Northern Utilities, Inc. Fit-Up

400 Riverside Industrial Parkway
Portland, Maine 04101

SPECIFICATION MANUAL

ISSUED FOR 100% REVIEW 03/04/2015

OWNER:

UNITIL
6 Liberty Lane West
Hampton, New Hampshire 03842
(603) 773-6531

ARCHITECT:

CWS ARCHITECTS
434 Cumberland Avenue
Portland, Maine 04101
(207) 774-4441

GENERAL CONTRACTOR

T.B.D.

INDEX OF CONTRACT DOCUMENTS

SPECIFICATIONS INDEX

CONTRACT DOCUMENTS

Division 0 – Supplemental Information

Division 1 – General Requirements

Division 2 – Sitework

Civil Engineering documentation to follow at a later date.

Division 3 – Concrete

Not Applicable

Division 4 – Masonry

Division 5 – Metals

Not Applicable

Division 6- Wood & Plastics

Division 7 – Thermal & Moisture Protection

Division 8 – Openings

Divisions 9 - Finishes

Divisions 10 - Specialties

Divisions 12 - Furnishings

Not Applicable

Division 21 – Fire Suppression

Division 22 – Plumbing

Division 23 – Heating, Ventilating and Air Conditioning (HVAC)

Division 26 – Electrical

Division 28 – Electrical Safety and Security

DRAWINGS INDEX

TITLE PAGE: DATED: APRIL 17, 2015

COVER	COVER PAGE
G0.00	TITLE PAGE, DRAWING INDEX AND LOCUS MAP

SITE-CIVIL: PREPARED BY SEBAGO TECHNICS DATED: APRIL 17, 2015

C1.0	EXISTING CONDITIONS PLAN
C1.1	SITE PLAN
C1.2	DETAILS

ARCHITECTURAL: PREPARED BY CWS DATED: APRIL 17, 2015

LS1.01	CODE STUDY
LS1.10	OVERALL FIRST FLOOR LIFE SAFETY PLAN, NOTES AND LEGEND
LS1.20	OVERALL SECOND FLOOR LIFE SAFETY PLAN, NOTES AND LEGEND
LS1.30	FIRE RATED PARTITION DETAILS
LS1.40	U.L. DESIGN REFERENCE DETAILS
LS1.41	U.L. DESIGN REFERENCE DETAILS
LS1.42	U.L. DESIGN REFERENCE DETAILS
A0.00	PARTITION SCHEDULE, DETAILS AND NOTES
A1.10	OVERALL FIRST FLOOR PLAN
A1.20	OVERALL SECOND FLOOR PLAN
AD1.11	ENLARGED AREA “A” FIRST FLOOR REMOVALS PLAN
AD1.12	ENLARGED AREA “B” FIRST FLOOR REMOVALS PLAN
AD1.21	ENLARGED AREA “A” SECOND FLOOR REMOVALS PLAN
A1.11	ENLARGED AREA “A” FIRST FLOOR PLAN
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A1.21	ENLARGED AREA “A” SECOND FLOOR PLAN
AC1.11	ENLARGED AREA “A” FIRST FLOOR COORDINATION PLAN
AC1.12	ENLARGED AREA “B” FIRST FLOOR COORDINATION PLAN
AC1.21	ENLARGED AREA “A” SECOND FLOOR COORDINATION PLAN
A2.21	ENLARGED AREA “A” SECOND FLOOR REFLECTED CEILING PLAN
A4.01	INTERIOR ELEVATIONS AND DETAILS
A7.01	MISCELLANEOUS DETAILS
A8.00	DOOR & DOOR FRAME SCHEDULE
A8.10	DOOR & DOOR FRAME DETAILS
A8.11	WINDOW DETAILS

MECHANICAL & PLUMBING: PREPARED BY BENNETT ENGINEERING DATED: APRIL 17, 2015

M1.11	FIRST FLOOR MECHANICAL PLAN-AREA “A”
M1.12	FIRST FLOOR MECHANICAL PLAN-AREA “B”

END OF DRAWINGS INDEX

Division 0

Supplemental Information

SECTION 00 30 00

INFORMATION AVAILABLE TO BIDDERS

1.1 Existing Conditions Information

A. Two sets of construction documentation in electronic format are to be provided to the contractor. The sets represent two previous construction projects.

1. JE Gould Building - Original Construction Drawing set containing 12 individual sheets and are dated 07/14/72.

2. The Paradigm Fit-up drawings representing the most recent fit-up to the building and are dated 08/18/00.

B. These drawing sets are issued for informational purposes only and are NOT to be construed as as-built documentation.

C. There has been at least one other Expansion and/or renovation to the building. The time frame for these renovations falls between the two sets referenced above. Drawings for these previous projects were not made available to the design team nor the owner.

END OF SECTION

SECTION 00 42 00

PROPOSAL FORM

BIDDER: _____
_____
_____
_____

TO **Unitil** **Bid Date:**_____
Jacqueline Agel
6 Liberty Lane West
Hampton, NH 03842
agel@until.com

RE: Northern Utilities Incorporated Fit-up
400 Riverside Industrial Parkway, Portland, Maine

The undersigned Bidder has received the Bid Documents entitled **"Northern Utilities, Inc. Fit-up"**, as listed in the **Project Manual Table of Contents, Drawing Index** and **Addenda** bound into the Project Manual. This manual describes the construction work required for interior renovations located at 400 Riverside Industrial Parkway, Portland, Maine 04101

A. All bids must be presented on this completed form. Bids must bear the handwritten signature of a duly authorized member or employee of the organization making the bid. Identify costs associated with all applicable Alternates. All work specified in the contract documents and identified as a Deductive Alternate shall represent a value that will be deducted from the Base Bid amount should the owner decide to accept the alternate.

B. Bidder has included the provisions of the above Bid Documents and Addenda in this proposal. Bidder has examined the Bid Documents and Site, and declares that:

1. Bidder has examined copies of and familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions, laws and regulations that in any manner may affect cost, progress, performance, or furnishing of the work.

