driver) are warranted against defects during the life of the original installation. The LED board and driver are warranted for 5 years from date of manufacture. Visit www.philips.com/warranties for complete warranty information.

Dimensional Data



Installation Notes:

- (1) End-plate supplied to allow direct wiring into left end
- When row mounting, allow 1" at end of a run connection of last fixture
- When using power cord, allow 3" at start of run
- Subtract 7/16" for each end-cover removed in row mount applications.



DIMENSION	L	A
LINCS100L19	19-1/4" (489.0mm)	9-5/8" (244.5mm)
LINCS100L28	28-1/16" (712.8mm)	14-1/32" (356.4mm)

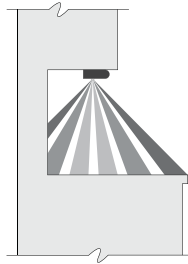
LINCS100E LINCS LED undercabinet

10", 19", or 28" lengths

Controls

Option Code	Description	Voltage	Wiring Type	Control		
				Single Fixture	All In Circuit	Linked Thru Power
OSC (standard)	Integral Occ Sensor - Linked Input Power, Linked Control	UNV	Linked		X	X
OSHL	Integral Occ Sensor - Hard Wired Power, Linked Control	UNV	Hard Wired		X	X
RSW (standard)	Rocker Switch - Linked Input Power	120V or 277V	Linked	X		X
RSL	Rocker Switch - Linked Input Power, Linked Control	120V or 277V	Linked		X	X
RSH	Rocker Switch - Hard Wired Power	120V or 277V	Hard Wired	X		X
RSHL	Rocker Switch - Hard Wired Power, Linked Control	120V or 277V	Hard Wired		X	X

Wiring Type Describes whether power is linked to the left side of the fixture, or direct wired to the back of the fixture.
Control - Single Fixture The integrated device controls only this single fixture.
Control - All in Circuit The integrated device controls this fixture and all adjacent fixtures (i.e. the thru power is controlled from this fixture).
Linked Thru Power Power is linked to adjacent fixtures via the LINCS connectors.



Integral occupancy sensor control (OSC)
 The OSC has a passive infrared occupancy (PIR) that has a field-adjustable time delay that can be set for 30 sec., 10 min., 20 min., or 30 min. Connect building power to the LINCS luminaire with the OSC. All additional luminaires interconnected to that luminaire will be controlled by the single OSC.

Electrical Data			
Model	LINCS L10	LINCS L19	LINCS L28
Fix. Watts	2.5	4.9	7.3
Total Fix. Lumens	175	391	594
Max. Amps	.02	.04	.06

Maximum of 6 total amps when row mounting.

LINCS100E LINCS LED undercabinet

10", 19", or 28" lengths

Photometry

LINCS LED 10" 3000K

LER - 73

Catalog No.	LINCS100E-L10-930-UNV-WHG-DIM	Candlepower				Light Distribution			Average Luminance			
		Angle	End	45	Cross	Degrees	Lumens	% Luminaire	Angle	End	45'	Cross
Test No.	35770	0	79	79	79	0-30	59	32.1	45	7476	7933	7358
S/MH	1.2	5	80	80	79	0-40	93	50.6	55	6547	6985	6276
Lamp Type	LED	15	76	77	75	0-60	150	81.9	65	5886	6311	5207
Lumens	184	25	69	70	67	0-90	183	99.9	75	5915	6192	4529
Input Watts	3	35	58	59	56	0-180	184	100.0	85	9331	9331	4803
		45	44	47	44	Coefficients of Utilization						
		55	31	34	30	EFFECTIVE FLOOR CAVITY REFLECTANCE 20 PER (pfc-0.20)						
		65	21	22	18	pcc						
		75	13	13	10	pwr						
		85	7	7	4	RCR						
Comparative yearly lighting energy cost per 1000 lumens - \$3.29 based on 3000 hrs. and \$.08 pwr KWH.												
The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology.												
Photometric values based on test performed in compliance with LM-79.												

LINCS LED 10" 3500K

LER - 79

Catalog No.	LINCS100E-L10-935-UNV-WHG-DIM	Candlepower				Light Distribution			Average Luminance			
		Angle	End	45	Cross	Degrees	Lumens	% Luminaire	Angle	End	45'	Cross
Test No.	35771	0	84	84	84	0-30	63	31.9	45	8017	8457	7814
S/MH	1.2	5	85	84	84	0-40	99	50.3	55	7069	7507	6735
Lamp Type	LED	15	81	82	80	0-60	161	81.7	65	6424	6792	5773
Lumens	196	25	73	74	72	0-90	196	99.9	75	6423	6700	4806
Input Watts	3	35	61	63	60	0-180	196	100.0	85	10017	10017	5077
		45	47	50	46	Coefficients of Utilization						
		55	34	36	32	EFFECTIVE FLOOR CAVITY REFLECTANCE 20 PER (pfc-0.20)						
		65	23	24	20	pcc						
		75	14	15	10	pwr						
		85	7	7	4	RCR						
Comparative yearly lighting energy cost per 1000 lumens - \$3.04 based on 3000 hrs. and \$.08 pwr KWH.												
The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology.												
Photometric values based on test performed in compliance with LM-79.												

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LINCS100E LINCS LED undercabinet

10", 19", or 28" lengths

LINCS LED 19" 3000K

LER - 78

Catalog No. LINCS100E-L19-930-UNV-WHG-DIM Test No. 35772 S/MH 1.2 Lamp Type LED Lumens 392 Input Watts 5 Comparative yearly lighting energy cost per 1000 lumens - \$3.08 based on 3000 hrs. and 5.08 pwr KWH. The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology. Photometric values based on test performed in compliance with LM-79.	Candlepower				Light Distribution			Average Luminance			
	Angle	End	45	Cross	Degrees	Lumens	% Linaire	Angle	End	45'	Cross
	0	167	167	167	0-30	125	31.8	45	8091	8460	7937
	5	169	167	166	0-40	197	50.2	55	7175	7619	6826
	15	160	161	159	0-60	320	81.7	65	6539	6955	5779
	25	144	146	142	0-90	392	99.9	75	6650	6885	4824
	35	121	124	120	0-180	392	100.0	85	10709	10222	4520
	45	94	99	93							
	55	68	72	65							
	65	46	49	40							
75	28	29	21								
85	15	15	7								

LINCS LED 19" 3500K

LER - 87

Catalog No. LINCS100E-L19-935-UNV-WHG-DIM Test No. 35773 S/MH 1.2 Lamp Type LED Lumens 415 Input Watts 5 Comparative yearly lighting energy cost per 1000 lumens - \$2.76 based on 3000 hrs. and 5.08 pwr KWH. The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology. Photometric values based on test performed in compliance with LM-79.	Candlepower				Light Distribution			Average Luminance			
	Angle	End	45	Cross	Degrees	Lumens	% Linaire	Angle	End	45'	Cross
	0	176	176	176	0-30	131	31.5	45	8828	9051	8357
	5	177	176	174	0-40	207	49.9	55	7957	8231	7196
	15	169	170	167	0-60	338	81.4	65	7343	7586	6124
	25	153	154	150	0-90	415	99.9	75	7517	7564	5128
	35	130	132	126	0-180	415	100.0	85	12030	11335	4729
	45	103	106	98							
	55	75	78	68							
	65	51	53	43							
75	32	32	22								
85	17	16	7								

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LINCS100E LINCS LED undercabinet

10", 19", or 28" lengths

LINCS LED 28" 3000K					LER – 81					
Catalog No. LINCS100E-L28-930-UNV-WHG-DIM Test No. 35774 S/MH 1.2 Lamp Type LED Lumens 588 Input Watts 7 Comparative yearly lighting energy cost per 1000 lumens – \$2.96 based on 3000 hrs. and 5.08 pwr KWH. The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology. Photometric values based on test performed in compliance with LM-79.	Candlepower				Light Distribution			Average Luminance		
	Angle	End	45	Cross	Degrees	Lumens	% Luminaire	Angle	End	45' Cross
	0	252	252	252	0-30	188	31.9	45	7948	8377 7908
	5	253	252	249	0-40	297	50.4	55	6988	7516 6833
	15	239	241	238	0-60	482	81.9	65	6320	6798 5765
	25	214	218	213	0-90	588	99.9	75	6323	6604 4746
	35	180	184	179	0-180	588	100.0	85	9596	9411 4080
	45	139	147	138						
	55	99	107	97						
	65	66	71	60						
75	41	42	30							
85	21	20	9							
					Coefficients of Utilization					
					EFFECTIVE FLOOR CAVITY REFLECTANCE 20 PER (pfc=0.20)					
					pcc 80 70 50 30 50 30					
					pw 70 50 30 70 50 30 50 30					
					RCR					
					0 118 118 118 115 115 115 111 111					
					1 109 104 100 106 102 97 97 94					
					2 100 92 84 96 90 83 85 81					
					3 91 81 73 89 80 72 77 70					
					4 83 72 64 81 70 63 68 61					
					5 78 65 56 76 64 56 61 55					
					6 71 58 51 69 57 50 56 48					
					7 67 54 45 65 53 45 52 44					
					8 63 48 40 60 48 40 46 40					
					9 58 46 38 56 45 36 44 36					
					10 55 41 34 54 41 34 40 34					

LINCS LED 28" 3500K					LER – 88					
Catalog No. LINCS100E-L28-935-UNV-WHG-DIM Test No. 35775 S/MH 1.2 Lamp Type LED Lumens 627 Input Watts 7 Comparative yearly lighting energy cost per 1000 lumens – \$2.73 based on 3000 hrs. and 5.08 pwr KWH. The photometric results were obtained in the Philips Day-Brite laboratory which is NVLAP accredited by the National Institute of Standards and Technology. Photometric values based on test performed in compliance with LM-79.	Candlepower				Light Distribution			Average Luminance		
	Angle	End	45	Cross	Degrees	Lumens	% Luminaire	Angle	End	45' Cross
	0	269	269	269	0-30	200	31.9	45	8588	9045 8440
	5	270	269	266	0-40	316	50.4	55	7516	8172 7284
	15	257	258	254	0-60	514	81.9	65	6817	7400 6157
	25	231	234	228	0-90	626	99.9	75	6947	7290 5058
	35	194	199	191	0-180	627	100.0	85	11034	10663 4358
	45	150	158	148						
	55	107	116	103						
	65	71	77	64						
75	45	47	32							
85	24	23	9							
					Coefficients of Utilization					
					EFFECTIVE FLOOR CAVITY REFLECTANCE 20 PER (pfc=0.20)					
					pcc 80 70 50 30 50 30					
					pw 70 50 30 70 50 30 50 30					
					RCR					
					0 118 118 118 115 115 115 111 111					
					1 109 104 100 106 102 97 97 94					
					2 100 92 84 96 90 83 85 81					
					3 92 81 73 89 80 72 77 70					
					4 83 72 64 81 70 63 68 61					
					5 78 65 56 76 64 56 61 55					
					6 71 58 51 69 57 50 56 48					
					7 67 54 45 65 53 45 52 44					
					8 63 48 40 60 48 40 46 40					
					9 58 46 38 56 45 36 44 36					
					10 55 41 34 54 41 34 40 34					

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LL Series | Linear LED strip - 24 VDC



LL9 LL18 LL30 LL36 LL54

Line LED LL series is a small profile high performance LED strip. The durable, but flexible products feature a heavier copper board core for better heat dissipation and even illumination over long runs.

