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Inspections Division
Approved with Conditions
Date: 05/08/17

SPECIFICATIONS

PROJECT:

Medical Offices
1945 Congress Street
Portland, ME 04102

ARCHITECT:

ARCHETYPE, P.A.
48 UNION WHARF
PORTLAND, MAINE 04101

BID SET
27 DECEMBER 2016

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SECTION 01 31 00

SUBMITTALS, MEETINGS AND RECORD DOCUMENTS

1. GENERAL

1.1 PRE-CONSTRUCTION MEETING

A. Architect and Owner will schedule a pre-construction meeting within 15 days of issuance of Notice to Proceed, to be attended by the owner, all project managers, Contractor's field superintendent, and representatives of major sub-contractors. At this time, Contractor shall make specified pre-construction submittals including following:

1. Typed list of sub-contractors with addresses and telephone numbers.
2. Certificates of insurance.
3. Approved construction schedule. See General Conditions, Paragraph 3.10.
4. Schedule of values.
5. Start-up authorization or certificates.

B. Pre-construction meeting agenda will include following:

1. Processing application for payment.
2. Processing and distribution of submittals.
3. Maintenance of record documents.
4. Procedure for field changes, change estimates, change orders, etc.
5. Site and building security.
6. Location and maintenance of temporary storage areas, field offices, vehicular parking and access, waste disposal, etc.
7. Safety and first-aid procedures.
8. Date and time for regular monthly coordination and progress meeting (to be coordinated with monthly application for payment).

1.2 CONSTRUCTION SCHEDULE

A. Refer to General Conditions, Paragraph 3.10, for general provisions concerning construction progress schedule. Schedule shall show activities, itemized according to specification Section, and be organized in bar-chart or graph form so as to show both projected and actual progress of work.

B. Arrange schedule to indicate required sequencing of units, and to show time allowances for submittals, inspections, and similar time margins.

C. Show critical submittal dates related to each time bar, or prepare a separate coordinated listing of critical submittal dates.

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D. Show phases of work within each time bar for major elements which involve purchase lead-time, fabrication, seasonal treatment, mockups, testing, or similar phases as well as installation.

E. Submit updated schedule monthly, together with application for payment.

1.3 SCHEDULE OF VALUES

A. Refer to General Conditions, Paragraph 9.2 for general provisions concerning schedule of values.

B. For these submittals, use AIA Document G702/703, Application and Certificate for Payment.

C. Use specifications Sections as listed in Table of Contents as basis for format for listing costs.

D. Itemize separately general cost items, such as bonds and allowances.

E. Itemize change orders separately as they are approved.

1.4 MEETINGS AND REPORTING

A. Contractor shall conduct general progress and coordination meetings at least twice each month, attended by a representative of each primary entity engaged for performance of work. Record discussions and decisions, and distribute copies to those attending and others affected, including Architect/Engineer.

B. Date and time of at least one regular monthly progress and coordination meeting shall be determined at the pre-construction meeting. Timing of this monthly meeting shall be coordinated with payment requests.

1.5 APPLICATION FOR PAYMENT

A. Refer to General Conditions, Paragraph 9.3, for general provisions concerning applications for payment.

B. Use AIA Form G702/703, fully completed and executed.

C. Submit the forms in triplicate including attachment of waivers and similar documentation with one copy.

1.6 SHOP DRAWINGS, PROJECT DATA, SAMPLES

A. Refer to General Conditions, Product Data and Samples, paragraph 3.12, for general provisions covering this type of submittal.

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B. Coordinate the preparation and processing of work-related submittals with the performance of the work. Coordinate each separate submittal with other submittals and related activities that require sequential activity. Coordinate the submittal of different units of interrelated work so that one submittal will not be delayed by the necessity of reviewing a related submittal.

C. Architect/Engineer Review:

1. Allow ten working days for the Architect/Engineer's initial processing of each submittal. Allow one week for reprocessing each submittal. No extension of time will be authorized because of failure to transmit submittals to the Architect/Engineer sufficiently in advance of the work.

2. The Architect/Engineer will stamp each submittal to be returned with a uniform, self-explanatory action stamp, appropriately marked and executed to indicate the status of the submittal.

D. Mark each submittal with a permanent label for identification. Provide project name, date, name of Architect/Engineer, name of Contractor, number and title of appropriate specification section and similar definitive information. Provide a space on the label for Contractors and Architect/Engineer's review markings.

E. Package each submittal appropriately for transmittal and handling. Send each submittal from the Contractor to the Architect/Engineer and other destinations using AIA Transmittal Form G810.

F. Provide additional copies of submittals required by governing authorities that are in addition to copies specified for submittal to the Architect/Engineer.

G. Where it is necessary to provide intermediate submittals between the initial and final submittals, provide and process intermediate submittals in the same manner as for initial submittals.

H. Submit as follows:

1. Shop drawings (original drawings prepared by Contractor or sub-contractor illustrating fabrication, layout, erection details, etc.): six prints, or one reproducible transparency and one opaque print, to Architect.

2. Manufacturers' specifications, installation instructions, charts, schedules, catalogs, brochures, etc.: number of copies required by Contractor for distribution, plus one copy for Architect's retention.

3. Samples: one sample to Architect only, unless otherwise specified.

4. In submitting shop drawings and product data to Architect, use separate transmittals for material in different specification Sections, with applicable specification Section clearly numbered.

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I. Architect will review submittals within ten working days, measured from date of receipt by Architect until date of mailing. Contractor shall promptly make corrections and resubmit when so directed. Where submittal is marked "Approved as Noted" or similar, assume that all items are approved other than those to which specific exception is taken. Do not delay fabrication, assembly and delivery pending receipt of entirely "Approved" submittal.

J. Distribute approved submittals to job site and record document files, and to suppliers and sub-contractors as required. Samples not designated by Contractor for incorporation into Work shall be kept on file until job completion. Any sample not reclaimed within 30 days after job completion will be considered unclaimed, and will be disposed of as directed by Architect.

1.7 PROJECT RECORD DOCUMENTS

A. Keep on file at job site one complete set of up-to-date Contract Documents, including drawings and specifications, addenda, shop drawings and product data, testing data, change orders, field orders, and other modifications. Documents shall be neatly and securely stored in files or on racks, clearly indexed by trade activity or specification Section, and shall not be used for construction purposes.

B. Legibly mark significant field changes such as following, using colored pencils or felt-tipped pens:

1. Drawings: locations of concealed utilities, field changes of dimension and detail, changes resulting from change order or field order, and details not on original drawings.

2. Specifications: manufacturer and model number of equipment actually installed.

3. Shop drawings and manufacturers' literature: changes made after Architect's review.

C. At completion of Work, deliver completed record documents to Architect. Final payment for Project will not be made until Architect reviews and approves these documents.

1.8 SUBSTANTIAL COMPLETION

A. Refer to General Conditions, Article 9, Substantial Completion, for general provision concerning substantial Completion.

B. Following issuance by Architect/Engineer of Certificate of Substantial Completion, Contractor may submit special payment request, provided the following have been completed:

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1. Obtain permits, certificates of inspection and other approval and releases by governing authorities, required for Owner's occupancy and use of project.
2. Submit warranties and similar documentation.
3. Submit maintenance manuals and provide instruction of Owner's operational/maintenance personnel.
4. Complete final cleaning of the work.
5. Submit record documents.
6. Submit listing of work to be completed before final acceptance.

C. Following completion of the following requirements, final payment request may be submitted:

1. Complete work listed as incomplete at time of substantial completion, or otherwise assure Owner of subsequent completion of individual incomplete items.
2. Settle liens and other claims, or assure Owner of subsequent settlement.
3. Submit proof of payment on fees, taxes and similar obligations.
4. Transfer operational, access, security and similar provisions to Owner; and remove temporary facilities, tools and similar items.
5. Completion of requirements specified in "Project Closeout" section.
6. Obtain consent of surety for final payment.

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SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Section Includes:
   1. Submittal procedures.
   2. Product Data, Shop Drawings, and Samples.
   3. Assurance/Control submittals.
      a. Certificates.
      b. Manufacturer's installation instructions.
   4. Architect's action.

1.2 SUBMITTALS

A. Submit two copies of proposed Schedule of Submittals to Contracting Officer Representative within 30 days after receipt of Notice to Proceed. List all items require submittal for review and approval by Contracting Officer.

B. Submit two copies of final Schedule of Submittals to Contracting Officer Representative within 2 days after receipt of proposed Schedule of Submittals review from Contracting Officer.

C. Submit schedule on Contracting Officer approved form provided to Contractor by Contracting Officer Representative.

D. Schedule of Submittals: Include the following.
   1. Indicate type of submittal; product data, shop drawing, sample, certificate, or other submittal.
   2. Identify by Specification Section number, Specification paragraph number where item is specified, and description of item being submitted.
   3. Indicate scheduled date for initial submittal, date for approval, and date for possible resubmittal for each submittal.

E. Coordinate Schedule of Submittals with Construction Schedule. Revise and update Schedule of Submittals when required by changes in the Construction Schedule. Provide Contracting Officer Representative with updated schedules within 2 days of date schedule is revised.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Contracting Officer accepted form. Submit 3 copies of each transmittal.

B. Sequentially number transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

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C. Identify Project, Lessor, Subcontractor or supplier; pertinent drawing and detail numbe specification section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to comply with scheduling requirements of Construction Schedule

F. For each submittal for review, allow 10 days excluding delivery time to and from the Contractor.

G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor and Architect of Record review stamps.

I. Revise and resubmit, identify all changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with provisions.

K. Submittals not requested will not be recognized or processed.

1.4 PRODUCT DATA

A. Product data includes printed information such as catalog cuts, manufacturer's published instructions, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, performance curves and other similar items.

A. Submit the number of copies which the Contractor requires, plus two copies which will be retained by Contracting Officer Representative and Architect of Record.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

C. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.5 SHOP DRAWINGS

A. Submit in the form of one reproducible transparency and one opaque reproduction.

B. Shop Drawings: Submit for review. After review, produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article above.

C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

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1.5 SAMPLES

B. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

C. Submit samples of finishes in colors selected, textures, and patterns for Contracting Officer selection.

D. Include identification on each sample, with full Project information.

E. Submit the number of samples specified in individual specification sections; one of which will be retained by the Contracting Officer.

1.6 CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer to Contracting Officer, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Contracting Officer.

1.7 MANUFACTURER INSTALLATION INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, to Contracting Officer Representative in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.8 CONTRACTING OFFICER ACTION

A. For submittals where action and return is required or requested, Contracting Officer Representative will review each submittal, mark to indicate action taken, and return promptly; generally within 10 calendar days from date of receipt.
   1. Compliance with specified characteristics is the Lessor's responsibility.
   2. Submittals for information, closeout documents, record documents and other submittals for similar purposes, no action will be taken.

B. Action Stamp: Architect of Record will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken.
   1. "Accepted": Final Unrestricted Release. Where submittals are marked "Accepted", that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
   2. "Accepted as Noted": Final-But-Restricted Release. When submittals are marked "Accepted as Noted", that part of the Work covered by the submittal may proceed provided it complies with

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notations or corrections on the submittal and requirements of the Contract Document acceptance will depend on that compliance.

3. "Rejected: Submit Specified Item" or "Revise and Resubmit": Returned for Resubmittal. When submittal is marked "Rejected: Submit Specified Item", "Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
   a. Do not permit submittals marked "Rejected: Submit Specified Item" or "Revise and Resubmit," to be used at the Project site, or elsewhere where Work is in progress.
4. "Returned - Not Required": Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Returned - Not Required".

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

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SECTION 01 33 10

PRODUCTS AND SUBSTITUTIONS

1. GENERAL

1.1 PROCEDURAL REQUIREMENTS

A. Source Limitations:

1. To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit of work. Where it is not possible to do so, match separate procurements as closely as possible.

2. To the extent that the product selection process is under the Contractor's control, provide products that are compatible with previously selected products.

3. Where standard products are available that comply with specified requirements, provide those standard products that have been used successfully before in similar applications, and that are recommended by the manufacturers for the applications indicated.

1.2 PRODUCT SELECTION LIMITATIONS

A. Product Selections: Comply with the following requirements in the selection of products, materials and equipment:

1. Single Product Name: Where only a single product or manufacturer is named, provide the product, unless it is not available, is incompatible with existing work, or does not comply with specified requirements or governing regulations.

2. Two or More Products Named: Where two or more products or manufacturers are named, the selection is at the Contractor's option, provided the product selected complies with specified requirements.

3. "Or Approved Equal" Provisions": Where products or manufacturers are specified by name accompanied by the term "or approved equal", provide either the product named, or comply with the requirements for gaining approval of "substitutions" for the use of an unnamed product.

4. Compliance with Standards: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting any product that complies with specified requirements provided no product names are indicated.

5. Performance Requirements: Where the specifications require compliance with indicated performance requirements, the Contractor has the option of selecting any

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product that complies with the specific performance requirements, provided no product names are indicated.

6. Visual Requirements: Where the specifications indicate that a product is to be selected from the manufacturer's standard options, without naming the manufacturer, the Architect/Engineer has the option of making the selection, after the Contractor has determined or selected the manufacturer.

B. Nameplates: Except as otherwise indicated for required labels and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on the exterior of the completed project.

1.3 SUBSTITUTIONS

A. Conditions: The Contractor's requests for substitutions will be considered when they are reasonable, timely, fully documented, and when they qualify under one or more of the following circumstances.

1. The proposed substitution is related to an "or approved equal" or similar provision in the contract documents.

2. The required product cannot be supplied in time for compliance with Contract Time requirements.

3. The required product is not acceptable to governing authorities.

4. The required product cannot be properly coordinated with other materials in the work, or cannot be warranted or insured as specified.

5. The proposed substitution will offer a substantial advantage to the Owner after deducting offsetting disadvantages including delays, additional compensation to the Architect/Engineer for redesign, evaluation and other necessary services, and similar considerations.

B. Submittals: Include the following information, as appropriate, in each request for substitution:

1. Provide complete product documentation, including product data and samples, where appropriate.

2. Provide detailed performance comparisons and evaluation, including testing laboratory reports where applicable.

3. Provide coordination information indicating the effect of the substitution on other work and the time schedule.

4. Provide cost information for the proposed change order.

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5. Provide the Contractor's general certification of the recommended substitution.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Receive, store and handle products, materials and equipment in a manner which will prevent loss, deterioration and damage.

B. Schedule deliveries so as to minimize long-term storage at the project site.

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SECTION 01 45 00
QUALITY CONTROL SERVICES

1. GENERAL

1.1 DESCRIPTION

A. Quality control services include inspections and tests performed by independent agencies and governing authorities, as well as by the Contractor.

B. Inspection and testing services are intended to determine compliance of the work with requirements specified.

C. Specific quality control requirements are specified in individual specification sections.

1.2 RESPONSIBILITIES

A. Except where indicated as being the Owner's responsibility, quality control services are the Contractor's responsibility, including those specified to be performed by an independent agency and not by the Contractor.

B. The Contractor shall employ and pay an independent agency, testing laboratory or other qualified firm to perform quality control services specified.

C. The Owner will engage and pay for services of an independent agency to perform the inspections and tests that are specified as Owner's responsibilities.

D. Where results of inspections or tests do not indicate compliance with contract document, retests are the Contractor's responsibility.

E. The Contractor shall cooperate with independent agencies performing inspections or tests. Provide auxiliary services as are reasonable. Auxiliary services include:

1. Provide access to the work.
2. Assist taking samples.
3. Deliver samples to test laboratory.

1.3 COORDINATION

A. The Contractor and independent test agencies shall coordinate the sequence of their activities. Avoid removing and replacing work to accommodate inspections and tests. The Contractor is responsible for scheduling times for inspections and tests.

1.4 QUALIFICATIONS FOR SERVICE AGENCIES

A. Engage inspection and test service agencies which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories.

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B. Each agency shall be employed with the approval of the Architect/Engineer.

1.5 SUBMITTALS

A. Notify the Architect/Engineer of the testing schedule.

B. Submit a certified written report of each inspection test or similar service, in duplicate to the Architect/Engineer. Submit additional copies of each report to governing authority, when the authority so directs.

1.6 REPORT DATA

A. Written inspection or test reports shall include:

1. Name of testing agency or test laboratory.
2. Dates and locations of samples, tests or inspections.
3. Names of individuals present.
4. Complete inspection or test data.
5. Test results.
6. Interpretations.
7. Recommendations.

B. Reports shall be provided to the Architect/Engineer in a timely manner.

1.7 REPAIR AND PROTECTION

A. Upon completion of inspection or testing repair damaged work and restore substrates and finishes. Comply with requirements for "Cutting and Patching".

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SECTION 01 50 00

TEMPORARY FACILITIES

1. GENERAL

1.1 DESCRIPTION OF REQUIREMENTS: Provide temporary services and facilities ready for use when first needed to avoid delay in the work. Field office facility shall be sufficiently large to accommodate all persons and furniture/equipment convening for project meetings (progress and requisition meetings). Maintain, expand and modify as needed. Do not remove until no longer needed, or replaced by authorized use of permanent facilities.

1.2 USE CHARGES: Usage charges for temporary services or facilities are not chargeable to the Owner or Architect/Engineer.

1.3 REGULATIONS: Comply with requirements of local laws and regulations governing construction and local industry standards, in the installation and maintenance of temporary services and facilities.

1.4 STANDARDS: Comply with the requirements of NFPA Code 241, "Building Construction and Demolition Operations", the ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and the NECA National Joint Guideline NJG-6 "Temporary Job Utilities and Services".

1.5 INSPECTIONS: Inspect and test each service before placing temporary utilities in use. Arrange for inspections and tests by governing authorities, and obtain certifications and permits for use.

1.6 SUBMITTALS: Submit copies of reports and permits required or necessary for installation and operation, including reports of tests, inspections and meter readings performed on temporary utilities, and permits and easements necessary for installation, use and operation.

1.7 MATERIALS AND EQUIPMENT

A. Provide materials and equipment that are suitable for the intended use.

B. Provide new materials and equipment for temporary services and facilities; if acceptable to the Architect/Engineer, used materials and equipment that are undamaged may be used.

1.8 INSTALLATION

A. Use qualified tradesmen for installation.

B. Locate temporary services and facilities where they will serve the project adequately and result in minimum interference with the work.

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1.9 TEMPORARY UTILITY INSTALLATION

A. Engage, or make arrangements if necessary with, the local utility company to make connections to existing service.

B. Arrange with the companies and existing users for an acceptable time when service can be interrupted to make connections.

C. Establish a service implementation and termination schedule. As early as possible change to use of permanent service, to enable removal of the temporary utility and eliminate possible interference with completion of the work.

D. Provide adequate capacity at each stage of construction. Prior to availability at the site, provide trucked-in services for startup of construction operations.

E. Obtain and pay for easements required to bring temporary utilities to the site, where the Owner's easement cannot be utilized for that purpose.

1.10 ELECTRIC POWER SERVICE

A. Coordinate with Owner to use existing electrical service during construction.

B. Comply with applicable requirements of NEMA, NECA and UL standards and governing regulations.

C. Install temporary lighting of adequate illumination levels to perform the work specified.

D. Comply with NEC pertaining to installation of temporary wiring service and grounding. Provide meters, transformers, and overcurrent protective devices at main distribution panel for power and light circuitry. Provide disconnects for equipment circuits.

1.11 POWER DISTRIBUTION SYSTEM

A. Provide circuits of proper sizes, characteristics, and ratings for each use indicated.

B. Install wiring overhead, and risers vertically where least exposed to damage.

C. Provide rigid steel conduit to protect wiring on grade, floors, decks or other areas exposed to possible damage.

D. Provide 20 amp, 4-gang receptacle outlets, equipped with ground-fault circuit interrupters, reset button and pilot light, spaced that a 100 foot extension cord can reach each area of work. Use only grounded extension cords; use "hard- service" cords where exposed to abrasion and traffic.

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E. Provide warning signs at power outlets that are other than 110/120 volt. Provide outlets of proper NEMA configuration to prevent insertion of 110/120 volt plugs into higher voltage outlets.

1.12 TEMPORARY LIGHTING

A. Provide general service incandescent lamps of wattage required for adequate illumination.

B. Protect lamps with guard cages or tempered glass enclosures, where exposed to breakage.

C. Provide exterior type fixtures where exposed to weather or moisture.

D. Provide one 200-watt incandescent lamp per 1000 square feet of floor area for general construction lighting, one 100-watt incandescent lamp every 50 feet in corridors, and one lamp per story, located to illuminate each landing and flight in stairways.

E. Install temporary lighting to fulfill security and protection requirements, without having to operate the entire temporary lighting system.

1.13 TEMPORARY TELEPHONES

A. Install telephone for each temporary office and first aid station.

B. At each telephone location post a list of operational and emergency telephone numbers.

1.14 TEMPORARY HEAT

A. Provide temporary heat where needed for performance of work, for curing or drying of recently installed work or for protection of work in place from adverse effects of low temperatures or high humidity.

B. Provide UL or FM tested and labeled heating units known to be safe and without adverse effect upon work in place or being installed. Coordinate with ventilation requirements to produce the ambient condition.

C. Maintain a minimum temperature of 45 deg. F (7 deg. C) in permanently enclosed portions of the building and areas where finished work has been installed.

D. Except where use of the permanent heating system is available and authorized, provide properly vented self-contained LP gas or fuel oil heaters with individual space thermostatic control for temporary heat. Do not use open burning or salamander type heating units.

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1.15 FIELD OFFICES

A. Provide standard prefabricated or mobile units, or the equivalent job-built field offices of sufficient size to accommodate required office personnel at the site.

B. Provide insulated, weathertight units with lockable entrances.

C. Provide vented space heater, capable of maintaining an indoor temperature of 68 deg. F (20 deg. C).

1.16 SANITARY FACILITIES

A. Sanitary facilities include temporary toilets.

B. Comply with governing regulations including safety and health codes for the type, number, location, operation and maintenance of fixtures and facilities.

C. Supply toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility. Provide covered waste containers for used material.

D. Install single occupant self-contained toilet units of the chemical, aerated recirculation or combustion type, properly vented and fully enclosed with glass fiber reinforced polyester shell. Use of pit-type privies will not be permitted.

E. Provide separate toilet facilities for male and female construction personnel.

F Provide drinking water fountains where and when piped potable water, approved by local authorities, is reasonably accessible from permanent or temporary lines. Otherwise, provide containerized tap-dispenser bottled-water type drinking water units.

1.17 FIRST AID SUPPLIES: Comply with governing regulations and recognized recommendations within the construction industry.

1.18 DEWATERING FACILITIES AND DRAINS

A. For temporary drainage and dewatering facilities and operations not directly associated with performance of work included under other sections, comply with dewatering requirements of applicable Division-2 sections. Where feasible, utilize the same facilities.

B. Maintain the site, excavations and construction free of water.

C. Dispose of rainwater in a lawful manner which will not result in flooding and project or adjoining property, nor endanger either permanent work or temporary facilities.

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1.19 TEMPORARY ENCLOSURE

A. Provide temporary enclosure of materials, equipment, work in progress and completed portions of the Work to provide protection from exposure, foul weather, other construction operations, and similar activities.

B. Provide enclosures where temporary heat is needed and the permanent building enclosure is not completed, and there is no other provision for containment of heat. Coordinate with ventilating and material drying or curing requirements to avoid dangerous conditions.

C. Provide temporary enclosures by installing waterproof, fire- resistant, UL labeled tarpaulins with a flame-spread rating of 15 or less, using a minimum of wood framing. Use translucent nylon reinforced laminated polyethylene tarpaulins to admit the maximum amount of daylight. Individual openings of 25 square feet or less may be closed with plywood or similar materials.

D. Close openings through the floor or roof decks and other horizontal surfaces with substantial load-bearing wood-framed or similar construction.

1.20 COLLECTION AND DISPOSAL OF WASTES

A. Establish a system for daily collection and disposal of waste materials, including separation and recycling of waste material. Do not hold collected materials longer than 7 days.

B. Handle waste materials that are hazardous, dangerous, or unsanitary separately from other waste by containerizing.

C. Burying or burning of waste materials on the site or washing waste material down sewers will not be permitted.

D. Provide a written construction materials recycling/waste management work plan, provide on-site containers specific to the items targeted in the plan, monitor and document results of the efforts taken, and report all quantifiable results. Develop and document a construction materials recycling/waste management work plan.

1.21 MISCELLANEOUS SERVICES AND FACILITIES

A. Design, construct, and maintain miscellaneous services and facilities as needed to accommodate performance of the work, including temporary stairs, ramps, ladders, staging, shoring, scaffolding, temporary partitions, waste chutes and similar items.

B. Provide and install on site, either by attachment to site fencing or on freestanding and secure structure a PROJECT SIGN, as designed by Owner or Architect or designated parties, on board 4’-0” x 8’-0” or as directed.

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1.22 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Provide a neat and uniform appearance in security and protection facilities acceptable to the Architect/Engineer and the Owner.

B. Maintain site in a safe, lawful and publicly acceptable manner.

C. Take necessary measures to prevent erosion.

D. Except for utilization of permanent fire protection facilities, as soon as available, do not change over to use of permanent facilities until substantial completion.

1.23 TEMPORARY FIRE PROTECTION

A. Until fire protection needs may be fulfilled by permanent facilities, install and maintain temporary fire protection of the types needed to protect against losses.

B. Comply with recommendations of NFPA Standard 10.

C. Locate fire extinguishers where most effective; provide not less than one on each floor at or near each stairwell.

D. Provide type "A" fire extinguishers for temporary offices and spaces where there is minimal danger of electrical or flammable liquid fires, and type "ABC" dry chemical extinguishers elsewhere.

E. Store combustible materials in containers in fire-safe locations.

F. Review fire prevention and protection needs with local fire department officials and establish procedures to be followed in the event of fire. Instruct personnel in procedures and post warnings and information.

G. Maintain unobstructed access to fire extinguishers, temporary fire protection facilities, stairways and other access routes.

H. Prohibit smoking in hazardous areas.

I. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of ignition.

J. At temporary water outlets provide hoses of sufficient length to reach construction areas. Hang hoses with a warning sign, indicating that hoses are for fire protection purposes and are not to be removed.

K. At the earliest feasible date complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel at the site on how to use facilities which may not be self-explanatory.

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1.24 BARRICADES, WARNING SIGNS AND LIGHTS

A. Comply with recognized standards and code requirements for erection of substantial, barricades where needed to prevent accidents.

B. Paint with appropriate colors and warning signs to inform personnel at the site and the public, of the hazard being protected against.

C. Provide lighting where needed, including flashing red lights where appropriate.

1.25 SECURITY ENCLOSURE AND LOCKUP: Where materials and equipment must be temporarily stored, and are of substantial value or attractive for possible theft, provide a secure lockup.

1.26 ENVIRONMENTAL PROTECTION

A. Conduct construction activities, and by methods that comply with environmental regulations, minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result from the performance of work at the site.

B. Avoid the use of tools and equipment which produce harmful noise.

C. Restrict the use of noise making tools and equipment to hours of use that will minimize complaints.

1.27 OPERATION, TERMINATION AND REMOVAL

A. Limit availability of temporary services and facilities to essential and intended uses to minimize waste and abuse. Do not permit temporary installations to be abused or endangered.

B. Operate and maintain temporary services and facilities in good operating condition and in a safe and efficient manner until removal is authorized. Do not overload services or facilities. Protect from damage by freezing temperatures and similar elements.

C. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.

D. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24- hour basis where required to achieve indicated results and avoid the possibility of damage to the Work or to temporary facilities.

E. Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation.

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F. Remove each temporary service and facility promptly when need has ended, or when replaced by use of a permanent facility, but no later than substantial completion. Complete, or, if necessary, restore permanent work delayed because of interference with the temporary service or facility. Repair damaged work, clean exposed surfaces and replace work which cannot be repaired.

G. At substantial completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period.

END OF SECTION

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SECTION 01 73 29

CUTTING AND PATCHING

1. GENERAL

1.1 REFERENCES

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this Section.

B. Divisions 2 through 31.

1.2 DESCRIPTION OF WORK

A. Definition: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition. This section does not apply to new work that has been installed as part of the Work.

B. Structural Work: Do not cut-and-patch structural work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio.

C. Operational/Safety Limitations: Do not cut-and-patch operational elements and safety components in a manner resulting in decreased performance, shortened useful life, or increased maintenance.

D. Visual/Quality Limitations: Do not cut-and-patch work exposed to view (exterior and interior) in a manner resulting in noticeable reduction of aesthetic qualities and similar qualities, as judged by the Architect/Engineer.

E. Limitation on Approvals: The Architect/Engineer's approval to proceed with cutting and patching does not waive right to later require removal/replacement of work found to be cut-and-patched in an unsatisfactory manner, as judged by the Architect/Engineer.

F. Materials marked to be removed and reused shall be repaired as necessary to maintain their existing condition. When repair is not sufficient, existing materials shall be disposed of and new materials installed to match existing materials.

G. Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.

H. Unless otherwise specified, requirements of this Section apply to Mechanical and Electrical work. Refer to Divisions 15 and 16 for additional requirements and limitations on cutting and patching of mechanical and electrical work.

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1.3 QUALITY ASSURANCE

A. Refer to Section 01 33 10, Products and Substitutions, for general provisions covering product selection, substitutions, material storage and installation.

B. Refer to Section 01 45 00, Quality Control Services, for provisions for testing and inspections.

C. Refer to specific Specification Section covering subject in question for quality assurance requirements.

1.4 SUBMITTALS

A. Issue submittals in accordance with Section 01 33 00, Submittals.

B. Refer to specific Specification Section covering subject in question for submittal requirements.

2. PRODUCTS

2.1 GENERAL

A. Use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will result in equal-or-better performance characteristics.

B. Fire-stopping:

1. Seal openings in fire-rated walls and floors to make a tight fit with penetrating items, using appropriate non-combustible filler material. to provide a rating equivalent to wall/floor assemble.

2. Acceptable filler materials include:
   a. Concrete
   b. Cementitious proprietary product: Zonolite Firestop ZF-1
   c. Blanket-type mineral-fiber or ceramic-fiber insulation (glass-fiber insulation is not acceptable)
   d. Fire-resistant sealant: Domtar Fire-Halt, Dow Corning Fire Stop, Hilti CS 240 Firestop, or Nelson CLK or CMP
   e. Fire-resistant silicone foam: Dow Corning RTV Foam Penetration Seal System, Hilti CB 120 Adhesive Filling and Sealing Foam, Tremco Fyre-Sil
   f. Flexible intumescent strip wrapped around pipe penetrations: Dow Corning Fire Stop Intumescent Wrap, Hilti CS 24720 Intumescent Wrap, Nelson RSW, Tremco TREMstop WS
   g. Intumescent fibrous material enclosed in a polyethylene envelope: Nelson PLW, Tremco TREMstop PS

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h. Pliable intumescent putty: Nelson FSP Flameseal, Tremco TREMstop WBM
i. Water-based intumescent fire-protective coating for electrical cables: Nelson CTG

3. Neatly patch and seal exposed-to-view openings, using sealants, tooled mortar joints, escutcheons, or flanged collars, as appropriate.

3. EXECUTION

3.1 INSPECTION

A. Before cutting, examine surfaces to be cut and patched and conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

3.2 TEMPORARY SUPPORT

A. To prevent failure provide temporary support of work to be cut.

3.3 PROTECTION

A. Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.4 PERFORMANCE

A. Employ skilled workmen to perform cutting and patching work. Except as otherwise indicated or as approved by the Architect/Engineer, proceed with cutting and patching at the earliest feasible time and complete work without delay.

B. Cutting:
1. Cut the work using methods that are least likely to damage work to be retained or adjoining work. Provide dust barriers to prevent dust from entering existing building beyond immediate work area. Where possible, review proposed procedures with the original installer; comply with original installer's recommendations.

2. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

3. Comply with requirements of applicable sections of Division 2 where cutting and patching requires excavating and backfilling.