2. Bidder has obtained and carefully studied (or assumes responsibility for obtaining and Carefully studying) all such examinations, site investigations, explorations, tests and studies (in addition to or supplement those referred to in one [1] above) which pertain to the physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the work as Bidder considers necessary for performance of furnishing the Work at the contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract documents; and no additional examinations, investigations, explorations, test, reports or similar information or data are or will be required by Bidder for such purposes.

3. Bidder has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents.

4. Bidder has brought to the attention of the Architect in writing, prior to submitting this bid, any questions, conflicts, errors or discrepancies that it has discovered in the Contract

Documents and that the written resolution thereof by the Architect is acceptable to the Bidder.

C. In submitting this proposal, Bidder agrees to the following:

1. This bid will remain subject to acceptance for sixty (60) days after the Bid due date. Bidder will sign and submit the agreement with the Bonds, Insurance Certificate, and other documents required within 15 days after the date of Owner's Notice of Award.

2. To enter into an agreement with the Owner which shall constitute a valid and binding Contract, in the form included in the Project Manual, to perform and furnish all work as specified or indicated in the Contract Documents for the Contract Price and within the Contract time indicated in this bid and in accordance with the other terms and conditions of the Contract Documents.

3. That this Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid. Bidder has not induced or solicited any person, firm or corporation to refrain from bidding. Bidder has not sought by collusion to obtain for itself any advantages over any other Bidder or over Owner.

4. To accomplish the work in accordance with the Contract Documents.

5. Owner reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Successful Bidder, and the right to disregard all non-conforming, non-responsive, unbalanced or conditional Bids. Also, Owner reserves the right to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make and award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner.

6. When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Contractor shall sign the Agreement in an unaltered form.

Having carefully examined the Form of Contract, General Conditions, and Plans and Specifications prepared by CWS Architects for the Construction of the **Northern Utilities, Inc. Fit-up** as well as the premises and conditions affecting the work, we the undersigned propose to furnish all labor, equipment and materials necessary for and reasonably incidental to the construction and completion of this proposal for the amount of:

D. UNIT PRICING:

The following unit prices are requested for comparison purposes.

Item No. 1: The cost of the 500kw generator alone. Exclude the transfer switch associated wiring and installation labor. **$**_____

Item No. 2: The cost of the 500kw generator alone. Exclude the transfer switch associated wiring and installation labor. **$**_____

E. Alternate Bid Items:

1. Deductive Bid Alternate No.1: Deduct $_____

The contractor shall provide deductive alternate pricing pertaining to all work associated with the construction of the Weld Shop 157. Work includes all walls, doors, mechanical and electrical items noted in the new work drawings.

2. Deductive Bid Alternate No.2: Deduct $_____

The contractor shall provide deductive alternate pricing pertaining to incorporating a 300kw generator into the project as opposed to a 500kw. This pricing should include but not be limited to the cost of the generator, wiring, building service change over and installation.

TOTAL BASE BID:

$_____

TOTAL Base Bid:

(written):_____**Dollars**

G. This proposal includes the following addenda to the Plans and Specifications:

Addendum #___, Dated: _____ Addendum #___, Dated:_____

Addendum #___, Dated: _____ Addendum #___, Dated:_____

H. TIME FOR COMPLETION

The undersigned guarantees all work performed under this contract will be done in accordance with the specifications and in good and workmanlike manner, and to renew or repair any workmanship prior to the date of final completion and acceptance by the owner except for specific manufacturer's warranties.

The Undersigned hereby certifies that this Bid Proposal is genuine, and not a sham or collusive, or made in the interest of or in behalf of any person not herein named, and that the Undersigned has not directly or indirectly induced or solicited any other Bidder to submit a sham bid, or any other person, firm or corporation to refrain from bidding, and that the Undersigned has not in any manner sought by collusion to secure for himself an advantage over any other bidder.

DaVita Incorporated reserves the right to reject any or all bids**.**

Having reviewed all documents and having made a Site Visit and being otherwise familiar with existing site conditions, the estimated number of calendar days following issuance of Notice to Proceed to Substantial Completion of the Contract for Construction shall be in accordance with the Project Schedule provided within the RFP package. Actual construction shall only begin upon completing appropriate submittal review processes and only upon obtaining all applicable building construction permits.

I. The undersigned agrees, if this proposal is accepted, to sign a contract and deliver it, along with the bonds and affidavits of all insurance specified, within fourteen (14) calendar days after the date of notification of such acceptance, except if the 14th day falls on a holiday, a Saturday or Sunday, then the conditions will be

fulfilled if the required documents are received before 12 o'clock noon on the day following the holiday, or the Monday following the Saturday or Sunday.

The Owner may use this authorization and information obtained with it to administer and enforce the contract documents and review credentials and credit of individuals, partnerships and or corporations involved in the bid process. Any individuals or organizations including public or private may be asked to release information including but not limited to financial institutions, suppliers, insurance companies, credit investigating agencies, law enforcement agencies, local, state and federal agencies.

TRADE		NAME OF SUBCONTRACTOR
1.	Demolition	_____
2.	Sitework	_____
3.	Concrete Slab Work	_____
4.	Masonry	_____
5.	Rough Carpentry	_____
6.	Finish Carpentry	_____
7.	Cabinetry	_____
8.	Roofing	_____
9.	Insulation	_____
10.	Fire Stopping/Sealing	_____
11.	Doors and Frames	_____
12.	Finish Hardware	_____
13a.	Floor Preparation	_____
13b.	Flooring	_____
14.	Ceiling Systems	_____
15.	Painting	_____
16.	Wall Framing and Drywall	_____
17.	Sprinkler	_____
18.	Plumbing	_____
19.	HVAC	_____
20.	Electrical	_____
21.	Fire Alarm System	_____

J. SCHEDULE OF VALUES

The contractor is asked to provide a schedule of values within the bid. The contractor is asked to break the base bid down into individual specification divisions. Further break down may be requested at a later date if required. The schedule may be presented in the contractor's preferred format.

The undersigned agrees, if awarded the Contract, to complete the work within the specified number of calendar days from the notice to proceed.

This proposal includes the full cost of all bonds and permits required for the completion of this work.