Available in single row configurations ranging from 9 to 54 LEDs per foot with multiple power feed and connector options. Line LED LL series feature outstanding color consistency with single binning and CRI up to 98.

Mounting

LED strip is equipped with 3M™ adhesive transfer tape (94721E). The strip must be adhered to either a luminii aluminum profile or an unpainted aluminum surface. For other surfaces the HST Aluminum heat sink tape will be required to reach the rated 50,000 hours average life

Applications

Indoor only - above and below cabinets, cove lighting, counter accent, architectural reveals, under banister, display and book cases, etc.

Approvals

Class 2 damp listed

Operating voltage
24 VDC

Average life
50,000 hours

Warranty
5 years



LM80

Technical information

MODEL	LL9	LL18	LL30	LL36	LL54
LEDS/ft	9	18	30	36	54
Light output 3000K	65 lum/ft	125 lum/ft	203 lum/ft	253 lum/ft	354 lum/ft
Average power consumption (for 15" section)	1.0 W/ft	1.5 W/ft	2.5 W/ft	3.0 W/ft	4.5 W/ft
Cutting increment	6.50"	4.00"	2.50"	2.00"	1.3"
Efficacy lum/watt	65	83	91	84	79
Maximum run length (in series)	100 ft	100 ft	48 ft	39 ft	26 ft
Dimensions	0.39" W 0.09" H	0.39" W 0.09" H	0.39" W 0.09" H	0.39" W 0.09" H	0.39" W 0.09" H

CCT INFO/LUMEN MULTIPLIER		TM-30-15		
Color temperature	Multiplier (referenced from 3000K)	CRI	R _f	R _g
2200K	0.87	82	81	99
2400K	0.73	98	95	101
2700K	0.81	98	95	102
2900K	0.86	97	95	102
3000K	1.00	91	90	101
3500K	1.05	95	90	97
4100K	1.28	93	88	96

SECTION START/END OPTIONS

Female connector



Male connector



No connector



Soldered leads (72")



Ordering code

MODEL	COLOR TEMPERATURE	SECTION START	SECTION END	LENGTH
LL9	22K	F	M	
LL9	22K - 2200K	F - Female connector	F - Female connector	view table above for increment options and maximum run limits
LL18	24K - 2400K	M - Male connector	M - Male connector	
LL30	27K - 2700K	*SL - Soldered lead wires (72")	*SL - Soldered lead wires (72")	
LL36	29K - 2900K	NC - No connector	*NC - No connector	
LL54	30K - 3000K			
	35K - 3500K			
	41K - 4100K			

*LL54 only available in this option

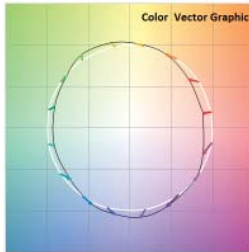
<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 3W/LF LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer</p>	<p>F17</p>
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LL Series | Linear LED strip - 24 VDC

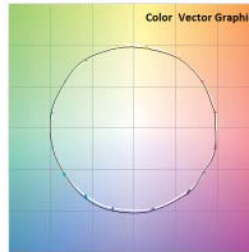
TM-30-15: Data

22K CCT



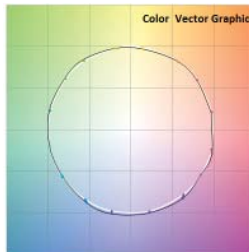
Hue Bin	R _f	Graphic shifts (%)	
		Chroma	Hue
1	79	-10%	0%
2	79	-8%	8%
3	70	-2%	14%
4	85	2%	8%
5	90	5%	5%
6	90	6%	-3%
7	84	-2%	-8%
8	89	-6%	-4%
9	85	-6%	3%
10	78	-6%	11%
11	77	2%	14%
12	79	6%	9%
13	88	8%	-7%
14	67	4%	-20%
15	84	0%	-10%
16	75	-7%	-14%

24K CCT



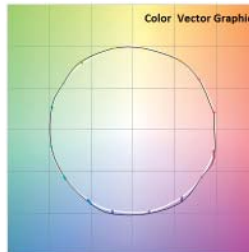
Hue Bin	R _f	Graphic shifts (%)	
		Chroma	Hue
1	97	-1%	0%
2	97	-1%	0%
3	97	0%	1%
4	95	-3%	-1%
5	96	-1%	2%
6	96	1%	3%
7	97	0%	1%
8	98	1%	0%
9	97	0%	2%
10	95	0%	3%
11	93	3%	4%
12	93	3%	1%
13	93	3%	-6%
14	92	2%	-8%
15	95	-1%	-1%
16	91	0%	-6%

27K CCT



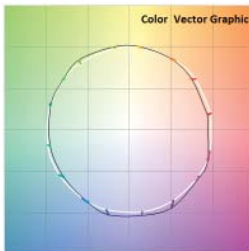
Hue Bin	R _f	Graphic shifts (%)	
		Chroma	Hue
1	97	-1%	0%
2	98	0%	0%
3	96	0%	1%
4	96	-2%	0%
5	96	0%	2%
6	95	2%	2%
7	96	1%	0%
8	98	1%	-1%
9	98	0%	1%
10	95	0%	3%
11	92	2%	5%
12	93	3%	1%
13	95	2%	-3%
14	93	3%	-3%
15	96	0%	-1%
16	91	1%	-6%

29K CCT



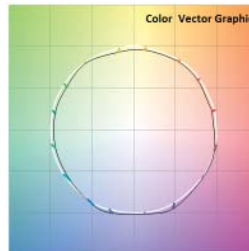
Hue Bin	R _f	Graphic shifts (%)	
		Chroma	Hue
1	79	-10%	0%
2	79	-8%	8%
3	70	-2%	14%
4	85	2%	8%
5	90	5%	5%
6	90	6%	-3%
7	84	-2%	-8%
8	89	-6%	-4%
9	85	-6%	3%
10	78	-6%	11%
11	77	2%	14%
12	79	6%	9%
13	88	8%	-7%
14	67	4%	-20%
15	84	0%	-10%
16	75	-7%	-14%

30K CCT



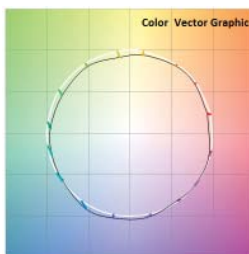
Hue Bin	R _f	Graphic shifts (%)	
		Chroma	Hue
1	90	-8%	-1%
2	91	-4%	3%
3	86	-1%	7%
4	91	1%	5%
5	92	2%	3%
6	93	4%	-1%
7	92	0%	-4%
8	95	-1%	-2%
9	94	-3%	1%
10	87	-3%	6%
11	84	0%	10%
12	88	6%	4%
13	92	4%	-1%
14	88	6%	-6%
15	89	1%	-7%
16	85	0%	-11%

35K CCT



Hue Bin	R _f	Graphic shifts (%)	
		Chroma	Hue
1	91	-4%	0%
2	93	-3%	0%
3	92	-2%	2%
4	92	-3%	1%
5	91	-5%	1%
6	96	-1%	1%
7	92	-4%	1%
8	93	-3%	2%
9	90	-4%	5%
10	83	-3%	10%
11	83	2%	10%
12	89	3%	4%
13	95	2%	-1%
14	90	5%	-4%
15	90	1%	-5%
16	88	0%	-6%

41K CCT



Hue Bin	R _f	Graphic shifts (%)	
		Chroma	Hue
1	88	-4%	1%
2	93	-2%	1%
3	93	-2%	1%
4	89	-4%	-2%
5	88	-7%	-1%
6	93	-4%	0%
7	88	-7%	3%
8	87	-4%	6%
9	82	-3%	12%
10	79	0%	12%
11	83	5%	9%
12	91	4%	0%
13	89	3%	-6%
14	92	-1%	-3%
15	84	0%	-7%
16	84	-1%	-6%

REV5.5

page 2 of 7

www.luminii.com tel: 224-333-6033

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>F17</p>
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LL Series | Linear LED strip - 24 VDC

Power consumption per linear foot - loads tested with PSD series of power supplies (page3)