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4. By-pass utility services such as pipe and conduit, before cutting, where such utility services are shown or required to be removed, relocated or abandoned. Cut-off conduit and pipe in walls or partitions to be removed. After by-pass and cutting, cap, valve or plug and seal tight remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter.

C. Patching:

1. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

2. Where feasible, inspect and test patched areas to demonstrate integrity of work.

3. Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

4. Where removal of walls or partitions extends one finished area into another finished area, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. If necessary to achieve uniform color and appearance, remove existing floor and wall coverings and replace with new materials.

5. Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coat.

6. Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.5 MAINTENANCE OF TRAFFIC, ACCESS, AND UTILITIES

A. Maintain accessibility from street at all times to any fire hydrants within construction area. Ensure that utilities serving adjacent buildings remain in service.

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SECTION 01 77 00

PROJECT CLOSEOUT

1. GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

A. Provisions of this section apply to the procedural requirements for the actual closeout of the Work, not to administrative matters such as final payment or the changeover of insurance.

B. Closeout requirements relate to both substantial and final completion of the Work; they also apply to individual portions of completed work as well as the total Work.

C. Specific requirements contained in other sections have precedence over the general requirements contained in this section.

Certifications, Final Requisition, Incomplete Work Escrow.

1.2 PROCEDURES AT SUBSTANTIAL COMPLETION

A. Prerequisites: Comply with General Conditions and complete the following before requesting Architect's/Engineer's inspection of the Work, or a designated portion of the Work, for certification of substantial completion.

1. Submit executed warranties, workmanship bonds, maintenance agreements, inspection certificates and similar required documentation for specific units of work, enabling owner's unrestricted occupancy and use.

2. Submit record documentation, maintenance manuals, tools, spare parts, keys and similar operational items.

3. Complete instruction of Owner's operating personnel, and start-up of systems.

4. Complete final cleaning, and remove temporary facilities and tools.

B. Inspection Procedures:

1. Upon receipt of Contractor's request, Architect/Engineer will either proceed with inspection or advise Contractor of prerequisites not fulfilled.

2. Following initial inspection, Architect/Engineer will either prepare certificate of substantial completion, or advise Contractor of work which must be performed prior to issuance of the certificate of substantial completion.

3. The Architect/Engineer will repeat the inspection when requested and assure that the Work has been substantially completed.

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4. Results of the completed inspection will form the initial "punch-list" for final acceptance.

1.3 PROCEDURES AT FINAL ACCEPTANCE

A. Reinspection Procedure:

1. The Architect/Engineer will reinspect the Work upon receipt of the Contractor's notice that, except for those items whose completion has been delayed due to circumstances that are acceptable to the Architect/Engineer, the Work has been completed, including punch-list items from earlier inspections.

2. Upon completion of reinspection, the Architect/Engineer will either recommend final acceptance and final payment, or will advise the Contractor of work not completed or obligations not fulfilled as required for final acceptance. If necessary, this procedure will be repeated.

1.4 RECORD DOCUMENTATION

A. Record Drawings:

1. Maintain a complete set of either blue- or black-line prints of the contract drawings and shop drawing for record mark-up purposes throughout the Contract Time.

2. Mark-up these drawings during the course of the work to show both changes and the actual installation, in sufficient detail to form a complete record for the Owner's purposes. Give particular attention to work which will be concealed and difficult to measure and record at a later date, and work which may require servicing or replacement during the life of the project.

3. Require the entities marking prints to sign and date each mark-up.

4. Bind prints into manageable sets, with durable paper covers, appropriately labeled.

B. Maintenance Manuals:

1. Provide 3-ring vinyl-covered binders containing required maintenance manuals, properly identified and indexed.

2. Include operating and maintenance instructions extended to cover emergencies, spare parts, warranties, inspection procedures, diagrams, safety, security, and similar appropriate data for each system or equipment item.

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1.5 GENERAL CLOSEOUT REQUIREMENTS

A. Operator Instructions: Require each Installer of systems requiring continued operation and maintenance by owner's operating personnel, to provide on-location instruction to Owner's personnel, sufficient to ensure safe, secure, efficient, non-failing utilization and operation of systems. Provide instructions for the following categories of work:

1. Mechanical/electrical/electronic systems (not limited to work of Divisions 23 and 26).
2. Live plant materials and lawns.
3. Roofing, flashing, joint sealers.
4. Floor finishes.

B. Final Cleaning: At the time of project close out, clean or reclean the Work to the condition expected from a normal, commercial building cleaning and maintenance program. Complete the following cleaning operations before requesting the Architect/Engineer's inspection for certification of substantial completions.

1. Remove non-permanent protection and labels.
2. Polish glass.
3. Clean exposed finishes.
4. Touch-up minor finish damage.
5. Clean or replace mechanical systems filters.
6. Remove debris.
7. Broom-clean unoccupied spaces.
8. Sanitize plumbing and food service facilities.
9. Clean light fixtures and replace burned-out lamps.
10 Sweep and wash paved areas.
11. Police yards and grounds

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Geotechnical Report

Proposed Medical Building
1945 Congress Street, Portland, Maine

Client

Michael Bedecs, D.O.
Age Management Center
1375 Congress Street
Portland, ME 04101

SUMMIT
GEOENGINEERING SERVICES

145 Lisbon Street (PO Box 7216) Lewiston, Maine 04243 | (207) 576-3313
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Project #: 16092
Date: 10/17/2016

CITY OF PORTLAND, MAINE RESURGAM
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 05/08/17

October 17, 2016
Summit #16092

Age Management Center
Attn: Michael Bedecs, D.O.
1375 Congress Street
Portland, ME 04101

Reference: Geotechnical Engineering Services
Proposed Medical Building – 1945 Congress St, Portland, Maine

Dear Dr. Bedecs;

Summit Geoengineering Services, Inc. (SGS) has completed a geotechnical investigation for the proposed medical building at the site referenced above. Our scope of services included the drilling of two test borings and performing two cone penetration tests (CPT) in and around the proposed building footprint and preparing this geotechnical report summarizing our findings and providing geotechnical recommendations.

Our scope of services for this project did not include an environmental site assessment or further investigation for the presence or absence of hazardous or toxic material on, below, or around the site. Any statements in this report, or on the soil boring logs, regarding odors or unusual and suspicious conditions observed are for informational purposes and are not intended to constitute an environmental assessment.

1.0 Project and Site Description

We understand the project consists of the construction of a new medical office building at the site referenced above. We further understand that the proposed building will be a three story wood framed structure with a footprint of approximately 7,900 square feet containing a partial basement. The east portion of the proposed building will be a slab on grade. Finish floor elevation (FFE) for the basement will be approximately elevation 67 feet and FFE for the slab on grade will be approximately 75 feet.

The site is located at the existing grass/lawn area southeast of the Elk's Lodge building at 1945 Congress Street in Portland, Maine. Grades are relatively flat in this area, ranging from approximately elevation 70 feet to 75 feet, increasing in elevation in an easterly direction. We anticipate up to 2 feet of fill will be required for the exterior of the west end of the building, and up to 7 feet of cut will be required for construction of the basement. The slab-on-grade for the east portion of the building will be approximately at existing grade. Based on discussions with Structural Integrity, Inc., we understand that the column loads will be a maximum of approximately 50 kips and linear loads will be a maximum of approximately 3 kips/ft.

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2.0 Subsurface Exploration and Laboratory Testing

2.1 Subsurface Exploration

Summit Geoengineering Services (SGS) observed the subsurface conditions with the drilling of 2 test borings and 2 cone penetration tests (CPT) on July 6, 2016 using a track mounted AMS Power Probe 9500 VTR rig. Refusal was encountered in Boring B-2, CPT-1, and CPT-2 at depths of 72.5 feet, 34.1 feet, and 38.9 feet respectively. Boring B-1 was advanced to a depth of 22 feet without refusal. Refusal at the CPT-2 location was likely due to a dense gravel layer or cobble.

The borings were advanced using 3" diameter direct push steel casing. During the borings, split spoon sampling was conducted in general accordance with ASTM D1586 at 5 foot intervals. In situ field vane shear testing was performed in Boring B-2 at a depth of 18 feet. In Boring B-2, the borings were advanced using a direct push spear-tip probe.

The CPT explorations were performed in accordance with ASTM D5778 using a Vertek 5 ton digital cone pushed at a constant rate (2 cm/s) with dual-point anchors set at a depth of 1 feet. Measured parameters included cone resistance (q_c), sleeve friction (f_s), and piezocone pore pressure (u_2). Seismic shear wave velocity measurements were collected at discrete intervals of 3.28 feet (1 meter rod breaks) in accordance with ASTM D7400 during both CPTs.

The explorations were located prior to their completion by taping from existing site features. The approximate locations of the borings and CPT are shown on the Exploration Location Plan in Appendix A. Boring Logs and the CPT Logs are provided in Appendix B.

2.2 Laboratory Testing

Laboratory testing was performed on samples of clay recovered from the split spoons collected during the borings. Laboratory testing consisted of the following:

- (3) Moisture Content Tests (ASTM D2216/D4643)
- (1) Atterberg Limit Test (ASTM D4318)

Moisture content tests were performed on three split spoon samples from Boring B-2, ranging in depth from 10 feet to 22 feet below ground surface. The Atterberg Limit was performed on sample S-4 (15 ft. to 17 ft. depth) from Boring B-2. Result from the laboratory tests are summarized below. Detailed results of each test are included in Appendix C.

Presumpscot Formation (Clay):

Moisture Content: 21.8% to 43.4% (average of 33.3%)
Liquid Limit: 40, Plasticity Index: 18

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3.0 Subsurface Conditions

The subsurface conditions presented herein are based on the findings from the test borings and CPTs performed by SGS on July 6, 2016.

3.1 Soil

The following subsurface layers and thicknesses were encountered in our geotechnical investigation, starting from the ground surface:

- ***Topsoil,*** 8 inches to 1 foot
- ***Fill,*** 2.0 feet
- ***Glacial Marine,*** greater than 19 feet to 69 feet

The ***Topsoil*** was encountered in both borings and ranged in thickness from 8 inches to 1 foot. This soil is described as dark brown fine silty sand with some rootlets and visually classifies as SM in accordance with the United Soil Classification System (USCS).

The ***Fill*** is located beneath the topsoil and is approximately 2 feet thick. The soil in this layer is described as dark brown sandy silt and visually classifies as SM in accordance with the USCS. Standard Penetration Testing blow counts (SPT-N) values for the layer ranged from 12 bpf to 26 bpf and averaged at 17 bpf. This soil is dry and compact.

The ***Glacial Marine*** deposit is located beneath the fill layer and extends to bedrock. The composition of the glacial marine deposit varies across the proposed building footprint, generally consisting of granular (sand/silt) material towards the east end of the building, and consisting of primarily cohesive (clay) soil towards the west end of the building.

The glacial marine deposit at the east end of the building (Boring B-1) is described as olive brown to brown silt with little to some sand, trace to little clay, and trace to little gravel. Pocket penetrometer readings (an approximate measurement of unconfined compressive strength) of samples recovered in Boring B-1 range from 3,000 psf to 6,000 psf. SPT-N in the layer ranges from 9 to 28 and average 19 blows per foot. This soil visually classifies as ML in accordance with USCS.

The glacial marine deposit towards the west end (Boring B-2 and CPT-2) consists of approximately 10 feet of stiff silty clay (down to approximate elevation 56 feet), overlying approximately 15 feet of soft silty clay. Below the silty clay is interbedded with sand and silt to refusal depths ranging from 34.1 feet to 72.5 feet. The upper stiff clay “crust” ranges in Pocket Penetrometer measurements from 3,500 psf to 5,000 psf. SPT-N ranges from 13 to 7 and averages 10 blows per foot. It is described as firm to stiff olive brown silty clay with trace sand and gravel. The lower soft clay deposit ranges in Pocket Penetrometer measurements from 0 to 1,000 psf, ranges in SPT-N from 0 to 2 blows per foot, and resulted in a field vane measurement of 600 psf at 18 foot depth. Moisture content ranges from 21.8% to 43.4% with an average of

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33.3%. The clay has a Liquid Limit (PL) of 40 and a Plasticity Index (PI) of 18. The stiff clay and soft clay both visually classify as CL in accordance with USCS.

3.2 Bedrock

Bedrock was encountered at the B-2 location at a depth of 72.5 feet. Mapping by the Maine Geological Survey indicates the bedrock at the site is of the Precambrian Z Spring Point Formation consisting of green schist and amphibolites facies ranging from mafic to felsic volcanic rock.

3.3 Groundwater

Groundwater was encountered at depths ranging from 8.0 feet to 11.9 feet. Slight mottling was observed in both borings between 5 and 7 feet. Mottling can indicate a temporary rise in the groundwater level during periods of heavy rainfall. The table below summarizes the groundwater depths and corresponding elevation interpreted from the site plan.

GROUNDWATER DEPTHS/ELEVATIONS		
Exploration	**Groundwater Depth (ft.)**	**Groundwater Elevation (ft.)**
B-1	10.6 ft.	64.2 ft. +/-
B-2	11.9 ft.	57.9 ft. +/-
CPT-1	10.5 ft.	61.6 ft. +/-
CPT-2	8.0 ft.	61.8 ft. +/-

Note: All elevations are interpreted from the site plan.

4.0 Geotechnical Evaluation

The primary geotechnical concern for the proposed medical office building is the foundation's susceptibility to total and differential settlements due to the variable soil conditions throughout the building footprint and the soft soils underneath the west end of the proposed building. To minimize these settlements, we have provided subgrade preparation recommendations (Section 5.0) to keep settlement magnitudes within tolerable limits.

5.0 Foundation Recommendations

The recommendations provided herein apply to the foundation for the proposed medical office building.

5.1 Foundation Bearing Pressure

Assuming that the recommendations from this report are followed, the proposed building can be supported using conventional spread footings proportioned with an allowable bearing pressure of 3,000 psf. We anticipate that footings will be supported on native sandy silt or

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clayey silt soil. If the recommendations provided below are followed, we anticipate that post construction total settlement to be less than 1 inch and differential settlement within the building will be less than a deflection of 1/300 (δ/L deflection divided by span length) between column footings.:

- All topsoil is removed from within the proposed building footprint prior to excavation of the basement.
- All interior or exterior footings exposed to freezing temperatures are constructed at the recommended frost protection depth of 4' below exterior finish grade or finish floor elevation. Interior footings in heated areas are constructed 2' below finish floor elevation
- If soft or unsuitable soil is encountered at the bottom of the excavation, it is removed and replaced with ¾" crushed stone prior to proofrolling. If a significant amount of soft/unsuitable soils are encountered, SGS should be notified.
- If the exposed soil at the bottom of footing trenches is granular (silt/sand/gravel), it is proofrolled with a minimum of 4 passes with a large plate compactor or vibratory roller. All proofrolling should be performed on dry, unfrozen soils.
- If the exposed soil is cohesive (clay), proofrolling is not strictly necessary. For this condition, we recommend that excavations be performed using a smooth-edged bucket.

5.2 Frost Protection

The design air freezing index for the Portland area is approximately 1,200 degree F days (10 year, 90% probability). Based on this, a total of 4 feet of frost protection should be provided for footings exposed to freezing temperatures.

The exterior of all foundation elements should be backfilled with FB. The portion of FB passing the 3" sieve size should meet the following gradation requirements:

FOUNDATION BACKFILL	
Sieve Size	**Percent Finer**
3 inch	100
¼ inch	25 to 100
No. 40	0 to 50
No. 200	0 to 7

Reference: MDOT Specification 703.06, Type E (2014)

Maximum particle size should be limited to 6 inches. Foundation backfill should be placed in 6 to 12 inch lifts and compacted to 90% of its optimum dry density determined in accordance with ASTM D1557. The compaction requirement for FB should be increased to 95% for the slab-on-grade foundation areas beneath pavement.

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Inspections Division
Approved with Conditions
Date: 05/08/17

5.3 Seismic Design

The soil profile at the site was evaluated for seismic site class using data from the cone penetration tests (CPT-1 and CPT-2) conducted with shear wave velocity testing as follows:

- Average shear wave velocity (V_s) of CPT-1 = 925 ft/sec
- Average shear wave velocity (V_s) of CPT-2 = 900 ft/sec

Based on the summary of field and laboratory testing, we recommend Site Class D be used in accordance with the 2012/2015 International Building Code. The following seismic site coefficients should be used:

SEISMIC DESIGN COEFFICIENTS – 2012/2015 IBC	
Seismic Coefficient	**Site Class D**
Short period spectral response (S_S)	0.244
1 second spectral response (S_1)	0.079
Maximum factored spectral response (S_{MS})	0.391
1 second factored spectral response (S_{M1})	0.189
Design short period spectral response (S_{DS})	0.261
Design 1 second spectral response (S_{D1})	0.126

Soils susceptible to liquefaction were not encountered at the site.

5.4 Groundwater Control

On the day of the explorations, groundwater was observed between 8.0 feet and 11.9 feet below ground surface, ranging in approximate elevations of 57.9 feet to 64.2 feet. Based on this, groundwater is anticipated to rise to or above proposed footing elevation for the basement.

To keep the basement area dry to and to preclude uplift pressure on the basement slab, groundwater should be kept at or below the bottom of footing elevation. We recommend that perimeter foundation underdrains be included along all basement foundation walls. Underdrains are not strictly necessary for the foundations walls of the slab-on-grade area. We recommend that underdrains consist of 6-inch diameter, perforated PVC pipe surrounded by a minimum of 6 inches of crushed stone wrapped in filter fabric. The underdrains should be placed at the base of the foundation and outlet to a free draining location or pumped if necessary.

5.5 Slab-on-Grade

Based on a finish floor elevation of 67 feet for the basement slab and 75 feet for the first floor slab on grade, approximately 3 to 8 feet of cut will be required to construct the basement slab

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and the first floor slab will be at or near existing grade. We anticipate that a combination of existing fill and glacial marine soil (stiff clayey silt and sandy silt) will be exposed in the slab excavations. Assuming that the slab areas are continuously heated (above freezing temperature), we recommend that the slab be constructed on a minimum of 12" of Structural Fill or ¾" crushed stone. The subgrade beneath the SF or ¾" crushed stone should be compacted with a minimum of 6 passes in each of 2 perpendicular directions with a 10 ton minimum (operating) weight vibratory roller if the exposed material is granular. If the exposed soil is cohesive, the roller should be operated in static mode. If ¾" crushed stone is placed on top of clayey soils, a separation geotextile (such as Mirafi 140N) should be placed on the subgrade prior to installing the stone. Any soft or unsuitable soil exposed in the slab excavation should be removed and replaced with compacted SF or ¾" crushed stone.

The portion of SF passing the 3" sieve shall meet the following gradation requirements:

STRUCTURAL FILL (SF)	
Sieve Size	**Percent finer**
3 inch	100
½ inch	35 to 80
¼ inch	25 to 65
No. 40	0 to 30
No. 200	0 to 7

Reference: MDOT Specification 703.06, Type D

The maximum particle size should be limited to 6 inches. Structural Fill should be placed in 6 to 12 inch lifts and should be compacted to a minimum of 95 percent of its maximum dry density, determined in accordance with ASTM D1557. For the conditions described above, the garage and basement slabs can be designed using a subgrade modulus value of 175 pci.

Exterior concrete slabs should be constructed on a minimum of 30" of Structural Fill (SF). Soil exposed in the excavation below the SF for the exterior slabs should be proofrolled with a minimum of 6 passes in each of two perpendicular directions with a 10 ton minimum (operating weight) roller. Any exposed soft or unsuitable soil should be removed and replaced with ¾" crushed stone or compacted SF. Exterior slabs attached to the building should be constructed on frost wall foundations to preclude differential movement between the building threshold and entry pads, which could block doors.

5.6 Retaining Wall Design Parameters

Based on the subgrade preparation recommendations provided in Section 5.1, native glacial marine soil can be assumed to be at the bottom of the footing and Foundation Backfill (FB) can be assumed to be the soil on the exterior of the foundation wall. The gradation requirements for FB are presented in Section 5.2.

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The following soil parameters can be used for the structural design of the foundation:

Foundation Backfill (FB):

Active Equivalent Fluid Pressure (free at top): 40 psf/ft
At-Rest Equivalent Fluid Pressure (fixed at top): 60 psf/ft
Passive Equivalent Fluid Pressure: 400 psf/ft
Unit Weight: 130 pcf
Internal Friction Angle: 30°

Glacial Marine Soil:

Friction Coefficient: 0.45
Unit Weight: 125 pcf
Passive Equivalent Fluid Pressure: 350 psf/ft
Cohesion: 0 psf

These values assume that groundwater is controlled at the base of the wall with a continuous underdrain pipe as described in Section 5.4. We recommend that foundation walls be backfilled with FB meeting the gradation requirements presented in Section 5.2. FB should be compacted to a minimum of 90% to 95% of its maximum dry density in accordance with ASTM D1557 (See Section 5.2).

6.0 Earthwork Considerations

The existing fill soils (sand, silt) are classified as OSHA Type C soil. The native glacial marine is classified as OSHA Type B soil. Based on this, general excavations less than a depth of 20 feet are limited to a maximum side slope of 1.5 horizontal to 1 vertical in the existing fill soil and to a maximum slope of 1.0 horizontal to 1 vertical in the native glacial marine soil.

Excavations within the existing fill soil or native glacial marine deposit may be susceptible to subgrade softening when exposed to excessive surface water or groundwater. Surface water should be redirected from excavation areas. Where softened, we recommend the subgrade at the base of the excavation be over-excavated and replaced with a minimum of 12 inches of Crushed Stone. Crushed Stone should meet the following gradation specification:

CRUSHED STONE ¾ INCH	
Sieve Size	**Percent finer**
1 inch	100
¾ inch	90 to 100
½ inch	20 to 55
⅜ inch	0 to 15
No. 4	0 to 5

Reference: MDOT Specification 703.13, Crushed Stone ¾-Inch (2014)

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If ¾" crushed stone is placed on top of clayey soils, a separation geotextile (such as Mirafi 140N) should be placed on the subgrade prior to installing the stone. Crushed Stone should be should be tamped to lock the stone structure together.

In general, we do not anticipate groundwater within footing excavations. If localized perched groundwater is encountered, dewatering may consist of shallow sumps at the base of the excavation. Diversion and control of surface water should be performed to prevent water flow from rain or snowmelt from entering the excavations.

We recommend that a qualified geotechnical consultant be retained to monitor and test soil materials used during construction and confirm that soil conditions and construction methods are consistent with this report.

7.0 Closure

Our recommendations are based on professional judgment and generally accepted principles of geotechnical engineering and project information provided by others. Some changes in subsurface conditions from those presented in this report may occur. Should these conditions differ materially from those described in this report, SGS should be notified so that we can re-evaluate our recommendations.

It is recommended that this report be made available in its entirety to contractors for informational purposes and be incorporated in the construction Contract Documents. We recommend that SGS be retained to review final construction documents relevant to the recommendations in this report.

We appreciate the opportunity to serve you during this phase of your project. If there are any questions or additional information is required, please do not hesitate to call.

Sincerely,
Summit Geoengineering Services, Inc.

Mathew Hardison, EI
Geotechnical Engineer

STATE OF MAINE
WILLIAM M. PETERLEIN 5787
LICENSED PROFESSIONAL ENGINEER

William M. Peterlein, PE
President & Principal Engineer

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APPENDIX A

EXPLORATION LOCATION PLAN

LEGEND

B-1	SUMMIT TEST BORING (JULY 6, 2016)
CPT-1	SUMMIT CONE PENETRATION TEST (JULY 6, 2016)

PLAN REFERENCE

"GRADING PLAN, 1945 CONGRESS STREET", DATED APRIL 14, 2016, PREPARED BY PINKHAM & GREER CIVIL ENGINEERING.

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EXPLORATION LOCATION PLAN
NEW MEDICAL OFFICE BUILDING

1945 CONGRESS STREET - PORTLAND, MAINE

PREPARED FOR

MICHAEL BEDECS

DATE: 10-14-2016	DRAWN BY: KRF	CHECKED BY: WMP
JOB: 16092	SCALE: 1" = 40'	FILE: 16092 BOR

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LEWISTON, ME 04240
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ROCKLAND, ME 04841
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APPENDIX B

EXPLORATION LOGS

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EXPLORATION COVER SHEET

The exploration logs are prepared by the geotechnical engineer from both field and laboratory data. Soil descriptions are based upon the Unified Soil Classification System (USCS) per ASTM D2487 and/or ASTM D2488 as applicable. Supplemental descriptive terms for estimated particle percentage, color, density, moisture condition, and bedrock may also be included to further describe conditions.

Drilling and Sampling Symbols:

SS = Split Spoon Sample
UT = Thin Wall Shelby Tube
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RW = Rotary Wash
SV = Shear Vane
PP = Pocket Penetrometer
RC = Rock Core Sample
FV = Field Vane Shear Test
PS = Concrete Punch Sample

Hyd = Hydraulic Advancement of Drilling Rods
Push = Direct Push of Drilling Rods
WOH = Weight of Hammer
WOR = Weight of Rod
PI = Plasticity Index
LL = Liquid Limit
W = Natural Water Content
USCS = Unified Soil Classification System
Su = Undrained Shear Strength
Su(r) = Remolded Shear Strength

Water Level Measurements:

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations. Groundwater monitoring wells may be required to record accurate depths and fluctuation.

Gradation Description and Terminology:

Boulders:	Over 12 inches	Trace:	Less than 5%
Cobbles:	12 inches to 3 inches	Little:	5% to 15%
Gravel:	3 inches to No.4 sieve	Some:	15% to 30%
Sand:	No.4 to No. 200 sieve	Silty, Sandy, etc.:	Greater than 30%
Silt:	No. 200 sieve to 0.005 mm		
Clay:	less than 0.005 mm		

Density of Granular Soils and Consistency of Cohesive Soils:

CONSISTENCY OF COHESIVE SOILS		DENSITY OF GRANULAR SOILS	
SPT N-value blows/ft	**Consistency**	**SPT N-value blows/ft**	**Relative Density**
0 to 2	Very Soft	0 to 4	Very Loose
2 to 4	Soft	5 to 10	Loose
5 to 8	Firm	11 to 30	Compact
9 to 15	Stiff	31 to 50	Dense
16 to 30	Very Stiff	>50	Very Dense
>30	Hard		

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SUMMIT GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Medical Building	Boring #:	B
Location:	1945 Congress Street	Project #:	1(
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	74.8 ft. +/-
Driller:	C. Coolidge, P.E.	Reference:	Topographic map by Pinkham and Greer Civil Engineers, dated 5/2016
Summit Staff:	P. Spicer, M. Hardison, E.I.	Date started: 7/6/2016	Date Completed: 7/6/2016

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID
Method:	3" Casing	Hammer:	140 lb
Hammer Style:	Automatic	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
7/6/2016	10.6 ft.	64.2 ft. +/-	Measured after completion

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	Elev. (ft.)	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
	S-1	24/18	0 to 2	3		Dark brown fine Sandy SILT, some rootlets, trace		TOPSOIL
1				4	73.8'	Clay, loose, dry, SM		
				9		Same as above, compact, SM		
2				13				FILL
3					71.8'			
4								GLACIAL MARINE
5								
	S-2	24/20	5 to 7	12		Olive brown SILT, little Clay, Sand, and Gravel,	PP = 5,000 to	
6				13		slightly mottled, occasional Sand seams, compact,	6,000 psf	
				15		humid, ML		
7				16				
8								
9								
10								
	S-3	24/24	10 to 12	4		same as above, trace Clay, loose to compact, moist,	PP = 4,000 to	
11				6		wet starting at 11.2' depth, ML	5,000 psf	
				3				
12				4				
13								
14								
15								
	S-4	24/18	15 to 17	2		Brown Sandy SILT, little Gravel, trace Clay, loose,		
16				3		wet, ML		
				11				
17				20				
						Likely cobble @ 17', dense drilling		
18								
19								
20								
	S-5	24/24	20 to 22	10		Brown Sandy SILT, little Gravel, trace Clay,	PP = 3,000 to	
21				10		compact, wet, ML	6,000 psf	
				13				
22				12	53'			
						End of boring at 22', no refusal		

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index, FV = Field Vane Test
Bedrock Joints Su = Undrained Shear Strength, Su(r) = Remolded Shear Strength
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

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SUMMIT GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Medical Building	Boring #:	
Location:	1945 Congress Street	Project #:	
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	69.8 ft. +/-
Driller:	C. Coolidge, P.E.	Reference:	Topographic map by Pinkham and Greer Civil Engineers, dated 5/2016
Summit Staff:	P. Spicer, M. Hardison, E.I.	Date started: 7/6/2016	Date Completed: 7/6/2016

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID
Method:	3" Casing	Hammer:	140 lb
Hammer Style:	Automatic	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
7/6/2016	11.9 ft.	57.9 ft. +/-	Measured after completion

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	Elev. (ft.)	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
	S-1	24/12	0 to 2	1		Dark brown Sandy SILT, some rootlets, loose, dry,		TOPSOIL
1				3	68.8'	SM		
				6		Same as above, compact, SM		FILL
2				6				
3								
4								GLACIAL MARINE
5								
	S-2	24/18	5 to 7	3		Olive brown Silty CLAY, trace Sand and Gravel,	PP = 3,500 psf to	
6				6		slightly blocky, mottling, stiff, humid, CL	4,500 psf	
				7				
7				10				
8								
9								
10								
	S-3	24/24	10 to 12	3		Olive brown Silty CLAY, firm, moist, CL	PP = 3,000 psf to	
11				3			5,000 psf	
				4			(MC = 34.6%)	
12				4				
13								
14								
15								
	S-4	24/24	15 to 17	WOH		Gray Silty CLAY, soft, wet, CL	PP = 0 psf	
16				WOH			(MC = 43.4%)	
				WOH			LL = 40	
17				1			PI = 18	
18	FV1		17.5 to 18			Advanced field vane from 17.5' using hydraulic push		
						Su = 600 psf, Sur = 100 psf		
19								
20						19.8' push refusal for vane		
	S-5	24/24	20 to 22	0		Gray Silty fine SAND, little Clay, very loose, wet,	PP = 1,000 psf	
21				1		SM	(MC = 21.8%)	
				1				
22				2				
				PROBE		Probed to refusal	Dense drilling @ 60'	
73					-2.7'	Refusal @ 72.5', end of boring		

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index, FV = Field Vane Test
Su = Undrained Shear Strength, Su(r) = Remolded Shear Strength

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

PIEZOCONE PENETRATION LOG

SUMMIT GEOENGINEERING SERVICES

Project:	Proposed Medical Building	Test Number:	CP
Location:	1945 Congress Street	Sheet:	1
City, State	Portland, Maine	Project Number:	16
		Method:	ASTM
		Weather:	90° Sunny

Reviewed for Code Compliance Inspections Division Approved with Conditions
Date: 05/08/17

Cone ID:	Vertek #4544.101	Test Elevation:	72.1 ft. +/-		
Cone Type:	VTK 5 Ton Digital Cone	Reference:	Topographic map by Pinkham and Greer Civil Engineers, dated 5/2016		
Piezocone:	Silicone Single Filter	Date started:	7/6/2016	Date Completed:	7/6/2016
Push Rig:	AMS Power Probe 9500 VTR	ESTIMATED GROUND WATER DEPTH			
Anchor Style:	Dual Driven Anchors	Date	Depth	Elevation	Reference
Performed By:	Craig Coolidge, P.E.	7/6/2016	10.5 ft.	61.6 ft. +/-	Interpreted from pore pressure

NOTES:

Soil Profile based on interpretation of CPT measurements and nearby borings

Shear Wave Velocity test (V_s) performed at 3.3 feet (1-meter) increments

Abrupt push refusal encountered at depth of 33.8 feet

SUMMIT GEOENGINEERING SERVICES	**PIEZOCONE PENETRATION LOG**	Test Number:	CP
		Sheet:	1
	Project: Proposed Medical Building	Project Number:	16
	Location: 1945 Congress Street	Method:	ASTM
	City, State Portland, Maine	Weather:	90° Sunny

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Cone ID:	Vertek #4544.101	Test Elevation:	69.8 ft. +/-		
Cone Type:	VTK 5 Ton Digital Cone	Reference:	Topographic map by Pinkham and Greer Civil Engineers, dated 5/2016		
Piezocone:	Silicone Single Filter	Date started: 7/6/2016	Date Completed: 7/6/2016		
Push Rig:	AMS Power Probe 9500 VTR	ESTIMATED GROUND WATER DEPTH			
Anchor Style:	Dual Driven Anchors	Date	Depth	Elevation	Reference
Performed By:	Craig Coolidge, P.E.	7/6/2016	8.0 ft.	61.8 ft. +/-	Interpreted from pore pressure

NOTES:

Soil Profile based on interpretation of CPT measurements and nearby borings
Shear Wave Velocity test (V_s) performed at 3.3 feet (1-meter) increments
OCR profile calculated using a k-valie of 0.30
Abrupt push refusal encountered at depth of 38.9 feet

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APPENDIX C

LABORATORY TEST RESULTS

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Laboratory Determination of Water (Moisture) Content of Soil ASTM D2216 / D4643

PROJECT NAME:	Proposed Medical Building	PROJECT #:	16092
PROJECT LOCATION:	1945 Congress St, Portland, ME	DRYING METHOD:	Oven Dried
CLIENT:	Age Management Center	DESCRIPTION:	Glacial Marine Clay
SOURCE:	Boring B-2	TECHNICIAN:	Erika Stewart, E.I.
COLLECTION DATE:	07/06/16	TESTING DATE:	07/11/16

Location	Sample No.	Depth	Moisture Content	Remarks
B-2	S-3	10' - 12'	34.6%	Stiff Olive Clay
B-2	S-4	15' - 17'	43.4%	Gray Clay
B-2	S-5	20' - 22'	21.8%	Gray Clay w/ Sand & Gravel

REMARKS:

GEOENGINEERING SERVICES

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ATTERBERG LIMIT TEST - ASTM D4318

Method "A" (Multi-point)

PROJECT NAME:	Proposed Medical Building	PROJECT NUMBER:	16092
CLIENT:	Age Management Center	SAMPLE NUMBER:	B-2, S-4
SOURCE:	Boring B-2	DEPTH:	15' - 17'
DATE:	7/11/2016	TECHNICIAN:	Erika Stewart, E.I.