Signed: _____

Typed: _____

Title: _____

Firm Name & Address:

_____

_____

_____

_____

_____

Corporate Sea, if any:

If Bidder is a corporation, write State of incorporation, and if a partnership, give full name of all partners in the spaces provided below:

Partners: _____

_____

_____

NON-COLLUSION AFFADAVIT

The undersigned certifies, under penalty of perjury, that to the best of their knowledge and belief:

1. The prices in this Bid have been arrived at independently without collusion, consultation, communications or agreement with any other bidder or competition on any matter whatsoever for the purpose of restricting competition;

2. Except as may be required by law, prices quoted in the Bid have not been knowingly disclosed by the Bidder, directly or indirectly, to any other Bidder or competitor, nor will they be so disclosed prior to the Bid opening;

3. No attempt has been made by the Bidder to induce any other person, partnership, or corporation to submit or to refrain from submitting a Bid on this project.

Signed: _____

Typed: _____

Title: _____

Firm Name & Address:

_____

_____

_____

_____

_____

END OF PROPOSAL FORM

AIA® Document G701™ – 2001

Change Order

PROJECT *(Name and address)*:	**CHANGE ORDER NUMBER:** 001	OWNER: ☐
	DATE:	ARCHITECT: ☐
TO CONTRACTOR *(Name and address)*:	**ARCHITECT'S PROJECT NUMBER:**	CONTRACTOR: ☐
	CONTRACT DATE:	FIELD: ☐
	CONTRACT FOR: General Construction	OTHER: ☐

THE CONTRACT IS CHANGED AS FOLLOWS:
(Include, where applicable, any undisputed amount attributable to previously executed Construction Change Directives)

The original Contract Sum was	$	0.00
The net change by previously authorized Change Orders	$	0.00
The Contract Sum prior to this Change Order was	$	0.00
The Contract Sum will be increased by this Change Order in the amount of	$	0.00
The new Contract Sum including this Change Order will be	$	0.00

The Contract Time will be increased by Zero (0) days.
The date of Substantial Completion as of the date of this Change Order therefore is

NOTE: This Change Order does not include changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

ARCHITECT *(Firm name)*	**CONTRACTOR** *(Firm name)*	**OWNER** *(Firm name)*
ADDRESS	**ADDRESS**	**ADDRESS**
BY *(Signature)*	**BY** *(Signature)*	**BY** *(Signature)*
(Typed name)	*(Typed name)*	*(Typed name)*
DATE	**DATE**	**DATE**

AIA® Document G702™ – 1992

Application and Certificate for Payment

TO OWNER:

PROJECT:

APPLICATION NO: 001
PERIOD TO:
CONTRACT FOR: General Construction
CONTRACT DATE:
PROJECT NOS: / /

Distribution to:
OWNER:
ARCHITECT:
CONTRACTOR:
FIELD:
OTHER:

FROM CONTRACTOR:

VIA ARCHITECT:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM		$ 0.00
2. NET CHANGE BY CHANGE ORDERS		$ 0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2)		$ 0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)		$ 0.00
5. RETAINAGE:		
a. 0 % of Completed Work (Column D + E on G703)	$ 0.00	
b. 0 % of Stored Material (Column F on G703)	$ 0.00	
Total Retainage (Lines 5a + 5b or Total in Column I of G703)		$ 0.00
6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)		$ 0.00
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)		$ 0.00
8. CURRENT PAYMENT DUE		$ 0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	$ 0.00	

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$ 0.00	$ 0.00
Total approved this Month	$ 0.00	$ 0.00
TOTALS	$ 0.00	$ 0.00
NET CHANGES by Change Order	$ 0.00	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... $ 0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

AIA® Document G703™ – 1992

Continuation Sheet

AIA Document, G702™–1992, Application and Certification for Payment, or G736™–2009, Project Application and Project Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.
In tabulations below, amounts are in US dollars.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 001
APPLICATION DATE:
PERIOD TO:
ARCHITECT'S PROJECT NO:

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED FROM PREVIOUS APPLICATION (D + E)	WORK COMPLETED THIS PERIOD	MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00 %	0.00	0.00
	GRAND TOTAL	$0.00	$0.00	$0.00	$0.00	$0.00	0.00 %	$0.00	$0.00

(929326644)

Division 1

General Requirements

SECTION 01 00 00

BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Summary of Work: Contract, work by owner, contractor use of premises, future work.

B. Contract Considerations: Cash allowances, contingency allowance, inspection and testing allowances, schedule of values, applications for payment, change procedures, alternates.

C. Coordination and Meetings: Coordination, field engineering, cutting and patching, meetings, progress meetings, equipment electrical characteristics and components, examination, preparation, cutting and patching.

D. Submittals: Submittal procedures, construction progress schedules, proposed products list, shop drawings, product data, samples, manufacturers' installation instructions, manufacturers' certificates.

E. Quality Control: Quality assurance - control of installation, Tolerances, References, Mock-ups, Inspection and testing laboratory services, Manufacturers' field services and reports.

F. Construction Facilities and Temporary Controls: Temporary electricity, barriers and fencing, water control, exterior enclosures, interior enclosures, protection of installed work, progress cleaning, and waste removal.

G. Material and Equipment: Products, transportation, handling, storage, and protection, products options, substitutions.

H. Starting of Systems: Starting systems demonstration and instructions.

I. Contract Closeout: Contract closeout procedures, final cleaning, adjusting, project record documents, operation and maintenance data, spare parts and maintenance materials, warranties.

1.2 WORK BY OWNER

A. Items noted as NIC (Not in Contract), will be furnished and installed by Owner beginning at Substantial Completion.

B. The contractor shall submit, pay for and obtain applicable construction permits. Costs associated with these permitting costs shall be handled as reimbursable expenses

1.3 DAVIS BACON REPORTING AND WAGE DETERMINATIONS

A. The construction of this project will not be governed by the Davis Bacon Act.

1.4 CONTRACTOR USE OF PREMISES

A. Limit use of premises to allow:
   1. Owner occupancy.
   2. Work by others and work by owner.
   3. Use of premises by public.

1.5 SCHEDULE OF VALUES

A. Submit schedule on AIA G703 (Requisition Continuation Sheet) standard form, similar electronic media printout will be considered.