Length of strip (LF)	LL9		LL18		LL30		LL36		LL54	
	W/ft	Total wattage	W/ft	Total wattage	W/ft	Total wattage	W/ft	Total wattage	W/ft	Total wattage
1	1.20	0.90	1.65	1.65	2.70	2.70	3.25	3.25	5.35	5.30
2	1.20	1.90	1.65	3.30	2.70	5.40	3.25	6.50	5.30	10.60
3	1.20	2.70	1.65	4.95	2.70	8.10	3.25	9.75	5.25	15.80
4	1.20	3.70	1.63	6.58	2.65	10.60	3.20	12.80	5.20	20.60
5	1.15	4.90	1.63	8.21	2.65	13.25	3.20	16.00	5.15	26.00
6	1.15	6.10	1.62	9.83	2.65	15.90	3.15	18.90	5.10	30.80
7	1.15	7.10	1.62	11.45	2.60	18.20	3.15	22.05	5.05	35.70
8	1.10	8.10	1.62	13.07	2.60	20.80	3.10	24.80	5.00	40.00
9	1.10	8.60	1.60	14.67	2.60	23.40	3.10	27.90	4.95	44.80
10	1.10	9.60	1.60	16.50	2.55	25.50	3.05	30.50	4.90	48.90
11	1.05	10.90	1.57	18.07	2.55	28.05	3.05	33.50	4.85	53.30
12	1.05	11.90	1.57	19.64	2.55	30.60	3.00	36.00	4.80	57.40
13	1.05	12.90	1.57	21.21	2.50	32.50	3.00	39.00	4.70	60.60
14	1.05	14.10	1.55	22.76	2.50	35.00	3.00	42.00	4.60	64.30
15	1.00	14.80	1.55	24.31	2.50	37.50	3.00	45.00	4.50	67.40
16	1.00	15.60	1.55	25.86	2.45	39.20	2.95	47.20	4.40	70.50
17	1.00	16.80	1.52	27.38	2.45	41.65	2.95	50.15	4.35	73.40
18	1.00	17.80	1.52	28.90	2.45	44.10	2.90	52.50	4.30	77.00
19	1.00	18.80	1.52	30.42	2.40	45.60	2.90	55.10	4.25	81.30
20	0.95	18.90	1.50	31.20	2.40	48.00	2.85	57.00	4.20	83.50
21	0.95	19.84	1.50	32.70	2.40	50.40	2.85	59.85	4.10	85.70
22	0.95	20.78	1.50	34.20	2.35	51.70	2.80	61.60	4.00	87.10
23	0.95	21.72	1.48	35.68	2.35	54.05	2.80	64.60	3.90	88.80
24	0.95	22.66	1.47	37.15	2.35	56.40	2.75	66.00	3.80	90.10
25	0.95	23.60	1.47	38.62	2.30	57.50	2.75	68.75	3.70	92.30
26	0.95	24.54	1.45	40.07	2.30	59.80	2.70	70.20	3.60	93.60
27	0.95	25.48	1.45	41.52	2.30	62.10	2.70	72.90		
28	0.95	26.42	1.43	42.20	2.25	63.00	2.65	74.20		
29	0.95	27.46	1.42	43.00	2.25	65.25	2.65	76.85		
30	0.95	28.30	1.40	43.70	2.25	67.50	2.60	78.00		
31	0.95	29.06	1.40	45.10	2.20	68.20	2.60	80.60		
32	0.95	29.82	1.38	46.50	2.20	70.40	2.55	81.60		
33	0.95	30.58	1.37	47.70	W	72.60	2.55	84.15		
34	0.95	31.34	1.37	49.00	2.15	73.10	2.50	85.00		
35	0.95	32.10	1.36	50.45	2.15	75.25	2.50	87.50		
36	0.95	32.86	1.36	51.70	2.15	77.40	2.45	88.20		
37	0.95	33.62	1.36	52.50	2.10	77.70	2.45	90.65		
38	0.95	34.38	1.36	53.00	2.10	79.80	2.40	91.20		
39	0.95	35.14	1.35	53.90	2.10	81.90	2.40	93.60		
40	0.90	35.90	1.35	54.40	2.05	82.00				
41	0.90	36.65	1.35	55.75	2.05	84.05				
42	0.90	37.40	1.34	57.09	2.05	86.10				
43	0.90	38.15	1.34	58.43	2.02	86.90				
44	0.90	38.90	1.33	59.76	2.00	88.00				
45	0.90	39.65	1.33	61.07	2.00	90.00				
46	0.90	40.40	1.32	61.97	1.96	90.20				
47	0.90	41.15	1.32	62.70	1.95	91.65				
48	0.90	41.90	1.31	63.50	1.95	93.60				
49	0.90	42.65	1.31	64.05						
50	0.90	43.40	1.30	64.80						
51-60	0.85	50.50	1.30 - 1.25	65.20 - 70.80						
61-70	0.80	56.20	1.25 - 1.20	71.00 - 76.20						
71-80	0.75	64.50	1.20 - 1.10	77.00 - 81.60						
81-90	0.72	65.50	1.10 - 1.00	82.00 - 86.20						
91-100	0.70	69.30	1.00 - 0.95	87.00 - 91.40						



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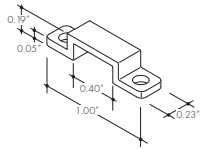


LL Series | Linear LED strip - 24 VDC

Accessories

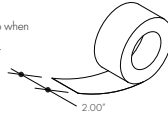
Mounting clip:
recommended at every 12" when
LineLED strip is facing down.

Part # CL-1



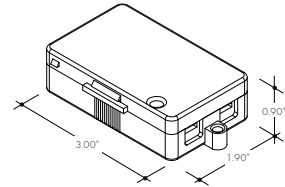
Heat sink tape:
included with LineLED strip when
no extrusions are ordered.

Part # HST



Splice Box:
low voltage, 4 terminal
splice box, black.

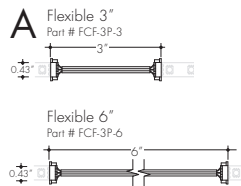
Part # LVSP-4T-BK



Connectors

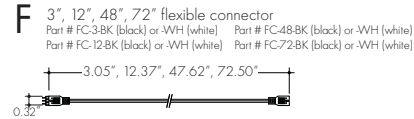
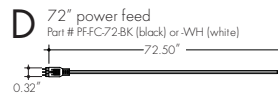
Field-cut connectors

(not applicable with the LL54, also these connectors
will not fit inside of the extrusion)

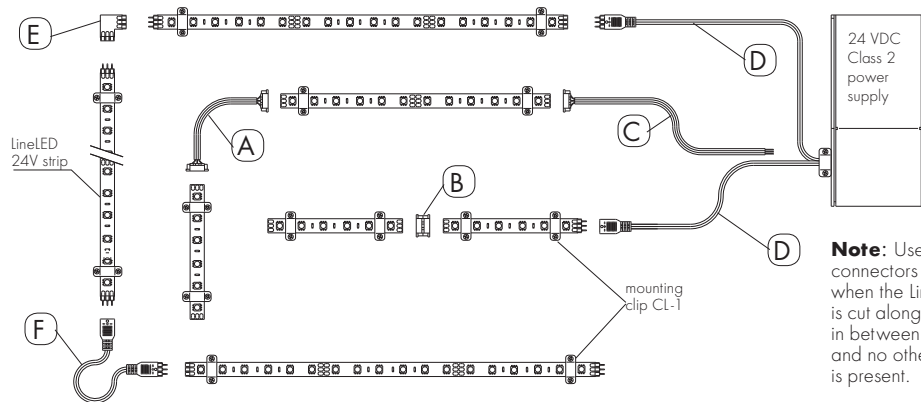


3-pin connectors

(not applicable with the LL54, also these connectors
will not fit inside of the SL7, RSL7, Channel B, & ALU-Flat)



Sample layout with connectors



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LL Series | Linear LED strip - 24 VDC

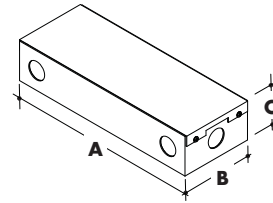
Power supply

See fixture and power supply instructions & spec sheet for wiring information. Dimming possible in select models - view Luminii website for list of compatible dimmers.

Non-Dimming:

MODEL	POWER	OUTPUT	DIMMING	LOCATION
PSV	40	24V	U2ND	D
PSV - PSV Series	40 - 40 W 60 - 60 W 96 - 96 W	24 - 24 VDC	U2ND - Non Dimming	D - Dry Location IP65 - Wet Location

MODELS	PSV Dry	PSV Wet
A Length	9.2"	9.5"
B Width	3.4"	4.12"
C Depth	1.9"	2.3"

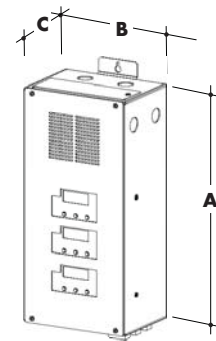


Dimming 0-10V:

MODEL	POWER	OUTPUT	DIMMING
PS010V	3X100	24	LIN
PS010V - 0-10V Power Supply	3X100 - 3 X 100 WATT	24 - 24 VDC	LIN - linear LOG - Logarithmic

- features eldoLED's LINEARdrive configurable 0-10V drivers

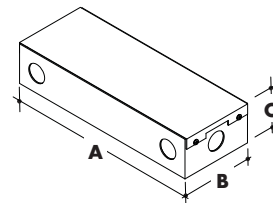
MODELS	PSD010V
A Length	15.75"
B Width	6.60"
C Depth	4.80"



MODEL	POWER	OUTPUT	DIMMING	LOCATION
PSV	40	24V	U2DIM	D
PSV - PSV Series	40 - 40 W 60 - 60 W 96 - 96 W	24 - 24 VDC	U2DIM - Dimming 0-10V	D - Dry Location IP65 - Wet Location

dims down to 5%

MODELS	PSV Dry	PSV Wet
A Length	9.2"	9.5"
B Width	3.4"	4.12"
C Depth	1.9"	2.3"

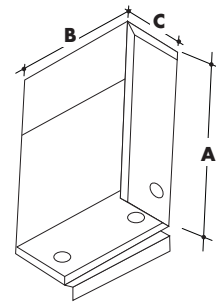


Dimming Magnetic low voltage:

MODEL	POWER	OUTPUT	INPUT
PSD	48	24	
PSD - PSD Series	48 - 48 W 96 - 96 W 288 - 288 W (3x 96W)	24 - 24 VDC	Blank - 120 V 240 - 240 V 277 - 277 V

dims down to 0%

MODELS	PSD 48	PSD 96	PSD 288
A Length	11.25"	11.25"	13.06"
B Width	3.42"	3.42"	8.42"
C Depth	3.42"	3.27"	4.47"



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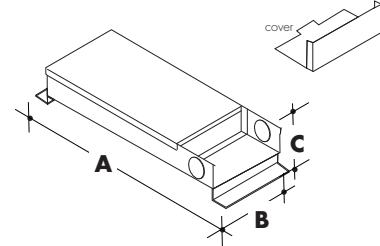
LL Series | Linear LED strip - 24 VDC

Power supply

See fixture and power supply instructions & spec sheet for wiring information. Dimming possible in select models - view Luminii website for list of compatible dimmers.