DATA

Source	Depth	LL	PL	PI	Classification
B-2	15' - 17'	40	22	18	Gray CLAY, CL

Notes: Moisture Content = 43.4%. Trace black organic streaks.

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SECTION 03 20 00
REINFORCEMENT STEEL

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall furnish, fabricate, and place all concrete reinforcement steel, welded wire fabric, couplers, and concrete inserts for use in reinforced concrete and masonry construction and shall perform all appurtenant work, including all the wires, clips, supports, chairs, spacers, and other accessories, all in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03 30 00 Cast-in-Place Concrete.

B. Section 04 20 00 Unit Masonry Assemblies.

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Comply with the reference standards of the GENERAL REQUIREMENTS.

B. Comply with the current provisions of the following Codes and Standards, as applicable:

1. Commercial Standards:

ACI 315	Details and Detailing of Concrete Reinforcement.
ACI 318	Building Code Requirements for Reinforced Concrete.
ACI 530	Building Code Requirements & Specifications for Masonry Structures
WRI	Manual of Standard Practice for Welded Wire Fabric.
AWS D1.4	Structural Welding Code - Reinforcing Steel.
ASTM A 185	Specification for Welded Steel Wire Fabric For Concrete Reinforcement.
ASTM A 615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
ASTM A 706	Low-alloy Deformed Steel Bars for Concrete Reinforcement
CRSI	Manual of Standard Practice

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CRSI Recommended Practice for Placing Bar Supports, Specifications a Nomenclature

CRSI Recommended Practice for Placing Reinforcing Bars

1.4 CONTRACTOR SUBMITTALS

A. Submittals shall be made in accordance with the GENERAL REQUIREMENTS.

B. The following submittals and specific information shall be provided.

1. The CONTRACTOR shall furnish shop bending diagrams, placing lists, splice lengths and location, and drawings of all reinforcement steel prior to fabrication in accordance with GENERAL REQUIREMENTS, only if the reinforcing details differ from that shown on the plans.

2. Details of the concrete reinforcement steel and concrete inserts shall be submitted by the CONTRACTOR at the earliest possible date after receipt by the CONTRACTOR of the Notice to Proceed. Said details of reinforcement steel for fabrication and erection shall conform to ACI 315 and the requirements specified and shown. The shop bending diagrams shall show the actual lengths of bars, to the nearest inch measured to the intersection of the extensions (tangents for bars of circular cross section) of the outside surface. The shop drawings shall include bar placement diagrams which clearly indicate the dimensions of each bar splice.

3. Where mechanical couplers are required or permitted to splice reinforcement steel, the CONTRACTOR shall submit the applicable Department of Building and Safety's Research Report for approval with manufacturer's literature which contains instructions and recommendations for installation for each type of coupler used; certified test reports which verify the load capacity of each type and size of coupler used; and shop drawings which show the location of each coupler with details of how it is to be installed in the formwork.

4. If reinforcement steel is required or permitted to be spliced by welding at any location, the CONTRACTOR shall submit mill test reports which shall contain the information necessary for the determination of the carbon equivalent as specified in AWS D1.4. The CONTRACTOR shall submit a written welding procedure for each type of weld for each size of bar which is to be spliced by welding; merely a statement that AWS procedures will be followed is not acceptable.

1.5 MARKING AND SHIPPING

A. Tag bundled bars with identification, and transport and store so as not to damage any material. Use metal tags indicating size, length and other marking shown on placement drawings. Maintain tags after bundles are broken.

PART 2 -- PRODUCTS

2.1 REINFORCEMENT STEEL

A. All reinforcement steel for all cast-in-place reinforced concrete construction shall conform to the following requirements:

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1. Bar reinforcement shall conform to the requirements of ASTM A615, Grade 60 Billet St Reinforcement with supplementary requirement S-1, and ASTM A706 for rebars subject to welding, or as otherwise shown.

1. Bar reinforcement for wall boundary elements, special moment frames, or when subject to welding, shall conform to ASTM A706, unless noted otherwise.

3. Welded wire fabric reinforcement shall conform to the requirements of ASTM A185 , or ASTM A497 and the details shown; provided, that welded wire fabric with longitudinal wire of W9.5 size wire shall be either furnished in flat sheets or in rolls with a core diameter of not less than 10 inches; and provided further, that welded wire fabric with longitudinal wires larger than W9.5 size shall be furnished in flat sheets only.

4. Reinforcement with any of the following defects will not be acceptable and be immediately removed from the site:

    a. Bar lengths, depths, and/or bends exceeding the specified fabrication tolerances.

    b. Bends or kinks not shown on the Drawings

    c. Bars with reduced cross-section due to excessive rusting or other cause.

B. Accessories:

1. Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers, and other devices to position reinforcement during concrete placement. Slab bolsters shall have gray plastic-coated legs.

2. Concrete blocks (dobies), used to support and position reinforcement steel, shall have the same or higher compressive strength as specified for the concrete in which it is located. Where the concrete blocks are used on concrete surfaces exposed to view, the color and texture of the concrete blocks shall match that required for the finished surface. Wire ties shall be embedded in concrete block bar supports.

3. Use bar supports complying with CRSI recommendations, unless otherwise shown on the Contract Drawings.

4. Do not use wood, brick, or other non-complying material.

5. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

6. For exposed-to-view completed concrete surfaces, where legs of supports are in contact with forms, provide supports with either hot-dip galvanized or plastic-protected legs. CONTRACTOR's selection subject to the ENGINEER's approval.

2.2 MECHANICAL COUPLERS

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A. Mechanical couplers shall comply with the applicable Department of Building and Safety's Resea Report. Location of the Mechanical Couplers shall be approved by the ENGINEER. The couplers sl develop a tensile strength which exceeds 125 percent of the yield strength of the reinforcement bars being spliced at each splice. CONTRACTOR to provide the required number of couplers and bars for testing in accordance with the Report

B. Where the type of coupler used is composed of more than one component, all components required for a complete splice shall be supplied. This shall apply to all mechanical splices, including those splices intended for future connections.

C. The reinforcement steel and coupler used shall be compatible for obtaining the required strength of the connection. Clearance and coverage requirements shall be maintained at all times.

D. Couplers which are located at a joint face shall be a type which can be set either flush or recessed from the face as shown. The couplers shall be sealed during concrete placement to completely eliminate concrete or cement paste from entering. After the concrete is placed, couplers intended for future connections shall be plugged and sealed to prevent any contact with water or other corrosive materials. Threaded couplers shall be plugged with plastic plugs which have an O-ring seal.

E. Hot-forged sleeve-type couplers shall not be used.

2.3 WELDED SPLICES

A. Welded splices shall be provided where shown and where approved by the ENGINEER. All welded splices of reinforcement steel shall develop a tensile strength which exceeds 125 percent of the yield strength of the reinforcement bars which are connected. Provide two samples of each bar size for testing. When welding is to be done in the field, provide field prepared samples. Preparation shall be made by welder actually preparing the production run.

B. All materials required to conform the welded splices to the requirements of AWS D1.4 shall be provided.

C. All welding shall be performed by the applicable certified welders for The State. All shop welding shall be performed at shops of an approved fabricator of The State.

PART 3 -- EXECUTION

3.1 GENERAL

A. All reinforcement steel, welded wire fabric, couplers, and accessories shall be fabricated, and placed in accordance with the requirements of the applicable State Building Code, CRSI Recommended Practices and Manual, and WRI, and the supplementary requirements specified herein.

3.2 FABRICATION

A. General: Reinforcement steel shall be accurately formed to the dimensions and shapes shown, and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318 or ACI 350 (as

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applicable), except as modified by the Drawings. Bars shall be bent cold.

B. The CONTRACTOR shall fabricate reinforcement bars for structures in accordance with bending diagrams, placing lists, and placing drawings. Said drawings, diagrams, and lists shall be prepared by the CONTRACTOR as specified under GENERAL REQUIREMENTS.

C. Fabricating Tolerances: Bars used for concrete reinforcement shall meet the following requirements for fabricating tolerances:

1. Sheared length: ± 1 inch

2. Depth of truss bars: + 0, - 1/2 inch

3. Stirrups, ties, and spirals: ± 1/2 inch

4. All other bends: ± 1 inch

3.3 PLACING

A. Placing: Reinforcement steel shall be accurately positioned as shown, and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcement steel shall be supported using approved accessories and chairs which are strong and rigid enough to prevent any displacement of the reinforcement steel and shall comply with the applicable Department of Building and Safety's Research Report. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used, in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. All concrete blocks used to support reinforcement steel shall be tied to the steel with wire ties which are embedded in the blocks. Use care not to damage vapor barriers where they occur.

B. The portions of all accessories in contact with the formwork shall be made of concrete, plastic, or steel coated with a 1/8-inch minimum thickness of plastic which extends at least 1/2-inch from the concrete surface. Plastic shall be gray in color.

C. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

D. Bars additional to those shown which may be found necessary or desirable by the CONTRACTOR for the purpose of securing reinforcement in position shall be provided by the CONTRACTOR at its own expense.

E. Placing Tolerances: Unless otherwise specified, reinforcement placing tolerances shall be within the limits specified in Section 7.5 of ACI 318 except where in conflict with the requirements of the applicable State Building Code.

F. Bars may be moved as necessary to avoid interference with other reinforcement steel, conduits, or embedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangement of bars shall be reviewed and accepted by the ENGINEER.

G. Welded wire fabric reinforcement placed over horizontal forms shall be supported on slab bolsters having gray, plastic-coated standard type legs as specified in Paragraph B herein. Slab bolsters shall

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be spaced not less than 30 inches on centers, shall extend continuously across the entire width the reinforcement mat, and shall support the reinforcement mat in the plane shown.

H. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than 3 feet on centers in any direction. The construction practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be used.

3.4 SPACING OF BARS

A. Spacing of reinforcement shall comply with ACI 318 requirements.

3.5 SPLICING

A. General: Reinforcement bar splices shall only be used at locations shown. When it is necessary to splice reinforcement at points other than where shown, the character of the splice and location shall be as acceptable to the ENGINEER.

B. Splices of Reinforcement: The length of lap for reinforcement bars, unless otherwise shown shall be in accordance with ACI 318, Section 12.15.1 for a class B splice. Stagger splices in horizontal wall bars at least 48" longitudinal in alternate bars and opposite faces.

C. Laps of welded wire fabric shall be in accordance with the ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each 2 running feet. Wires shall be staggered and tied in such a manner that they cannot slip.

D. Field welding of bars: In accordance with the approved submittal. Continuous inspection required.

E. Mechanical couplers: Install in accordance with the approved submittal.

F. Bending or Straightening: Reinforcement shall not be straightened or rebent in a manner which will injure the material. Bars with kinks or bends not shown shall not be used. All bars shall be bent cold, unless otherwise permitted by the ENGINEER. No bars partially embedded in concrete shall be field-bent except as shown or specifically permitted by the ENGINEER.

3.6 CLEANING AND PROTECTION

The surfaces of all reinforcement steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcement shall be reinspected and, if necessary recleaned. Bars with reduced cross-section due to excessive rusting or other cause will not be acceptable for use and shall be replaced by the CONTRACTOR at no additional cost to the OWNER.

3.7 FIELD QUALITY CONTROL

A. Inspection: Secure inspection and acceptance from INSPECTOR before concrete is placed. Make arrangements in advance for geotechnical inspection of foundations, continuous inspection as

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required, and/or structural observation by the designated registered design professional prior concrete placement.

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SECTION 03 30 00
CAST IN PLACE CONCRETE

PART I. GENERAL

1.1 SCOPE

A. Cast in place concrete
B. Concrete reinforcing and accessories, supply and installation.
C. Supply and erection of all formwork for cast in place concrete.
D. Footings for exterior walls.
E. Reinforced concrete walls.
F. Concrete slabs on grade.
G. Architectural quality concrete
H. Submittals
I. Shop drawings
J. Mock ups
K. Testing

1.2 GENERAL REQUIREMENTS

A. The work of this section is governed by the conditions set forth in the Agreement Between the Owner and Contractor, the General Conditions of the Contract for Construction, Division 1 of these Specifications, and all other documents that make up the Agreement.
B. Ensure that the work of this section is coordinated with the work of related trades affected by or affecting the work of this Section.
C. The work of this section includes providing labor, material, miscellaneous fasteners and accessories, and equipment required to complete the work of this Section including but not limited to that work specified herein and on the Drawings or as required for a complete job.

1.3 RELATED SECTIONS

A. Basic Requirements, Division 1
B. Excavation and Earthwork, Section 31 00 00
C. Unit Masonry, Section 04 20 00
D. Structural and Miscellaneous Steel, Section 05 12 00
E. Waterproofing, Section 07 10 00

1.4 SUBMITTALS

A. Submit mix design for all structural concrete for review prior to pouring concrete.
B. Submit shop drawings on reinforcing steel in the following locations:

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1. Footings
2. Walls.
3. Shop drawings shall show the following:

    a. A schedule of reinforcing
    b. Bends and laps of reinforcing bars.
    c. Placement drawings showing clearance of reinforcing to forms, sleeves and other openings.
    d. Opening, slots, and sleeves with re-bar shown in place around sleeves on the placing plan.
    e. Bolts and anchors shown to scale and in place on the placing plan.

C. Provide product data on the following:

1. Admixtures
2. Anchor bolts
3. Forming system
4. Releasing agents
5. Bonding agents

1.5 REFERENCE STANDARDS

A. In case of conflict between the specifications, the architectural drawings, structural drawings and the referenced standards the more restrictive shall govern.
B. References shall be to the latest edition of each manual cited.
C. Concrete work shall comply with the latest edition of ACI 301, Standard Specification for Structural Concrete.
D. Construction finishes shall comply with ACI 117-90: Specifications for Tolerances.
E. Concrete reinforcing to comply with ACI 301 and ACI 318, Building Code Requirements for Reinforced Concrete, and The Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practices".
F. Concrete formwork shall comply with ACI 347, latest edition.

1.6 QUALITY ASSURANCE

A. Subgrades are to be reviewed by Soils Engineer prior to pouring of any footings.
B. Concrete testing shall be done on every 20 yards of concrete poured using the following methods:

1. Tests are to be performed by an independent testing agency contracted by the Owner.
2. Tests are to be performed in accordance with Paragraph 1.6.4

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of ACI 301.

3. Test cylinders and slump tests are to be taken by the testing agency.
4. Slump tests shall be performed in accordance with ASTM C 143. These test shall be performed by the testing agency.
5. Mold and cure 4 samples from each pour in accordance with ASTM C 31. Cure 3 cylinders under controlled conditions. Cure one cylinder on site.

    a. Test cylinders in accordance with ASTM C 39.
    b. Test one cylinder at 7 days.
    c. Test two cylinders at 28 days. These cylinders shall be cured under controlled conditions.
    d. Test one cylinder kept on site at 28 days.

C. Test air content of air entrained concrete per ASTM C 231, C 173, or C 138.
D. Full scale mock ups are required for architectural quality concrete. Size and location of mock up is to be determined by the Architect.

1.7 DELIVERY, STORAGE AND HANDLING

A. Store reinforcing materials and accessories in a way that facilitates inspection of materials prior to installation.
B. Materials shall be delivered in their original, unopened packages, and protected from exposure to the elements.
C. Store materials off the ground in a dry place until erection.
D. Damaged or deteriorated materials shall be removed from the premises.

PART II. PRODUCTS

2.1 FORM MATERIAL AND ACCESSORIES FOR VERTICAL FORMWORK

A. Material used for forms shall be of adequate strength and thickness to ensure that the forms do not deform while concrete is being poured and in its plastic state.

    1. Maximum deflection permitted in formwork is l/360.

B. Wall, beam and column forms:

    1. For architectural grade exposed concrete, High Density Overlay, Class I Exterior, APA stamped, 5/8 in. thick minimum. Plywood

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shall be new unless otherwise noted.

2. B/B Plyform, Class I Exterior, APA stamped, 5/8 in. thick minimum for foundation forms and other non-architectural concrete.
3. Plywood shall be new.
4. Used plywood face on forms is permitted only at unexposed concrete surfaces and utility areas unless otherwise noted.

C. At textured concrete, forms shall be faced with boards or other liner material in patterns as noted on the drawings.

D. Forming system for non-architectural grade walls shall be a manufactured forming system with wall ties particular to that system.

E. At exposed concrete, form ties shall be a fabricated tie of adjustable length that can be snapped of or removed without causing spalling of the concrete surface.

1. Holes that are left by form ties shall be no larger than 1" in diameter.

F. Forms for cylindrical columns shall be;

1. Metal tubes
2. Paper tubes
3. Fiber tubes
4. Glass fiber reinforced plastic tubes
5. Strength of tubes shall be adequate to prevent deformation of forms during pouring of concrete.

G. Form releasing agents shall not contain oils or waxes and shall be compatible with all finishes to be applied to concrete. They shall conform to ASTM C 309, Type I, Class A or B:

1. Cast-Off WB by Sonneborn.
2. Aquaform by Tamms Industries, Mentor OH.
3. Duogard II by W. R. Meadows, Inc.

H. Construction joints to be:

1. Metal by Keyed-Kold by Burke
2. Wood, size as required to form a true even joint between pours.

I. Pipe sleeves to be Schedule 40 PVC if permitted by local codes. Coordinate size and number of sleeves required with related trades.

J. Pipe sleeves to be galvanized steel pipe.

K. Block outs for windows, doors and other openings to be formed of framing lumber.

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2.2 FORMS AND ACCESSORIES FOR SLABS ON GRADE

A. Edges of slabs to be formed with framing lumber, plywood, or steel forms.
B. Formed construction joints for slabs-on-grade to be extruded plastic type, tongue and groove profile.
C. At slabs on grade, slab edge and expansion joint filler to be a pre-molded asphaltic board, 1/2" thick.
D. Vapor barrier to be:

1. 6 mil black polyethylene

2.3 REINFORCEMENT MATERIALS

A. Reinforcing steel to conform to ASTM A615, yield grade, deformed billet steel bars, plain finish.

1. Grade 60, deformed billet steel bars, unfinished.

B. Reinforcing wire to be deformed wire fabric conforming to ASTM A 497.
C. Reinforcing wire to be epoxy coated welded wire fabric conforming to ASTM A 884.
D. Reinforcing wire to be plain welded wire fabric conforming to ASTM A 185.
E. Welded wire fabric to be of the following sizes. See Drawings for locations.

1. Sizes and gauges as noted on Drawings.

F. Chairs, bolsters, bar supports, and spacers to be steel and be of shape and sizes as required for proper support of reinforcing.
G. Chairs and other supports for exposed architectural concrete to have plastic protected legs, CRSI Class C.
H. Do not use brick, blocks, wood or other non-specified items for reinforcing bar supports.
I. Fabrication of reinforcing bars:

1. Make all bends cold.
2. Heating bars for field bending is permitted only per CRSI MSP-1.
3. Cut bars by mechanical means, do not cut with a torch.
4. Minimum bend of bars shall be as per the requirements of ACI 301-96.

2.4 CONCRETE MATERIALS

A. Cement to be ASTM 150, Type I/II
B. Fine and course aggregates to be well graded and comply with ASTM C33.

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1. Maximum aggregate size for bulk concrete to be 1 ½
2. Maximum aggregate size for slabs and formed walls to be 3/4 in.

C. Water to be potable and clean.
D. Water reducing agents, if permitted, to comply with ASTM C 494, Type A, D, or G.

2.5 MISCELLANEOUS MATERIALS

A. Bonding agent: Acrylic latex or styrene butadiene conforming to ASTM C 1059, Type II.

1. Euclid Chemical Company, "SBR Latex".
2. Tamms Industries, Hornbond.

B. Bonding agent shall be a 2 component epoxy resin conforming to ASTM C 881.
C. Drypack: 1 part Portland cement to 2 parts damp sand with 0" slump. Add water necessary to mix only.
D. Non-shrink grout shall conform to ASTM C 1107, Grade B or C.
E. Curing agent shall conform to ASTM 309 Type I, Class A or B.

1. Sonneborn Kure-N- Seal WB
2. Sonneborn Kure-N-Seal

2.6 CONCRETE MIX

A. Mix and deliver concrete in accordance with ASTM C94.
B. Provide concrete of the following strengths:

1. Footings and reinforced concrete walls, 3000 psi at 28 days.
2. Reinforced concrete slabs, 3,500 psi at 28 days.
3. Other strengths as noted on Drawings.

C. Add air entraining agent to concrete mix for concrete exposed to the exterior to obtain the following amounts of entrained air:

1. 5% to 7%

D. The following are the design slumps required for the various types of pours. These slumps are taken before adding admixtures:

1. Footings: 3 in., +/- 1 in.
2. Slabs on grade: 3 in., +/- 1 in.
3. Slabs and walls greater than 8 in. thick: 4 in., +/- 1 in.

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4. Walls and curbs 8 in. and less in thickness: 4 ½ in., +/- 1-1/2 in.

E. Slump tests are to be taken by an independent testing agency. Slump tests are to be taken in accordance with ASTM C 143.

PART III. EXECUTION

3.1 EXAMINATION AND PREPARATION FOR SLABS AND FOOTINGS

A. Prior to forming footings or preparation of slabs verify that subgrades are stable and able to support design loads. Proof roll areas to confirm if required by Engineer or Architect.
B. Ensure that subgrades are free of standing water and are not frozen.
C. Ensure that excavations for footings and slabs are properly de-watered prior to pour.
D. Ensure that proper inspections and tests have been made on subgrade, piping, conduits, and other utilities that are to be encased in concrete prior to pour.

3.2 FORMWORK ERECTION

A. Set formwork to achieve design requirements to tolerances noted herein.
B. Comply with ACI 347 for erection and tolerances of formwork:
C. Provide bracing required to ensure stability of formwork during pouring of concrete. Formwork to remain true in plain, plumb, straight and level.
D. Apply releasing agent to concrete forms in accordance with manufacturers recommendations. Do not use releasing agents on forms where finishes will be applied that are not compatible with the releasing agent.
E. Clean forms of foreign matter before erecting.
F. Cast-in-place concrete shall be within the tolerances set forth in ACI 117 Section 4.
G. Forms for architectural quality concrete shall be set as per approved mock up.
H. Abut forms one to another to ensure no leakage of cement during pour.
I. Fabricate formwork to ensure easy removal without damaging concrete.
J. Provide temporary openings in forms for cleanouts where required. Ensure that these openings are securely sealed and braced during pour. Locate these cleanouts in inconspicuous places approved by the Architect.
K. Unless noted otherwise, provide chamfers at all exposed edges. Ensure that the materials used to form these will provide a true, straight line during pour.
L. Remove debris from forms prior to pour.

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M. Do not enclose forms until required inspections and review of forms and reinforcing have been made.

3.3 INSERTS, EMBEDDED COMPONENTS, AND OPENINGS

A. Provide formed openings or sleeves where required for work to be embedded in or passing through concrete members. Ensure that these openings do not violate structural requirements of the members.
B. Coordinate work of other sections in forming and setting openings, sleeves, slots, reglets, bolts, anchors, and other accessories embedded in concrete.
C. Install accessories and inserts in locations noted on architectural drawings or shop drawings this or other trades.
D. Place construction joints in slabs in pattern noted on plans or shop drawings.
E. Place joint filler as required at perimeter of slab at wall.
F. Kerf wood inserts to ensure easy removal.
G. Inserts and block-outs shall be installed plumb, true, and level. Ensure that items are coordintated with related trades and that sizes are correct.

3.4 REINFORCEMENT PLACEMENT

A. Install reinforcement as noted on the drawings.
B. Install reinforcement in a manner so that it is supported and secure and will not be displaced during placement of concrete.
C. Ensure that reinforcement is clean and free of scaling, rust, dirt, oil, and other foreign matter.
D. Place reinforcement in concrete as per structural Drawings and details. Maintain the following minimum coverage for all reinforcement:

1. Minimum concrete cover for reinforcement shall be per ACI 301, Table 3.3.2.3.
2. At walls, 2" coverage
3. At slabs, 1 1/2" coverage
4. At footings, 3" coverage unless indicated otherwise on Drawings.

E. Reinforcement shall be placed within the tolerances set forth in ACI 117, Section 2.

3.5 PLACING CONCRETE

A. Place concrete in accordance with ACI 301-96.
B. Cold weather placing shall be in accordance with ACI 306R.
C. Hot weather placing shall be in accordance with ACI 305R.
D. Do not place concrete until inspections required by the building department, the Architect and Engineer have been made and approval

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given to pour.

E. Do not pour slabs until insulation, vapor barrier and waterproofing installations are complete and have been observed by the Architect.

F. Coordinate placement of waterproofing and insulation under slabs with those trades.

G. Provide proper protection of poured concrete from heat if over 90 degrees, from freezing, and from rain or ground water. Do not pour in the rain unless concrete is protected from the rain.

H. Poured concrete is to be protected from freezing for 48 hours after pouring.

I. If concrete is being pour against previously poured concrete, thoroughly clean with wire brush and apply bonding agent before pour. Prepare for and apply bonding agent in accordance with manufacturer's recommendation.

J. Separate slabs-on-grade from vertical surfaces with 1/2" thick joint filler flush with bottom of slab and 1/4" from top of slab.

K. Where new concrete is doweled to old, drill hole for dowel in existing concrete, insert steel dowels, pack with non-shrink grout prior to pouring new concrete.

L. Screed floors level unless noted to pitch to drain.

M. Ensure that concrete is properly vibrated to prevent honey-comb or other voids.

1. Do not use vibrators to move concrete in forms.
2. Provide the size of vibrators and number required for each pour per requirements of ACI-301-96, Table 5.3.2.5.
3. Place vibrators into forms prior to placing concrete and pull through concrete as vibrating.
4. Vibrate only to remove honey comb and air bubbles and to consolidate concrete.
5. Conform to the requirements of ACI 309 for consolidating concrete.

N. Embedded items:

1. Coordinate placement of sleeves with mechanical and electrical installations but place only in areas approved by Architect and structural Engineer.
2. Place anchor bolts and knock outs in locations as noted on the Drawings. Ensure that these items are securely installed in formwork. Ensure that their location has been reviewed with the related trades.

3.6 FORM REMOVAL

A. Do not remove forms in hot or cold weather until proper protection is in place to keep concrete from curing too fast or freezing.

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B. Do not remove forms until concrete has set sufficiently to carry its own weight and imposed loads.
C. Remove formwork in a way that complies with all codes.
D. Remove formwork in such a way so as not to damage concrete surfaces.

3.7 CURING

A. Immediately after pouring concrete, protect concrete from premature drying.
B. Immediately after pouring concrete, protect concrete from excessive cold or hot temperatures. Concrete shall be cured in accordance with ACI 308.
C. Cure concrete in accordance with ASTM 308.
D. Ensure that concrete will remain at a relatively constant temperature for the period of time necessary for proper curing.
E. Apply curing agent in accordance with manufacturer's written instructions only in areas noted on the Drawings. Ensure that curing agent is compatible with finishes to be applied to the concrete.
F. Damp cure walls and slabs where a curing agent is not used.
G. Do not apply curing compound to slabs that are to receive finish materials, topping slabs, paint or stains.

3.8 TOLERANCES

A. Tops of walls to be level and true to within 1/8 in. in 20 feet with total variation to be no more than ¼ in.
B. Each wall shall be plumb to within 1/8 in. per 8 foot of length.
C. Each wall shall be straight to within 1/8 in. per 10 feet of length.
D. Tolerances for architectural quality concrete shall be per approved mock up.
E. The following inspections are required in addition to those required by the building department.

1. Layout of footings, prior to pour, after forms and reinforcing are in place
2. Reinforcing steel prior to closing of forms.
3. Level of top of forms prior to pouring of walls.
4. Review of insulation and waterproofing under slabs.

3.9 DEFECTIVE CONCRETE

A. Modify or replace as required by the Architect or Engineer concrete that does not comply with drawings, specifications, mock ups, and/or details noted herein or on the drawings. Contractor shall bear all direct and associated cost of this replacement.

END SECTION

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SECTION 04 20 00

UNIT MASONRY

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

B. Extent of Unit Masonry is shown on the drawings.

C. In addition to work shown on the drawings and specified elsewhere in this Section, build in steel lintels, anchors, inserts and sleeves.

1.2 QUALITY ASSURANCE

A. Standards: Comply with recommendations of Brick Institute of America (BIA), and National Concrete Masonry Assoc. (NCMA).

1.3 SUBMITTALS

A. Issue submittals in accordance with Section 01 31 00, Submittals.

B. Submit product data and installation recommendations for masonry units, cementitious products for mortar and grout, coloring pigments, throughwall flashing, and masonry accessories.

C. Submit samples of exposed masonry units and mortar, illustrating full range of colors and textures.

~~D. Build 4 x 4 sample wall on site for Architect's inspection. Sample wall to include back up wall finishes, weeps, brick ties.~~

2 PRODUCTS

2.2 CONCRETE MASONRY UNITS

A. Except as shown on Drawings or specified otherwise, all concrete masonry units shall be as follows:

1. Hollow-type complying with ASTM C 90, Type 1 (moisture-controlled), Grade N.

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2. Compressive strength: 2500 psi net, 1250 psi gross (average of three units). Prism strength fm=2500 psi in Pier A, fm=2000 elsewhere.

3. Normal-weight, with sand and gravel aggregate complying with ASTM C 33, approximate oven-dry unit weight of 135 lbs. per cu. ft.