B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

1.6 APPLICATIONS FOR PAYMENT

A. Submit three copies of each application on AIA G702 (Requisition Form), similar electronic media printout will be considered.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Payment Period: Monthly.

1.7 CASH ALLOWANCES

A. Section is not applicable

1.8 TESTING AND INSPECTION

A. The contractor shall carry costs associated with performing and documenting concrete slab-on-grade moisture testing referenced within latter floor finish specification sections

1.9 CHANGE PROCEDURES

A. Stipulated Sum/Price Change Order: Based on Proposal Request with General Contractor profit and overhead delineated and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Architect/Engineer.

B. Change Order Forms: AIA G701 (Change Order Form), similar electronic media printout will be considered.

C. Change Orders must be approved by the Owner and the Architect.

1.10 UNIT PRICING:

A. Section is not applicable

1.11 ALTERNATES:

A. Deductive Alternate No.1: The contractor shall provide deductive alternate pricing pertaining to all work associated with the construction of the Weld Shop 157. Work includes all walls, doors, mechanical and electrical items noted in the new work drawings.

B. Deductive Alternate No.2: The contractor shall provide deductive alternate pricing pertaining to incorporating a 300kw generator into the project as opposed to a 500kw. This pricing should include but not be limited to the cost of the generator, wiring, building service change over and installation.

1.12 COORDINATION

A. Coordinate scheduling, submittals, and Work of the various sections of specifications to ensure efficient and orderly sequence of installation of interdependent construction elements. No claims for additional Time will be considered if the Work has not been properly coordinated.

B. Verify utility requirement characteristics of operating equipment are compatible with building utilities.

C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable.

D. In finished areas, conceal pipes, ducts, and wiring within the construction.

1.13 FIELD ENGINEERING

A. Establish elevations, lines, and levels and certify that elevations and locations of the Work conform with the Contract Documents.

B. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

1.14 PRECONSTRUCTION PREINSTALLATION MEETINGS

A. Architect will schedule a preconstruction meeting for all affected parties.

B. When required in individual specification section, convene a preinstallation meeting at Project site prior to commencing work of the section.

1.15 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Preside at meetings, record minutes, and distribute copies within two days to those affected by decisions made.

1.16 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Section is not applicable.

1.17 CUTTING AND PATCHING

A. Employ original installer to perform cutting and patching new Work; restore Work with new Products.

B. Submit written request in advance of cutting or altering structural or building enclosure elements.

C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and non-conforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Cut masonry and concrete materials using masonry saw or core drill. Restore Work with new Products in accordance with requirements of Contract Documents.

E. Cut from finished side of surfaces to concealed side.

F. Protect existing construction from damage during cutting and patching.

G. Fit Work tight to adjacent elements. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

H. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. Refinish surfaces to match adjacent finishes in a manner that will eliminate evidence of patching and refinishing.

1.18 SUBMITTAL PROCEDURES

A. Submittal form to identify Project, Contractor, Subcontractor or supplier; and pertinent Contract Document references.

B. Submittals to Architect shall be provided in electronic format.

C. 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.

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

E. All submittals shall conform to the requirements of the Contract Documents and, thus, presentation of a submittal shall represent by the contractor that the product is in conformance.

F. Products that do not conform with the Contract Documents shall be presented for review as Substitutions as specified.

F. Revise and resubmit submittals as required; identify all changes made since previous submittal.

G. Distribute submittals reviewed by Architect/Engineer to project site and all affected parties.

H. Allow 10 (ten) working days for review and return of submittals by architect.

I. Do not allow submittals requiring Architect/Engineer's action stamp to be used on the project site without marking.

J. Architect/Engineer's action stamp is self-explanatory.

K. Reference Specification Section 01 33 23 – Shop Drawings, Product Data and Samples for further submittal information and requirements.

1.19 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule in duplicate within 15 days after date of Owner-Contractor Agreement for Architect/Engineer review.

B. Submit revised schedules with each Application for Payment, identifying changes since previous version. Indicate estimated percentage of completion for each item of Work at each submission.

C. Submit a horizontal bar chart with separate line for each major section of Work or operation, identifying first workday of each week.

1.20 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Owner-Contractor Agreement, submit list of major Products proposed for use, with name of manufacturer, trade name, and model number of each product.

1.21 PROPOSED SUBCONTRACTOR/SUPPLIER LIST

A. Within 15 days after date of Owner-Contractor Agreement, submit list of major subcontractors/suppliers proposed, with indication of trade/product type.

1.22 PRODUCT DATA

A. Product Data For Review:
   1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
   2. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record purposes described in specification Section 01 70 00 - CONTRACT CLOSEOUT.

B. Product Data For Information:
   1. Submitted for the Architect/Engineer's benefit as contract administrator or for the Owner.

C. Product Data for Project Close-out:
   1. Submitted for the Owner's benefit during and after project completion.

D. Submit the all documentation in electronic format.

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

1.23 SHOP DRAWINGS

A. Shop Drawings for Review:

1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.
2. After review, produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article above and for record purposes described in specification Section 01 70 00 - CONTRACT CLOSEOUT.

B. Shop Drawings for Information:
1. Submitted for the Architect/Engineer's benefit as contract administrator or for the Owner.

C. Shop Drawings for Project Close-out:
1. Submitted for the Owner's benefit during and after project completion.
2. Submit the number of opaque reproductions which Contractor requires, plus three copies which will be retained by Architect/Engineer.

1.24 SAMPLES

A. Samples for Review:
1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
2. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in specification Section 01 70 00 - CONTRACT CLOSEOUT.

B. Samples for Information:
1. Submitted for the Architect/Engineer's benefit as contract administrator or for the Owner.

C. Samples for Selection:
1. Submitted to Architect/Engineer for aesthetic, color, or finish selection.
2. Submit samples of finishes from the full range of manufacturers' standard colors, in custom colors selected, textures, and patterns for Architect/Engineer selection.
3. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in specification Section 01 70 00 - CONTRACT CLOSEOUT.

D. Submit samples to illustrate functional and aesthetic characteristics of the Product.

E. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect/Engineer's selection.