Dimming Electronic low voltage:

MODEL	CIRCUIT x POWER	OUTPUT	INPUT
CVE	48D	24V	
CVE - CVE Series dims down to 0.1%	48D - 48W 48X2D - 2 x 48W 48X3D - 3 x 48W 48X4D - 4 x 48W 96D - 96W 96X2D - 2 x 96W 96X3D - 3 x 96W 96X4D - 4 x 96W	24 - 24 VDC	Blank - 120 V 277 - 240/277 V



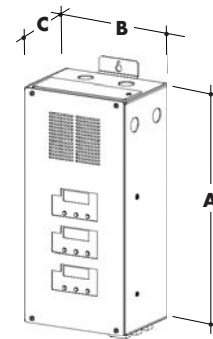
MODELS	Single circuit	Dual circuit	Three circuit	Four circuit
A Length	13.9"	13.8"	13.8"	13.8"
B Width	2.3"	4.0"	5.9"	7.75"
C Depth	1.3"	1.9"	1.9"	1.9"

DMX & DALI:

MODEL	POWER	OUTPUT
PSDMX	3X100	24
PSDMX - DMX Power Supply PSDALI - DALI Power Supply dims down to 0%	3X100 - 3 X 100 WATT	24 - 24 VDC

- Features eldoLED's LINEARdrive configurable dimmable drivers

MODELS	PSDMX	PSDALI
A Length	15.75"	15.75"
B Width	6.60"	6.60"
C Depth	4.80"	4.80"

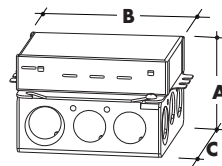


Luminii is a Lutron OEM Advantage Partner

MODEL
LTEA4U1UKL-CV240
Lutron - Hi-lume™ 1% 2-wire LED driver (120V forward phase only)

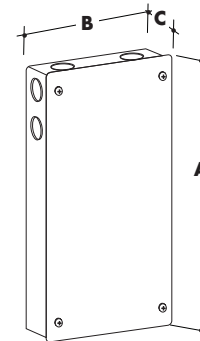
MODELS	LTEA	L3DA
A Length	4.89"	4.89"
B Width	2.66"	2.66"
C Depth	4.00"	4.00"

MODEL
L3DA4U1UKL-CV240
Hi-lume™ 1% EcoSystem Voltage LED Driver



MODEL
L3DO-96W24V-U
Hi-lume™ 0.1% EcoSystem Voltage LED Driver with Soft-On, Fade-to-Black™

MODELS	L3DO
A Length	10.50"
B Width	5.50"
C Depth	2.00"



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LL Series | Linear LED strip - 24 VDC

Optional mounting channels - lens type per channel / light transmission percentage per lens / dimensions

Lens options / light transmission percentage per lens

- Ⓒ Clear Ⓗ Half (50%) frosted Ⓐ Narrow
- Ⓕ Frosted Ⓜ Medium beam frosted Ⓒ Gel color filter suitable

 Ⓒ 78% Ⓕ 50% Alu-Round	 Ⓒ 70% Ⓕ 50% Ⓗ 61% Alu-45	 Ⓒ 79% Ⓕ 58% Ⓗ 69% Alu-Corner			
 Ⓒ 85% Ⓕ 63% Ⓗ 75% Ⓜ 87% Ⓐ 84% Ⓒ 78% Slim Line 7	 Ⓒ 85% Ⓕ 63% Ⓗ 75% Ⓜ 87% Ⓐ 84% Recessed Slim Line 7	 Ⓒ 63% Ⓕ 43% Ⓗ 54% Ⓜ 65% Ⓐ 60% Ⓒ 54% Slim Line 15	 Ⓒ 63% Ⓕ 43% Ⓗ 54% Ⓜ 65% Ⓐ 60% Recessed Slim Line 15	 Ⓒ 85% Ⓕ 63% Ⓗ 75% Ⓜ 87% Alu-Flat	 Ⓒ 47% Ⓕ 44% Alu-Wall
 Ⓒ 85% Ⓕ 60% Ⓗ 71% Slim Wide 8	 Ⓒ 85% Ⓕ 60% Ⓗ 71% Recessed Slim Wide 8	 Ⓒ 69% Ⓕ 44% Ⓗ 55% Slim Wide 15	 Ⓕ 34% Alu-Stair	 Ⓕ 34% Alu-Stair-Carpet	 Alu-Edge

Installation

All mounting channels are field cuttable using miter saw with circular blade suitable for cutting aluminum.

Ordering

Extrusions are sold separately. View respective specsheets for details on ordering extrusions and their accessories (endcaps, mounting brackets, etc).

LED Dotting per extrusion

using the frosted lens option

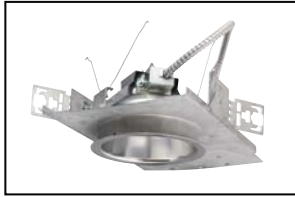
extrusion	LED Models				
	LL9	LL18	LL30	LL36	LL54
SL7, RSL7, ALU-FLAT	CD	CD	CD	CD	SD
ALU-CORNER	CD	CD	CD	CD	SD
SLW8, RSLW8	CD	CD	CD	CD	SD
ALU-45	CD	CD	SD	SD	ND
ALU-WALL	CD	CD	SD	ND	ND
ALU-STAIR	CD	CD	ND	ND	ND
ALU-ROUND	CD	SD	ND	ND	ND
SL15, RSL15	CD	SD	ND	ND	ND
SLW15	CD	SD	ND	ND	ND

CD = Clear Dotting
SD = Slight Dotting
ND = No Dotting



Clear Dotting Slight Dotting NO Dotting

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6" LED Downlight LC6SL

1000/1400/1800 Lumens
120V-277V, 347V
0-10V Dimming Option

APPLICATIONS:

LiteFrame Commercial LC6SL is a 6" commercial grade LED downlight with available outputs between 1000-1800 lumens. This is suitable to replace most CFL downlighting applications, while realizing substantial energy and maintenance savings. Rated for a minimum of 50,000 hours life (70% lumen maintenance) with ambient plenum temperatures up to 35°C (10L), 28°C (14L), 25°C (18L). Free Air Flow around the fixture is required for optimal life performance. This product is not recommended for use with 3rd party "FIREHAT" or insulation barriers.

HOUSING:

One-piece 22 gauge non-corrosive steel platform. Pre-wired J-box with snap-on cover for easy access. Snap-in connection from driver compartment allows easy installation of light engine/trim assembly and can be upgraded to accommodate technology improvements. Approved for 8 (4 in/4 out) No. 12 AWG conductors rated for 90°C through wiring.

REFLECTOR:

High purity aluminum, Alzak, iridescence suppressed, semi-diffuse reflector. Self-trim standard. Painted white self-trim (WT) available as option.

LED LIGHT ENGINE:

The LC6SL uses mid power Nichia LEDs, specifically mixed to provide a minimum of 80 CRI with 3 SDCM color consistency. The use of multiple mid power LEDs allows for optimal thermal management by effectively spreading the heat over a larger area and eliminating hot spots on the LEDs. A diffuse, yet highly transmissive lens obscures the view of the LEDs and creates a smooth, even look from below. The light engine is available in multiple Kelvin temperatures and the system is designed to provide optimal life and lumen maintenance (50,000 hours at 70% lumen maintenance). The reflector/light engine assembly is mechanically retained to the housing.

LED DRIVER:

The LC6SL utilizes a constant current LED driver. This same driver is capable of running all three different lumen outputs, resulting in a reduction of housing skus and simplified specification. The driver is UL8750, Class II compliant and universal 120V-277V.

DIMMING:

0-10V dimming options are available (DM/DM1), providing flicker-free dimming at 10% and 1% respectively. See list of compatible dimmers on page (4). For the sizing of the control circuit, the dimming circuit may require up to 2mA of sink current.

INSTALLATION:

Light commercial bar hangers included (not with WWCP option). Universal adjustable mounting brackets also accept 1/2" EMT conduit or 1 1/2" or 3/4" lathing channel (by others) or Prescolite 24" bar hangers (B24 or B6). Wall wash orientation may be field adjusted in 90° increments to housing.

CERTIFICATIONS:

CSA certified to US and Canadian safety standards. Suitable for wet locations (EM, EMR and WW damp location). ENERGY STAR qualified.

WARRANTY:

5 year warranty. See www.prescolite.com for details.