2.3 MORTAR AND GROUT

A. Mortar shall comply with ASTM C 270, BIA Technical Notes 8 and 8A, and local Building Code.

B. Materials shall conform to applicable ASTM specifications including the following:

1. Portland Cement: ASTM 150, Types I, II, or III (do not use Types IA, IIA, or IIIA).

2. Masonry Cement: ASTM C 91.

3. Hydrated Lime: ASTM C 207, Type S only (do not use Type N).

4. Natural or manufactured sand aggregate: ASTM C 144, gradation conforming to Table 1 in BIA Technical Note 8.

5. Masonry cement shall not contain ground limestone.

6. Water: clean, potable, and free of deleterious amounts of acids, alkalies or organic materials.

C. Mortar Type

1. General:

a. ~~Mortar for exterior brick shall be colored, submit samples to Architect for approval.~~ ***~~Color to be SGS 44H Deep Red~~***.

b. Use 1800 psi minimum Type S mortar for reinforced masonry and where indicated.

c. Use 750 psi minimum Type N mortar for exterior, above-grade loadbearing and non-loadbearing walls, and for other applications where another type is not indicated.

D. Grout

1. Grout shall conform to ASTM C 476 and to match existing.

2. Fine and coarse aggregate for grout mixes shall be defined in ASTM C 404.

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a. Fine grout shall consist of one part portland cement, 0 to 1/10 part lime, 2-1/4 to 3 parts fine sand.

b. Coarse grout shall consist of the fine grout mix described in "a" above plus 1 to 2 parts coarse aggregate.

c. Use coarse grout (pea gravel aggregate) except where minimum horizontal core dimension is under 4 in., in which case use fine grout (sand aggregate). Ordinary concrete (maximum 1 in. aggregate) may be used where minimum core dimension exceeds 6 inches.

E. During cold-weather construction at exterior walls, use Type III (high-early strength) cement and Type S hydrated lime. A non-calcium-chloride-based accelerator such as Dur-o-Wal, Dur-o-Guard, or Euco Accelguard 80 may be used, in quantities recommended by manufacturer for expected ambient temperature. Calcium chloride may not be used. Refer to EXECUTION portion of this Section for general provisions governing cold weather construction.

2.4 METAL REINFORCING, TIES, ANCHORS

A. Acceptable manufacturers: Hohmann & Barnard, Inc., or approved equal.

~~B. Brick ties at masonry veneer construction:~~

~~1. HB-200X adjustable veneer anchors, 14 Ga., stainless steel Type 304, with Pintle Length and Legs fabricated to accommodate 2 inch rigid exterior insulation. Min. 2" into bed joints. ***Ties to be stainless steel.***~~

~~2. Secure anchors to sheathing with s/s wood screws as recommended by anchorage manufacturer.~~

~~3. Maximum spacing: 24 in. o.c. vertically, 16 in. o.c. horizontally or closer spacing as required at expansion joints, corners, floors, etc., or to secure directly to studs.~~

~~4. Material: stainless steel.~~

2.5 THROUGHWALL FLASHING

A. Through-wall flashing: Thru wall flashing at base and all window and door heads to be equal to "EPRA"- max EPDM. Flashing to be extended sufficiently beyond jambs and form end dams. Thru wall flashing with H & B # DP stainless steel drip plate as manufactured by Hohmann & Barnard Inc. "Henry Thru Wall", blue skin is also an acceptable product.

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B. Through-wall flashing sealant: Shall be Sandell Trowel Mastic, as manufactured by Sandell Manufacturing Co., Inc.

2.6 AIR BARRIER

A. Typar Metro-Wrap Air Moisture Barrier (located behind exterior rigid insulation). Refer to Specification Section 07 21 16.

2.7 MASONRY ACCESSORIES

A. Weepholes: medium-density polyethylene, 3/8 in. diameter, full depth of outer wythe.

B. Chemical cleaning agents for newly-installed masonry: ProSoco Sure-Klean liquid masonry cleaners or equal by Diedrich, as recommended by manufacturer for particular condition. Recommended cleaners include Sure-Klean No. 600 Detergent, No. 101 Lime Solvent, and Vana Trol.

C. Apply water proofing – Karnac 920 A.F. or Henry 785 Asphalt Emulsion trowel grade, on all block face bearing brick veneer.

3. EXECUTION

3.1 MASONRY WORK IN GENERAL

A. Erect all masonry work in compliance with the line and level tolerances specified herein. Correct, or replace, as directed by the Architect, non-conforming masonry work at no additional cost to the Contract.

B. Lay no face brick or concrete masonry unit having chipped edges or face defects where such unit or piece would be exposed to view. Remove any such unit or piece, if installed, replace with new matching material, and bear all costs therefore.

C. Examine all Drawings as to requirements for the accommodation of work of other trades. Provide all required recesses, chases, slots, cutouts, and set loose lintels. Place anchors, bolts, sleeves and other items occurring in the masonry work. Take every precaution to minimize future cutting and patching. Closely coordinate the location and placement of such items.

D. Protect all masonry from rain prior to, and during the installation thereof. If the temperature is in excess of 80 degrees F. at time of installation, lightly moisten contact surfaces or masonry units by brushing with water.

E. Lay all masonry in full mortar beds, and completely butter all concealed from view vertical edges with mortar. Completely fill cells of masonry units with mortar where vertical reinforcement is to be installed therein and in other locations specified or indicated on the Drawings.

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F. Provide complete protection against breakage and weather damage to all masonry work, including substantial wood boxing around door jambs, over the tops of walls and wherever necessary to protect work at all stages of completion. Protect masonry when not roofed over, at all times when masons are not working on the walls. Apply non-staining tarpaulins or waterproof paper, properly weighted, or nailed, to assure their remaining in place to protect masonry from all possible hazards.

G. Fit masonry into bucks and frames so as not to distort alignment of such items, and fill backs of such items with mortar, except where joints are indicated to receive caulking and sealant and have no compressible filler therein, in which case rake joints to a uniform depth of ¾ inch for proper installation of caulking and sealant material.

H. Use only power saw, equipped with carborundum blade, for cutting exposed masonry, as needed to assure straight, evenly-cut edges.

I. Lay out coursing before setting to minimize cutting closures or jumping bond. Do not spread any more mortar than can be covered before surface of mortar has begun to dry. Do not endanger bond or mortar by moving masonry when once laid. If necessary to re-adjust any items, remove entirely, clean-off mortar, and reset with fresh mortar.

J. Except for cleaning down and pointing, finish all new masonry as the walls and partitions are carried up.

K. Point and fill all holes and cracks in mortar joints with additional fresh mortar; do not merely spread adjacent mortar over defect or use dead mortar droppings. Do all pointing while mortar is still soft and plastic. If hardened, chisel defect out and refill solidly with fresh additional mortar, and tool as specified.

3.2 JOB CONDITIONS

A. Store cement, lime and other cementitious materials under cover in a dry place.

B. Keep steel reinforcing, ties and anchors free from oil, dirt, rust, and other materials which would destroy bond.

C. Store masonry above ground on level platforms which allow air circulation under stacked units. Masonry units shall be dry and free from soil and ice before being laid in wall.

D. Keep installed walls dry and clean at all times. Immediately remove grout or mortar from face of masonry to be left exposed or painted. Protect previously installed elements such as louvers, doors, frames, and windows from mortar droppings and construction damage, using masking elements, dropcloths, etc.

E. Cover exposed walls at end of working day with well-secured canvas tarpaulins. Protect base of exterior walls from splashing mud and mortar by spreading sand, raw, and sawdust or plastic sheeting 3 to 4 ft. horizontally and up face of wall. Turn scaffold boards near wall on edge at end of day to prevent splashing mortar or dirt.

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F. Securely brace partially completed walls against wind damage. Walls shall have been completed 24 hours minimum before application of distributed loads, 72 hours before concentrated loads.

G. Comply with cold-weather construction specifications in NCMA-TEK 16 and BIA Technical Note 1A:

1. Maintain masonry above 32 degrees F. for 24 hours minimum using insulated blankets or heated enclosures. Construct windbreaks at wind velocities over 15 mph. Maintain mortar on board at 40 degrees F. minimum, heating mixing water and sand as required.

2. Sprinkle units with high rates of absorption with heated water. Refer to mortar paragraph under PRODUCTS in this Section for provisions governing cold-weather additives to mortar. If standard instead of Type III high-early strength cement must be used, maintain installed masonry above freezing for 48 instead of 24 hours.

3. Do no masonry work at temperatures below 38 degrees F and falling or 35 degrees F and rising, until General Contractor has contacted Architect.

3.3 INSTALLATION

A. Verify that substrate is dry and free from frost, dirt, laitance, loose sand and other material which would prevent satisfactory bond. Lay first course in full mortar bed including face shells and webs of concrete masonry units. Keep cells to be grouted free from mortar.

B. Dampen masonry units as required to prevent excess suction of mortar. Lay concrete masonry units to form continuous unobstructed vertical spaces within wall. Provide full mortar coverage on horizontal and vertical face shells. Also bed webs adjacent to reinforced cores to prevent grout leakage, except omit web bedding at fully grouted walls to permit grout to flow laterally. Lay face brick with full vertical and bed joints, except as specified below to provide weepholes. Cut exposed masonry units, where necessary, with a power saw. Avoid the use (by proper layout) of less-than-half-size units.

C. Install masonry units in the bond pattern indicated, or if none is indicated, in running bond.

D. Step back unfinished work -- toothing is not permitted. Do not adjust installed units -- where necessary, completely remove and reinstall using fresh mortar.

E. Maximum variation of installed walls from plumb, level, or plan grid shall not exceed 1/4 in. in 10 ft. Wall thickness shall not vary more than 1/4 in. plus or minus from dimension shown on drawings.

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F. Mortar:

1. Measure materials in calibrated containers, or by similar easily-controlled and maintained method. Do not use shovel measurement.

2. Mix materials in a mechanical mixer at least three minutes with minimum amount of water necessary to produce a workable consistency. Retemper stiffened mortar as required to restore evaporated water, but do not place mortar any later than 2-1/2 hours after mixing.

3. Exposed-to-view joints shall be approximately 3/8 in. wide, to meet coursing shown, tooled when thumbprint hard with a round bar to produce a dense, slightly concave surface well-bonded to masonry edges.

4. After tooling, cut off mortar tailings with a trowel and brush off excess. Concealed joints, including those on cavity side of masonry veneer, and joints in masonry to be plastered or stuccoed shall be struck off flush, with no protrusions.

5. Mortar not tight at time of tooling shall be raked out, pointed with fresh mortar, and retooled. Where sealant is shown, rake out joint 3/4 in., ready for backer rod and sealant specified in Division 7 sealants Section.

G. Through-wall flashing:

1. Install flashing to the profiles shown on the drawings.

2. Masonry and concrete surfaces receiving through wall flashings shall be thoroughly dry, free from loose material, and reasonably smooth. There shall be no slopes that will form pockets or prevent free drainage of water to exterior surfaces of wall.

3. Set flashing in sealant. Hold sealant back 1/4 inch from face of lintel. Hold flashing 1/2 inch back from face of lintel.

4. At wall openings, extend flashing 6 in. beyond each side of opening and turn up to form pan. Fold all corners, do not cut.

5. Lap joints between lengths of flashing 6 in. minimum and seal with mastic. Seal penetrations through flashing with mastic or overlapping piece of flashing.

H. Provide weepholes at 24 inches on center maximum spacing through outer face of masonry at all through-wall flashing.

I. At masonry veneer construction over gypsum sheathing, provide rubber washers or bituminous dampproofing compound at all penetrations made in sheathing board or

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paper as part of work under this Section, including screw heads and veneer-tie anchorage.

J. Provide openings and chases as required for structural members, ductwork, large pipes, etc. Cut exposed masonry with carborundum saw to ensure straight even edges. Neatly block around and patch penetrations. Provide compressible filler around edges of openings to accommodate vibration and structural deflection. Ensure that joint reinforcement remains uncut or is well-lapped.

K. Provide control and expansion joints at locations shown, and keep clean of mortar droppings. Install Joint Sealers in accordance with Section 07 92 00.

L. Build other work into the masonry work as shown, fitting masonry units around other work, and grouting to secure anchorage.

3.4 ALLOWABLE TOLERANCES FOR MASONRY WORK

A. Maximum variation from true surface level for exposed to view walls and partitions:

1. Unit-to-unit tolerance: 1/8 inch.

2. Surface, overall tolerance: ¼ inch in 10 feet in any direction when tested with ten foot long straightedge. Where both faces or wall or partition will be exposed to view, request and obtain decision from the Architect as to which face will be required to conform to the specified surface level tolerance.

B. Maximum variation from true vertical plumb lines:

1. In lines of walls and arises:

a. ¼ inch in 10 feet.
b. 3/8 inch in any story, or up to 20 feet maximum.
c. ½ inch in 40 feet maximum.

2. For external corner lines, control joints, and other conspicuous lines:

a. ¼ inch in any story, or up to 20 feet maximum.

C. Maximum variation from horizontal level or grades for exposed sills, lintel blocks, and other conspicuous lines:

1. ¼ inch in any bay, or up to 20 feet maximum.

2. ½ inch in 40 feet maximum.

D. Maximum variation of linear building line from an established position in plan and related portions of walls and partitions:

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1. ½ inch in any bay or up to 20 feet.

2. ¾ inch in 40 feet maximum.

3.5 WALL AND PARTITION CONSTRUCTION

A. General:

1. Build the masonry walls and partitions in the various combinations and thickness as indicated on the Drawings and as herein specified.

2. Build in anchorage items and loose lintels as the work progresses.

3. Lay first course of masonry on a smooth bed or mortar, after supporting concrete has been cleaned. Fill cells of first course concrete masonry units with mortar in all cases. Completely fill cells of concrete masonry units wherever vertical reinforcing rods are installed therein.

4. For exterior masonry cavity walls, install cavity insulation, through wall membrane flashings, weep wicks, and peastone, as specified herein.

5. Fill pressed metal frames occurring in masonry with mortar, as the masonry is erected.

3.6 GROUT

A. Lay masonry units with core cells vertically aligned and cavities clear of mortar and unobstructed.

B. Permit mortar to cure three (3) days before placing grout.

C. ACI Building Code requirements for Masonry Structures and ACI Specifications for Masonry Structures are made part of this specification as are all pertinent sections of the ACI Building Code.

3.6 CLEANING MASONRY

A. Masonry cleaning procedures shall follow recommendations of NCMA-TEK 45 and BIA Technical Note 20 (revised).

B. Dry brush masonry work at end of each day's work.

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C. After new mortar has cured 14 days minimum, remove large mortar particles with non-metallic scrapers, chisels, or wooden paddles. Wash off dirt and other foreign materials with clean water and light concentration of soap or detergent.

D. For mortar smears, construction dirt, stains, efflorescence, etc., not removable by above methods, use proprietary cleaners specified under PRODUCTS. Muriatic acid may not be used. Adhere strictly to manufacturer's recommendations.

E. Apply and scrub cleaning solutions with non-metallic fibrous brushes. Thoroughly rinse cleaned area before cleaning solution can dry, using water hosed under moderate pressure.

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SECTION 05 12 00

STRUCTURAL AND MISCELLANEOUS STEEL

PART I. GENERAL

1.1 SCOPE

A. Structural steel framing, bearing plates, base plates, and all connections.
B. Miscellaneous steel.
C. Angles and lintels for masonry work
D. Cleaning, priming and touch-up of steel.
E. Supply of all cranes and rigging for setting steel.
F. Submittals
G. Shop drawings
H. Samples
I. Mock ups

1.2 GENERAL REQUIREMENTS

A. The work of this section is governed by the conditions set forth in the Agreement between the Owner and Contractor, the General Conditions of the Contract for Construction, Division 1 of these Specifications, and all other documents that make up the Agreement.
B. Ensure that the work of this section is coordinated with the work of related trades affected by or affecting the work of this Section.
C. The work of this section includes providing labor, material, miscellaneous fasteners and accessories, and equipment required to complete the work of this Section including but not limited to that work specified herein and on the Drawings or as required for a complete job.

1.3 RELATED SECTIONS

A. Structural Drawings and notes.
B. Basic Requirements, Division 1
C. Cast in Place Concrete, Section 03 30 00

1.4 SUBMITTALS

A. Provide shop drawings and erection plans for review on the following:

1. Structural steel.
2. Miscellaneous steel and shop fabricated timber connectors.

B. These shop drawings are to be prepared under the supervision of a structural engineer licensed in the state in which the project is being built. Field verify all dimensions prior to preparation of shop drawings.

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The shop drawings shall:

1. Show details of all connections including connector sizes, hole sizes and spacing, weld sizes and lengths and types of welds.
2. Provide detailed drawings of bearing plates and base plates.
3. Provide full scale templates for coordination of work done by other trades.
4. Provide setting drawings for all structural members, plates and anchors.
5. Reference each shop drawing detail to the applicable Architectural and/or Engineering Drawings.

C. These shop drawings are to be prepared by the fabricator. Field verify all dimensions prior to preparation of shop drawings. The shop drawings shall:

1. Show details of all connections including connector sizes, hole sizes and spacing, weld sizes and lengths and types of welds.
2. Provide detailed drawings of bearing plates and base plates.
3. Provide full scale templates for coordination of work done by other trades.
4. Provide setting drawings for all structural members, plates and anchors.
5. Reference each shop drawing detail to the applicable Architectural and/or Engineering Drawings.

D. Provide product data on the following:

1. Steel primer paint.
2. High strength bolts
3. Welding rods.
4. Grouts.
5. Structural steel shapes
6. Paint/finishes

E. Submit copies of test reports as required herein and by local building officials when required as a condition of the building permit.

F. Provide mock-ups of exposed steel finishes for Architect's review. Mock-ups will be required for the following:

1. Exposed structural steel and connections.
2. Exposed steel and cold formed framing connectors.
3. Finish on exposed steel.

1.5 QUALITY ASSURANCE

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A. Fabricate structural steel members in accordance with the latest editions of the following:

1. Specifications for Structural Steel Buildings- Allowable Stress Design and Plastic Design
2. Code of Standard Practice for Steel Buildings and Bridges.

B. Priming and painting shall be in accordance with the recommendations of the Steel Structures Painting Council (SSPC).

C. Controlled inspections shall be required. These shall be performed by an independent engineer or testing agency hired by the Owner. It is the responsibility of the Contractor to coordinate these test and ensure that the proper forms and documentation of these test results are filed with the Building Department.

D. Provide AWS certification for welders. Welders shall satisfy the requirements for the ANSI/ AWS D1.1, "Structural Welding Code- Steel, Chapter 5, Qualification. Re-certification, if required, shall be the responsibility of the Contractor.

E. Welding shall be inspected by an approved welding agency which shall issue an affidavit verifying that all welds have been inspected and found to be in conformity with the details and structural requirements.

F. Affidavits from the steel mill attesting to the strength and the composition of the structural steel shall be filed by the Contractor with the Department of Buildings. Copies of these reports shall be sent to the Architect and Engineer. Submit a report on each type of steel and from each mill.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials of this trade in intervals that do not delay the progress of this Section or the job as a whole.

B. Store materials in such a way to accommodate easy inspection of the materials prior to installation.

C. Deliver anchor bolts, plates, miscellaneous steel and other materials to related trades in a timely fashion so as to not delay the progress of their work or the job as a whole.

D. Store materials off the ground in a dry place until erection.

PART II. PRODUCTS

2.1 MATERIALS

A. Shapes and sizes of steel members and decking are noted on the Drawings. Members shall comply to the applicable ASTM specification for the material being used.

B. Structural carbon steel members, shapes, plates and bars: ASTM A 36.

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C. High strength steel members, shapes, plates and bars: ASTM A 572.
D. Structural tubing, Hot-formed: ASTM A 501.
E. Hex head bolts and nuts with washers: ASTM A 325
F. Galvanizing of bolts, nuts and washers to comply with ASTM A 153.
G. Galvanizing of structural steel shapes; ASTM A 123
H. Anchor bolts: ASTM A 307
I. Welding materials: AWS D1.1; E70XX low hydrogen or type required for materials being welded.
J. Grout: Non-shrink type grout attaining a compressive strength of 7000 psi at 28 days. Types:

1. Nonmetallic shrinkage resistant grout.
2. Metallic shrinkage resistant grout.

2.2 FABRICATION OF STRUCTURAL MEMBERS

A. Fabricate structural steel as per Drawings and reviewed, final shop drawings.
B. Coordinate fabrication of structural members with related trades.
C. Ensure that templates, base plates, and anchor bolts supplied by this Section and installed by other trades are delivered in a timely manner.
D. Fabricate steel and deliver in the sequence in which it will be needed on the job.
E. Ensure that holes in beams and columns required for mechanical systems are shop cut to the greatest extent possible. Coordinate all cutting with the Architect and Engineer. Cut, drill or punch holes into steel members. Do not flame cut holes.
F. Ensure that holes, studs, nuts and other connectors for erection and attachment of other materials are fabricated into the steel in the shop.
G. Fabricate and assemble connections in the shop to the greatest extent possible.
H. Galvanize parts and assemblies after fabrication to G-85 per ASTM A 123.
I. Bolted connections shall be detailed as slip critical unless otherwise noted.
J. Bolted connections shall be made in the field.
K. Welds shall be done in the shop to the greatest extent possible. Correct any warpage in welded surfaces that will be visible or cause miss-alignment of the work
L. Bolted connections that will be exposed shall be carefully aligned and detailed per Drawings and final shop drawings.
M. Welded connections that will be exposed shall be ground smooth.

2.3 FABRICATION OF MISCELLANEOUS STEEL

A. Fabricate miscellaneous steel per details on the Drawing and review

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final shop drawings.

B. Where applicable, miscellaneous steel shall be fabricated and delivered by the work of this Section for installation by other trades.
C. Fabrication of miscellaneous steel to be installed by other trades shall be carefully coordinated with the work of these trades.
D. Fabricate beam brackets and timber connectors per details on Drawings and reviewed final shop drawings.
E. Fabricate flitch plates required for built up wood beams.
F. For exposed timber connectors and flitch plates, carefully layout spacing of bolt holes and align holes carefully.
G. For exposed timber connectors and flitch plates, grind exposed welds smooth. Grind smooth cutting marks on exposed edges of steel.

2.4 SHOP PRIMING

A. Remove oil, grease, mill scale, dirt, and dust before starting fabrication.
B. Clean in accordance with the recommendations of the Steel Structures Painting Council (SSPC) for the type of cleaning being used.

1. As required for the SSPC or other painting system specified, see arch

C. This installer shall be responsible for the shop coat of primer paint and field touch up of primers.

D. Shop prime members except as noted below.
E. Do not prime the following:

1. Members to be embedded in concrete.

PART III. EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Coordinate steelwork with mechanical and other related trades.
B. Store materials off the ground in a dry place until erection.
C. Before delivering or erecting steel, ensure that anchor bolts and beam pockets and other field conditions are ready to receive steel.
D. Ensure that concrete and other masonry work are properly cured to receive the loading of the steel and subsequent work.

3.2 WORKMANSHIP

A. Workmanship shall be of the highest quality.
B. Welds, bolts, joints, and materials shall be subject to inspection by the Engineer who will ascertain their acceptability.

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C. Afford the Engineer opportunity to inspect the work at all times during work hours at the building site or at the mill where parts are in the making.

D. Connections:

1. Shop connections shall be welded or bolted with friction type, high strength bolts, except where welded connections are called for specifically.
2. Field connections shall be bolted or welded, except where otherwise shown.
3. Inspect and certify high-strength bolts wherever they are used.
4. Provide standard American Institute of Steel Construction framed beam connections wherever possible or unless otherwise noted.

3.3 ERECTION OF STRUCTURAL MEMBERS

A. Allow for erection loads. Provide temporary bracing as required until steel is set and permanently placed. Remove temporary braces and framing when permanent framing is in place.

B. Do not mechanically fasten bracing to or otherwise mar any members that remain exposed.

C. Field weld or bolt connections as per reviewed shop drawings and erection plans.

D. Do not field cut or otherwise alter steel framing members from reviewed shop drawings unless written approval is given by the Engineer.

E. Immediately after steel is erected, prime all welds, abrasions, and other surfaces not primed. Prime to a dry film thickness of 1.5 mils.

F. Bearing plate installation;

1. Clean area of concrete under bearing plates to provide bond to grout.
2. Set bearing plate loose, with shims.
3. Set structural members and tighten bolts securely at base and bearing plates after member is set true and plumb.
4. Pack space under bearing plate with non-shrink grout. Mix and install grout as per manufacturer's instructions.

G. Light drifting necessary to draw holes together will be permitted, but drifting of unfair holes will not be permitted.

H. Twist drills shall be used to enlarge holes as necessary to make connections. Reaming that weakens the members or makes it impossible to fill the holes properly or to adjust accurately after reaming will not be allowed.

I. Provisions shall be made for the adjustment of all members requiring

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accurate alignment. Adjustments and alignment shall be done after the steelwork has been plumbed and bolted.

J. Steel shall be carried up true and level and the temporary bracing shall be introduced wherever necessary to take care of all loads to which the structure may be subjected, including erection equipment and the operation of same.

K. Bracing shall be left in place as long a may be required for safety.

L. After steelwork has been properly aligned all bolts shall be drawn up tight.

3.4 INSPECTION AND QUALITY CONTROL

A. High strength bolted connections and welded connections are to be inspected by an independent testing agency.

B. Testing shall be done on all shop fabrications in the shop prior to delivery. Work shall not be delivered to the site until test results show that work complies the structural requirements for each item.

C. Testing shall be done on all field connections as required by the Engineer. Work shall not be covered until test results show that work complies the structural requirements for each item.

D. Work that is found to be deficient shall be corrected and re-tested until the work complies with the structural requirements of that member. The cost of correction and re-testing shall be borne by the Contractor.

3.5 TOLERANCES

A. Beams to be level to within 1/8" in 10 feet.

B. Columns to be plumb within 1/8" in 12 feet.

C. Alignment of adjacent members to be flush with no tolerance.

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SECTION 05 41 00

LIGHTGAGE METAL FRAMING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. RELATED DOCUMENTS: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF THE WORK

A. Work specified within this Section includes, but is not necessarily limited to, the following:

1. Provide and install lightgage framing for interior and exterior walls, as shown on the Drawings.

2. Provide and install lateral strap bracing, anchors and bridging as required.

3. Provide and install miscellaneous fasteners, hat channels, stiffeners, expansion joints, and accessories necessary to complete the work.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Interior Partition Walls: Section 09 29 00 - Gypsum Wallboard Systems

1.04 QUALITY ASSURANCE

A. Materials and installation shall conform to recommendations of the following publications:

1. American Iron and Steel Institute Cold-Formed Steel Design Manual, Parts I & II "Specification for the Design of Cold-Formed Steel Structural Members".
2. AWS D1.1-90 "Structural Welding Code" - Steel.
3. AWS D1.3-89 "Structural Welding Code" - Sheet Steel.
4. ASTM C 954, "Specification for Steel Drill Screws for the Application of Gypsumboard or Metal Plaster Bases to Steel Studs from 0.033 in. to 0.112 in. Thickness."

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5. ASTM C 955, “Specification for Load-Bearing (Transverse and Axial)Steel Studs, Runners (Tracks), and Bracing or Bridging, for Screw Application of Gypsum Board and Metal Plaster Bases.
6. ASTM C 1007 “Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.”
7. ASCE 7-98 "Minimum Design Loads for Building and Other Structures," (formerly ANSI A58.1).

B. Slip Track Tolerances: Where non-bearing light gage framing abuts the structure, provide a slip joint capable of accommodating the vertical movement of the structure. Slip joint gaps shall allow for 1" Live Load deflection of the supporting member

1.04 SUBMITTALS

A. The Engineer shall receive all submittals a minimum of two weeks prior to the start of fabrication. The Contractor shall have reviewed and approved all submittals prior to review by the Engineer. All review of submittals by the Contractor, Architect and Engineer shall be completed prior to fabrication and installation of any material or product.

The Engineer’s review of shop drawings will consist of a review of the design criteria and loads used for calculations and a review of the type and position of elements and connections to the Primary Structural System. Any errors in calculations, shop drawings and verification of field dimensions shall be the responsibility of the General Contractor.

B. Product Data: Submit Manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications.

1. Steel Studs, tracks, cold rolled channels and hat channels.
2. Anchors and anchor bolts
3. Self drilling screws

C. Shop Drawings:

1. General: Submit shop drawings showing the following:

a. Member type, gauge and spacing.
b. Sizes, gauges and fastenings for all built-up members including but not limited to roof trusses, headers and jambs.
c. Shop Coatings
d. Type, size, quantity, locations and spacing of all anchorages and self drilling screws.
e. Details of attachment to structure and adjacent work.

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f. Supplemental strapping, bracing, splices, bridging, hat channels and other accessories required for proper installation.
g. Critical installation procedures.

D. Submit (3) reproductions of each shop drawing. Submit (2) copies of design calculations.

PART 2 - PRODUCTS

2.01 FRAMING MEMBERS

A. Steel Studs:

1. Acceptable manufacturers:
   Dale/Incor
   Marino
   Dietrich
   Superior
   Ware
   Or approved equal.
2. Provide channel-shaped studs, channel-shaped joists, runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, stiffeners, fasteners, and other accessories recommended by manufacturer for complete framing system.
3. Steel framing materials (all gauges) shall comply with ASTM A 653. Fabricate all components from structural quality sheet steel with the following minimum yield points:

   A. Studs and truss components, 40,000 psi
   B. Bracing, bridging and blocking, 33,000 psi

4. Manufacture of studs, runners (track), and other framing members shall comply with ASTM C 955.
5. Framing components shall be galvanized per ASTM A 525, minimum G-60 coating.

B. Screws and other attachment devices:
1. Provide a protective coating equivalent to cadmium or zinc plating and comply with ASTM A 165 type NS.
2. Self-drilling screws shall comply with the Industrial Fastener Institute Standard for steel self-drilling and tapping screws (IFI-113).
3. Penetration through jointed materials shall not be less than three (3) exposed threads.

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PART 3 - EXECUTION

3.01 INSTALLATION

A. Product Storage: Store studs, trusses, joists, track etc. on a flat plane. Material damaged (i.e. rusted, dented, bent or twisted) shall be discarded. Protect adhesives and sealants from freezing.

B. Construction Methods: Wall construction may be either piece-by-piece (stick-built), or by fabrication into panels either on or off site.

C. Material Fit up: All framing components shall be cut squarely or at an angle to fit squarely against abutting members. Members shall be held firmly in position until properly fastened. Prefabricated panels, if used, shall be square and braced against racking.

D. Attachment: Components shall be joined by self-drilling screws, so that connection meets or exceeds required design loads. Wire tying of framing components will not be permitted. Field welding will be permitted only where shown on the drawings or approved by the engineer.

E. Anchorage to Structure: Securely anchor studs and track to floor construction and overhead structure. Provide slip joints where non-bearing vertical studs meet floor or roof structural steel, or as indicated on the drawings.

F. Welding: Shop and field welds shall conform to applicable AWS and AISI standards, and may be fillet, plug, butt or seam type. Touch-up damage to galvanizing caused by welding with zinc-rich paint.

G. Openings: Frame openings larger than 2 ft. square with double studs. Provide suitable reinforcements (double studs, headers, jack studs, cripples, bracing, etc.) at control joint intersections, corners, and other special conditions.

H. Tolerances: Finished installation shall be level and plumb within a tolerance of 1/8 inch 10 feet horizontally and vertically. Maximum deviation from plan or section dimension shall not exceed 1/8 inch. Spacing of studs shall not be more than 1/8 inch from design spacing, providing that cumulative error does not exceed requirements of finishing materials.

END OF SECTION

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SECTION 05 50 00

METAL FABRICATIONS

1. GENERAL

1.1 REFERENCES

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 specifications, apply to work in this section.

B. Rough Carpentry: Section 06 10 00

C. Finish Carpentry: Section 06 20 00

D. Roofing and Flashing: Section 07 53 00

E. Painting: Section 09 90 00

F. American Society of Testing Materials (ASTM)

G. Steel Structures Painting Council (SSPC)

H. National Association of Architectural Metal Manufacturers (NAAMM)

1.2 DESCRIPTION OF WORK

A. Extent of Metal Fabrications is shown on the drawings.
B. Railings.

1.3 QUALITY ASSURANCE

A. Refer to Section 01 33 10, Products and Substitutions, for general provisions covering product selection, substitutions, material storage, and installation.