1.25 MANUFACTURER INSTALLATION INSTRUCTIONS

A. When specified in individual specification sections, submit manufacturer printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, as specified within the Product Data article above.

1.26 MANUFACTURER CERTIFICATES

A. When specified in individual specification sections, submit certifications by manufacturer to Architect/Engineer, 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.

1.27 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions.

C. Comply with specified standards as minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.28 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that utility services are available, of the correct characteristics, and in the correct location.

1.29 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

1.30 TOLERANCES

A. Monitor fabrication and installation tolerance control of installed Products over suppliers, manufacturers, Products, site conditions, and workmanship, to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply fully with manufacturers' tolerances.

1.31 REFERENCES

A. Conform to reference standards by date of issue current as of date of Contract Documents.

B. Should specified reference standard conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Reference Standards have the same force and effect as if bound herein and include publications of the following:

1. American National Standards Institute (ANSI).
2. American Concrete Institute (ACI) 2005.
3. American Institute of Steel Construction 2005 (AISC).
4. American Plywood Association 2010 (APA).
5. American Society for Testing and Materials 2010 (ASTM).
6. American Society of Civil Engineers 2010 (ASCE).
7. American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. (ASHRAE) 90.1 - 2007.
8. American Society of Mechanical Engineers (ASME).
9. Americans with Disabilities Act 1999 (ADA).
10. American Water Works Association 2005 (AWWA).

11. American Welding Society 2008 (AWS).
12. International Building Code 2009 (IBC).
13. Consumer Product Safety Commission (CSPC).
14. Factory Mutual (FM).
15. National Electric Manufacturers Association 2010 (NEMA).
16. National Electrical Code (NEC) 2011 (NFPA 70)
17. National Fire Protection Association 2009 (NFPA).
18. National Fire Protection Association (NFPA) Life Safety Code 2009
19. Underwriters Laboratories, Inc. 2007 (UL).
20. US Department of Commerce, National Bureau of Standards (NBS).
21. Federal, State and local codes and regulations.

1.32 MOCK-UPS

A. Tests and sample installations will be performed under provisions identified in this section and identified in respective product specification sections and as requested by the architect.

1.34 CORRELATION AND INTENT

A. Contract Documents are complementary, and elements of the Work required by one shall be as binding as if required by all. The intent of the Documents is to include all items necessary for the proper execution and completion of the Work.

B. Where discrepancies or conflicting requirements exist among the Contract Documents and/or applicable reference standards, the Contractor shall assume the greater quantity or quality level, normally the most costly. Refer conflicting requirements to the Architect/Engineer for interpretation before proceeding.

1.35 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, to initiate instructions and conduct warranty inspections when necessary.

B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturers' written instructions.

1.36 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify utility services are available, of correct characteristics, and in correct location.

1.37 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

1.38 TEMPORARY ELECTRICITY

A. The Owner shall provide access to on-site power services required by the project. The contractor shall be responsible for all tie-in labor and material costs at the source.

B. Provide temporary electricity and power outlets for construction operations, connections, branch wiring, distribution boxes, and flexible power cords as required. Do not disrupt Owner's need for continuous service.

1.39 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain temporary lighting for construction operations.

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

C. The existing building lighting may be utilized during construction. Repair, clean, and replace lamps to achieve new condition at end of construction.

1.40 TEMPORARY HEAT

A. Provide and maintain temporary heating as required by the projects general construction finish installations.

1.41 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.42 TELEPHONE SERVICE

A. The contractor shall make available to the architect and owner contact phone numbers and information for all field and main office personnel throughout the duration of the project.

1.43 TEMPORARY WATER SERVICE

A. Provide, maintain and pay for suitable quality water service required for construction operations.

B. The use of the existing water service is acceptable.

1.44 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. New facilities may not be used.

B. Maintain in clean and sanitary condition.

C. The contractor may utilize the existing male and female toilets toward the rear of the building during construction. Thoroughly clean each upon project completion. All other toilets shall remain closed except to access for related work.

1.45 BARRIERS AND FENCING

A. Provide barriers and/or fencing to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage.

B. Construction: Reference Specification 01 56 00. The Contractor shall enclose the limit of work with hard barriers. Coordinate the location of all barriers with the Owner and assure and authorities having jurisdiction. Do not block or impede means of egress paths and normal building operations. Provide doors with locking hardware in the assemblies maintain controlled access to the work space.

1.46 WATER CONTROL

A. Reference Civil documentation.

1.47 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closures to exterior openings to permit acceptable working conditions and protection of the Work.

1.48 PROTECTING INSTALLED CONSTRUCTION

A. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

B. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

C. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

D. Prohibit traffic through landscaped areas.

1.49 SECURITY

A. Provide security and facilities to protect Work and existing facilities, and Owner's operations from unauthorized entry, vandalism, and/or theft.

1.50 POLLUTION AND ENVIRONMENTAL CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

B. Provide dust control, erosion and sediment control, noise control, pest control and rodent control to allow for proper execution of the Work.

1.51 ACCESS ROADS

A. Utilize existing roads for access to the site. Coordinate allowable lay down areas with owner prior to project start-up.

1.52 PARKING

A. Coordinate construction personnel parking locations with Owner.

1.53 PROGRESS CLEANING AND WASTE REMOVAL

A. Collect and maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

1.55 FIELD OFFICES AND SHEDS

A. Coordinate location of office trailer and the associated utility service tie-ins for the trailer/trailers with the owner.

1.56 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials, prior to Substantial Completion review.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

1.57 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components specifically identified for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically identified or allowed by the Contract Documents.

C. Provide interchangeable components of the same manufacture for components being replaced.

D. Provide Products of the same type from the same manufacturer.

1.58 TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

A. Transport, handle, store, and protect Products in accordance with manufacturer's instructions.

1.59 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions (or equal clause): Submit a request for substitution for any manufacturer not named.

1.60 SUBSTITUTIONS

A. Architect/Engineer will **NOT** consider requests for Substitutions during the bid process.

B. Architect/Engineer will consider requests for Substitutions **ONLY** within 15 days after date of Owner-Contractor Agreement.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.