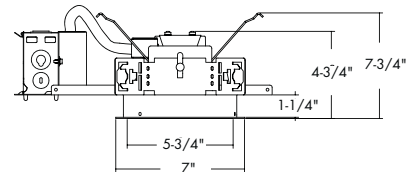
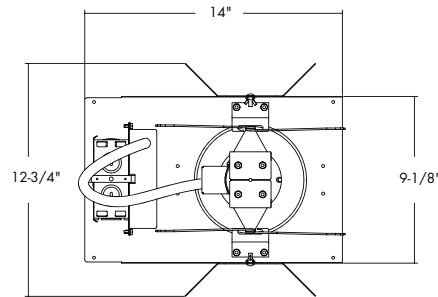
DATE: _____ TYPE: _____

FIRM NAME: _____

PROJECT: _____



Ceiling Cutout: 6 1/4"
Maximum Ceiling Thickness 1 1/4"
For conversion to millimeters,
multiply inches by 25.4
Not to Scale



LC6SL 10L & 14L

- *See page 4 for LC6SL 18L line art
- *See page 4 for LC6SLEM line art
- *See page 4 for LC6SLCP line art
- *See page 4 for LC6SL WWCP line art

Order housing, reflector, and accessories separately

CATALOG NUMBER:

EXAMPLE: LC6SLDM-6LCSL14L35K9WT

HOUSING	DRIVER OPTIONS	VOLTAGE	HOUSING OPTIONS	TRIM APERTURE	OUTPUT	KELVIN	CRI	REF. FINISH/COLOR OPTION	REFLECTOR OPTIONS	ACCESSORIES
<input type="checkbox"/> LC6SL Standard Lumen Non Dimming 120V-277V	<input type="checkbox"/> DM 0-10V 10% Dimming <input type="checkbox"/> DM1 0-10V 1% Dimming	<input type="checkbox"/> 347 ^{3,7,10} 347V	<input type="checkbox"/> EM ^{2,4,8} Integral Battery Pack <input type="checkbox"/> EMR ⁴ Remote Battery Pack <input type="checkbox"/> CP ^{3,6,8} Chicago Plenum Housing <input type="checkbox"/> WWCP ^{3,9} Wall Wash Chicago Plenum Housing	<input type="checkbox"/> 6LCSL Standard Lumen Clear Alzak Reflector	<input type="checkbox"/> 10L 1000 Lumen <input type="checkbox"/> 14L 1400 Lumen <input type="checkbox"/> 18L 1800 Lumen	<input type="checkbox"/> 27K 2700 Kelvin <input type="checkbox"/> 30K 3000 Kelvin <input type="checkbox"/> 35K 3500 Kelvin <input type="checkbox"/> 40K 4000 Kelvin <input type="checkbox"/> 50K 5000 Kelvin	<input type="checkbox"/> 8 80+ CRI <input type="checkbox"/> 9 90+ CRI	<input type="checkbox"/> WH Painted Matte White Reflector and Flange	<input type="checkbox"/> WT Painted White Flange Only <input type="checkbox"/> WF Wide Flange <input type="checkbox"/> WW ^{5,7} Wall Wash <input type="checkbox"/> EM ^{4,8} Integral Battery Pack <input type="checkbox"/> CP ^{3,6} Chicago Plenum	<input type="checkbox"/> B24 Set of two(2) 24" bar hangers for T-bar ceilings <input type="checkbox"/> B6 Set of two (2) bar hangers for ceiling joist up to 24" centers <input type="checkbox"/> SCA6D Sloped ceiling adapter (see note on page 4) <input type="checkbox"/> LiteGear ¹ Inverter, single phase central lighting, 125VA-250VA <input type="checkbox"/> LPS Series ¹ LitePower micro-inverter, 20VA-55VA

¹ See Central Inverter compatibility note and web links on page 4.
² EM must be selected on both the housing and the trim.
³ Not compatible with EM or EMR
⁴ Damp location only
⁵ Compatible with EMR only
⁶ CP must be selected on both the housing and the trim
⁷ Not compatible with CP
⁸ Not available with WW option
⁹ WW must be selected on trim
¹⁰ Not compatible with WWCP



In a continuing effort to offer the best product possible we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product.
Web: www.prescolite.com • Tech Support: (888) 777-4832

LF-LED-041

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<p>LAMP: 13.4W LED, Provided by Manufacturer, 3500K DRIVER: Provided by Manufacturer</p>	<p>F18</p>
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PHOTOMETRIC DATA

LiteFrame - 6" LC6SL Downlight

DRIVER DATA	6LCSL10Lxxx	6LCSL14Lxxx	6LCSL18Lxxx
Input Voltage	120-277V	120-277V	120-277V
Input Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Input Current	0.111 (120v)	0.148 (120v)	0.185 (120v)
Input Power	13.4W	17.8W	22.2W
Constant Current Output	700mA	700mA	700mA
Power Factor	≥0.90	≥0.90	≥0.90
THD	<25%	<20%	<20%
EMI Filtering	FCC 47CFR Part 15, Class A	FCC 47CFR Part 15, Class A	FCC 47CFR Part 15, Class A
Operating Temperature	-30°C to +35°C	-30°C to +28°C	-30°C to +25°C
Dimming	0-10V	0-10V	0-10V
Over-voltage, over-current, short-circuit protected			
When operating in EM mode, the fixture will deliver approximately 30% of the published full lumen output.			

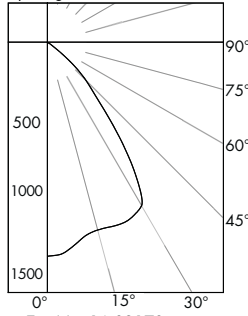
Lumen Multiplier Table

Photometrics for the LC6SL are published below at a nominal 3500 Kelvin temperature. This table may be used to approximate the lumen values at different Kelvin temperatures. Power consumption would stay the same.

5000 Kelvin	1.09
4000 Kelvin	1.00
3500 Kelvin	1.00
3000 Kelvin	0.99
2700 Kelvin	0.96

LC6SL 6LCSL18L35K8

LED Light Engine: 3500K, 80+ CRI
System Wattage: 22.3W
Fixture Delivered Lumens: 1941
Fixture Efficacy: 87.0
Spacing Criteria: 1.1



CANDELA DISTRIBUTION

DEG	CANDELA
0	1368
5	1345
15	1243
25	1247
35	923
45	357
55	27
65	5
75	1
85	0
90	0

Test No. 16.03178

Tested at 25°C Ambient in accordance to IESNA LM-79-2008

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%LUMINAIRE
0-60	1935	99.7
0-90	1941	100.0
90-180	0	0.0
0-180	1941	100.0

LUMINANCE DATA IN CANDELA/SQ. METER

Angle in Vertical	Average
	45°
55°	2580
65°	648
75°	212
85°	0

COEFFICIENTS OF UTILIZATION

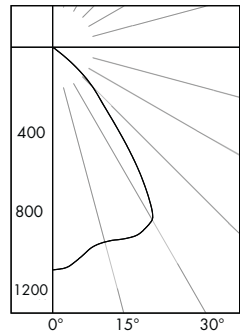
Room Cavity Ratio	Zonal Cavity Method																													
	% Effective Ceiling Cavity Reflectance						% Effective Floor Cavity Reflectance																							
	80%						70%						50%						30%						10%					
	70	50	30	10	70	50	30	10	70	50	30	10	70	50	30	10	70	50	30	10	70	50	30	10						
1	113	110	107	105	110	108	105	103	104	102	100	100	98	97	96	95	94													
2	106	101	97	95	104	99	95	92	96	93	90	89	88	88	86	85	84													
3	100	93	87	83	98	92	86	82	89	85	81	80	80	78	76	74	72													
4	94	86	79	75	92	84	79	74	82	77	73	73	72	71	70	69	68													
5	89	79	73	69	87	78	72	67	76	71	67	74	70	68	67	66	65													
6	83	73	66	62	82	72	66	61	71	65	61	69	64	63	62	61	60													
7	78	68	61	56	77	67	61	56	66	60	56	64	59	58	57	56	55													
8	74	63	56	52	72	62	56	52	61	55	51	60	55	54	53	52	51													
9	70	59	52	48	68	58	52	48	57	51	47	56	51	47	46	45	44													
10	66	55	48	44	65	54	48	44	54	48	44	53	47	44	42	41	40													

LC6SL 6LCSL18L35K8

Test No. 16.03178

LC6SL 6LCSL14L35K8

LED Light Engine: 3500K, 80+ CRI
System Wattage: 17.9W
Fixture Delivered Lumens: 1520
Fixture Efficacy: 84.9
Spacing Criteria: 1.1



CANDELA DISTRIBUTION

DEG	CANDELA
0	1072
5	1050
15	971
25	990
35	721
45	277
55	20
65	4
75	1
85	0
90	0

Test No. 16.03177

Tested at 25°C Ambient in accordance to IESNA LM-79-2008

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%LUMINAIRE
0-60	1515	99.7
0-90	1520	100.0
90-180	0	0.0
0-180	1520	100.0

LUMINANCE DATA IN CANDELA/SQ. METER

Angle in Vertical	Average
	45°
55°	1911
65°	519
75°	212
85°	0

COEFFICIENTS OF UTILIZATION

Room Cavity Ratio	Zonal Cavity Method																													
	% Effective Ceiling Cavity Reflectance						% Effective Floor Cavity Reflectance																							
	80%						70%						50%						30%						10%					
	70	50	30	10	70	50	30	10	70	50	30	10	70	50	30	10	70	50	30	10	70	50	30	10						
1	113	110	107	105	110	108	105	103	104	102	100	100	98	97	96	95	94													
2	106	101	97	95	104	99	95	92	96	93	90	89	88	88	86	85	84													
3	100	93	87	83	98	92	86	82	89	85	81	80	80	78	76	74	72													
4	94	86	80	75	92	84	79	74	82	77	73	73	72	71	70	69	68													
5	89	79	73	69	87	78	72	67	76	71	67	74	70	68	67	66	65													
6	83	73	66	62	82	72	66	61	71	65	61	69	64	63	62	61	60													
7	78	68	61	56	77	67	61	56	66	60	56	64	59	58	57	56	55													
8	74	63	56	52	72	62	56	52	61	55	51	60	55	54	53	52	51													
9	70	59	52	48	68	58	52	48	57	51	47	56	51	47	46	45	44													
10	66	55	48	44	65	54	48	44	54	48	44	53	47	44	42	41	40													

LC6SL 6LCSL14L35K8

Test No. 16.03177



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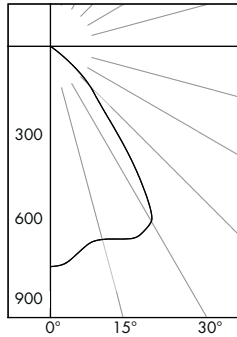
<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	F18
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PHOTOMETRIC DATA