B. Refer to Section 01 45 00, Quality Control Services, for provisions for testing and inspection.

1.4 SUBMITTALS

A. Issue submittals in accordance with Section 01 33 00, Submittals.

B. Submittals under this section include:

1. Shop drawings showing details of fabrication, assembly, and installation showing all connections to other work.
2. Samples of materials and finished products as may be requested by the Architect.

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2. PRODUCTS

2.1 MATERIALS

1. Railing assembly shall withstand a minimum concentrated load of 200 lbs. applied in any direction at any point on top rail. Intermediate rails, balusters, and panel fillers shall be designed for uniform load of not less than 25 lbs./sq. ft. over gross area of guard. Assembly shall comply with all provisions of the applicable Building Codes.

2. Accurately miter and cope intersections, and weld all around. Form rail-to-end post connections and changes in rail direction with mitered corners or radius bends, as detailed. Form elbow bends and wall returns to uniform radius, free from buckles and twists.

3. EXECUTION

3.1 FABRICATION

A. GENERAL

1. Use materials of size and thickness shown, or if not shown, of required size, grade, and thickness to produce strength and durability in finished product.

2. Provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes on exposed surfaces.

3. Form metalwork to required shapes and sizes, with true lines, curves and angles. Provide necessary rebates, lugs and brackets for assembly and installation. Use concealed fasteners wherever possible. Mill joints to tight hairline fit; cope or miter corners.

4. Welding:
   a. Weld corners and seams continuously; grind exposed welds smooth and flush.
   b. Welding Electrodes and Filler Metal: Type and alloy to match metal to be welded.

5. Anchors and Inserts: Furnish as required for installation in other work. Use copper, cadmium or galvanized anchors and inserts for exterior work.

6. Fasteners
   a. Type and alloy to match metal to be fastened; use Phillips flat-head screws for exposed fasteners if not otherwise indicated.
   b. Provide bolts, nuts, lag bolts, machine screws, wood screws, toggle bolts, masonry anchorage devices, lock washers as required for application indicated and complying with applicable Federal standards. Hot-dip galvanize fasteners for exterior applications to comply with ASTM A 153.

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7. Shop Finishing

    a. Comply with NAAMM "Metal Finishes Manual".
    b. Apply shop primer to surface of metal fabrications except those embedded in concrete or galvanized; comply with SSPC-PA1.
    c. Surface Preparation: Comply with SSPC-SP6 "Commercial Blast Cleaning" for exterior work, and with SSPC-SP3 "Power Tool Cleaning" for interior work.
    d. Shop Primer: Fabricator's standard, fast-curing, lead-free, "universal" primer complying with performance requirements of FS TT-P-645.
    e. Stripe paint edges, corners, crevices, bolts, welds and sharp edges.
    f. Protect finished metal items.

3.2 INSTALLATION

A. Perform cutting, drilling and fitting required for installation; set work accurately in location, alignment and elevation, measured form established lines and levels.

B. Provide anchorage devices and fasteners where necessary for installation to other work.

C. Repair or replace damaged items as directed by the Architect.

D. Touch-up shop paint after installation. Clean field welds, bolted connections and abraded areas, and apply same type paint as used in shop.

E. Restore damaged protective coverings after installation. Maintain until other work in same areas is completed. Remove protective coverings and clean exposed surfaces prior to final inspection.

END OF SECTION

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SECTION 06 10 00

ROUGH CARPENTRY

PART I - GENERAL

1.01 GENERAL REQUIREMENTS

A. RELATED DOCUMENTS: The drawings and the general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Work covered by this Section includes the furnishing of all labor, material, equipment and accessories, and the performing of all operations in connection with the wood framing, other carpentry as indicated on the Drawings and/or specified within this Section.

B. The work covered by this Section includes, but is not necessarily limited to, the following:

1. Furnishing and installing all rough carpentry, including miscellaneous grounds, blocking, sills, plates, shoes, shims, and furring, framing, framing anchors, and fasteners.

2. Furnishing and installing plywood wall back up panels and backer boards for telephone and electrical equipment.

3. Drilling concrete and masonry and drilling and tapping of metal work as required for installation of rough carpentry.

4. Any other items of carpentry necessary to complete work properly.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

A. Finish Carpentry - Section 06 20 00.

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B. Roofing and Flashing - Section 07 53 00.

C. Joint Sealants - Section 07 92 00.

D. Glazing - Section 08 81 00.

E. Finish Hardware - Section 08 71 00.

1.04 QUALITY ASSURANCE

A. Codes and Standards:

1. International Building Code - 2009

2. AITC Timber Construction Manual – Sixth Edition

3. NFPA National Design Specification for Wood Construction - 2012

PART 2 - PRODUCTS

2.01 LUMBER

A. Lumber shall conform to American Softwood Lumber Standard Voluntary Product Standard PS20-05. Lumber shall bear the grade and trademark of the Association under whose rules it is produced and a mark of mill identification.

B. Protect all lumber and keep dry, both in transit and at the job site.

C. All lumber shall be well seasoned and contain not more than 15% moisture content (marked "S-Dry").

D. All two inch nominal framing lumber shall have the following minimum base values, unless otherwise noted:

1. Extreme Fiber Stress in Bending, F_b = 750 psi.

2. Horizontal Shear, F_v = 70 psi.

3. Compression Perpendicular to Grain, $F_{cÁ}$ = 335 psi.

4. Compression Parallel to Grain, F_c = 975 psi.

5. Tension Parallel to Grain, F_t = 325 psi.

6. Modulus of Elasticity, E = 1,100,000 psi.

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2.02 PRESERVATIVE TREATED LUMBER

A. The following wood members shall be Southern Yellow Pine Treated with CCA to 0.4 #/CF in accordance with AWPA C-18. Lumber embedded in or in contact with soil shall be treated to 0.6#/CF. Wood shall be air dried or kiln-dried to reduce maximum moisture content to 15 percent. Each piece shall bear the AWPA stamp, indicating the plant number, preservative symbol, symbol of standard, date of treatment and moisture content after treatment:

1. Wood sills plates, rough bucks and frames in exterior masonry wall openings.

2. Wall plates and furring in contact with exterior masonry or concrete.

3. Nailers that are set into, or are in contact with, concrete or masonry.

4. Blocking and nailers for roof deck, sub-fascia members, roof cants and saddles.

5. Lumber in contact with the ground, embedded in or in contact with concrete or masonry and all exterior trim.

B. Cut Surfaces: Cut surfaces of preservative-treated materials shall be brush coated with at least two coats of the same preservative used in the pressure treatment.

C. Odors and Compatibility: Treated wood exposed in the final structure shall be free from objectionable odors and shall not be harmful or corrosive to adjacent materials or anchorages.

D. Plywood Backer Panels:

1. Plywood telephone and electrical backer panels, roof framing, and any other wood designated as fire-retardant treated on drawings, shall be pressure-treated with fire-retardant 2 chemicals to achieve a UL FR-S rating, designating a surface-burning characteristics rating of 25 or less for flame-spread, fuel contributed, and smoke developed, per ASTM E 84, in compliance with AWPA C 20 (lumber) and AWPA C 27 (plywood). Each piece shall be dried to a 15-to-19 percent moisture content after treatment.

2. Acceptable products include: Koppers Dricon, Osmose Flame-Proof, and Hoover Pro-Tex.

1. Strength reduction factors used in the design of fire retardant treated wood shall be in accordance with the NFPA "National Design Specification."

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PART 3 – EXECUTION

3.01 INSTALLATION

A. Wood Framing:

1. General Requirements:

a. Wood construction practices shall conform to recommendations of the NFPA "National Design Specification" and the AITC "Timber Construction Manual". Wall framing will conform to the Optimum Value Engineering framing practices detailed in Appendix A of this section.

b. All members are to be installed as shown on the drawings.

c. When individual members have built-in camber, the members shall be placed with camber up.

d. No cutting of holes or notches in trusses for pipe, conduit or other reasons will be allowed.

e. All bearing surfaces shall be horizontal and even over the entire width of support.

f. Accurately and properly fit and brace all work. Secure in proper position and orientation. Framing, studding and blocking shall be as indicated on the Design Drawings, or as required by the work.

g. Cooperate with all other trades as required.

h. Use acoustical sealant along shoe and header of all party walls.

2. Cutting and Patching: Do all cutting, patching, heading and blocking required for work of all trades. Notify Telephone Company to place jacks at rough-in stages.

3. Blocking and Supports:

a. Install 2" nominal blocking in stud partitions for anchoring all cabinets, mirrors, towel bars, grab bars, handrail brackets, wall mounted door stops and other items applied to or in the walls.

b. Set all blocking required to erect all exterior and interior woodwork, cabinets, plumbing, electrical and mechanical equipment, rough bucks and blocking for roofing work.

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c. Backing Boards: Install 3/4" plywood backer boards for electrical and mechanical trades as required.

d. Provide pressure-treated blocking at exterior window openings in steel stud walls.

B. Fastening:

1. Fastening shall be as indicated on the Design Drawings, or in accordance with Table 2304.9.1 of the International Building Code.

2. Framing supported by concrete or masonry shall be anchored with built-in threaded bolts or lags, as indicated on the design drawings. Powder actuated fasteners shall not be substituted, except in the attachment of wall furring strips.

3. Fasteners shall be non-corrosive on exposed and exterior locations.

C. Firestops: Firestops of 2" nominal stock, shall be provided in all concealed spaces not otherwise cut off from passage of air from one space to another.

3.02 CLEAN-UP

A. Keep the premises and working surfaces in a neat, safe, and orderly condition at all times during execution of this portion of the work.

1. At the end of each day, or more often if necessary, remove accumulation of sawdust, cut-ends, and other debris to proper storage areas for disposal.

B. Upon completion of this portion of the work, thoroughly clean up the area.

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SECTION 06 20 00

FINISH CARPENTRY

1. GENERAL

1.1 GENERAL PROVISIONS: Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

1.2 DESCRIPTION OF WORK:

A. The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specifications. The work covered by this section of Specifications consists of the following:

1. All finished carpentry work and millwork as required by Drawings and as specified under this section.
2. Installation of metal and other items furnished by other trades, if specifically noted in these Specifications.

2. PRODUCTS:

2.1 BOARD LUMBER shall comply with the American Lumber Standards Simplified Practice Recommendation No. 16. Grade of board lumber shall be suitable for its intended use. Finish lumber is to be painted and shall be dressed free of tool marks and other objectionable defects. All exposed lumber to be architectural quality grade: Custom.

2.2 PUBLIC SPACES: See base and trim details on drawings.

2.3 NAILS: 6d for 1/2" finish stock and 4d finish for thinner wood. Use 8d generally for nailing 3/4" wood trim to framing.

2.4 SCREWS, BOLTS & OTHER FASTENERS: as shown on Drawings with penetration into framing or blocking adequate to support loads shown. Where not shown, consult Architect.

2.10 COUNTERTOPS: REFER TO INTERIOR DESIGN PACKAGE.

2.11 PLASTIC LAMINATE: REFER TO INTERIOR DESIGN PACKAGE.

3. EXECUTION:

3.1 ALL ITEMS OF MILLWORK shall be carefully erected, leveled and plumbed with tight-fitting joints and square corners, carefully cut and secured. Exposed nails shall be set adequately for putty. Moulds and faces shall be free from hammer or other tool marks, clean-cut and true pattern. All work shall be thoroughly cleaned and sanded to receive the finish. Sharp corners of small members of finished woodwork shall be slightly rounded. All trim baseboards, etc. fastened to walls shall be secured to wall framing members and nails set. Care shall be taken to avoid splitting ends of trim boards.

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3.2 INTERIOR TRIM: Install trim with finishing nails and glue where required to assure permanent, tight joints, according to Drawing details.

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SECTION 07 21 16
THERMAL AND ACOUSTIC INSULATION

1 GENERAL

1.1 GENERAL PROVISIONS: Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

1.2 DESCRIPTION OF WORK: The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of the Specifications. The work covered by this section of Specifications consists of the following:

1. Installation of rigid insulation on inside foundation wall and sill sealer, where shown on Drawings.
2. Installation of rigid insulation, fiberglass batts, and blown insulation and sound insulation in exterior walls, interior walls, ceilings and floors where shown on Drawings.
3. Vapor barriers to be installed as shown.

2 PRODUCTS

2.1 SPRAY APPLIED INSULATION: Closed cell spray foam by Corbond or equal.
Refer to Spec Section 07 21 19.

2.2 BATT INSULATION TYPE: Fiberglass by Owens-Corning- Fiberglass, or approved equal, 6" or 4" to suit wall thickness.

~~2.3 BLOWN INSULATION TYPE: Cellulose Blowing Insulation by National Fiber or equal. *Refer to Spec Section 07 21 26.*~~

2.4 INTERIOR WALL SOUND INSULATION: Owens Corning Fiberglas Unfaced Sound Attenuation Blanket, 3" thickness.

2.5 AIR INFILTRATION BARRIER: *Refer to Spec Section 07 27 00.*

2.6 RIGID BOARD INSULATION (on exterior walls): sizes as shown on Drawings. Styrofoam square edge insulation by Dow Chemical, or approved equal.

3 EXECUTION

3.1 RIGID INSULATION on foundation walls must extend to top of footing.

3.2 FIBERGLASS INSULATION

A. Sound attenuation batts shall be installed in all interior walls on this project.

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SECTION 07 21 19

MOISTURE AND THERMAL PROTECTION
SPRAY FOAM INSULATION

CORBOND® III ***Performance Insulation System®***

All spray applied insulation as shown on drawings or Specified herein shall be the **CORBOND** Performance Insulation System® as manufactured by Corbond Corporation of Bozeman, Montana OR EQUAL.

CORBOND shall be installed by technicians in accordance with manufacturer's instructions.

I. GENERAL

A. Related documents: The general provisions of the contract and all codes and standards referenced.

B. Description of the Work:

1. The extent of **CORBOND** insulation is shown on the drawings.
2. The applications of **CORBOND** include the following:
   a. Rigid spray-in-place perimeter floor header (box sill, rim joist) insulation. Provide minimum R-Value of 21 at all exterior wall applications. (Thermal barrier requirement exception at floor header for class 1, 1.5 – 2.0 lb. spray foam when applied at 3.25 thickness or less per IBC/IRC).

3. **Related Work:**
   a. Spray-on Thermal Barrier: Division 7 (071).
   b. Spray-on Ignition Barrier: Division 7 (071).
   c. Gypsum Drywall System: Division 9 (092000).

4. **Quality assurance:**
   a. Thermal Conductivity: K = .15 (ASTM-C-518).
   b. R-Factor = 6.6 per inch.
   c. Density = 2.0 lbs/cu ft. in-place (ASTM D-1622).
   d. Permeance = .90 at 2.5 inch thickness (ASTM-E-96).
   e. Surface Burning Characteristics: Class I (ASTM-E-84-91a) **Flame Spread <25, Smoke Density <450. (1.5 inch, 4inch, 6inch)
   f. Recognizable lavender trademark color.
5. **Product handling:**
   a. Do not store containers in direct sunlight. Keep drums covered. Empty container disposal by technicians in accordance with current law and industry standard practice.
   b. Store raw materials at 60° F to 70° F.
   c. Fire hazard class of raw material stored on site: Combustible liquid, Class 3B.
   d. Transportation Class 55, NOIBN, Non-Hazardous

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e. WARNING: Breathing hazard during application of insulation materials. Do not enter without proper respiratory protection. No smoking or open flame.
f. Process materials in accordance with **CORBOND** published Technical Data.

6. **Job Conditions:**
   a. Examination of substrate: Technicians will examine the substrate and conditions under which the spray insulation work is to be performed, and notify the contractor in writing of any unsatisfactory conditions, such as: 1. Excessive dirt or oil on substrate. 2. Excessive moisture present as dampness, dew, frost or water. 3. Substrate temperatures outside applicable limits.
   b. Cover tools and work of other trades as required to prevent damage from overspray.
   c. Do not weld or torch near **CORBOND**. Cover as soon as possible with subsequent work.

II. PRODUCTS

A. Materials:

1. Crawlspace perimeter and floor header (box sill, rim joist) insulation: **CORBOND** Performance Insulation System® installed to thickness required to provide R-Value of 21.

III. EXECUTION

A. Installation:

Installation of the **CORBOND** Performance Insulation System® is performed by technicians familiar with the processing of two component polyurethane foams and in complete accord with application instructions provided by the manufacturer. These technicians employ equipment with preset component ratio and electronically controlled heat input to assure in-place consistency of finished product and performance. Contact **CORBOND** Corporation, Bozeman, Montana, (888) 949-9089 or direct at (406) 586-4585.

END OF SECTION

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SECTION 07 27 00
WATER RESISTIVE AND AIR BARRIER ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Weather resistive barrier.

B. Water resistive and air barrier assemblies.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: substrate.

1.3 REFERENCES

A. ASTM International:
1. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
2. ASTM D 779 - Standard Test Method for Water Resistance of Paper, Paperboard, and Other Sheet Materials by the Dry Indicator Method.
3. ASTM D 903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
4. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
5. ASTM D 2523 - Standard Practice for Testing Load-Strain Properties of Roofing Membranes.
6. ASTM D 5733 - Standard Test Method for Tearing Strength of Nonwoven Fabrics by the Trapezoid Procedure.
7. ASTM E 96 Standard Test Method for Water Vapor Transmission of Materials.
8. ASTM E 283 Standard - Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
9. ASTM E 1677 - Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls.
10. ASTM E 2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights.

B. AATCC- 27 Hydrostatic Head Test.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation and maintenance methods.

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C. Test Results: Submit copies of test results showing performance characteristics equaling or exceeding those specified.

D. Verification Samples: For each finish product specified submit 12 inch (305 mm) square sample for approval by the Architect.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain primary materials from a single manufacturer regularly engaged in manufacturing building wraps. Obtain secondary materials from a source acceptable to the primary materials manufacturer.

B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of two years demonstrated experience in installing products of the same type and scope as specified.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in unopened factory labeled packages.

B. Store and handle in strict compliance with manufacturer's instructions and recommendations.

C. Prevent damage or contamination to materials by construction activities.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Fiberweb Typar, which is located at: 70 Old Hickory Blvd. Old Hickory, TN 37138; Toll Free Tel: 800-284-2780; Tel: 615-847-7000; Email: request info (moreinfo@typarhousewrap.com); Web: www.typar.com

B. Substitutions: Approved equal.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 33 10.

D. Obtain products from a single manufacturer.

2.2 MATERIALS

A. Water Resistive and Air Barrier Assembly: Typar® MetroWrap™ by Fiberweb™, for use in exterior walls with the following characteristics:
1. Thickness: 12.1 mils (0.31 mm).
2. Breaking Strength Test: 94 pounds (418 N) mean value per ASTM D5034.
3. Water Vapor Transmission: 10-20 perms (grains per hr.in.Hg.sq.ft.) per ASTM E 96, desiccant method.
4. Pliability: No signs of cracking per AC38, Sec. 3.3.4.
5. Ultraviolet Exposure: Not to be installed more than 12 months prior to

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exterior cladding coverage.

6. Accelerated Aging Cycling: No signs of failure at 21 days per AC38.
7. Water Resistance Test: Exceeds one hour per ASTM D 779.
8. Elongation: 1.9 inches (4.8 cm) per ASTM D 5034, 4 inch (10.2 cm) wide sample.

2.3 ACCESSORIES

A. Sealing Tape:
1. Product: Typar® Construction Tape by Fiberweb™.
2. Description: Elastomeric polymer based, butyl rubber, rubber based, meeting ASTM C 920 evaluation.

B. Mechanical Fasteners:
1. Plastic cap nails.
2. Plastic cap staples.
3. Rust-resistant screws with washers.
4. Sealant: Polyurethane based, meeting ASTM C 920 evaluation.
5. Mechanical: Masonry fastener with washer.

C. Self-Adhering Sheet Flashing: Typar® Flashing Flex by Fiberweb™ with the following characteristics.
1. Face Material Composition: Conformable textured polyolefin.
2. Face Color: Dark gray.
3. Adhesive Composition: Butyl adhesive.
4. Thickness: 60 mil.
5. Release Liner: Siliconized paper.
6. Dimensions: 6 in (15.2 cm) x 75 ft (22.9 m), 9 in (22.7 cm) x 75 ft (22.9 m).
7. Low Temperature Flex: Meets or exceeds ASTM D 903.
8. Nail Sealability: Meets or exceeds ASTM D 1970.
9. Tensile Strength: Meets or exceeds ASTM D 2523.
10. Maximum Exposure Limit: 90 days.

D. Self-Adhering Sheet Flashing: Typar® Flashing BA by Fiberweb™ with the following characteristics.
1. Face Material Composition: Conformable Textured Polyolefin.
2. Face Color: Gray.
3. Adhesive Composition: Butyl adhesive.
4. Thickness: 25 mil.
5. Release Liner: Siliconized paper.
6. Dimensions: 4 in (10.2 cm), 6 in (15.2 cm) x 75 ft (22.9 m), 9 in (22.7 cm) x 75 ft (22.9 m).
7. Low Temperature Flex: Meets or exceeds ASTM D 903.
8. Nail Sealability: Meets or exceeds ASTM D 1970.
9. Tensile Strength: Meets or exceeds ASTM D 2523.
10. Maximum Exposure Limit: 180 days.

E. Self-Adhering Sheet Flashing: Typar® Flashing RA by Fiberweb™ with the following characteristics.

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1. Face Material Composition: Polyolefin.
2. Face Color: Gray.
3. Adhesive Composition: Rubberized asphalt.
4. Thickness: 25 mil.
5. Release Liner: Siliconized paper.
6. Dimensions: 4 in (10.2 cm) x 75 ft (22.9 m), 6 in (15.2 cm) x 75 ft (22.9 m), 9 in (22.7 cm) x 75 ft (22.9 m), 12 in (30.5 cm) x 75 ft (22.9 m).
7. Low Temperature Flex: Meets or exceeds ASTM D 903.
8. Nail Sealability: Meets or exceeds ASTM D 1970.
9. Tensile Strength: Meets or exceeds ASTM D 2523.
10. Maximum Exposure Limit: 90 days.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Prior to start of installation, inspect existing conditions to ensure surfaces are suitable for installation of specified products, including removal of sharp protrusions and that substrate is dry.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Installation of Typar® MetroWrap™: Comply with manufacturer's installation instructions including but not limited to the requirements specified in this section. Sequence construction such that Typar® MetroWrap™ is not exposed for more than 12 months before covering material is applied.
   1. Overlaps: Install shingle style to shed water, with minimum 6 inch (15 cm) overlap vertically and horizontally, and 12 inches (30 cm) overlap at corners, at all locations where this is possible.
   2. Fasteners at Wood Studs: Use manufacturer's recommended fasteners with plastic heads. Use 2 inch (5 cm) long plastic headed nails or plastic headed screws when 1/2 inch (1.2 cm) thick OSB sheathing is used.
   3. Fasteners at Metal Studs: Use manufacturer's recommended fasteners with 2 inch (5 cm) plastic disk around shank of No. 10 stainless steel self-taping screws. Use 2 inch (5 cm) long screws when 1/2 inch (1.2 cm) thick gypsum board is used.

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4. Fastening at Concrete Block and Poured Concrete: Adhesive Recommended by manufacturer.
5. Fastener Pattern: Attach one fastener or more every 24 inches (61 cm) in horizontal and vertical direction or at 16 inches (40 cm) in horizontal and 24 in the vertical if using 16 inch stud spacing.
6. Edge Seal Where Material is Sealed to Itself: Typar® Construction Tape.
7. Edge Seal Where Material is Sealed to Adjacent Material: Install approved sealant on them substrate 1 inch (2.5 cm) to 2 inches (5 cm) back from the edge of the Typar® MetroWrap™. Press MetroWrap into the sealant to create air and water seal. If required by location of termination, provide furring strip to hold the Typar® MetroWrap™ in place.
8. Edge Seal at Penetrations: Install approved sealant on the substrate 1 inch (2.5 cm) back from the edge of the cut. Press MetroWrap into the sealant to create air and water seal. Install Typar® Flashing Flex, Typar® Flashing BA or Typar® Flashing RA as specified on the exterior of the Typar® MetroWrap™ to join the material to the penetration.
9. Final Inspection of Typar® MetroWrap™: When each section is complete, the installer shall visually inspect the installation and verify that all rows of material have overlapped the row below it, that all materials and components have been installed in a shingle fashion, that the fasteners are the proper ones, that the nailing pattern is correct, that all penetrations and terminations have been done correctly and that doors and windows have been properly flashed and integrated into the MetroWrap material.
10. The installer shall repair any cuts or tears with Typar® Construction Tape.

B. Install prior to installation of window over exterior sheathing or open studs, in accordance with manufacturer's instructions. Install air tight and free from holes, tears, and punctures.

C. Flash and seal window and door penetrations per ASTM E 2112, AMMA guidelines and manufacturer instructions.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

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SECTION 07 53 23

ROOFING AND FLASHING

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Fully adhered EPDM sheet roofing, tapered and flat roof insulation, elastomeric flashing, copper flashings, copper edge strips, tapered edge strips and roof drains.

1.02 CODES, REGULATIONS AND STANDARDS

A. Contractor Responsibility: The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and local codes, regulations and standards pertaining to work practices, hauling, disposal, protection of workers and visitors to the site, and persons occupying areas adjacent to the site. This includes modification of procedures to comply with changes to codes, regulations and standards which occur during the work of this contract. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State and local regulations. The Contractor shall hold the Owner and Owner's Representatives harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulations on the part of himself, his employees or his subcontractors.

1.03 QUALITY ASSURANCE

A. Roofing contractor to be approved in writing by the membrane manufacturer. Contractor shall be able to substantiate that he has been trained by the membrane manufacturer.
B. Roofing and flashing workmanship to comply with industry standards. The National Roofing Contractors Association's (NRCA) ***ROOFING AND WATERPROOFING MANUAL*** along with ***ARCHITECTURAL SHEET METAL MANUAL*** as published by Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) will be used to establish industry standards.

1.04 SUBMITTALS

A. Sample twenty (20) year watertight warranty for the EPDM membrane.
B. Sample twenty (20) year material warranty for the EPDM membrane.
C. Current EPDM membrane manufacturer's application specifications.
D. Shop drawings of each flashing condition, such as eave, curb, vent, wall termination, fascia and siding. Show securement of panels and clips, spacing, type and number of fasteners.

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1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in their original, unopened containers, clearly labeled with manufacturer's name. All material to be stored in waterproof trailers or sheds, up on raised platforms and under lock and key until use. Do not use materials damaged in handling or storage. Replace damaged material with new material. Store adhesives between 60 and 80 degrees F. Should they be exposed to lower temperatures, restore to room temperature for three to five days prior to use.

1.06 WARRANTY

A. A twenty (20) year watertight and material warranty shall be issued by the EPDM membrane manufacturer.
B. The roofing contractor shall furnish the Owner with his personal two (2) year watertight warranty.

PART 2 PRODUCTS

2.01 ROOF INSULATION

A. Tapered and flat roof insulation to be polyisocyanurate closed-cell foam core with manufacturer's standard facing laminated to both sides, complying with FS HH-I-1972/2, Class 1. The roof is to receive an average thickness of 8 ½" polyisocyanurate, to achieve slopes as necessary to drain water, refer to the drawings and specifications. Roof insulation to be ISO 95+ by Firestone, H-Shield by Hunter Panels or approved equal.
B. Over all foam insulation, install one layer of 1/2" high density polyisocyanurate roof insulation.
C. Tapered edge strips to be 1-1/2" by 18" fiberboard. Use the tapered edge strips at the drains to create an additional sump for the drains.

2.02 MEMBRANE ROOF SYSTEM

A. Membrane roofing to be fully adhered .060" EPDM sheet roofing furnished in twenty five foot (25') wide (or wider) rolls by Firestone, Carlisle or Versico. **EPDM to be "Low Slope Fire Resistant" LSFR meeting U.L. - B. - FA.- 38.** Roof membrane to be fully adhered to the 1/2" high density polyisocyanurate roof insulation.
B. Use the roof membrane for flashing of curbs and walls per the manufacturer's standard details. Use reinforced EPDM anchor strips to avoid splice joints at walls and edges.
C. Adhesives, sealants, thinner, cleaner and accessories to be furnished by the membrane manufacturer.
D. **Six inch (6") wide seam tape will be required for all field seams**.

2.03 ROOF DRAINS

A. New roof drains shall be Zurn ZC-100-DP furnished with *CAST IRON DOMES* and "Top-Set" deck plates. Insulate bottom side of roof drain.

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2.04 METAL FLASHING

A. Edge strip to be formed using 24 gauge galvalume-coated steel, factory painted with Kynar 500. Color to be selected by Architect from manufacturer's standard colors. Concealed clips to be formed using 24 gauge galvalume, mill finish.

B. Cap flashing to be formed using 24 gauge galvalume-coated steel, factory painted with Kynar 500. Color to be selected by Architect from manufacturer's standard colors.

2.05 FASTENERS

A. Use fasteners recommended by the membrane manufacturer to secure anchor bars and termination bars.

B. Fasteners used to secure roof insulation to the wood deck to be #14-10 Heavy Duty Roofing Fasteners with CR-10 coating, a minimum shank diameter of 0.170" and a thread diameter of 0.125". Pressure plates to be 3" diameter Galvalume plates. Screws and plates to be manufactured by Olympic Fasteners or approved equal. Length, size and accessories to be as required by the EPDM membrane manufacturer selected.

C. Copper flashing to be secured with annular-ring copper nails as shown on attached drawings.

PART 3 EXECUTION

3.01 PREPARATION OF SURFACES

A. Surfaces on which the roofing system is to be applied shall be clean, smooth, dry, free of fins, rot, sharp edges, loose and foreign materials, oil and grease.

3.02 ROOF INSULATION

A. Insulation shall be tightly butted with joints not more than 1/8" in width. Stagger joints with those in layer below.

B. Fasten insulation to the roof deck with the appropriate screws and plates. Fastener quantity and layout must meet the requirements of the EPDM manufacturer. Secure the ½" high density polyisocyanurate cover board to the roof insulation using low-rise foam.

C. Stagger joints in one direction for each course. For multiple layers, stagger joints in both directions between courses, leaving no gaps and allowing a complete thermal envelope to be formed.

D. Provide tapered units to suit drainage pattern indicated.

E. Do not install more insulation in a day than can be covered with membrane before end of day or before start of inclement weather.

3.03 ROOF MEMBRANE

A. Adhere the .060" EPDM membrane to the 1/2" high density polyisocyanurate in strict

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accordance with the manufacturer's specifications.
B. **Six inch (6") wide seam tape will be required for all field seams**.
C. Install an additional layer of roof membrane material, loosely applied, for additional protection at locations shown to receive concrete paver system.

3.04 FLASHING - - WALLS, PARAPETS, CURBS AND VENTS

A. Use the longest pieces of material which are practical. All flashing and terminations shall be done in accordance with the applicable manufacturer's details.
B. Care must be taken to set the elastomeric flashing so it does not bridge where there is a change of direction (i.e. where a parapet meets the roof deck). This can be accomplished by creasing the membrane into the angle change prior to adhering up the wall. Excess bridging will be cause for rejection and will be re-done at the contractor's expense.
C. Install termination bars at the top of all base flashing, fastening a minimum of 6" on center.

3.05 METAL FLASHING

A. Bottom edge of copper edge strips to be secured with continuous cleats. Nail top flange with annular-ring nails, three inches (3") on center. Strip top flange with 6" pressure sensitive flashing.
B. Submit details of all proposed flashing conditions.

3.06 TEMPORARY WATER CUT-OFF

A. Temporary water cut-offs are to be constructed at the end of each working day to protect the insulation, roofing, building and building interior from damage due to wind, snow and rain.
B. Temporary water cut-offs are to be detailed by the contractor and approved by the manufacturer and Owner.