E. Conditions: Substitutions will be considered under the following conditions:

1. Revisions to the Contract Documents are not required.
2. Proposed changes are in keeping with the intent of the Contract Documents.
3. The specified product or construction method cannot be provided within the Contract Time, if not due to failure by the Contractor to pursue the work promptly.
4. The specified product or construction method cannot receive approval by governing authorities, and the substitution can be approved.
5. A substantial advantage is offered to the Owner in terms of cost, time or maintenance.
6. The specified product or construction method is not compatible with other materials, and the substitution is compatible.
7. The specified product or construction method cannot receive a required warranty, and the substitution can be warranted.
8. The Contractor will bear the impact of additional cost or time needed to provide the substitution, including design services.
9. The Contractor will be responsible for coordinating the substitution with other Work.

F. The substitution process SHALL BE considered a stand-alone process and shall not eliminate the need for the contractor to meet the submittal and shop drawing requirements outline within this documentation. Substitutions SHALL NOT be made during the submittal process. Any substitutions received within submittal packages will be immediately rejected without consideration.

1.61 STARTING SYSTEMS

A. Provide seven days notification prior to start-up of each item.

B. Ensure that each piece of equipment or system is ready for operation.

C. Execute start-up under supervision of responsible persons in accordance with manufacturers' instructions.

D. Submit a written report that equipment or system has been properly installed and is functioning correctly.

1.62 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at designated location.

1.63 TESTING, ADJUSTING, AND BALANCING

A. Contractor will appoint, employ, and pay for services of an independent firm to perform testing, adjusting, and balancing.

B. Reports will be submitted by the independent firm to the Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.

C. Cooperate with independent firm; furnish assistance as requested.

D. Re-testing required because of non-conformance to specified requirements will be charged to the Contractor.

1.64 CONTRACT CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's inspection.

B. Submit final Application for Payment identifying total adjusted Contract Sum/Price, previous payments, and amount remaining due.

C. Reference specification Section 10 70 00 - Contract Closeout for further closeout procedure requirements.

1.65 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Thoroughly clean interior and exterior surfaces exposed to view. Vacuum carpeted and soft surfaces, wash and polish glass, reflective and smooth hard surfaces.

C. Clean debris from site, roofs, gutters, downspouts, and drainage systems.

D. Replace filters of operating equipment.

E. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.66 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.67 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of Contract Documents to be utilized for record documents.

B. Record actual revisions to the Work. Record information concurrent with construction progress.

C. Specifications: Legibly mark and record at each Product section a description of actual Products installed.

D. Record Documents and Shop Drawings: Legibly mark each item to record actual construction.

E. Submit original and two photocopies of record documents to Owner with claim for final Application for Payment.

F. Reference specification Section 01 32 00 - Project Record requirements.

1.68 OPERATION AND MAINTENANCE DATA

A. Submit two sets prior to final inspection, bound in 8-1/2 x 11 inch text pages, three D side ring binders with durable covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS" and title of project.

C. Internally subdivide the binder contents with permanent page dividers, logically organized, with tab titles clearly printed under reinforced laminated plastic tabs.

D. Reference specification Section 01 32 00 - Project Record Documents and Section 01 70 00 - Contract Closeout for further requirements.

1.69 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide Products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed obtain receipt prior to final payment.

1.70 WARRANTIES

A. Provide duplicate notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Submit one project binder containing all warranty documentation for all materials utilized for the project. Submit as part of the Close-out Documentation indicated within 01 70 00 prior to final Application for Payment.

D. All project warranties for all materials utilized for shall extend for 12 months beyond the issuance of the Certificate of Substantial Completion unless this period is lengthen by specific specification sections to follow.

END OF SECTION

SECTION 01 07 00

ABBREVIATIONS and DEFINITIONS

PART 1 - GENERAL

1.1 INTERPRETATIONS

A. This section is not intended to cover all definitions which may be required, nor all the abbreviations which may be used on the Contract Documents.

B. Questions regarding definition of terms, or meaning of abbreviations should be directed to the Architect.

1.2 DEFINITIONS

A. The following definitions shall apply to the Specifications:
1. The words "Furnish" or "Supply" means purchase and delivery of items or materials to the project site, including proper storage without installation.
2. The word "Install" means applications, connection or erection of items or materials that have been furnished.
3. The word "Provide" means both furnishing and supplying and installing of items or materials.
4. The term "Work" as used herein refers to work at site of project and includes all labor and materials to be incorporated in the construction.
5. The word "Concealed" means work within or behind various construction elements, or in crawl spaces or trenches, which is not exposed to view when the project is complete.
6. The word "Exposed" means anything exposed to view when the project is complete, as opposed to being "concealed."

1.3 ABBREVIATIONS

A. The following list of abbreviations shall apply to the Drawings and Specifications. This list is not all inclusive. Other abbreviations may exist on the drawings. If any questions arise regarding abbreviations, contact the Architect for interpretation.

A/B	Acid, Bicarb Tubing
ABV	Above
AC	Air Conditioning
ACT	Acoustical Tile
ADD	Addendum
ADJ	Adjacent
ADJT	Adjustable
AFF	Above Finished Floor
ALT	Alternate
ALUM	Aluminum
APPROX	Approximate
APX	Approximate
ARCH	Architect(ural)
AUTO	Automatic
BD	Board

BEL	Below
BET	Between
BIT	Bituminous
BK	Brick
BLK	Block
BLKG	Blocking
BOT	Bottom
BRG	Bearing
BRK	Brick
BSMT	Basement
CAB	Cabinet
CG	Corner Guard
CIPC	Cast-in-Place Concrete
CJ	Control Joint
CJT	Control Joint
CL	Clear
CLG	Ceiling
CMU	Concrete Masonry Unit
CO	Cased Opening
COL	Column
CONC	Concrete
CPT	Carpet
CRS	Course
CSC	Concealed Spline Ceiling
CT	Ceramic Tile
CTSK	Countersunk Screw
CW	City Water
DET	Detail
DI	DeIonized Water
DIM	Dimension
DISP	Disposal
DISPEN	Dispenser
DO	Door Opening
DPL	Disposal
DPR	Dispenser
DR	Door
DW	Drywall
DWG	Drawing
DWR	Drawer
ELEC	Electrical
EMER	Emergency
EMR	Existing Material to Remove
EQ	Equal
EQUIP	Equipment
EXG	Existing
EXIST	Existing
EXT	Exterior
FCO	Floor Clean Out
FD	Floor Drain
FE	Fire Extinguisher
FEC	Fire Extinguisher Cabinet
FIN	Finish(ed)