LiteFrame - 6" LC6SL Downlight

LC6SL 6LCSL10L35K8

LED Light Engine: 3500K, 80+ CRI
System Wattage: 13.5W
Fixture Delivered Lumens: 1106
Fixture Efficacy: 81.9
Spacing Criteria: 1.1



CANDELA DISTRIBUTION

DEG	CANDELA
0	780
5	762
15	708
25	740
35	518
45	196
55	15
75	1
85	0
90	0

Test No. 16.03179

Tested at 25°C Ambient in accordance to IESNA LM-79-2008

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%LUMINAIRE
0-60	1103	99.7
0-90	1106	100.0
90-180	0	0.0
0-180	1106	100.0

LUMINANCE DATA IN CANDELA/SQ. METER

Angle in Vertical	Average
45°	15190
55°	1433
65°	389
75°	212
85°	0

COEFFICIENTS OF UTILIZATION Zonal Cavity Method

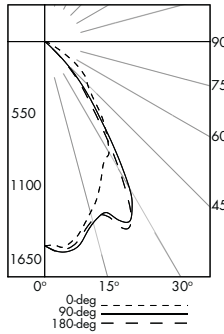
Room Cavity Ratio	% Effective Ceiling Cavity Reflectance					% Effective Floor Cavity Reflectance					% Wall Reflectance						
	80%	70%	50%	30%	10%	80%	70%	50%	30%	10%	70	50	30	10			
	1	113	110	107	106	110	108	105	103	104	102	100	100	98	97	96	95
2	107	101	97	93	104	99	95	92	98	93	90	93	90	88	86	85	84
3	100	93	88	83	96	92	87	82	89	85	81	86	83	80	78	77	76
4	94	86	80	75	92	85	79	74	82	77	74	80	76	73	71	70	72
5	89	79	73	68	87	78	72	68	76	71	67	75	70	66	73	69	68
6	83	73	67	62	82	73	66	62	71	65	61	69	65	61	68	64	60
7	78	68	61	57	77	67	61	56	66	60	56	65	60	56	64	59	55
8	74	63	57	52	73	63	56	52	61	56	52	60	55	51	59	55	51
9	70	59	52	48	69	58	52	48	57	52	48	57	51	47	56	51	47
10	66	55	49	44	65	55	48	44	54	48	44	53	48	44	52	47	44

LC6SL 6LCSL10L35K8

Test No. 16.03179

LC6SL 6LCSL18L35K8 WW

LED Light Engine: 3500K, 80+ CRI
System Wattage: 22.2W
Fixture Delivered Lumens: 1938
Fixture Efficacy: 87.3



CANDELA DISTRIBUTION

DEG	0	90	180
0	1527	1527	1527
5	1545	1581	1565
15	1324	1404	1383
25	1030	1489	1517
35	792	780	670
45	454	219	189
55	273	8	8
65	64	2	2
75	9	1	1
85	0	0	0
90	0	0	0

Test No. 16.03309

Tested at 25°C Ambient in accordance to IESNA LM-79-2008

LUMINANCE DATA IN CANDELA/SQ. METER

Angle in Vertical	0 DEG	90 DEG	180 DEG
45°	38311	18480	15949
55°	28400	832	832
65°	9036	282	282
75°	2075	231	231
85°	0	0	0

MULTIPLE UNITS	
UNITS ON 2' CENTER	UNITS ON 4' CENTER
1' 2' 3' 4'	

2' DISTANCE FIXTURE MOUNTED OUT FROM WALLS FOOTCANDLE DISTRIBUTION ON WALL SURFACE (DIRECT ONLY)

DISTANCE FROM CEILING IN FEET	1	2	3	4	5	6	7	8	9		
1	15	11	8	2	1	15	5	15	15	1	15
2	40	36	26	13	5	41	27	41	40	10	40
3	36	35	28	18	11	41	36	41	36	22	36
4	22	22	22	19	13	33	39	33	25	27	25
5	14	14	14	14	13	27	30	27	20	25	20
6	10	10	9	9	9	24	22	24	16	19	16
7	7	7	6	6	6	19	18	19	14	14	14
8	5	5	5	4	4	15	15	15	12	11	12
9	4	4	3	3	3	12	13	12	10	9	10

LC6SL 6LCSL18L35K8 WW

Test No. 16.03309



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PHOTOMETRIC DATA

LiteFrame - 6" LC6SL Downlight

Dimming Compatibility Table

Dimming Ballast	Manufacturer	Web Link
DM/DM1	Lutron DTVV	http://bit.ly/11jSvZg
DM/DM1	Leviton AWRMG-7xx, AWSMG-7xx, AWSMT-7xx	http://bit.ly/1Bln2R9

Central Inverters

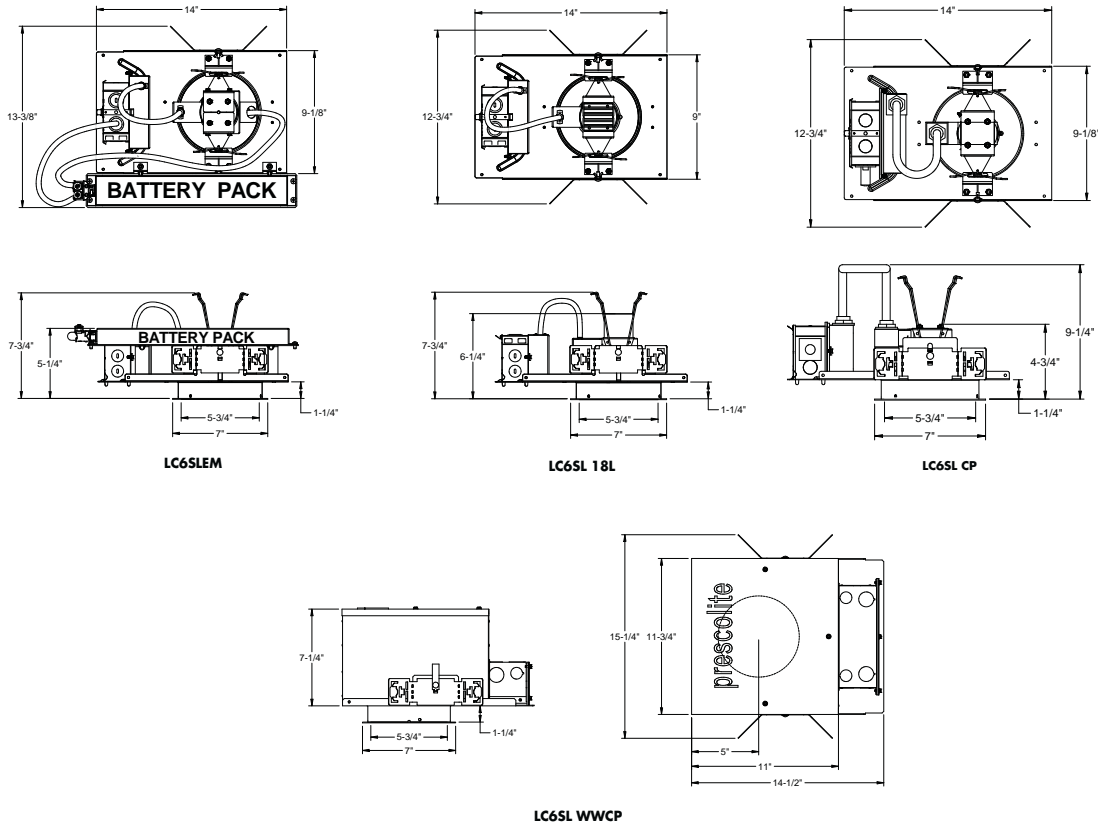
For full fixture output in back-up mode, we recommend you visit www.dual-lite.com for your Central Lighting Inverter options. Please contact your local Hubbell representative for any assistance with proper sizing and loading of your inverter selection. Central lighting inverters must be ordered separately.

LiteGear: www.dual-lite.com/products/litegear_lg_series

LPS Series: www.dual-lite.com/products/lps

SCA6D

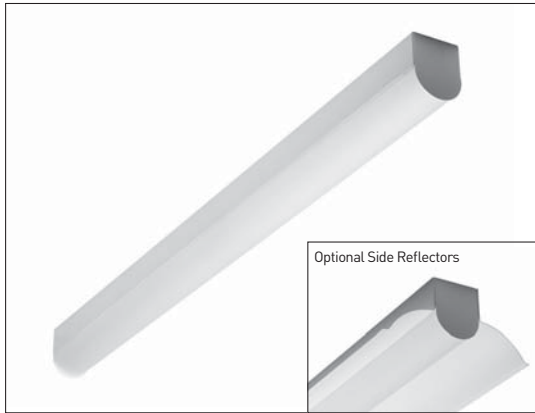
When ordering a sloped ceiling adapter, specify the degree of slope in 1° increments, maximum of 35°. For a more precise degree or wet ceiling applications, please contact factory. Sloped ceiling adapter and housing must be installed at the same time.



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LW4 SERIES

Architectural Linear Ambient LED Luminaire

Fixture Type: _____

Job Information: _____

SPECIFICATIONS:

LED MODULES:

- High performance linear configured LED module boards.
- Each board consists of multiple mid-power, high efficacy LEDs in a precise layout eliminating the need for supplemental heat sinking.
- The boards produce an even and diffuse light which maximizes optical efficiency.
- Compatible with the dimming performance of the LED driver.
- Color temperatures available: 3000K, 3500K and 4000K.
- Upon request: 5000K.

LED DRIVERS:

- Factory programmable constant current LED power supply.
- Multiple standard drive current outputs (factory set by Mercury) are cataloged with their corresponding lumen package offerings. Upon request, custom drive current outputs and lumen packages are available.
- Note: Certain cataloged lumen packages may be provided with a non-programmable constant current LED power supply at Mercury's discretion. Contact factory if critical.
- Universal voltage input, 120V-277V, 50HZ-60HZ.
- Specification grade dimming down to 10% on 0-10V dimming controls.

LED LUMEN PACKAGES:

- Cataloged standard lumen packages. See attached chart for full details.
- Custom lumen packages pre-set are optional with programmable drivers only. Contact factory for details.