3.07 CLEAN UP

A. Site clean-up shall be complete and to the satisfaction of the Owner.
B. All roofs, building, landscape and parking areas shall be cleaned of all trash, debris and dirt caused by or associated with this work.
C. Any areas stained, dirtied, discolored or otherwise damaged due to this work shall be cleaned, restored and replaced as required.
D. All debris shall be removed from the premises promptly and the construction area left clean daily.

3.08 INSPECTION AND TESTING

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THE OWNER RESERVES THE RIGHT TO INSPECT AND TEST ALL CONSTRUCTION OPERATIONS AND MATERIALS.

A. Any defect or noncompliance discovered by inspection shall be reported to the contractor who shall promptly remove any defective material from the site.
B. The Owner reserves the right to inspect the work or parts of it as he chooses. His failure to inspect the work in progress shall not relieve the contractor of the responsibility for properly executing the contracted work, nor shall it impair the Owner's right to reject deficiencies he may subsequently discover.

PART 4 JOB CONDITIONS

A. Roofing to be applied in dry weather.
B. Completed roof areas shall not be trafficked. The work shall be coordinated to prevent this situation by working toward the roof edges.
C. This project is subject to compliance with all requirements of the Occupational Safety and Health Administration (OSHA). All work on this project must meet the requirements of all applicable state and local codes, laws and ordinances.

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SECTION 07 62 00

Through Wall Penetration
FLASHING PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flashing panels to weatherproof plumbing, mechanical and electrical penetrations in exterior walls.

1.2 RELATED SECTIONS

A. Section 23 00 00 & 22 00 00 -Mechanical: Plumbing piping, venting.

B. Section 26 00 00 - Electrical: Electrical boxes.

1.3 REFERENCES

A. ASTM D 412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.

B. ASTM D 638 – Standard Test Method for Tensile Properties of Plastics.

C. ASTM D 792 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.

D. ASTM D 1505 – Standard Test Method for Density of Plastics by the Density-Gradient Technique.

E. ASTM D 2240 – Standard Test Method for Rubber Property—Durometer Hardness.

1.4 SUBMITTALS

A. Comply with Section 01330 (01 33 00) – Submittal Procedures.

B. Product Data: Submit manufacturer's product data, including installation instructions.

C. Warranty: Submit manufacturer's standard warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials during handling and installation to prevent damage.

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1.6 WARRANTY

A. Warranty Period: 10 years.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Quickflash Weatherproofing Products, Inc., 4129 Wagon Trail Avenue, Las Vegas, Nevada 89118. Phone (702) 614-6100. Fax (702) 614-4090. Website www.quickflashproducts.com. E-mail qfinfo@quickflashproducts.com.

2.2 FLASHING PANELS

A. Flashing Panels: Quickflash Weatherproofing Flashing Panels.

B. Plumbing Flashing Panels:
   1. Materials:
      a. Panel: Combination of high-density polyethylene (HDPE) and low-density polyethylene (LDPE).
         1) HDPE, Specific Gravity, ASTM D 1505: 0.953 g/cm^3.
         2) HDPE, Tensile Strength at Yield, ASTM D 638: 3,100 psi.
         3) LDPE, Specific Gravity, ASTM D 792: 0.917 g/cm^3.
         4) LDPE, Tensile Strength at Yield, ASTM D 638: 1,300 psi.
      b. Weatherproof Seal: Thermoplastic elastomer.
         1) Hardness, ASTM D 2240, Shore A, 10 Seconds: 46.
         2) Specific Gravity, ASTM D 792: 1.05 g/cm^3.
         3) Tensile Strength, ASTM D 412: 490 psi.
   2. Model: P-50.
      a. Fits: 1/2-inch to 3/4-inch pipes; copper, rigid, PVC, and ABS.
      b. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.
   3. Model: P-100.
      a. Fits: 1-inch to 1-1/4-inch pipes; copper, rigid, PVC, and ABS.
      b. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.
   4. Model: P-150.
      a. Fits: 1-1/2-inch to 1-3/4-inch pipes; copper, rigid, PVC, and ABS.
      b. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.
   5. Model: P-200.
      a. Fits: 2-inch to 2-1/2-inch pipes; copper, rigid, PVC, and ABS.
      b. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.
   6. Model: P-300.
      a. Fits: 3-inch pipes, ABS.
      b. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.
   7. Model: P-400.
      a. Fits: 4-inch pipes, ABS.
      b. Size: 12-1/2 inches by 12-1/2 inches by 3/32 inch.
   8. Model: P-600.

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a. Fits: 6-inch sheet metal duct.
b. Size: 12-1/2 inches by 12-1/2 inches by 3/32 inch.

9. Model: P-2PS.
a. Fits: Cut out center to fit 1/2-inch to 2-inch copper pipes with exterior tees sweated on.
b. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch. 2-piece panel.

C. Electrical Flashing Panels:
1. Material: Thermoplastic elastomer.
a. Hardness, ASTM D 2240, Shore A, 10 Seconds: 93.
b. Specific Gravity, ASTM D 792: 1.05 g/cm^3.
c. Tensile Strength, ASTM D 412: 1,300 psi.
2. Model: E-3/0 B, electrical 3/0 box flashing panel.
a. Use: 3-coat stucco and lap siding.
b. Fits: Specified electrical 3/0 plastic boxes.
c. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.
3. Model: E-4/0 B, electrical 4/0 box flashing panel.
a. Use: 3-coat stucco and lap siding.
b. Fits: Specified electrical 4/0 plastic boxes.
c. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.
4. Model: E-PC 3/0, electrical pancake 3/0 box flashing panel.
a. Use: 3-coat stucco and lap siding.
b. Fits: Specified electrical pancake 3/0 metal boxes.
c. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.
5. Model: E-PC 4/0, electrical pancake 4/0 box flashing panel.
a. Use: 3-coat stucco and lap siding.
b. Fits: Specified electrical pancake 4/0 metal boxes.
c. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.
6. Model: E-SGB, electrical single-gang box flashing panel.
a. Use: 3-coat stucco and lap siding.
b. Fits: Specified electrical single-gang plastic boxes.
c. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.
7. Model: E-SGR, electrical single-gang 1/2-inch raised-plaster-ring cover flashing panel.
a. Use: 3-coat stucco and lap siding.
b. Fits: Specified electrical single-gang raised-plastic-ring cover.
c. Size: 11-1/8 inches by 11-1/8 inches by 3/32 inch.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive flashing panels.

B. Notify Architect of conditions that would adversely affect installation or subsequent use.

C. Do not begin installation until unacceptable conditions are corrected.

3.2 PREPARATION

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A. Copper Pipes:
   1. Heat sweat copper pipes before installation of flashing panels.

3.3 INSTALLATION

A. Install flashing panels in accordance with manufacturer's instructions.

B. Plumbing Flashing Panels, 1 Piece:
   1. Select flashing panel required for specific pipe sizes.
   2. Push flashing panel over pipe with label facing to exterior to form weatherproof seal around pipe.
   3. Nail flashing panels to walls with corrosion-resistant nails at top of panels.

C. Electrical Flashing Panels:
   1. Select flashing panel required for specific electrical boxes.
   2. Push flashing panel over electrical box with label facing to exterior to form weatherproof seal around box.
   3. Ensure flashing panel collar edge is flush with electrical box opening edge.
   4. Nail flashing panels to walls with corrosion-resistant nails at top of panels.

D. Weather Barriers:
   1. Place weather barrier up behind bottom of flashing panel to bottom of pipe or electrical box.
   2. Place second layer of weather barrier over top of flashing panel to bottom front edge or further down.

3.4 PROTECTION

A. Protect installed flashing panels from damage during construction.

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SECTION 07 84 13
FIRESTOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.02 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in, or construction joints between, fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only tested firestop systems shall be used in specific locations as follows:

A. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

B. Safing slot gaps between edge of floor slabs and curtain walls.

C. Openings between structurally separate sections of wall or floors.

D. Gaps between the top of walls and ceilings or roof assemblies.

E. Expansion joints in walls and floors.

F. Openings and penetrations in fire-rated partitions or walls containing fire doors.

G. Openings around structural members which penetrate floors or walls.

1.04 RELATED WORK OF OTHER SECTIONS

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

1. Section 03 30 00 - Cast-In-Place Concrete
2. Section 04 20 00 - Unit Masonry
3. Section 07 90 00 - Joint Sealants

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4. Section 09 20 00 - Plaster and Gypsum Board
6. Section 21 00 00 - Fire Suppression
7. Section 22 00 00 - Plumbing
8. Section 23 00 00 - Heating, Ventilating, and Air Conditioning (HVAC)
9. Section 26 00 00 - Electrical
10. Section 26 00 00 - Communications

1.05 REFERENCES

A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops"

B. Test Requirements: UL 1479, “Fire Tests of Through-Penetration Firestops”

C. Test Requirements: UL 2079, “Tests for Fire Resistance of Building Joint Systems”

D. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.

1. UL Fire Resistance Directory:
   a. Firestop Devices (XHJI)
   b. Fire Resistance Ratings (BXRH)
   c. Through-Penetration Firestop Systems (XHEZ)
   d. Fill, Voids, or Cavity Material (XHHW)
   e. Forming Materials (XHKU)
   f. Joint Systems (XHBN)
   g. Perimeter Fire Containment Systems (XHDG)

2. Alternate Systems: “Omega Point Laboratories Directory” (updated annually).

E. Test Requirements: ASTM E 1966, “Standard Test Method for Fire Resistive Joint Systems”

F. Test Requirements: ASTM E 2307, “Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus”

G. Inspection Requirements: ASTM E 2174, “Standard Practice for On-site Inspection of Installed Fire Stops”

H. ASTM E 84, “Standard Test Method for Surface Burning Characteristics of Building Materials”

I. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

J. International Building Code (IBC 2009)

K. NFPA 101 - Life Safety Code

L. NFPA 70 - National Electric Code

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1.06 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide through-penetration fire stop systems and fire-resistive joint systems that comply with specified requirements of tested systems.

B. Fire stop System installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

C. Proposed fire stop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Fire stop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

E. For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.

1.07 SUBMITTALS

A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of qualified tested firestop systems to be used and manufacturer's installation instructions to comply with Section 01 30 00.

B. Manufacturer's engineering judgment identification number and document details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor’s name who will install firestop system as described in document.

C. Submit material safety data sheets provided with product delivered to job-site.

1.08 INSTALLER QUALIFICATIONS

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer’s products per specified requirements. A supplier’s willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

B. Installation Responsibility: assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single sole source firestop specialty contractor.

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C. The work is to be installed by a contractor with at least one of the following qualifications:

FM 4991 Approved Contractor
UL Approved Contractor
Hilti Accredited Fire Stop Specialty Contractor

D. Firm with not less than 3 years experience with fire stop installation.

E. Successfully completed not less that 3 comparable scale projects using similar systems.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

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PART 2 - PRODUCTS

2.01 FIRESTOPPING - GENERAL

A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.

D. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
2. T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.

E. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.

F. Mold Resistance: Provide penetration firestoppping with mold and mildew resistance rating of 0 as determined by ASTM G21.

G. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

2.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with through penetration firestop systems (XHEZ), joint systems (XHBN), and perimeter firestop systems (XHDG) listed in Volume 2 of the UL Fire Resistance Directory; provide products of the following manufacturers as identified below:

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1. Hilti, Inc., Tulsa, Oklahoma
   800-879-8000
   www.us.hilti.com
   Chris Allington 508-509-8316
   Chris.allington@hilti.com

2. Substitution requests shall be considered in accordance with contract provisions.

2.03 MATERIALS

A. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

B. Pre-installed firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors and/or gypsum walls, the following products are acceptable:

1. Hilti Cast-In Place Firestop Device (CP 680-P)
   a. Add Aerator Adaptor when used in conjunction with aerator system.
2. Hilti Tub Box Kit (CP 681) for use with tub installations.
3. Hilti Cast-In Place Firestop Device (CP 680-M) for use with noncombustible penetrants.
4. Hilti Speed Sleeve (CP 653) for use with cable penetrations.
5. Hilti Firestop Drop-In Device (CFS-DID) for use with noncombustible and combustible penetrants.
6. Hilti Firestop Block (CFS-BL)

C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE)
2. Hilti Self-leveling Firestop Sealant (CP 604)
3. Hilti Fire Foam (CP 620)
4. Hilti Flexible Firestop Sealant (CP 606)
5. Hilti Elastomeric Firestop Sealant (CP 601S)

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

1. Hilti Elastomeric Firestop Sealant (CP 601S)
2. Hilti Flexible Firestop Sealant (CP 606)
3. Hilti Intumescent Firestop Sealant (FS-ONE)

E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:

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1. Hilti Firestop Joint Spray (CFS-SP WB)
2. Hilti Elastomeric Firestop Sealant (CP 601S)
3. Hilti Flexible Firestop Sealant (CP 606)
4. Hilti Self-leveling Firestop Sealant (CP 604)

F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.

1. Hilti Speed Plugs (CP 777)
2. Hilti Speed Strips (CP 767)

G. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE)

H. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE)
2. Hilti Fire Foam (CP 620)
3. Hilti Elastomeric Firestop Sealant (CP 601S)
4. Hilti Flexible Firestop Sealant (CP 606)

I. Non-curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti Firestop Putty Stick (CP 618)
2. Hilti Firestop Plug (CFS-PL)

J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:

1. Hilti Firestop Putty Pad (CP 617)
2. Hilti Firestop Box Insert

K. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:

1. Hilti Firestop Collar (CP 643N)
2. Hilti Firestop Collar (CP 644)
3. Hilti Wrap Strips (CP 648E/648S)

L. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:

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1. Hilti Firestop Mortar (CP 637)
2. Hilti Firestop Block (CFS-BL)
3. Hilti Fire Foam (CP 620)
4. Hilti Firestop Board (CP 675T)

M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:

1. Hilti Firestop Block (CFS-BL)
2. Hilti Firestop Board (CP 675T)

N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:

1. Hilti Firestop Joint Spray (CFS-SP WB)
2. Hilti Elastomeric Firestop Sealant (CP 601S)
3. Hilti Flexible Firestop Sealant (CP 606)
4. Hilti Self-leveling Firestop Sealant (CP 604)

O. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:

1. Hilti CFS-BL Firestop Block
2. Hilti CFS-PL Firestop Plug

P. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

Q. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction joint assembly.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Verify penetrations are properly sized and in suitable condition for application of materials.
2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.

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4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

A. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

C. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.

D. Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector.

3.03 INSTALLATION

A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.

1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops” or other recognized standard.

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D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

E. Manufacturer's Field Services: During Installation, provide periodic destructive testing inspections to assure proper installation/application. After installation is complete, submit findings in writing indicating whether or not the installation of the tested system identified was installed correctly.

3.05 IDENTIFICATION & DOCUMENTATION

A. The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.

A.1 The Documentation Form for through penetrations is to include:

1. A Sequential Location Number
2. The Project Name
3. Date of Installation
4. Detailed description of the penetrations location
5. Tested System or Engineered Judgment Number
6. Type of assembly penetrated
7. A detailed description of the size and type of penetrating item
8. Size of opening
9. Number of sides of assemblies addressed
10. Hourly rating to be achieved
11. Installers Name

A.2 The Documentation Form for Construction Joints is to include:

1. A Sequential Location Number
2. The Project Name
3. Date of Installation
4. Detailed description of the Construction Joints location
5. Tested System or Engineered Judgment Number
6. Type of Construction Joint
7. The Width of the Joint
8. The Lineal Footage of the Joint
9. Number of sides addressed
10. Hourly rating to be achieved
11. Installers Name

B. Copies of these documents are to be provided to the general contractor at the completion of the project.

C. 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

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visible to anyone seeking to remove penetrating items or firestop systems. Include th 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.

3.06 ADJUSTING AND CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.07 LABOR USE TO INSTALL FIRESTOP SYSTEMS

A. To ensure complete harmony on the project site, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreements.

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FIRESTOPPING SCHEDULE

CONCRETE FLOORS		UL-CLASSIFIED SYSTEMS
TYPE OF PENETRANT	**F-RATING HR**	**HILTI**
CIRCULAR BLANK OPENINGS	1	FA 0006, CAJ 0070
	2	FA 0006, CAJ 0070
	3	CAJ 0055
SINGLE METAL PIPES OR CONDUIT	1	CAJ 1226, CAJ 1278, FA 1017
	2	CAJ 1226, CAJ 1278, FA 1017
	3	CAJ 1226, CAJ 1278, FA 1017
	4	CAJ 8095, CBJ 1034
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, ENT)	1	CAJ 2109, CAJ 2168, FA 2054, FA 2067
	2	CAJ 2109, CAJ 2168, FA 2054, FA 2067
	3	CAJ 2109, CAJ 2168, FA 2054,
	4	N/A*
SINGLE OR BUNDLED CABLES	1	FA 3007,

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		CAJ 3095,
	2	FA 3007, CAJ 3095,
	3	FA 3007, CAJ 3095,
	4	N/A*
CABLE TRAY	1	CAJ 4034, CAJ 4054, CAJ 4017
	2	CAJ 4034, CAJ 4054, CAJ 4017
	3	CAJ 4034, CAJ 4017
	4	N/A*

CONCRETE FLOORS (CONTINUED)		**UL-CLASSIFIED SYSTEMS**
TYPE OF PENETRANT	**F-RATING HR**	**HILTI**
SINGLE INSULATED PIPES	1	FA 5016, FA 5017, CAJ 5090, CAJ 5091,
	2	FA 5016, FA 5017 CAJ 5090, CAJ 5091,
	3	FA5016, CAJ 5061, CAJ 5090,
	4	CBJ 5006
ELECTRICAL BUSWAY	1	CAJ 6006, CAJ 6017
	2	CAJ 6006, CAJ 6017
	3	CAJ 6006, CAJ 6017
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ 7046

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		CAJ 7051
	2	CAJ 7046 CAJ 7051
	3	CAJ 7046 CAJ 7051
MIXED PENETRANTS	1	CAJ 8056, CAJ 8095, CAJ 8099
	2	CAJ 8056, CAJ 8095, CAJ 8099
	3	CAJ 8056, CAJ 8095, CAJ 8099
	4	CAJ 8095

CONCRETE OR BLOCK WALLS		**UL-CLASSIFIED SYSTEMS**
TYPE OF PENETRANT	**F-RATING**	**HILTI**
CIRCULAR BLANK OPENINGS	1	CAJ 0055, CAJ 0070
	2	CAJ 0055, CAJ 0070
	3	CAJ 0055
SINGLE METAL PIPES OR CONDUIT	1	CAJ 1226, CAJ 1278,
	2	CAJ 1226, CAJ 1278,
	3	CAJ 1226, CAJ 1278,
	4	CAJ 8095, CBJ 1034, WJ 1042
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, ENT)	1	CAJ 2109, WJ 2108, WJ 2121
	2	CAJ 2109, WJ 2108,

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		WJ 2121
	3	CAJ 2109, CAJ 2168, WJ 2091
	4	WJ 2091
SINGLE OR BUNDLED CABLES	1	CAJ 3095, WJ 3060 WJ 3074
	2	CAJ 3095, WJ 3060 WJ 3074
	3	CAJ 3095, WJ 3050
	4	WJ 3050
CABLE TRAY	1	CAJ 4034, CAJ 4054, WJ 4016,
	2	CAJ 4034, CAJ 4054, WJ 4016,
	3	CAJ 4034, WJ 8007
	4	WJ 8007

CONCRETE OR BLOCK WALLS (CONT)		**UL-CLASSIFIED SYSTEMS**
TYPE OF PENETRANT	**F-RATING**	**HILTI**
SINGLE INSULATED PIPES	1	CAJ 5090, CAJ 5091, WJ 5042
	2	CAJ 5090, CAJ 5091, WJ 5042
	3	CAJ 5090, CAJ 5091,
	4	WJ 5028, CBJ 5006
ELECTRICAL BUSWAY	1	CAJ 6006, CAJ 6017
	2	CAJ 6006, CAJ 6017
	3	CAJ 6006,

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		CAJ 6017
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ 7046, WJ 7029, WJ 7022
	2	CAJ 7046, WJ 7029, WJ 7022
	3	CAJ 7046 CAJ 7051
MIXED PENETRANTS	1	CAJ 8096, CAJ 8099 WJ 8007
	2	CAJ 8096, CAJ 8099 WJ 8007
	3	CAJ 8099 WJ 8007
	4	WJ 8007
WOOD FLOORS		**UL-CLASSIFIED SYSTEMS**
TYPE OF PENETRANT	**F-RATING**	**HILTI**
METAL PIPES OR CONDUIT	1	FC 1009, FC 1059
	2	FC 1009, FC 1059
NON-METALLIC PIPE OR CONDUIT	1	FC 2025, FC 2126
	2	FC 2025, FC 2126
SINGLE OR BUNDLED CABLES	1	FC 3012, FC 3044
	2	FC 3012
INSULATED PIPES	1	FC 5004, FC 5036, FC 5037

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	2	FC 5004
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	FC 7013
MIXED PENETRANTS	1	FC 8014, FC 8026
	2	N/A*

GYPSUM WALLBOARD ASSEMBLIES		**UL-CLASSIFIED SYSTEMS**
TYPE OF PENETRANT	**F-RATING**	**HILTI**
METAL PIPES OR CONDUIT	1	WL 1054, WL 1164
	2	WL 1054, WL 1164
	4	WL 1110
NON-METALLIC PIPE OR CONDUIT	1	WL 2078, WL 2075, WL 2128
	2	WL 2078, WL 2075, WL 2128
	4	WL 2184, WL 2245
SINGLE OR BUNDLED CABLES	1	WL 3065
	2	WL 3065
	4	WL 3139
CABLE TRAY	1	WL 4011, WL 4019
	2	WL 4011, WL 4019
	4	WL 8014
INSULATED PIPES	1	WL 5029, WL 5096
	2	WL 5029, WL 5096
	4	WL 5073

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NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	WL 7040, WL 7042
	2	WL 7040, WL 7042
MIXED PENETRANTS	1	WL 8004, WL 8013
	2	WL 8004, WL 8013
	4	WL 8014

NOTES:

1. Jobsite conditions of each through-penetration firestop system must meet all details of the UL-Classified System selected.
2. If jobsite conditions do not match any UL-classified systems in the schedules above, contact firestop manufacturer for alternative systems or Engineer Judgment Drawings.
3. Coordinate work with other trades to assure that penetration-opening sizes are appropriate for penetrant locations, and vice versa.
4. For 3-hour rated gypsum walls, contact the firestop manufacturer for a UL-classified system or engineer judgment drawing.
5. The Contractor shall verify that the schedule is current at the time of construction, and that each referenced system is suitable for the intended application.

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SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Exterior polyurethane sealants.
2. Exterior and interior polyurethane traffic sealants.
3. Interior polyurethane sealants.
4. Interior latex sealants.
5. Interior sanitary silicone sealants.
6. Exterior and interior water immersed polyurethane sealants.
7. Metal lap joint sealants.
8. Threshold and sheet metal bedding sealants.
9. Joint accessories.

B. Related Sections:
1. Section 08 80 00 – Glazing: Glazing sealants and protective glazing systems.

1.2 REFERENCES

A. ASTM International Inc.
1. ASTM C 510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
2. ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
3. ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
4. ASTM C834 - Standard Specification for Latex Sealants.
5. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
8. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
9. ASTM C 1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.
10. ASTM C 1311 - Standard Specification for Solvent Release Sealants.
11. ASTM D 2203 - Standard Test Method for Staining from Sealants.

1.3 SUBMITTALS

A. Shop Drawings:
1. Submit details to show installation and interface between sealants and adjacent work.

B. Product Data:
1. Materials list of items proposed to be provided under this Section;

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2. Manufacturer's specifications and other data needed to prove compliance wit the specified requirements;

C. Samples:
1. Submit color charts for each sealant type for initial selection.
2. Submit standard cured color samples for each sealant type illustrating selected colors.

D. Manufacturer's Installation Instructions:
1. Submit manufacturer’s published installation procedures.
2. Include instructions for completing sealant intersections when different materials are joined.
3. Include instructions for removing existing sealants and preparing joints for new sealant.

E. Manufacturer's Certificate:
1. Certify products are suitable for intended use and products meet or exceed specified requirements.
2. Certify applicator is approved by manufacturer.

F. Qualifications Data:
1. Submit applicator's qualifications, including reference projects of similar scope and complexity, with current phone numbers and contact names of architects and owners for verification.

G. Manufacturer's Field Reports:
1. Indicate time present at project site.
2. Include observations, indicate compliance with manufacturer's installation instructions, and supplemental instructions provided to installers.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:
1. Submit recommended inspection intervals.
2. Submit instructions for repairing and replacing failed sealant joints.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with the following:
1. Building Joints: ASTM C 1193.

B. Field Pre-Construction Testing:
1. Test each elastomeric sealant and joint substrate in accordance with the following, before beginning work of this section:
a. Install sealants in field samples using joint preparation methods determined by laboratory pre-construction testing.
b. Remove existing sealant, clean joint, and install new sealant using manufacturer's recommended joint preparation methods.

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c. Install field-test joints in location as approved by Architect.
d. Test Method: Manufacturer's standard field adhesion test to verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
e. When test indicates sealant adhesion failure, modify joint preparation, primer, or both and retest until joint passes sealant adhesion test.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.

B. Applicator Qualifications:
1. Company specializing in performing work of this section with minimum three years documented experience, minimum three successfully completed projects of similar scope and complexity, and approved by manufacturer.
2. Designate one individual as project foreman who shall be on site at all times during installation.

1.7 MOCKUP

A. Install sealants in mockups specified in other sections including sealant and joint accessories to illustrate installation quality and color.

B. Incorporate accepted mockup as part of Work.
1. Repair seal joint mockups used for field adhesion testing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in manufacturers unopened original packaging. Inspect for damage.

B. Store primers and sealants in cool dry location with ambient temperature range of 60 to 80 degrees F.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not install primers or sealants when atmospheric temperatures or joint surface temperatures are less than 40 degrees F.

1.10 SCHEDULING

A. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.

B. Ensure sealants are cured before covering with other materials.

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1.11 WARRANTY

A. Submit signed copies of the following warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of 3 years from date of completion.
   1. Manufacturer's standard warranty covering sealant materials.
   2. Applicator's standard warranty covering workmanship.

PART 2 PRODUCTS

2.1 Caulking for joints at all junctions as necessary to obtain complete watertight construction.

2.2 MANUFACTURERS

A. Tremco Sealant/Weatherproofing Division of RPM International, Inc.

B. Or equal

2.3 URETHANE SEALANTS

A. Multi-Component Urethane: two component, chemical curing, nonstaining, nonbleeding, color as selected.
   1. Dymeric 240
   2. Dymeric 240FC
   3. Or equal

B. Single Component Urethane: single component, moisture curing, nonstaining, non-bleeding, color as selected.
   1. Dymonic FC
   2. Or equal

2.4 SILICONE SEALANTS

A. Multi-Component Silicone: ASTM C920, Type M, Grade NS, Class 50; Uses NT, M, G, A and O: multi-component, neutral curing, nonstaining, nonbleeding, color as selected
   1. Spectrem 4-TS.
   2. Or equal

B. Single Component Silicone: ASTM C920, Type S, Grade NS, ; Uses NT, M, G, A and O: single component, nonstaining, nonbleeding, color as selected.
   1. Spectrem 1.
   2. Spectrem 2.
   3. Spectrem 3.
   4. Or equal

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C. Single Component Silicone: ASTM C920, Type S, Grade NS, Class 25; Uses NT, G, A and O: single component, nonstaining, nonbleeding, color as selected.
   1. Proglaze.
   2. Tremsil 200.

2.5 OTHER SEALANTS

A. Latex Sealant: ASTM C 834; single component, solvent curing, nonstaining, nonbleeding, nonsagging; color as selected.
   1. Tremflex 834.

B. Synthetic Rubber Sealant:
   1. Acoustical Sealant.

C. Butyl Sealant: ASTM C 1311, butyl or polyisobutylene, single component, nondrying, non-skinning, non-curing.
   1. Butyl Sealant.

2.6 ACCESSORIES

A. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

C. Joint Backing: Round foam rod compatible with sealant; oversized 25 to 50 percent larger than joint width; recommended by sealant manufacturer to suit application

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

E. Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate surfaces and joint openings are ready to receive work.
   1. Verify joint surfaces are clean and dry.
   2. Ensure concrete surfaces are fully cured.

B. Report unsatisfactory conditions in writing to the Architect;

C. Do not proceed until unsatisfactory conditions are corrected.

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3.2 PREPARATION

A. Prepare joints in accordance with ASTM C 1193 and manufacturer's instructions.

B. Clean joint surfaces to remove dirt, dust, oils, wax, paints, and other contamination capable of affecting primer and sealant bond.
   1. Clean concrete joint surfaces to remove curing agents and form release agents.

C. Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

3.3 EXISTING WORK

A. Mechanically remove existing sealant.

B. Clean joint surfaces of residual sealant and other contaminates capable of affecting sealant bond to joint surface.

C. Allow joint surfaces to dry before installing new sealants.

3.4 SEALANT INSTALLATION

A. INTERIOR CAULKING shall be applied to seal all penetrations through top plates of interior walls, (due to electrical or plumbing), and at tubs, showers, counter tops, bottom of party walls GWB, full perimeter of all exterior walls, and other as shown on Drawings.

B. ALL POTENTIAL INFILTRATION cracks & joints to be caulked. Caulking shall be done only by workmen who are thoroughly experienced in this work. Exterior caulking shall be applied around windows, doors, vents, utilities, and any other infiltration "crack".

C. IN GENERAL see Drawings for any additional applications. Joints and spaces to be caulked shall be dry and free from dust. Finished caulking "bead" shall be neat and smooth, free of gaps and sags and run continuously. Complete all caulking work and allow to stand for the manufacturer's recommended time period before painting. Prime if required before finish coat of paint is applied.

D. Install primer and sealants in accordance with ASTM C 1193 and manufacturer's instructions.

E. Caulking shall apply to sealing of joints less than 3/4 inches in width. Any joint in excess of this width shall be filled with a low-expansion closed cell foam insulation or as directed by Architect.

F. Install joint backing to maintain the following joint ratios:
   1. Joints up to 1/2 inch Wide: 1:1 width to depth ratio.

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2. Joints Greater than 1/2 inch Wide: 2:1 width to depth ratio; maximum 1/2 in joint depth.

G. Install bond breaker where joint backing is not used.

H. Apply primer where required for sealant adhesion.

I. Install sealants immediately after joint preparation.

J. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

K. Tool exposed joint surface concave.

L. Building Envelope:

1. Gaskets or sill seals under mud sills along foundation walls.
2. Seal first floor band joists to the adjoining mud sills and plywood decking using adhesive or caulk. Use construction adhesive or caulking between multiple sill plates.
3. Seal any band joists between upper floors to the adjoining top plate and plywood decking.
4. Use construction adhesive or caulking between multiple tops plates.
5. Seal bottom plates of exterior walls to the sub-floor with construction adhesive or caulking.
6. Window frames and doorjambs must be sealed to their rough openings using low expansion foam, backer rod or caulk but NOT fiberglass.
7. All penetrations through building must be carefully sealed. Typical Penetrations include chimney, duct and plumbing chases and penetrations of pipes and wires through the top plates of top story walls. It is particularly important to seal all possible air paths to the attic.
8. Electrical boxes on exterior walls and ceilings should either be air-sealed or placed in airtight enclosures (i.e. Lesco Boxes). Electrical boxes in unit demising walls shall be caulked to the gyp surface to provide full compartmentalization eliminating air leakage between units.
9. SPECIAL NOTE: THIS BUILDING WILL BE "BLOWER DOOR TESTED" TO VERIFY THE EFFECTIVENESS OF THE AIR SEALING PROCEDURES. ALL COST BEYOND THE INITIAL TEST ASSOCIATED WITH THE RE-TESTING AND RE-SEALING, SHOULD THE FIRST TEST FAIL TO MEET MAINEHOUSINGS STANDARDS, SHALL BE BORNE BY THE CONTRACTOR. IT IS THEREFORE INCUMBENT UPON THE CONTRACTOR TO HAVE IN PLACE AN AIR-SEALING PROGRAM, AS DEFINED IN THE DRAWINGS AND SPECIFICATIONS AND MAINEHOUSING'S STANDARDS, AT THE OUTSET OF FRAMING AND CONTINUOUSLY MONITORED DURING FINISHING OF THE SHELL.