FIXT	Fixture
FL	Floor
FLR	Floor(ing)
FLUR	Fluorescent
FP	Fixed Panel
FS	Floor Sink
GA	Gage, Gauge
GL	Glass
GV	Galvanized
GWB	Gypsum Wall Board
H	High
HP	Handicapped
HR	Hour
HT	Height
HVAC	Heating-Ventilating-Air-Conditioning
HW	HW Hot Water
HWR	Hot Water Return
ID	Inside Diameter
INS	Insulate (d), (ion)
INT	Interior
IW	Indirect Waste
IWV	Indirect Waste Vent
JT	Joint
LAM	Laminate
LAV	Lavatory
LT	Light
MAS	Masonry
MAX	Maximum
MECH	Mechanical
MT	Metal
MIN	Minimum
MISC	Miscellaneous
MO	Masonry Opening
MOV	Moveable
MRGB	Moisture Resistant Gypsum Wallboard
NIC	Not in Contract
NO	Number
NS	Nurses Station
NTS	Not to Scale
OA	Overall
OC	On Center
OF	Owner Furnished
OFI	Owner Furnished and Installed
OFIC	Owner Finished Installed by Contractor
OH	Opposite Hand
OPG	Opening
OPNG	Opening

PAT	Patient
PL	Plate
PLAM	Plastic Laminate
PLAS	Plaster
PLYWD	Plywood
PNL	Panel
PSTA	Patient Station
PTD	Paper Towel Dispenser
PTN	Partition
PTR	Paper Towel Dispenser
PVC	Poly. Vinyl Chloride
PWD	Plywood
R	Rubber
RA	Return Air
RB	Rubber Base
REF	Refrigerator
REFR	Refrigerator
REFRIG	Refrigerator
RM	Room
REMOV	Removable
RO	Reverse Osmosis (water)
RP	Removable Panel
SDS	Solution Delivery System
SHT	Sheet
SIM	Similar
SL	Sliding
SQ	Square
SR	Sheet Rubber
SST	Stainless Steel
ST	Steel
STA	Station
STD	Standard
STL	Steel
STR	Structural
STRUCT	Structural
STUC	Stucco
SUS	Suspended
THK	Thick(ness)
TKBD	Tackboard
TPD	Toilet Paper Dispenser
TYP	Typical
V	Vinyl
VCT	Vinyl Composition Tile
VERT	Vertical
VWC	Vinyl Wall Covering
WC	Water Closet
WCO	Wall Clean Out
WD	Wood
WDP	Wood Panel on Gypsum Wallboard
WIN	Window
WO	Window Opening

END OF SECTION

SECTION 01 14 19

CONTRACTOR'S USE OF THE PREMISES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: This section applies to situations in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees, and field engineers, enter upon the Owner's property.

B. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.

B. Require that all personnel who will enter upon the Owner's property certify their awareness of familiarity with the requirements of this Section.

1.3 USE OF PREMISES

A. The Contractor shall confine his apparatus, storage of materials and operations of his workmen to limits as required by the Owner, and shall not unreasonably encumber the premises with his materials.

B. The Contractor shall maintain access to and egress from the building in a safe manner, well marked and in locations as required by the local authorities having jurisdiction over this work. They shall be responsible for furnishing and maintaining in a safe condition all barricades, temporary enclosures, railings, lights, etc. and removing same at completion of job.

C. At no time shall the structure be loaded beyond safe limits, and in no case shall any loads exceed the design limits.

D. It is anticipated that the bulk of the work shall be done during the regular work hours of the day. All work carried on outside of regular working hours shall be done at the Contractor's expense, and no extras will be allowed. Reference the off-hour noting on drawing TP for specific work scopes required to be completed during off-hours. The use of "Overtime" shall be at the Contractor's option but will not be reimbursed by the Owner.

1.4 SECURITY

A. Restrict the access of all persons entering upon the Owner's property in connection with the Work to the Access Route and to the actual site of the work.

1.5 COORDINATION OF WORK

A. The Contractor shall limit the storage of materials and equipment to the areas indicated or required by the Owner.

B. At no time during the work under the Contract shall the Contractor place, or cause to be placed, any material or equipment, etc., at any location that would impede or impair access to or from the present facilities for other tenants, employees, or delivery facilities.

C. The Contractor shall cooperate with the Owner to the fullest extent in providing traffic control during the course of construction so as to provide a minimum of inconvenience to existing tenants.

D. The Contractor shall send proper notices, make all necessary arrangements, and perform all services required in the care and maintenance of all public utilities. The Contractor shall, during the construction period and until final acceptance of the work as a whole by the Owner, assume all responsibility concerning the same for which the Owner my be liable.

E. It is of paramount importance that the work of this Contract does not interfere in any way with the normal operation of the existing utility services and no interruption of the utility services in the existing building can be allowed. Coordinate all work affecting service in the existing building with the Architect and the Owner.

1.6 NOISE AND DUST CONTROL

A. Exercise all possible care to control excessive noise and dust during the construction to keep these problems to a minimum. Traffic or construction areas shall be kept clean as required by the Owner and in accordance with applicable local requirements.

B. Notify the Owner prior to using air compressor, jack-hammers, etc., in sufficient time to permit removal of any occupants close enough to be affected by such disturbances. Screen all noisy equipment with temporary enclosures to shield adjacent areas as much as possible.

1.7 ADJACENT WORK – within adjacent occupied buildings

A. In preparing the proposal, the Contractor and Subcontractors shall be aware that adjacent work may be required due to the scope of the work indicated by the Documents. These areas include, but are not limited to:

1. Remote mechanical or electrical locations
2. Roof areas above or adjacent to the space
3. General limits of adjacent corridors and spaces.