HOUSING:

- Fabricated from heavy gauge code grade cold rolled steel with a white polyester powder coating finish for long lasting durability.
- Housing ends are welded into place.
- Sufficient electrical knockouts are provided on the housing back and ends.

REFLECTOR OPTIONS:

- Side reflectors are factory installed or can be field installed to the housing.
- May be used individually for one-side asymmetric function or in pairs for dual-side symmetric function.
- Aperture option; a series of architectural apertures allows a segment of up lighting.

DIFFUSER:

- Small-scale rounded profile design.
- Extruded from custom formulated high transmission acrylic material.
- Linear ribbing for high LED performance.

STANDBY LIGHTING OPTION:

- Self contained module, 5W, 7W, 10W or 12W as specified. Battery backup upon loss of power. Available 4Ft. and 8Ft. modules only.

OPTIONAL INTEGRAL LIGHTING CONTROLS:

- Self-contained motion sensors mount directly to luminaire.
- Passive infrared (PIF) technology for individual luminaire control.
- On/Off control with optional delay features.
- See ordering matrix for available sensors.
- System lighting controls available. Contact factory.

INSTALLATIONS:

- May be installed in any direction, individually or in continuous run applications.
- May be surface mounted or suspended.
- End knockouts for surface conduit entry.

CERTIFICATE OF SAFETY COMPLIANCE AND LISTINGS:

- Luminaire: UL and CUL listed 1598 and bears their label. Suitable for damp locations.
- DesignLights Consortium (DLC) qualified product. Not all versions of this product may be DLC qualified. Check at www.designlights.org/QPL to confirm.

WARRANTY:

- 5-year limited warranty is standard. Special 10-year warranty available on a job-to-job basis. Complete LED warranty terms available at www.mercltg.com.
- Actual performance may differ as a result of end-user environment and application.
- Most LED luminaires are suitable to operate in ambient temperatures from -20C (-4F) to 25C (77F).
- The following exclusions apply: Luminaires with optional standby lighting option, integral lighting controls options, or wireless control options. Consult factory.
- LM-79 testing was measured under a controlled 25C (77F) ambient operating temperature.

FEATURES:

- Shallow form linear ambient LED luminaire.
- Small-scale rounded profile acrylic diffuser evenly surrounds the LED light source enabling a very wide and near-perfect light distribution.
- Compact design complies with all ADA requirements for public areas.
- Custom formulated high diffusion acrylic material allows for maximum light transmission while eliminating pixilation and hot spots.
- Optional integral side reflectors add both function and architectural contour.
- Nominal 2Ft., 4Ft. or 8Ft. long modules.
- Digital LED technology provides high efficacy and energy efficiency.
- Multiple power and light levels are offered as standard to allow meeting design and energy needs per application. Custom factory set levels available on request.
- Lumen maintenance; Reported L70 (hours) & L80 (hours) > 60,000.
- CRI greater than 80.
- Fixture lumens per watt ratios 105 or higher.
- American Made.



MERCURY LIGHTING
PRODUCTS CO. INC.

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www.mercltg.com

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LW4 SERIES

Fixture Type:

ORDERING DATA: Fill in boxes below with corresponding bold options.

Example: LW4-4-3800-35K-HTA-___-UNI-EM7

LW4				HTA		UNI	
SERIES	NOMINAL LENGTH (FT)	NOMINAL LUMENS	COLOR TEMP	DIFFUSER	DRIVER*	VOLTAGE	OPTIONS

LW4	2 24" Length
	4 45" Length
	8 96" Length

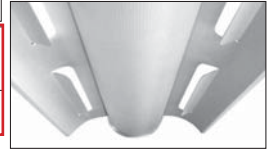
24" L	2100
2300	
2500	
2700	
45" L	2100
3800	
4500	
5000	
96" L	6000
8000	
10000	

30K	HTA High Transmission Acrylic
35K	
40K	
50K	Upon Request

Factory Selected Driver.

UNI

* NOTE: Certain cataloged lumen packages may be provided with a non-programmable constant current LED power supply at Mercury's discretion. Contact factory if critical.



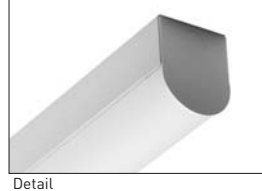
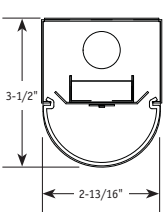
Aperture Reflectors

XXXX
Custom Lumen Package.
Contact Factory.
600 Lumens/LF

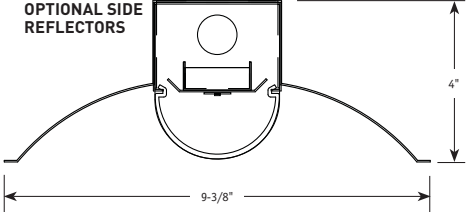
PHOTOMETRICS:

All photometric reports are available at www.mercltg.com.

CROSS SECTIONS:



OPTIONAL SIDE REFLECTORS



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www.mercltg.com

LUMEN PACKAGE

SERIES	NOMINAL LENGTH (FT)	Nominal Lumen Package	Color	Fixture Power (W)	Delivered Lumens	Fixture LPW	DLC	SR OPTION DLC
LW4	2	2100	3000K	18	2035	111	✓	✓
		2100	3500K	18	2067	113	✓	✓
		2100	4000K	18	2131	116	✓	✓
		2100	5000K	18	2195	120	✓	✓
	4	2300	3000K	21	2265	108	✓	✓
		2300	3500K	21	2301	110	✓	✓
		2300	4000K	21	2372	113	✓	✓
		2300	5000K	21	2443	117	✓	✓
		2500	3000K	22	2392	107	✓	✓
		2500	3500K	22	2429	108	✓	✓
		2500	4000K	22	2504	112	✓	✓
		2500	5000K	22	2580	115	✓	✓
8	2700	3000K	25	2586	105	✓	✓	
	2700	3500K	25	2627	106	✓	✓	
	2700	4000K	25	2708	110	✓	✓	
	2700	5000K	25	2789	113	✓	✓	

SERIES	NOMINAL LENGTH (FT)	Nominal Lumen Package	Color	Fixture Power (W)	Delivered Lumens	Fixture LPW	DLC	SR OPTION DLC
LW4	4	2100	3000K	18	2025	114	✓	✓
		2100	3500K	18	2056	116	✓	✓
		2100	4000K	18	2120	119	✓	✓
		2100	5000K	18	2184	123	✓	✓
	8	3800	3000K	32	3649	113	✓	✓
		3800	3500K	32	3706	115	✓	✓
		3800	4000K	32	3821	119	✓	✓
		3800	5000K	32	3935	122	✓	✓
		4500	3000K	39	4314	109	✓	✓
		4500	3500K	39	4382	111	✓	✓
		4500	4000K	39	4517	115	✓	✓
		4500	5000K	39	4653	118	✓	✓
16	5000	3000K	45	4821	107	✓	✓	
	5000	3500K	45	4897	108	✓	✓	
	5000	4000K	45	5048	112	✓	✓	
	5000	5000K	45	5200	115	✓	✓	

SERIES	NOMINAL LENGTH (FT)	Nominal Lumen Package	Color	Fixture Power (W)	Delivered Lumens	Fixture LPW	DLC	SR OPTION DLC
LW4	8	6000	3000K	49	5798	118	-	-
		6000	3500K	49	5889	120	-	-
		6000	4000K	49	6071	123	-	-
		6000	5000K	49	6253	127	✓	✓
	16	8000	3000K	69	7701	112	✓	✓
		8000	3500K	69	7822	114	✓	-
		8000	4000K	69	8064	117	✓	✓
		8000	5000K	69	8306	121	✓	✓
		10,000	3000K	89	9557	107	-	-
		10,000	3500K	89	9707	108	-	-
		10,000	4000K	89	10,008	112	-	-
		10,000	5000K	89	10,308	115	✓	✓

Actual wattage may differ by +/- 5% when operating between 120V-277V +/- 10%.

HANGING ACCESSORIES

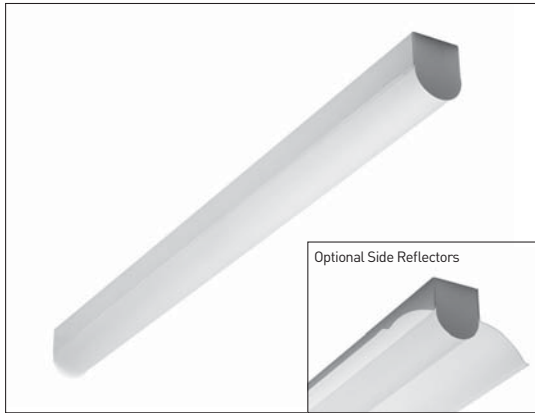
PART #	DESCRIPTION	PART #	DESCRIPTION
HWPFCS5/2T	Cable Hanger-Grid Ceiling/5" J-Box Feed Canopy, 2" Non-Feed Grid Canopy	ACXX	Aircraft Cable/ XX= 48"L, 96"L, 150"L **Other lengths available.
HWPFCS2	Cable Hanger-Grid Ceiling/2" Non-Feed Grid Canopy	VH-XX	"V" Hanger w/XX= 48"L or 72"L Chain & "S" Hook ** Other lengths available.
HWPFCS5J	Cable Hanger-J-Box/5" J-Box Feed Canopy	CPYS-1	S-1 Single Stem 5" Dia. Canopy
HWPFCS5J	Cable Hanger-J-Box/5" J-Box Non-Feed Canopy	STMXX	XX= 12"L, 24"L, 48"L Stem/ 3/8" IPS-5/8" OD ** Other lengths available.

SPECIFICATIONS SUBJECT TO CHANGE, 02/17
CONSULT FACTORY WHEN CRITICAL.