3.5 MANUFACTURER'S FIELD SERVICES

A. Require sealant manufacturer to be present at project site to:
1. Observe sealant mockup installation and to issue reports of observations.

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2. Conduct field pre-construction testing.

3.6 CLEANING

A. Remove masking tape.

B. Clean adjacent surfaces soiled by sealant installation.

3.7 SCHEDULE – SEALANT JOINTS

A. Exterior Sealant Joint [Type A]:
   1. Applications:
      a. Control and expansion joints in cast-in-place concrete.
      b. Joints between architectural precast concrete units.
      c. Control and expansion joints in unit masonry.
      d. Control and expansion joints in stone masonry.
      e. Butt joints between metal panels.
      f. Joints between different materials listed above.
      g. Perimeter joints between materials listed above and frames of doors, windows, storefronts, louvers and similar openings.
      h. Control and expansion joints in soffits and overhead surfaces.
      i. Other exterior joints in vertical surfaces and non-traffic horizontal surfaces for which no other sealant is specified.
      j. Or equal
   2. Multi-Component Urethane Sealants:
      a. Dymeric 240/240FC.
      b. Vulkem 227.
      c. Or equal
   3. Single Component Urethane Sealants:
      a. Dymonic FC.
      b. Dymonic.
      c. Vulkem 116.
      d. Or equal
   4. Multi-Component Silicone Sealants:
      a. Spectrem 4-TS. D.O.E
   5. Single Component Silicone Sealants:
      a. Spectrem 1.
      b. Spectrem 2.
      c. Spectrem 3.
      d. Or equal

B. Interior Sealant Joint [Type C]:
   1. Applications:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Perimeter joints on exposed interior surfaces of exterior openings.

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c. Perimeter joints between interior wall surfaces and frames of interior doors, windows, storefronts, louvers, elevator entrances and similar openings.
d. Other interior joints in vertical surfaces and non-traffic horizontal surfaces subject to movement for which no other sealant is specified.

2. Multi Component Urethane Sealants:
   a. Dymeric 240/240FC.
   b. Vulkem 227.
   c. Or equal
3. Single Component Urethane Sealants:
   a. Dymonic FC.
   b. Dymonic.
   c. Vulkem 116.
   d. Or equal
4. Single Component Silicone Sealants:
   a. Spectrem 1.
   b. Spectrem 2.
   c. Spectrem 3.
   d. Or equal
5. Other Sealants:
   a. Tremflex 834.
   b. Or equal

C. Interior Sanitary Sealant Joint [Type G]:
1. Applications:
   a. Joints in toilet room and bathroom counter tops.
   b. Joints between plumbing fixtures and adjacent materials.
   c. Other interior joints in wet areas where needed to limit mold and mildew growth.
2. Single Component Silicone Sealants:
   a. Tremsil 200.
   b. Or equal

D. Concealed Metal Lap Sealant Joint [Type J]:
1. Applications:
   a. Concealed lap and hook joints in sheet metal flashing and trim.
2. Single Component Non-Curing Sealants:
   a. Tremco Butyl Sealant.
   b. Or equal

E. Concealed Bedding Sealant Joint [Type K]:
1. Applications:
   a. Bedding joints under metal thresholds and saddles.
   b. Bedding joints between sheet metal flashing and other materials.
2. Single Component Urethane Sealants:
   a. Dymonic FC.
   b. Dymonic.

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c. Vulkem 116.
d. Or equal

3. Single Component Silicone Sealants:
   a. Proglaze.
   b. Spectrem 2.
   c. Spectrem 3.
   d. Or equal
4. Single Component Non-Curing Sealants:
   a. Tremco Butyl Sealant.
   b. Tremco Acoustical Sealant.
   Or equal

END OF SECTION

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STEEL DOORS AND FRAMES

SECTION 08 11 13

PART 1 – GENERAL

1.01 GENERAL PROVISIONS:

A. The CONDITIONS OF THE CONTRACT and all Sections of Division 1 are hereby made a part of this section.

1.02 DESCRIPTION OF WORK:

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this section. Extent of steel doors and frames required is indicated on drawings and in schedules.

1. Furnish and Install:
   a. Steel frames for hollow metal doors
   b. Steel frames for wood doors
   c. Steel sidelite, borrowed lite, and transom frames
   d. Hollow metal doors
2. Install Only: Finish hardware for hollow metal doors as specified in Section 08 71 00 Finish Hardware.

B. Related work specified elsewhere:

1. SECTION 08 14 16: WOOD DOORS
2. SECTION 08 71 00: FINISH HARDWARE
3. SECTION 09 90 00: PAINTING

1.03 QUALITY ASSURANCE; SUBMITTALS:

A. General: Comply with requirements of SECTION 01 31 00 - SUBMITTALS, MEETINGS & RECORD DOCUMENTS and SECTION 01 45 00 - QUALITY CONTROL SERVICES.

B. Manufacturer: Provide steel doors and frames complying with these specifications from one of the following:

1. CECO
2. Curries
3. Steelcraft

C. Supplier: A recognized hollow metal supplier, with in-house fabrication facilities, who has been furnishing doors and frames in the project's vicinity for a period of not less than five years.

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D. Product Data: Submit four copies of manufacturers technical product data for each item. Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and maintenance.

E. Door Schedule: Submit final door schedule in manufacturer's standard format and as outlined below. Coordinate doors, frames and related work to ensure proper size, thickness, hand, function, and fasteners.

1. **NOTE: Contractor shall make all submittals for finish hardware, doors, frames and related items simultaneously, only after proper review and coordination by own staff beforehand.**

2. Final Door Schedule Content: Based on doors and frames in drawings, organize door schedule to indicate complete designations of every item required for each door or opening. Include the following information:

   a. Type, style, hand, size and construction of each item.

   b. Anchors and fastenings to related work.

   c. Corner construction of welded and/or knocked down frames.

   d. Location of door and frame cross-referenced to indications on drawings both on floor plans and in hardware schedule.

   e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.

   f. Mounting locations for hardware.

   g. Door construction and materials.

   h. Gage and finish of all materials.

3. Shop Drawings: Submit separate detail drawings, referenced to door schedule, showing size, hand, construction, fasteners, anchors and all other details pertinent to the fabrication of doors and frames for this project.

1.04 APPROVAL OF SUBSTITUTIONS:

A. Manufacturers and model numbers specified herein are to establish a standard of quality. If products other than those specifically identified herein are to be considered for this Project, they must be submitted for approval of the Architect not less than ten (10) calendar days prior to receipt of General Bids.

B. Requests for approval of substitutions shall be in writing, accompanied by catalog cuts, technical information and physical samples.

C. Approval of substitutions shall only be valid when issued by Architect to all bidders in the form of Addendum.

1.05 REFERENCES:

A. ANSI A115 Series: Standards for Steel Doors And Frames.

B. NFPA 80, NFPA 101.

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C. Other applicable building and life safety codes.

D. Door and Hardware Institute: "Recommended Locations for Builder's Hardware.

E. ANSI A117.1: American National Standard Providing Accessibility and Usability for Physically Handicapped People.

F. Other applicable industry standards.

1.06 PRODUCT PACKAGING AND HANDLING:

A. Tag each item or package separately, with identification related to final door schedule.

B. All doors shall be packaged in full cartons and securely banded.

C. Doors and frames shall be received by the contractor at the jobsite and handled in a manner so as not to be damaged. They shall be stored upright in a protected area on wood runners or skids and shall be covered with vented tarpaulins or plastic.

1.07 WARRANTY: Doors and frames specified for this Project shall be guaranteed against defects in material and workmanship for a period of one (1) year from date of Substantial Completion of Project.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Doors shall be manufactured from commercial quality cold-rolled steel sheets. Exterior doors shall be A60 hot-dipped galvanized.

B. Frames shall be manufactured from commercial quality cold-rolled steel sheets. Exterior frames shall be *WELDED* A60 hot-dipped galvanized.

C. Steel shall conform to ASTM standards A366 or A620 and A568 (uncoated), ASTM A526 or A642 and A525 (galvanized).

D. All doors and frames shall be chemically treated for paint adhesion and prime painted to meet performance requirements of ANSI A224.1.

E. U Factor of 1.5 or less.

2.02 DOOR FABRICATION:

A. Interior doors shall be 1-3/4” thick, manufactured from two 18 gage steel sheets. A one piece resin-impregnated honeycomb core with sanded edges shall be securely bonded to both face sheets. Doors shall have mechanically interlocked vertical edges, flush face sheets, and hairline seam edges. The top and bottom of the door shall be closed flush by 16 gage steel channels (where concealed door bottoms are specified, bottom channel shall be reversed to allow insertion of door bottom into door web). At contractor option, in lieu of honeycomb cores, doors may be provided with a rigid polystyrene foam core, continuously bonded to the face sheets, and completely filling the door.

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B. Exterior doors shall be 1-3/4" thick, manufactured from two 16 gage galvanized steel shee The interior of the doors shall be completely filled with a foamed-inplace polyurethane core, chemically bonded to all interior surfaces. Doors shall have mechanically interlocked vertical edges, flush face sheets, and hairline seam edges. The top and bottom of the door shall be closed flush by 16 gage steel channels (where concealed door bottoms are specified, bottom channel shall be reversed to allow insertion of door bottom into door web).

C. All doors shall be handed type with factory preparation for all concealed or mortised Finish Hardware scheduled. Door closer reinforcements shall be provided for all doors whether scheduled to received closer or not. Reinforce doors for all surface applied hardware.

D. Non-handed doors, and/or filler plates for cutouts not required for scheduled hardware preparation shall NOT be acceptable.

2.03 FRAME FABRICATION:

A. General: Frames shall be knocked down and field assembled or welded type at contractor option. **All exterior frames shall be welded.**

B. Standard knockdown or welded frames shall be manufactured form 16 gage steel sheets with 2" face and 5/8" integral stop. Jamb depth to be determined by wall thickness in accordance with the drawings. Supply appropriate anchors for wall construction.

C. Drywall frames shall be manufactured form 16 gage steel sheets with 2" face and 5/8" integral stop and double back bend to grip the partition firmly without marring the wall surface. Jamb depth to be determined by wall thickness in accordance with the drawings. Provide adjustable plumb anchors to insure square and plumb installation. Supply standard floor anchors for bottom of each jamb.

D. Prepare frames for all concealed or mortised hardware and reinforce for all surface applied hardware.

E. Provide plaster guards for all hardware cutouts.

F. Prepare frames to receive pneumatic type silencers: two for each pair frame, three for each single frame.

G. Exterior frames shall be 16 ga welded, galvanized with thermally broken jambs.

2.04 FIRE RATED ASSEMBLIES

A. All labeled fire doors and frames shall be of a type tested in accordance with ANSI/UL-10b, ASTM E-152, NFPA-252, or UL-305, and shall provide the degree of fire protection, heat transmission, panic-loading capabilities, and/or smoke control as indicated on the label and required by the drawings.

B. Labeled doors and frames shall bear the label of Underwriters Laboratories, Warnock Hersey, or Factory Mutual and shall meet all requirements of the labeling agencies current procedures and policies.

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PART 3 - EXECUTION

3.01 INSTALLATION

A. Doors and frames shall be assembled, installed, and erected plumb and in true alignment and in conformance with manufacturer's recommendations and final approved shop drawings. Preparation for surface applied hardware shall be performed on the jobsite. Frames shall be rigid and securely anchored in place. Doors shall be installed in a manner to achieve functional operation and appearance.

B. Install hardware in compliance with 08 71 00 FINISH HARDWARE.

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SECTION 08 12 16
ALUMINUM FRAMES

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: Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.

1. Types of Kawneer Aluminum Storefront Systems include:
   a. InFrame™ Interior Framing System - 2" x 6" (50.8 x 152.4) nominal dimension; Non-Thermal; Center Glazed, Screw Spline, Punched Opening Fabrication.

B. Related Sections:

1. 07 27 00 Water Resistive & Air Barrier Assemblies
2. 07 92 00 Joint Sealants
3. 08 41 13 Aluminum-Framed Entrances and Storefronts
4. 08 51 13 Aluminum Windows
5. 08 80 00 Glazing

1.3 Definitions

A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG)

1.4 Performance Requirements

A. Storefront System Performance Requirements: Interior framing system.

1.5 Submittals

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum frames indicated.
B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.

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C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
D. Samples for Verification: For aluminum frames and components required.
E. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum frames, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
   1. Joinery, including concealed welds.
   2. Anchorage.
   3. Expansion provisions.
   4. Glazing.
   5. Flashing and drainage.
F. Other Action Submittals:
   1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.6 Quality Assurance

A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.
B. Manufacturer Qualifications: A manufacturer capable of providing aluminum frames that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
C. Source Limitations: Obtain aluminum frames through one source from a single manufacturer.
D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum frames and are based on the specific system indicated. Refer to Division 01 Section “Product Requirements”. Do not modify size and dimensional requirements.
   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. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup for type(s) of storefront elevation(s) indicated, in location(s) shown on Drawings.
F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section “Project Management and Coordination”.

1.7 Project Conditions

A. Field Measurements: Verify actual dimensions of aluminum frame openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.8 Warranty

A. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard

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warranty.

B. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

PART 2 - PRODUCTS

2.1 Manufacturers

A. Basis-of-design Product:
   1. Kawneer Company Inc.
   2. InFrame™ Interior Framing System (Non-Thermal)
   3. System Dimensions: 2" x 6" (50.8 x 152.4) nominal dimension
   4. Glass: Center Plane

B. Substitutions: Refer to Substitutions Section for procedures and submission requirements.

2.2 Materials

A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 Storefront Framing System

A. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposed shall

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be stainless steel.

C. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action

D. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

E. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

2.4 Glazing Systems

A. Glazing: As specified in Division 08 Section “Glazing”.

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:

1. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.

2.5 Entrance Door Systems

A. Entrance Doors: As specified in Division 084113 Section “Aluminum-Framed Entrances and Storefronts”.

2.6 Accessory Materials

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section “Joint Sealants”.

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

2.7 Fabrication

A. Extrude aluminum shapes before finishing.

B. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fit joints; make joints flush, hairline and weatherproof.

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3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

C. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

D. Storefront Framing: Fabricate components for assembly using manufacturer's standard installation instructions.
   1. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 Aluminum Finishes

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes:

B. Factory Finishing
   1. Kawneer Permanodic™ AA-M10C22A41, AAMA 611, Architectural Class I Clear Anodic Coating (Color #14 Clear)

PART 3 - EXECUTION

3.1 Examination

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight aluminum frame installation.
   1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
   2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
   3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
   4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum framed storefront system, accessories, and other components.

B. Install aluminum framed storefront system level, plumb, square, true to line, without distortion

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or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 Field Quality Control

A. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

3.4 Adjusting, Cleaning, and Protection

A. Clean aluminum surfaces immediately after installing aluminum framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

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SECTION 08 41 13
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

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: Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.
   1. Types of Kawneer Aluminum Storefront Systems include:
      a. Trifab™ VG 451T Framing System – 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension; Thermal; Front, Center, Back, Multi-Plane, Structural Silicone or Weatherseal Glazed (Type B); Screw Spline, Shear Block, Stick or Punched Opening Fabrication.

B. Related Sections:

   1. 07 27 00 Water Resistive & Air Barrier Assemblies
   2. 07 92 00 Joint Sealants
   3. 08 41 13 Aluminum-Framed Entrances and Storefronts
   4. 08 51 13 Aluminum Windows
   5. 08 80 00 Glazing

1.3 Definitions

A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

1.4 Performance Requirements

A. Storefront System Performance Requirements:

   1. Wind loads: Provide storefront system; include anchorage, capable of withstanding wind load design pressures of 25 lbs./sq. ft. inward and 30 lbs./sq. ft. outward. The design pressures are based on the IBC Building Code; 2009 Edition and ASCE 7-05.
   2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft2 (0.3 l/s · m2) at a static air pressure differential of 6.24 psf (300 Pa).
   3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 10 psf (479 Pa) as defined in AAMA 501.

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4. Uniform Load: A static air design load of 20 psf (958 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
5. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:
   a. Glass to Exterior – 0.47 (low-e) or 0.61 (clear).
   b. Glass to Center – 0.44 (low-e) or 0.61 (clear).
   c. Glass to Interior – 0.41 (low-e) or 0.56 (clear).
6. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
   a. Glass to Exterior – 70frame and 69glass (low-e) or 69frame and 58glass (clear).
   b. Glass to Center – 62frame and 68glass (low-e) or 63frame and 56glass (clear).
   c. Glass to Interior – 56frame and 67glass (low-e) or 54frame and 58glass (clear).
7. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:
   a. Glass to Exterior – 38 (STC) and 31 (OITC).
   b. Glass to Center – 37 (STC) and 30 (OITC).
   c. Glass to Interior – 38 (STC) and 30 (OITC).

1.5 Submittals

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed storefront system indicated.
B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.
C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
D. Samples for Verification: For aluminum-framed storefront system and components required.
E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type of aluminum-framed storefront.
F. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
   1. Joinery, including concealed welds.
   2. Anchorage.
   3. Expansion provisions.
   4. Glazing.
   5. Flashing and drainage.
G. Other Action Submittals:
   1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

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1.6 Quality Assurance

A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.
B. Manufacturer Qualifications: A manufacturer capable of providing aluminum-framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
C. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.
D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed storefront system and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements". Do not modify size and dimensional requirements.
   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. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup for type(s) of storefront elevation(s) indicated, in location(s) shown on Drawings.
F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".
G. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.
H. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

1.7 Project Conditions

A. Field Measurements: Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.8 Warranty

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

PART 2 - PRODUCTS

2.1 Manufacturers

A. Basis-of-Design Product:
   1. Kawneer Company Inc.
   2. Trifab™ 451T (Thermal) Framing System
   3. System Dimensions: 2" x 4-1/2" (50.8 mm x 114.3 mm)
   5. Glass: Exterior
C. Substitutions: Refer to Substitutions Section for procedures and submission requirements

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1. Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid storefront installation and construction delays.
2. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
3. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for storefront system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum storefronts for a period of not less than ten (10) years. (Company Name)
4. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
5. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.

D. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

2.2 Materials

A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.
B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components.
C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 Storefront Framing System

A. Thermal Barrier (Trifab™ VG 451T):
   1. Kawneer IsoLock™ Thermal Break with a 1/4" (6.4 mm) separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections.
      a. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.
D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposes shall be stainless steel.

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F. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action
G. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
H. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

2.4 Glazing Systems

A. Glazing: As specified in Division 08 Section "Glazing".
B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.
C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
   1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
      a. Color: Black
   2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
      a. Color: Matching structural sealant.

2.5 Entrance Door Systems

A. Design Requirements:
   1. Provide aluminum entrance doors from a single source.
   2. When aluminum entrances are part of a building enclosure system, including storefront framing, window wall systems, curtain wall system and related products, provide building enclosure system products from a single source manufacturer.
   3. Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.
   4. Material: ASTM B 221; 6063-T5 and T6 alloy and temper.
   5. Major portions of the door members to be 0.125 inch (3 mm) nominal in thickness and glazing molding to be 0.05 inch (1.3 mm) thick.
   6. Provide adjustable glass jack to center the glass in the door opening.
   7. Glazing gaskets shall be EPDM elastomeric extrusions.
   8. Fasteners: Where exposed, shall be aluminum, stainless steel or plated steel.
   9. Perimeter Anchors: Aluminum. When steel anchors are used, provide barrier between steel material and aluminum material to prevent galvanic action.

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B. Performance Requirements:
   1. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 6.24 PSF for single doors and 1.567 PSF for pairs of doors. A single 3 feet by 7 feet entrance door and frame shall not exceed 0.50 CFM per linear foot of perimeter crack. A pair of 6 feet by 7 feet entrance doors and frame shall not exceed 1.0 CFM per linear foot of perimeter crack.
   2. Door Corner Construction: Manufacturer shall provide a limited lifetime warranty for the life of the door under normal use.

C. Basis-of-Design Product:
   1. Kawneer Company Inc.
   2. The door stile and rail face dimensions of the AA™425 Thermal Entrance will be as follows:
      Vertical Stile: 4-1/4"
      Top Rail: 4-1/4"
      Bottom Rail: 10"
   3. Major portions of the door members to be 0.125" nominal in thickness and glazing molding to be 0.05" thick
   4. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
   5. Provide adjustable glass jacks to help center the glass in the door opening.

D. Fabricate thermally broken aluminum-framed entrance doors in sizes indicated. Include a complete system for assembling components and anchoring doors.

E. Fabricate thermally broken aluminum-framed doors that are reglazable without dismantling perimeter framing.
   1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1" (24 mm) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
   2. Accurately fit and secure joints and corners. Make joints hairline in appearance.
   3. Prepare components with internal reinforcement for door hardware.
   4. Arrange fasteners and attachments to conceal from view.

F. Weather-stripping: Provide weather-stripping locked into extruded grooves in door panels or frames as indicated on manufactures drawings and details.

G. Entrance Door Hardware: As specified in Division 08 71 00 Section “Door Hardware”.

2.6 Accessory Materials

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section “Joint Sealants”.

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

2.7 Fabrication

A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.

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2. Accurately fit joints; make joints flush, hairline and weatherproof.
3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

D. Storefront Framing: Fabricate components for assembly using manufacturer's standard installation instructions.

E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 Aluminum Finishes

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:
1. Kawneer Permanodic™ AA-M10C22A41, AAMA 611, Architectural Class I Clear Anodic Coating (Color #14 Clear).

PART 3 - EXECUTION

3.1 Examination

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight framed aluminum storefront system installation.
1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum-framed storefront system, accessories, and other components.

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B. Install aluminum-framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support and in proper relation to wall flashing and other adjacent construction.
C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
D. Install aluminum-framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within aluminum-framed storefront to the exterior.
E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 Field Quality Control

A. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
   1. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.
      a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft2, whichever is greater.
      b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf (300 Pa).
B. Manufacturer's Field Services: Upon Owner’s written request, provide periodic site visit by manufacturer’s field service representative.

3.4 Adjusting, Cleaning, and Protection

A. Clean aluminum surfaces immediately after installing aluminum-framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

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SECTION 08 53 13
VINYL WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Vinyl New Construction Windows or Replacement Windows complete with hardware, glazing, weather strip, insect screen, grilles between the glass, simulated divided lite and jamb extensions

1.2 RELATED SECTIONS

A. Section 01 33 23 – Submittal Procedures; Shop Drawings, Product Data, Samples

B. Section 01 62 00 – Product Options

C. Section 01 65 00 – Product Delivery

D. Section 01 66 00 – Storage and Handling Requirements

E. Section 01 71 00 – Examination and Preparation

F. Section 01 73 00 – Execution

G. Section 01 74 00 – Cleaning and Waste Management

H. Section 01 76 00 – Protecting Installed Construction

I. Section 06 22 00 – Millwork; Wood trim other than furnished by the window manufacturer

J. Section 07 92 00 – Joint Sealants; Sill sealant and perimeter caulking

K. Section 09 90 00 – Paint other than factory applied finish

1.3 REFERENCES

A. AAMA/WDMA/CSA 101/I.S. 2/A440-11 - Voluntary Specification for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.

B. AAMA 701/702; 2011 - Combined Voluntary Specifications for Pile Weather strip and Replaceable Fenestration Weather seals.

C. ASTM E 283; 2012 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.

D. ASTM E 330; 2014 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.

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E. ASTM E 547; 2009 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Cyclic Static Air Pressure Difference.

F. ASTM F 588; 2014 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact.

G. NFRC 100-2014 - Procedure for Determining Fenestration Product U-Factors.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum Twenty (20) years producing vinyl (PVC) windows.

B. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size.

C. Source Limitations: Obtain window units from one manufacturer through a single source.

D. Provide window units independently tested and found to be in compliance with AAMA/WDMA/CSA 101/I.S. 2/A440-11 and performance standards listed above.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver windows to project site in undamaged condition; handle windows to prevent damage to components and to finishes.

B. Store products out of direct sunlight or high temperature locations, until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Submit manufacturer's standard warranty against defects in workmanship and materials.
   1. Limited Twenty (20) Year Transferable residential warranty on extruded solid vinyl member and component parts. Insulated glass is warranted against material obstruction of transparency resulting from film formation or dust collection on the interior glass surfaces for a period of twenty (20) years in Residential Construction. Consult warranty for complete details.
   2. The warranty period for commercial project work such as apartments, housing authorities and other buildings not used by individual homeowners

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is 20 years, covering all vinyl, glass and component parts. Consult warranty for complete details.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturer: Mathews Brothers Company, 22 Perkins Rd, Belfast, ME 04915. Toll Free: (800) 615-2004 | Tel: (207) 338-6490 | Fax: (207) 338-6300 Email: info@mathewsbrothers.com | Web: http://www.mathewsbrothers.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 33 10.

2.2 NEW CONSTRUCTION OR REPLACEMENT *CLARA STARRETT DOUBLE HUNG WINDOWS*

A. Construction.

1. Frame and Sash: Tri-Extruded Fusion Insulated vinyl sash and frame with mitered cut and fusion welded corners.
2. Sash Balances: 3/4” Flat coil spring balance. The locking terminal and pivot bar system shall be designed to positively interlock, to provide accurate alignment of the sash and the frame during installation and operation.
3. Sash Locks: Cam type locks anchored with screws. Double locks where openings exceed 32-1/4 inches (819mm) wide.
4. Weather Stripping: In compliance with AAMA 701.2.
5. Color: White
6. Glazing: 3/4” nominal thickness insulated glass units with Duralite organic spacer secured to sash frame using a sealant and glazing bead. Complies with ASTM E 774.
    a. Guardian Climaguard 71/38 with Argon
7. Screens: Extruded aluminum frame with 20X20 charcoal finished fiberglass mesh.
8. Grids: Simulated Divided Lites to be applied to both sides.
9. Interior: Drywall returns

B. Performance.

1. Structural Rating: LC-PG 50 Test Size: 44 inches x 63 inches (1168mm x 1524mm) in accordance with AAMA/WDMA/CSA 101/I.S. 2/A440-11
2. See Certified Structural Report.
3. PG performance desired: 40
4. Forced Entry: Type B, Grade 10 in accordance with ASTM F588.
5. Thermal Transmittance: The following values are in accordance with NFRC 100-14.
   Dual Pane- Low E w/Argon: U-Factor 0.25, SHGC 0.28

All Clara Starrett windows shall be tested for energy efficiency and structural Performance according to the most current testing protocols of The National Fenestration Rating Council, and with AAMA/WDMA/CSA standards.

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All Clara Starrett windows will perform to the EnergyStar Version 6.0 requirements when glazed with low-e, argon filled, insulating glass. Performance shall be achieved by using one layer of low-E. Performance shall be reported using whole unit numbers, not center of glass. Low-E not allowable on the exterior surface or the last interior surface of the glazing.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify rough opening size is of sufficient size to receive window unit and complies with manufacturer's requirements for opening clearances.

B. Verify that sill plate is level.

C. Notify Architect of unacceptable conditions before proceeding with installation.

3.2 INSTALLATION

A. Install window unit in accordance with manufacturer's printed instructions.

B. Apply sealant around perimeter of window unit between nail fin and exterior sheathing of wall. Refer to Division 7 Section "Joint Sealants".

C. Install window unit level, plumb and square. Center window unit in opening and secure window unit by nailing through nail fin and screw through jambs as indicated in manufacturer's instructions.

D. Flash window in accordance with AAMA's "Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction".

E. Insulate between window frame and rough opening with insulation. Refer to Division 7 Section "Building Insulation".

3.3 ADJUSTING

A. Adjust units for smooth operation without binding or racking.

B. Adjust sash locks and screens for smooth operation.

3.4 CLEANING

A. Clean soiled surfaces and glass prior to substantial completion.

3.5 PROTECTION

A. Protect window unit from damage until substantial completion. Repair or replace damaged units.

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SECTION 08 81 00

GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Clear tempered glass.

1.2 REFERENCES

A. American National Standards Institute (ANSI):
   1. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.

B. American Society for Testing and Materials (ASTM):
   1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
   2. ASTM C1036 - Standard Specification for Flat Glass.
   2. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
   3. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.

C. Consumer Product Safety Standards for Architectural Glazing. CPSC 16 CFR, Part 1201.

D. Flat Glass Marketing Association (FGMA):
   1. FGMA - Glazing Manual and Glazing Sealing Systems Manual.

1.3 SUBMITTALS

A. Procedures for submittals.
   1. Product Data:
      a. Glass: Structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
      b. Glazing compound: Provide chemical, functional, and environmental characteristics, limitations, special application requirements.
   2. Samples:
      a Glazing: Submit one sample 12 x 12 inches (300 x 300 mm) in size of each type of glazing, illustrating tinting, and finish of glazing materials. Label each sample indicating kind, quality and manufacturer.
   3. Assurance/Control Submittals:
      a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
      b. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.

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1.4 QUALITY ASSURANCE

A. Identification: Each unit of tempered glass shall be permanently identified by the manufacturer. The identification shall be etched or ceramic fired on the glass and be visible when the unit is glazed.

B. Perform Work in accordance with FGMA Glazing Manual.

C. Installer Qualifications: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Transport, handle, store, and protect Products.

1.6 PROJECT CONDITIONS OR SITE CONDITIONS

A. Environmental Requirements:
   1. Do not install glazing when ambient temperature is less than 40 degrees F.
   2. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WARRANTY

A. Procedures for closeout submittals.

B. Special Warranty:
   1. Include coverage for cracking, breakage, and replacement of same.
      a. Warranty Period: 1 year.
   2. Include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
      a. Warranty Period: 10 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with project requirements, manufacturer's offering Products which may be incorporated in the Work include the following:
   1. Falconer Glass Industries.
   2. Libbey-Owens-Ford Company, Toledo, OH (800) 526-6557.
   3. PPG Industries, Pittsburgh, PA (412) 434-2858.
   4. Viracon, Owatonna, MN (800) 533-2080.

B. Product options and substitutions. Substitutions: Permitted.

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2.2 GLASS MATERIALS

A. Glass Type 1 - Clear Tempered Insulated Glass Units, Low E: Double pane units of clear tempered glass.
   1. Glass Thickness, Inner: ¼ inch.
   2. Glass Thickness, Outer: ¼ inch.
   3. Unit Thickness: 1 inch thick units.

B. Glass Type 2 - Clear Tempered Glass Units. Single pane units with clear tempered glass.
   1. Glass Thickness, Inner: ¼ inch.

2.3 GLAZING COMPOUNDS

A. Polysulphide Sealant: Two component, chemical curing, non-sagging type; cured Shore A hardness of 15-25.

B. Silicone Sealant: Single component, chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining; cured Shore A hardness of 15-25.
   1. Color: Clear.

C. Acrylic terpolymer compounded especially for glazing; non-hardening, non-staining, and non-bleeding.

2.4 GLAZING ACCESSORIES

A. Setting Blocks: Resilient blocks of 70 to 90 Shore A durometer hardness; compatible with glazing sealant.

B. Spacers: Resilient blocks of 40 to 50 Shore A durometer hardness; self-adhesive on one side; compatible with glazing sealant.

C. Filler Rods: Closed cell or jacketed foam rods of polyethylene, butyl, neoprene, polyurethane, or vinyl; compatible with glazing sealant.

D. Joint Cleaners, Primers, and Sealers: As recommended by glazing sealant manufacturer.

E. Gaskets: ASTM D2000, SBC 415 to 3BC 620; extruded or molded neoprene or EPDM, black.

F. Mastic: Non-solvent type adhesive as recommended by mirrored glass manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.

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1. Verify that openings for glazing are correctly sized and within tolerance.
2. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

B. Report in writing to Architect prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

C. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

3.3 GLAZING

A. Install glazing from interior only. No exterior glazing permitted. No glazing removal permitted from exterior.

B. Locate setting blocks at quarter points of sill; set in sealant if heel or toe bead is required.

C. Install spacers inside and out except where preshimmed tape or glazing gaskets are to be used.

D. Set each piece in a series to other pieces in pattern draw, bow, or other visually perceptible characteristics.

E. Provide glazing sealants and gaskets as required for particular glazing application. Coordinate with other Sections for material compatibility.

F. Gaskets:
1. Provide adequate anchorage, particularly for driven-in wedge gaskets.
2. Miter and weld ends of channel gaskets at corners to provide continuous gaskets.
3. Seal face gaskets at corners with sealant to close opening and prevent withdrawal of gaskets from corners.

G. Do not leave voids in glazing channels except as specifically indicated or recommended by glass manufacturer. Force sealant into channel to eliminate voids. Tool exposed surfaces to slight wash away from joint. Trim and clean promptly.

H. Do not allow sealant to close weeps of aluminum framing.

I. Provide filler rod where sealants are used in the following locations:
1. Head and jamb channels.

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2. Colored glass over 75 united inches in size.
3. Clear glass over 125 united inches in size.

3.4 CONSTRUCTION

A. Interface with Other Work: Coordinate glazing with installation of entrances and storefronts specified in Division 08.

3.5 FIELD QUALITY CONTROL

A. Inspect preparation and installation of glass.

3.6 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.8 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

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SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES ON METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Description of Work: Work of this section includes, but is not limited to, the following:
1. Gypsum board and accessories
2. Metal studs and furring
3. ~~Metal shaftwall systems~~
4. Metal suspension systems
5. Sound-rated construction and accessories
6. Gypsum board finishing
7. Trim and accessories

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 05 41 00 Lightgage Metal Framing.
B. Section 06 10 00 Rough Carpentry.
C. Section 07 21 16 Thermal and Acoustic Insulation.
D. Section 07 84 13 Firestopping.
E. Section 09 90 00 Painting

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions with project conditions and materials clearly identified or detailed for each required system.

1.4 SYSTEM REQUIREMENTS

A. Performance Requirements: Fabricate and install systems as indicated but not less than that required to comply with ASTM C754 under the following conditions:
1. Gypsum board partitions:
   a. Standard systems: Maximum deflection of l/240 of partition height.
2. Cavity shaftwall systems: Withstand minimum positive and negative pressure of 5 psf.
3. Interior suspended ceilings and soffits: Maximum deflection of l/360 of distance between supports.
4. Nonstructural components that are permanently attached to structures and their support attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance to local jurisdiction.

B. Fire Resistance Ratings: Where fire resistance classifications are indicated, provide materials and application procedures identical to those listed by UL or tested according to ASTM E119 for type of construction shown.

C. Acoustical Ratings: Where sound ratings are indicated, provide materials and application procedures identical to those tested by manufacturer to achieve Sound Transmission Class (STC) scheduled or indicated in accordance with ASTM E90.

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1.5 QUALITY ASSURANCE

A. Reference Standards:
   1. Applicable requirements of ASTM C754 for installation of steel framing.
   2. Install gypsum board in accordance with applicable requirements and recommendations of Gypsum Association GA 216, "Recommended Specifications for the Application and Finishing of Gypsum Board" except for more stringent requirements of manufacturer.
   3. Apply acoustical sealant in accordance with applicable requirements of ASTM C919.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery:
   1. Deliver material to site promptly without undue exposure to weather.
   2. Deliver in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.

B. Storage:
   1. Store above ground in dry, ventilated space.
   2. Protect materials from soiling, rusting and damage.

1.7 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Do not install gypsum board when ambient temperature is below 40°F.
   2. For adhesive attachment of gypsum board, and for finishing of gypsum board, maintain ambient temperature above 55°F from one week prior to attachment or joint treatment, and until joint treatment is complete and dry.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Gypsum Board and Accessories: Listed products establish standard of quality and are manufactured by United States Gypsum Company (USG), Chicago, IL. Or approved equal.

B. Steel Framing and Furring: Company acceptable to installer**.**

C. Grid Suspension Assemblies: Listed products establish standard of quality and are manufactured by United States Gypsum Company (USG), Chicago, IL. Or approved equal.

2.2 BOARD MATERIALS

A. Gypsum Board:
   1. ASTM C1396 (Section 5), regular type except where Type X fire-resistant type is indicated or required to meet UL assembly types.
   2. Edges: Tapered.
   3. Acceptable products:
      a. Typical partitions and ceilings: Equivalent to SHEETROCK® brand SW, FIRECODE® or FIRECODE® "C" Core gypsum panels by USG.

b. OR Equivalent to SHEETROCK® brand Regular, FIRECODE® or FIRECODE® "C" Core gypsum panels by USG.
c. Acceptable product for fire-rated walls: Equivalent to ULTRACODE® Core, 3/4 inch thick, by USG.
d. Use gypsum board and joint compound with little or no VOCs and formaldehyde emissions. Gypsum board shall have a minimum of 5% Post- consumer and 20% Post-industrial (nation-wide average for company) as defined by FTC (Federal Trade Commission) by USG.

B. Moisture & Mold Resistant
1. ASTM C1396 (Section 5), regular type except where Type X fire-resistant type is indicated or required to meet UL assembly types.
2. Edges: Tapered.
3. Thickness: 5/8 inch.
4. Acceptable products: Sheetrock® brand Mold Tough™ Firecode (Type X), Firecode® C Core or ULTRACODE® Core gypsum panels by USG.

C. Shaftwall:
1. Liner boards:
a. ASTM C442, Type SLX.
b. Edges: Beveled.
c. Thickness: 1 inch.
d. Acceptable product: Equivalent to SHEETROCK® gypsum liner panels by USG.
2. Face boards:
a. ASTM C1396 (Section 5), Type X.
b. Thickness: 1/2 inch, unless otherwise indicated.
c. Acceptable product: Equivalent to SHEETROCK® FIRECODE® C Core and FIRECODE® Core gypsum panels by USG.

2.3 METAL FRAMING AND FURRING MATERIALS

A. Metal Studs and Runners:
1. ASTM C645, "C" shaped, gauge:
a. Provide gauge as indicated for studs; runner gauge as recommended by stud manufacturer.
b. Provide runner gauge as recommended by stud manufacturer.
2. Depth of sections: As indicated.
3. Corrosion protection: G40 hot-dipped galvanized coating per ASTM A525.

B. Shaft Wall Supports:
1. Conform to ASTM A446, Grade A, with G40 hot-dipped galvanized coating per ASTM A525.
2. Studs:
a. Shape: "CH", or as standard with manufacturer.
b. Gauge: As required to fulfill performance criteria, minimum 25 gauge. Provide 20 gauge for jamb and lintel components.
c. Size: As indicated.
d. J runners: 24 gauge, size as required for coordination with studs.
e. Jamb struts: 20 gauge with 3 inch back leg for use at elevator frames.

C. Metal Furring Channels:
   1. Hat-shaped:
      a. ASTM C645, 7/8 inch high, 25 gauge, with G40 hot-dipped galvanized coating per ASTM A525.
      b. Provide 20 gauge at furring to receive tile backer board.
      c. Acceptable products: DWC-25 for ½" and 5/8" gypsum board and DWC-20 by USG.
   2. Z-shaped: ASTM C645, depths as indicated, 24 gauge minimum, with G40 hot-dipped galvanized coating per ASTM A525.
   3. Resilient: Manufacturer's standard type designed to reduce sound transmission; 1/2 inch deep, 25 gauge steel with G40 hot-dipped galvanized coating per ASTM A525.

2.4 CEILING AND SOFFIT SUPPORT MATERIALS

A. Hanger Anchorage Devices: Screws, clips, bolts or other devices compatible with indicated structural anchorage for ceiling hangers and whose suitability has been proven through standard construction practices or by certified test data.

B. Hangers:
   1. Steel wire or rods, sizes to comply with requirements of ASTM C754 for ceiling or soffit area and loads to be supported.
   2. Wire: ASTM A 641, soft, Class 1 galvanized.
   3. Rods and flats:
      1. Mild steel components.
      2. Finish: Galvanized or painted with rust-inhibitive paint for interior work; galvanized for exterior work.

C. Framing System:
   1. Main runners:
      1. Cold-rolled, "C" shaped steel channels, 16 gauge minimum.
      2. Finish:Galvanized or painted with rust-inhibitive paint for other interior work.
   2. Cross furring: Hat-shaped steel furring channels, ASTM C645, 7/8 inch high, 25 gauge, galvanized.
   3. Furring anchorages: 16 gauge galvanized wire ties, manufacturer's standard wire-type clips, bolts, nails or screws recommended by furring manufacturer and complying with ASTM C754.
   4. Provide compression posts and other accessories as required to comply with seismic requirements.

D. Proprietary Framing System:
   1. Framing system for gypsum board panels consisting of cold-rolled steel members conforming to ASTM C635, with exposed surfaces finished in manufacturer’s standard enamel paint finish.
   2. Fire rating: 1 hour rating in accordance with UL assembly indicated.
   3. Components: Main tees, furring cross channels, furring cross tees, and cross tees.
   4. Accessories:
      a. U-shaped channel molding.
      b. Galvanized carbon steel (12 ga.) hanger wire.
   5. Acceptable product: Equivalent to Drywall Suspension System by USG.

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2.5 ACCESSORIES

A. Metal Trim for Gypsum Board:
   1. Conform to profile and dimensions indicated.
   2. Material for interior work: Galvanized steel, 26 gauge minimum.
   3. Corner beads: Equivalent to Dur-A-Bead No. 103by USG.
   4. Casing beads (edge beads): Equivalent to 200A by USG.
   5. J-Beads.

B. Adhesives and Joint Treatment Materials:
   1. Conform to requirements of ASTM C475.
   2. Joint compounds:
      a. Drying-type (ready-mixed): Equivalent to SHEETROCK® brand taping joint compound and topping joint compound, or SHEETROCK® all purpose joint compound [or ready-mixed lightweight all purpose joint compound by USG.

C. Gypsum Board Screws: Self-drilling, self-tapping steel screws.
   1. For steel framing less than 0.03 inch thick: Comply with ASTM C1002.
   2. For steel framing from 0.033 inch thick to 0.112 inch thick: Comply with ASTM C954.
   3. Provide Type S or Type S-12 screws.

D. Backer Board Accessories: Provide accessories and corrosion-resistant-coated steel screws as recommended by backer board manufacturer and required for complete installation.

E. Acoustical Sealant: Equivalent to to SHEETROCK® acoustical sealant by USG.

F. Miscellaneous Accessories: Provide as required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and adjoining construction and conditions under which work is to be installed. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install in accordance with reference standards and manufacturer's instructions [and as required to comply with seismic requirements].

B. Tolerances:
   1. Do not exceed 1/8 inch in 8'-0" variation from plumb or level in exposed lines of surface, except at joints between gypsum board units.
   2. Do not exceed 1/16 inch variation between planes of abutting edges or ends.

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3. Shim as required to comply with specified tolerances.

C. Install framing to comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation.

D. Install supplementary framing, blocking and bracing at terminations in gypsum board assemblies to support fixtures, equipment, heavy trim, grab bars, toilet accessories, furnishings or similar construction.

3.3 METAL SUPPORT INSTALLATION

A. Metal Runners:
1. Align and secure runner tracks accurately to partition layout at both floor and ceiling.
2. Provide fasteners appropriate to substrate construction as recommended by manufacturer.

B. Metal Studs:
1. Position metal studs vertically in the runners, spaced as indicated.
2. Place studs so that flanges face in same direction.
3. Cut studs 1/2 inch short of full height to provide perimeter relief.
4. Align and plumb partition framing accurately.
5. Where partitions abut ceiling or deck construction or vertical structural elements, provide slip or cushion type joint between partition and structure as recommended by stud manufacturer to prevent transfer of structural loads or movements to partitions, and to provide lateral support.
6. Provide horizontal bracing where necessary for lateral support.
7. Chase walls:
   a. Position steel studs on opposite sides of chase directly across from each other.
   b. Cut cross-bracing from gypsum board 12 inches high by chase wall width.

C. Ceiling and Soffit Support Systems:
1. Secure hangers or rods to structural support by connecting directly to structure where possible; otherwise connect to inserts, clips or other anchorage devices or fasteners indicated.
2. Space main runners, hangers and furring according to requirements of ASTM C754, except as otherwise indicated.
3. Where spacing of structural members, or width of ducts or other equipment, prevents regular spacing of hangers, provide supplemental hangers and suspension members and reinforce nearest affected hangers to span extra distance.
4. Install compression posts, splay wires and other accessories as required to comply with seismic requirements.
5. Extend runners to within 6 inches of walls.
6. Wire-tie or clip furring members to main runners and to other structural supports indicated. In fire resistance rated assemblies, wire-tie furring members; do not clip.
7. Do not permit furring or runners to contact masonry or concrete walls.
8. Provide 1 inch clearance between furring or runners and abutting walls and partitions.

3.4 FINISHING

A. Provide levels of gypsum board finish for locations as follows, in accordance with Gypsum Association GA 214, "Recommended Specification: Levels of Gypsum Board Finish".
1. Level 1: Ceiling plenum areas and concealed areas, except provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
2. Level 2: Gypsum board substrate at tile [stone], except remove tool marks and ridges.

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3. Level 3: Gypsum board surfaces, where textured finishes or heavy vinyl wall paper will be used [High-build Primer required as specified in Division 09 or USG First C primer].
4. Level 4: Gypsum board surfaces, except where another finish level is indicated High-build Primer required as specified in Division 09 or USG First Coat primer.

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SECTION 09 29 00

GYPSUM BOARD

1. GENERAL

1.1 REFERENCES:

A. Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

B. NOTE: Selection of Finish colors and patterns in overall color scheme to be made by Architect. Contractor to notify Architect prior to commencing Gypsum Board work, to allow adequate time for color selections, Owner's approval and material ordering lead time.

1.2 DESCRIPTION OF WORK: The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specifications. The work covered by this section of Specifications consists of the following:

A. Drywall installation as required by Drawings and noted in these Specifications.
B. Taping and finishing all walls and ceilings, except where other kind of finish is specified.

2. PRODUCTS

2.1 Acceptable Manufactures

- American Gypsum
- Atlantic Group Limited
- Celotix Corporation
- Continental Gypsum Company
- James Hardie Gypsum
- Lafarge Gypsum
- United States Gypsum Company

2.2 NOTE: GWB types are shown as U.S.G. brand names “Sheetrock”, “Firecode”, “Firecode C”, “M.R. Board” and “Shaftwall”. Substitutions must have equal U.L. and STC ratings. See Drawings for Specific assembly.

2.3 EXTERIOR & INTERIOR WALLS & CEILINGS: See rated & non rated assemblies and wall types on the drawings.

2.4 NOTE: Type M.R. in bathrooms, walls and ceiling. See Drawings for double layer of gyp board to cover fiberglass tub flange.

2.5 RESILIENT CHANNEL: USG-RC-1

2.6 USG Drywall Suspension System.

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2.7 Corner Bead

3. EXECUTION

3.1 THE DRYWALL CONTRACTOR shall inspect all areas affected by his work to ascertain that all work is complete and has been accepted. Defective installations shall be corrected before finished surfaces are painted or sprayed with acoustical material.

3.2 DRYWALL INSTALLATION. Install drywall as shown on plans, noted in the UL Specifications, and as set forth in U.S.G. Handbook. Installation of non-UL rated drywall assemblies on steel studs shall comply with the following minimum requirements:

A. Spacing for attachment members shall not exceed 24" o.c. for walls and 16" o.c. for ceilings. All drywall shall be screwed with approved drywall screws made specifically for the purpose and of length adequate for wall types. On walls, screws shall not be placed more than 16" apart for 16" o.c. framing or 12" apart for 24" o.c. framing. Screw all edges 12" o.c. maximum. See Structural Drawings S3.2 and S3.3 for shear walls sheathing attachment.

B. The drywall contractor may use a few drywall nails to temporarily secure a sheet of drywall before securing with drywall screws. In this event, the drywall nails must be countersunk prior to taping. Corner beads shall be used on all corners and casing beads used whenever Gypsum Board abuts dissimilar material. Caulking to also be applied at these junctions. At all party and unit/corridor walls, Gypsum Board to be set in caulking (for sound).

C. Drywall shall be laid vertically or horizontally. No tapered joints at floor base. See Structural Drawings for shear walls.

D. Gypsum Sheathing Application
Apply 24” wide sheathing horizontally with tongue edge up. Install supplementary bracing as required by applicable code. Fasten sheathing with nails spaced 8” o.c. along each stud.
Apply 48” wide sheathing vertically with bottom edge bearing on foundation or subfloor. Install supplementary bracing (and adhesive) as required by applicable code. Fasten sheathing to studs and plates with nails 8” o.c.

E. Joint System
Prefill Application

a. Mix SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound according to directions on bag. Do not over mix, or use extremely cold water or cold joint compound.

b. Prefill all “V” grooves formed by abutting tapered eased edges of SHEETROCK Brand Gypsum Panels, SW Edge, with SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound using a flexible 5” or 6” joint finishing knife or Ames Pre-Fill Tool. Fill “V” joint flush and wipe off excess compound beyond the “V” groove, leaving a clear depression to receive tape. Allow prefill to harden prior to the next application (tape or embedding coat).
SHEETROCK Brand Joint Tape

c Mix joint compound in strict accordance with manufacturer’s recommendations.

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d Apply joint compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply SHEETROCK Brand Joint Tape centered over joint and seated into compound. Sufficient compound—approx. 1/64" to 1/32"— must remain under the tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape or embedding coat must be thoroughly dry prior to application of second coat. (Exception: DURABOND Setting-Type and EASY SAND Lightweight Setting-Type Joint Compounds need only have hardened prior to application of next coat.)

e Apply second coat of joint compound over embedding coat, filling panel taper flush with surface; cover tape and feather out at least 2" beyond first coat. On joints with no taper, cover the tape and feather out at least 4" on either side of tape. Allow second coat to dry thoroughly prior to application of finish coat. (Exception: DURABOND Setting-Type and EASY SAND Lightweight Setting-Type Joint Compounds need only have hardened prior to second coat application.)

f Spread finish coat evenly over and extend at least 2" beyond second coat on all joints and feather to a smooth uniform finish. Do not allow finished joint to protrude beyond plane of the surface. Where necessary, sand lightly between coats and following the final application of compound to provide a smooth surface ready for decoration. When sanding, take care not to roughen face paper.

SHEETROCK Brand Fiberglass Drywall Tape

a. Mix joint compound in strict accordance with manufacturer's recommendations.
b. Center and apply SHEETROCK Brand Fiberglass Drywall Tape directly over joint, pressing tape firmly so that it adheres evenly to surface. To eliminate wrinkles and ensure maximum bond, press entire length of taper with drywall knife.
Avoid overlapping tape at intersections. Cut tape with drywall knife.
c. Cover with a layer of SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, forcing compound through the tape with a drywall knife/trowel to completely fill and level the joint. Failure to completely fill the joint may result in cracking. Let dry and sand lightly as required.
d. Apply second coat of SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound or SHEETROCK Brand Drying-Type Joint Compound (powder or ready mixed), feathering approximately 2" beyond first coat. Let dry and sand lightly as required.

Finishing Fasteners

a. Apply a setting-type, all-purpose, or lightweight all-purpose compound to fastener depressions as the first coat. Follow with a minimum of two additional coats of topping or all-purpose compound, leaving all depressions level with the surface. (Exception: Setting-type and lightweight all-purpose joint compounds need only one additional coat.)

F. SHEETROCK Brand Paper Faced Drywall Metal Bead and Trim

Application and Finishing

a. Apply compound to both sides of corner, extending 2" on each side for outer corners, 1-1/2" for inside corners. Cut bead to desired length; align tightly to ceiling and press firmly with fingers along length of corner to set. Do not bend bead. Run taping knife over corner at a 45° angle with even pressure. Remove excess compound using knife to eliminate air bubbles under paper. Allow to dry.

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b. For outer corners, apply another coat of compound to both sides, feathering out 5”-6”on ea side. Let dry; sand lightly as necessary. For inner corners, apply fill coat to one side, feathering out 1”. Let dry. Apply fill coat to other side using same procedure. Let dry. Sand lightly where necessary.

c. For outer corner, apply finishing coat, feathering 8” from nose of bead. Draw knife along one side of bead with one edge resting on nose of bead and other on surface of wallboard. Repeat for other side. Let dry. Sand and prime. For inner corners, apply finishing coat to one side, feathering 1” past previous coat. Let dry. Apply finishing coat to other side. Let dry. Sand and prime.

G. Other Bead and Trim

Installation

a. Reinforce all vertical and horizontal exterior corners with corner bead fastened with nails or 9/16” galvanized staples 9” o.c. on both flanges along entire length of bead.

b. Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with nails or galvanized staples 9” o.c.

Finishing

a. Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must thoroughly dry prior to application of second coat (exception: SHEETROCK Brand Setting-Type [DURABOND] and Lightweight Setting-Type [EASY SAND] Joint Compounds need only have hardened prior to application of next coat.)

b. Apply second coat in same manner as first coat, extending compound slightly beyond face of panel. Compound must be thoroughly dry prior to application of finish coat (exception: Setting-Type joint compounds need only have hardened prior to application of next coat.)

c. Apply finish coat to all bead and trim, extending compound slightly beyond the second coat and properly feathering from ground to plane or surface (exception: Only two coats of SHEETROCK Brand Setting-Type [DURABOND] or Lightweight Setting-Type [EASY SAND] Joint Compound or SHEETROCK Brand Lightweight All Purpose Joint Compound Ready Mixed [PLUS 3] are needed.) When dry, sand finish as necessary to provide a flat smooth surface ready for decoration. When sanding, take care not to roughen face paper.

Note1: Gypsum board to be installed behind all tubs and shower units which results in double gypsum board on some bathroom walls. See bathroom drawing sheet.

Note 2: Fire rated gypsum board ceiling in concealed spaces. IE: Under acoustic tile ceiling in corridors tape to be set in compound and several coats of compound applied over tape, no exposed tape will be accepted.

H. Ceiling suspension system:

1. Space hangers not over 48 in. o.c. in direction of main runner channels, and within 6 in. of ends of main runner runs and of boundary walls, structural steel, partitions, and similar interruptions of ceiling continuity. Install additional hangers at ends of each suspension member and at ceiling equipment not separately suspended, 6 in. from vertical surfaces. Do not splay wires more than 5 in. in a 4 ft. vertical drop. Wrap wire a minimum of three times horizontally, turning ends upward.
2. Attach hangers directly to ceiling structure, or to supplementary framing members supplied and installed under this section. Hangers may not be suspended from mechanical or electrical equipment such as ductwork, conduit or piping.

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3. Install 1-1/2 in. main runner channels spaced not over 48 in. o.c. within 6 in. of wall Position channels for proper ceiling height, level and secure, with hanger wire saddle-tied along channel. Provide 1 in. clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12 in., and secure each end with double-strand 18 ga. tie wire.
4. Erect ¾ in. metal furring channels at right angles to main runner channels or main support members. Space furring not over 16 in. o.c., and within 6 in. of wall. Provide 1 in. clearance between furring ends and abutting walls and partitions. Secure furring to carrying channels with clips or saddle-tie to supports with double strand 18 ga. tie wire. At splices, next furring channels at least 8 double-strand 18 ga. tie wire.
5. At openings interrupting main or furring channels, install additional cross-reinforcing as required, to restore lateral stability of ceiling framing system.
6. Finished installations shall be level to within ¼ in. in 10 ft.

3.3 ON SURFACES TO BE PAINTED: tape and cement all joints and screw locations with three coats of compound, then sand to smooth finish, acceptable to paint.

3.4 DURING WORK PROGRESS, remove all excess materials and debris resulting from operations, which may disrupt the work of other trades and after completion leave the premises broom clean.

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SECTION 09 90 00

PAINTING AND WALL COVERING

1. GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specifications. The work covered by this section of Specifications consists of the following:

1. Painting or staining all interior as called for in the Finish Schedule on Drawings or in these Specifications.

2. Painting interior walls, door trim, window trim, etc. A minimum of five (5) different colors will be used.

NOTE: All colors to be selected by Architect/Interior Designer.

2. PRODUCTS

2.1 General

A. Acceptable manufacturers, unless specific manufacturer is noted: California Products Corporation, Benjamin Moors, Pratt & Lambert, Sherwin-Williams, Tnemec.

B. All products used shall be manufacturer's top quality product for each type of finish specified.

2.2 MATERIALS

A. Where primer is called for, use primer recommended by manufacturer for particular combination of substrate and finish coat. Where painting over shop-applied primers, verify that finish paint proposed for field application is compatible with shop primers actually used.

B. All Gypsum Walls and Ceilings to be painted: Primer - Benjamin Moore Vinyl Latex Primer Sealer.

C. Finish-Walls - Benjamin Moore Moorcraft Latex Eggshell

D. Interior Rails & Metal Frames: Touch up Shop Primer. Finish - Two coats Alkyd semi-gloss finish.

E. Note: All Field cut edges to be painted. Metal Door & Window frames latex satin finish.

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3. EXECUTION

3.1 JOB CONDITIONS

A. Store materials in sealed containers. Provide a fire extinguisher in storage room. Remove flammable rags and waste from building at end of day.

B. Do not perform exterior work in rain or when precipitation is forecast imminently; or in hot, dry, or windy weather which would cause finish to cure too rapidly, or be marred by windstorm dust; or at temperatures below 40 degrees F.

C. Maintain temperature at interior locations between 50 and 75 degrees F, maximum 80 percent relative humidity, while paint is being applied. Provide adequate ventilation, by mechanical means if necessary, for drying of paint and prevention of condensation and mildew. Do not apply finish in areas in which dust is being generated.

D. Protect finished surfaces and equipment not being painted with masking tape, canvas dropcloths, polyethylene sheets, etc. Items such as lighting switch covers, fixture canopies, and door handles shall be temporarily removed, carefully stored, and replaced after painting, or carefully covered during painting operations.

3.2 PREPARATION

A. Preparation of newly-installed materials to receive finish painting is specified under those Sections installing materials. This includes, but is not necessarily limited to: touch-up of damaged shop coats; taping, sealing and sanding of drywall; patching masonry; sanding finish wood; and cleaning off grease, oil, dirt, mildew, factory-applied protective coatings, and other foreign materials.

B. At wood surfaces to be painted, scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

C. Before beginning work under this Section, verify that preparation of substrates under other Sections has been done as specified. Thoroughly remove water, dirt, and dust with clean cloths, brooms, or brushes. Allow masonry mortar joints to cure as long as possible before beginning paint application, 7 days minimum, 28 days preferably.

3.3 APPLICATION

A. Apply all materials in accordance with the manufacturer's recommendations.

B. Apply materials with suitable brushes, rollers, and spraying equipment. Keep application equipment clean, dry, and free from contaminants. Thoroughly stir materials before applying, and periodically during application.

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C. Rate and method of application and drying time between coats shall be strictly in accordance with manufacturer's recommendations.

D. Prepare field test panels in accordance with paragraph 1.4-B.3 of this Section for each type and color of finish specified. Request review of first completed room, color scheme, special items, etc., which shall serve as project standard after approval.

E. Touch-up shop applied primers before field painting.

F. Do not apply first coat until surface is dry to touch. Moisture content of surface shall be within limitations recommended by paint manufacturer.

G. Leave all parts of moldings and ornaments clean and true to detail, without excessive paint in corners and depressions. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping. Paint surfaces visible through grilles one coat flat black.

H. Finish coats shall be smooth, free of brush marks, streaks, laps or pile-up of paint, and skipped or missed areas. Refinish whole wall if unacceptable finish is extensive or of such a nature that it cannot be repaired by normal touch-up.

I. After completion of painting work, remove spilled or spattered paint. Touch-up and repair finishes damaged in any way by work under this Section. Protect finished surfaces.

3.4 Interior

A. Interior Painting: Paint shall be applied in the following number of coats, primer and finish. Tint all primers to match finish color.

1. One (1) fully applied finish coat of even coverage. NOTE: Contractor to adequately cover M.R. (Blueboard) or other colored drywall by primer or finish coat as necessary to eliminate any visible "bleed through".

2. Drywall: All interior gyp board walls and ceilings to receive paint: one (1) coat latex base primer-sealer, two (2) finish coat’s latex eggshell.

B. Interior Glass & Door Frames - one (1) coat primer and two (2) coats finish, semigloss.

C. All hardwood to receive three (3) coats urethane.

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SECTION 10 52 00

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Fire Extinguishers and Brackets
2. Fire Extinguisher Cabinets
3. Hose Valve Cabinet
4. Accessories

1.02 REFERENCES

A. NFPA 10 - Portable Fire Extinguishers

1.03 SUBMITTALS

A. Submit product data which shall include physical dimensions, operational features, color and finish, anchorage details, rough-in measurements, location, and details.

B. Submit manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

A. National Fire Protection Association (NFPA) Publications:

1. NFPA 10 - Portable Fire Extinguishers

B. Underwriter's Laboratories, Inc. (UL) Standards:

1. UL 4A-60BC classification

1.05 OPERATION AND MAINTENANCE DATA

A. Do not install extinguishers when ambient temperatures may cause freezing.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Approved Manufacturers:

1. J. L. Industries, Inc. (800-554-6077).
2. Larsen's Manufacturing Company (800-527-7367).
3. Modern Metal Products, a Division of Technico, Inc. (800-435-5544)

2.02 EXTINGUISHERS:

A. Multi-Purpose, Dry-Chemical Type: Steel Tank, pressurized, including hose and nozzle; 10-pound, ABC classification, UL 4A/60BC.

2.03 BRACKET:

A. Furnish wall mount bracket where shown on Drawings complete with mounting hardware.

2.04 CABINETS:

A. Items specified below are by Larsen's Manufacturing Co. Equivalent products by listed manufacturer will be acceptable.

1. Wall mounted on Bracket (FE): "MP10" Extinguisher with "B2" bracket.

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2. Semi-recessed Cabinet (FEC-1): "MP10" Extinguisher with "G-2409-6R"; semi-reces cabinet, projecting 2-1/2", rough opening of 10-1/2" x 25" x 4".
3. Surface Mounted Cabinet (FEC-2): "MP10" Extinguisher with "G-2409-SM"; surface-mounted cabinet at exterior locations such as stairs.
4. Hose Valve Cabinet (FVC): "MP10" Extinguisher with "GTVCS 3616 RL" Hose Valve Cabinet.

B. Cabinet: 18 gauge steel with acrylic thermosetting enamel finish, flat trim type with continuous hinged 1/4" acrylic plastic "Gemini" series door with black vertical letters on white background stating equipment in cabinet.
1. Provide lock similar to “Larsen-Loc” on all cabinets.
2. Color: Door and frame to be White.
3. Provide text “FIRE EXTINGUISHER” on side of cabinet where required by code.

C. Mounting Hardware: Appropriate to Cabinet

D. Fabrication
1. Form body of cabinet with tight inside corners and seams.
2. Pre-drill holes for anchorage.
3. Form perimeter trim and door stiles by welding, filling, and grinding smooth.
4. Hinge doors for 180 degree opening with continuous piano hinge. Provide pull handle and roller type catch.

2.05 FINISHES

A. Extinguishers: Red Enamel

PART 3 EXECUTION

3.01 Verify Locations with Local Fire Department before any work.

3.02 INSPECTION

A. Verify rough openings for cabinet are correctly sized and located.

B. Beginning of installation means acceptance of existing conditions.

3.03 INSTALLATION

A. Install cabinets plumb and level in wall openings. Secure rigidly in place in accordance with manufacturer's instructions.

END OF SECTION