SBLD Studio
132 W 36th St.
NY, NY 10018
212.391.4230

LAMP: 8W/LF Maximum LED, Provided by Manufacturer, 3500K
DRIVER: Provided by Manufacturer, 0-10V Dimming Capable

F19



LW4 SERIES

Architectural Linear Ambient LED Luminaire

Fixture Type: _____

Job Information: _____

SPECIFICATIONS:

LED MODULES:

- High performance linear configured LED module boards.
- Each board consists of multiple mid-power, high efficacy LEDs in a precise layout eliminating the need for supplemental heat sinking.
- The boards produce an even and diffuse light which maximizes optical efficiency.
- Compatible with the dimming performance of the LED driver.
- Color temperatures available: 3000K, 3500K and 4000K.
- Upon request: 5000K.

LED DRIVERS:

- Factory programmable constant current LED power supply.
- Multiple standard drive current outputs (factory set by Mercury) are cataloged with their corresponding lumen package offerings. Upon request, custom drive current outputs and lumen packages are available.
- Note: Certain cataloged lumen packages may be provided with a non-programmable constant current LED power supply at Mercury's discretion. Contact factory if critical.
- Universal voltage input, 120V-277V, 50HZ-60HZ.
- Specification grade dimming down to 10% on 0-10V dimming controls.

LED LUMEN PACKAGES:

- Cataloged standard lumen packages. See attached chart for full details.
- Custom lumen packages pre-set are optional with programmable drivers only. Contact factory for details.

HOUSING:

- Fabricated from heavy gauge code grade cold rolled steel with a white polyester powder coating finish for long lasting durability.
- Housing ends are welded into place.
- Sufficient electrical knockouts are provided on the housing back and ends.

REFLECTOR OPTIONS:

- Side reflectors are factory installed or can be field installed to the housing.
- May be used individually for one-side asymmetric function or in pairs for dual-side symmetric function.
- Aperture option; a series of architectural apertures allows a segment of up lighting.

DIFFUSER:

- Small-scale rounded profile design.
- Extruded from custom formulated high transmission acrylic material.
- Linear ribbing for high LED performance.

STANDBY LIGHTING OPTION:

- Self contained module, 5W, 7W, 10W or 12W as specified. Battery backup upon loss of power. Available 4Ft. and 8Ft. modules only.

OPTIONAL INTEGRAL LIGHTING CONTROLS:

- Self-contained motion sensors mount directly to luminaire.
- Passive infrared (PIF) technology for individual luminaire control.
- On/Off control with optional delay features.
- See ordering matrix for available sensors.
- System lighting controls available. Contact factory.

INSTALLATIONS:

- May be installed in any direction, individually or in continuous run applications.
- May be surface mounted or suspended.
- End knockouts for surface conduit entry.

CERTIFICATE OF SAFETY COMPLIANCE AND LISTINGS:

- Luminaire: UL and CUL listed 1598 and bears their label. Suitable for damp locations.
- DesignLights Consortium (DLC) qualified product. Not all versions of this product may be DLC qualified. Check at www.designlights.org/QPL to confirm.

WARRANTY:

- 5-year limited warranty is standard. Special 10-year warranty available on a job-to-job basis. Complete LED warranty terms available at www.mercltg.com.
- Actual performance may differ as a result of end-user environment and application.
- Most LED luminaires are suitable to operate in ambient temperatures from -20C (-4F) to 25C (77F).
- The following exclusions apply: Luminaires with optional standby lighting option, integral lighting controls options, or wireless control options. Consult factory.
- LM-79 testing was measured under a controlled 25C (77F) ambient operating temperature.

FEATURES:

- Shallow form linear ambient LED luminaire.
- Small-scale rounded profile acrylic diffuser evenly surrounds the LED light source enabling a very wide and near-perfect light distribution.
- Compact design complies with all ADA requirements for public areas.
- Custom formulated high diffusion acrylic material allows for maximum light transmission while eliminating pixilation and hot spots.
- Optional integral side reflectors add both function and architectural contour.
- Nominal 2Ft., 4Ft. or 8Ft. long modules.
- Digital LED technology provides high efficacy and energy efficiency.
- Multiple power and light levels are offered as standard to allow meeting design and energy needs per application. Custom factory set levels available on request.
- Lumen maintenance; Reported L70 (hours) & L80 (hours) > 60,000.
- CRI greater than 80.
- Fixture lumens per watt ratios 105 or higher.
- American Made.



20 Audrey Place • Fairfield, NJ 07004 • Tel: 800.637.2584 • Fax: 973.244.9522
www.mercltg.com

<p>SBLD Studio 132 W 36th St. NY, NY 10018 212.391.4230</p>	<h1>F19A</h1>
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LW4 SERIES

Fixture Type:

ORDERING DATA: Fill in boxes below with corresponding bold options.

Example: LW4-4-3800-35K-HTA-___-UNI-EM7

LW4	NOMINAL LENGTH (FT)	NOMINAL LUMENS	COLOR TEMP	HTA	DRIVER*	UNI	OPTIONS
LW4	2 24" Length	24"L 2100 2300 2500 2700 45"L 2100 3800 4500 5000 96"L 6000 8000 10000	30K 35K 40K 50K Upon Request	HTA High Transmission Acrylic	Factory Selected Driver.	UNI	Side Reflectors SR Symmetric Function Set of 2 Side Reflectors AR Asymmetric Function 1 Side Reflector SRA Symmetric Function Aperture Reflectors Standby Modules EM5 EM7 EM10 EM12 Available 4ft. and 8ft. Modules Only Optional Integral Lighting Controls 01 Leviton OSFHU mounts externally, for higher ceilings. 04 Wattstopper FS-155-1 mounts internally with only the PIF dome visible. 05 Leviton OSF10 mounts internally with only the PIF dome visible.

* NOTE: Certain cataloged lumen packages may be provided with a non-programmable constant current LED power supply at Mercury's discretion. Contact factory if critical.

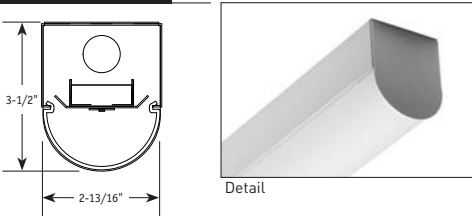


Aperture Reflectors

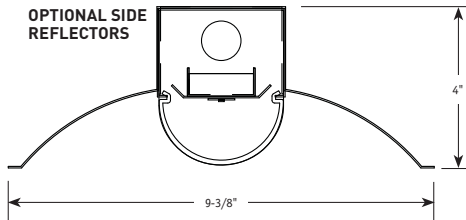
PHOTOMETRICS:

All photometric reports are available at www.mercltg.com.

CROSS SECTIONS:



OPTIONAL SIDE REFLECTORS



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LUMEN PACKAGE

SERIES	NOMINAL LENGTH (FT)	Nominal Lumen Package	Color	Fixture Power (W)	Delivered Lumens	Fixture LPW	DLC	SR OPTION DLC
LW4	2	2100	3000K	18	2035	111	✓	✓
		2100	3500K	18	2067	113	✓	✓
		2100	4000K	18	2131	116	✓	✓
		2100	5000K	18	2195	120	✓	✓
	4	2300	3000K	21	2265	108	✓	✓
		2300	3500K	21	2301	110	✓	✓
		2300	4000K	21	2372	113	✓	✓
		2300	5000K	21	2443	117	✓	✓
		2500	3000K	22	2392	107	✓	✓
		2500	3500K	22	2429	108	✓	✓
		2500	4000K	22	2504	112	✓	✓
		2500	5000K	22	2580	115	✓	✓

SERIES	NOMINAL LENGTH (FT)	Nominal Lumen Package	Color	Fixture Power (W)	Delivered Lumens	Fixture LPW	DLC	SR OPTION DLC
LW4	4	2100	3000K	18	2025	114	✓	✓
		2100	3500K	18	2056	116	✓	✓
		2100	4000K	18	2120	119	✓	✓
		2100	5000K	18	2184	123	✓	✓
	8	3800	3000K	32	3649	113	✓	✓
		3800	3500K	32	3706	115	✓	✓
		3800	4000K	32	3821	119	✓	✓
		3800	5000K	32	3935	122	✓	✓
		4500	3000K	39	4314	109	✓	✓
		4500	3500K	39	4382	111	✓	✓
		4500	4000K	39	4517	115	✓	✓
		4500	5000K	39	4653	118	✓	✓

SERIES	NOMINAL LENGTH (FT)	Nominal Lumen Package	Color	Fixture Power (W)	Delivered Lumens	Fixture LPW	DLC	SR OPTION DLC
LW4	8	6000	3000K	49	5798	118	-	-
		6000	3500K	49	5889	120	-	-
		6000	4000K	49	6071	123	-	-
		6000	5000K	49	6253	127	✓	✓
	10,000	8000	3000K	69	7701	112	✓	✓
		8000	3500K	69	7822	114	✓	-
		8000	4000K	69	8064	117	✓	✓
		8000	5000K	69	8306	121	✓	✓
		10,000	3000K	89	9557	107	-	-
		10,000	3500K	89	9707	108	-	-
		10,000	4000K	89	10,008	112	-	-
		10,000	5000K	89	10,308	115	✓	✓

Actual wattage may differ by +/- 5% when operating between 120V-277V +/- 10%.

HANGING ACCESSORIES

PART #	DESCRIPTION	PART #	DESCRIPTION
HWPFCS5/2T	Cable Hanger-Grid Ceiling/5" J-Box Feed Canopy, 2" Non-Feed Grid Canopy	ACXX	Aircraft Cable/ XX= 48"L, 96"L, 150"L **Other lengths available.
HWPFCS2	Cable Hanger-Grid Ceiling/2" Non-Feed Grid Canopy	VH-XX	"V" Hanger w/XX= 48"L or 72"L Chain & "S" Hook ** Other lengths available.
HWPFCS5J	Cable Hanger-J-Box/5" J-Box Feed Canopy	CPYS-1	S-1 Single Stem 5" Dia. Canopy
HWPFCS5J	Cable Hanger-J-Box/5" J-Box Non-Feed Canopy	STMXX	XX= 12"L, 24"L, 48"L Stem/ 3/8" IPS-5/8" OD ** Other lengths available.

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