1.8 RESTRICTIONS TO WORK

A. On-Site Hours: The contractor shall perform the work during the normal work hours of 7:00am and 8:00pm, Monday through Friday unless directed otherwise. It shall be understood that the owner will be remain in full operation on neighboring portions of the property. Work impacting these areas shall be fully coordinated with the owner prior to undertaking work that may impact normal business operations. It is the intent of this project that the contractor shall limit and minimize disturbances.

B. Interruptions to Existing Utilities: No interruption in utilities serving the Owner's occupied facilities shall occur without first obtaining permitting to do so. Permitting shall be obtained

under the following conditions and only after having arranged to provide temporary utility services according to the requirements hereafter:

1. The Owner shall be notified no less than 72 hours prior to and utility interruption.
2. The contractor shall not proceed with any utility interruption without written approval from the Owner. The contractor shall obtain the proper utility shutdown permit for the work being performed.

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART1 - GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Pre-installation meetings.

F. Cutting and patching.

G. Special procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

A. Architect/Engineer will schedule meeting after Notice of Award.

B. Attendance Required: Owner, Architect/Engineer and Contractor.

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of applicable executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
5. Designation of personnel representing parties in Contract and Architect/Engineer.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Coordination of premise access.
9. Procedures for managing off-hours portions of the work.

D. Record minutes and distribute electronic “PDF” versions within (5) five days after meeting to all participants and those affected by decisions made.

1.4 SITE MOBILIZATION MEETING

A. Architect/Engineer will schedule meeting at Project site prior to Contractor occupancy.

B. Attendance Required: Owner, Owner’s representatives and Contractor.

C. Agenda:
1. Use of premises by Owner and Contractor.
2. Use of site premises for project lay down and trailer locations.
3. Owner's requirements and partial occupancy.
4. Construction facilities and controls provided by Owner.
5. Temporary utilities provided by Owner.
6. Security and housekeeping procedures.
7. Application for payment procedures.
8. Procedures for testing.
9. Procedures for maintaining record documents.
10. Requirements for start-up of equipment.
11. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute electronic “PDF” versions within (5) five days after meeting to all participants and those affected by decisions made.

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner and/or Owner’s Representative, Architect/Engineer as appropriate to agenda topics for each meeting.

D. Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress. Reference Section 3.1 below.
3. Field observations, problems, and decisions.
4. Identification of problems impeding planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

E. Record minutes and distribute electronic "PDF" versions within (5) five days after meeting to all participants and those affected by decisions made.

1.6 PRE-INSTALLATION MEETINGS

A. When required in individual specification sections, convene pre-installation meetings at the Project site prior to commencing work of specific section.

B. Require attendance of parties directly affecting, or affected by, Work of specific section.

C. Notify Architect/Engineer five days in advance of meeting date.

D. Prepare agenda and preside at meeting:
1. Review conditions of installation, preparation and installation procedures.
2. Review coordination with related work.

E. Record minutes and distribute electronic "PDF" versions within (5) five days after meeting to all participants and those affected by decisions made.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

1.7 RECORD OF WORK PROGRESS

A. At a minimum, on a bi-weekly basis and at important points in the construction process provide and maintain a photographic record of the work in progress. Provide and maintain a work summary associated with the photographic record. Prepare and have available for review and comment for all progress meetings.

1.8 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:
1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.

3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight exposed elements.
5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and non-conforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products in accordance with requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids in accordance with Section 07 84 00.

J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

K. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

1.9 SPECIAL PROCEDURES

A. Materials: As specified in product sections; match existing with new products for patching and extending work.

B. Employ skilled and experienced installers to perform alteration work.

C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

D. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

E. Remove debris and abandoned items from area and from concealed spaces.

F. Prepare surface and remove surface finishes to permit installation of new work and finishes.

G. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.

H. Remove, cut, and patch Work in manner to minimize damage and to permit restoring products and finishes to original condition.

I. Refinish existing visible surfaces to remain in renovated rooms and spaces, to renewed condition for each material, with neat transition to adjacent finishes.

J. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

K. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect/Engineer for review.

L. Where change of plane of 1/4 inch or more occurs, submit recommendation for providing smooth transition; to Architect/Engineer for review.

M. Trim existing doors to clear new floor finish. Refinish trim to original or specified condition.

N. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.

O. Finish surfaces as specified in individual product sections.

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 - GENERAL

1.1 **SECTION INCLUDES:**

A. Contractor's Responsibilities:
1. Schedule and administer meetings throughout duration of work.
2. Prepare agenda for meetings.
3. Distribute written notice of each meeting seven working days in advance of meeting date.
4. Make physical arrangements for meetings.
5. Preside at meetings.
6. Record the minutes; include all significant proceedings and decisions.
7. Reproduce and distribute copies of minutes within three working days after each meeting.
8. Provide one copy to:
   a. All participants in the meeting, including the Architect.
   b. All parties affected by decisions made at the meeting.

B. Participants:
1. Qualified representative of Contractors, Subcontractors, and Suppliers authorized to act on behalf of the parties they represent.
2. Owner's Representative at their option.

1.2 **PRE-CONSTRUCTION MEETING**

A. Schedule meeting within the early stages of Construction as determined by the General Contractor.

B. Suggested agenda: Prepare written material, distribute lists, and discuss the following:
1. Identification of major Subcontractors and Suppliers
2. Projected construction schedules.
3. Critical work sequencing
4. Major equipment deliveries and priorities
5. Project coordination, including designation of responsible person.
6. Procedures for, and processing of:
   a. Field decisions.
   b. Proposal requests.
   c. Submittals.
   d. Change orders.
   e. Applications for payments.
7. Adequacy of distribution of Contract Documents.
8. Procedures for Maintaining Record Documents
9. Use of premises:
   a. Office, work, and storage areas.
   b. Owner's requirements.
   c. Compliance with applicable CDC Guidelines
10. Construction facilities, construction aids, and controls.
11. Temporary utilities.
12. Safety and first aid procedures.

13. Security procedures.
14. Housekeeping procedures.
15. Working days/hours.

1.3 PROGRESS MEETINGS

A. Schedule regular bi-weekly meetings and as necessary, schedule additional meetings.

B. Suggested Agenda:
1. Review and approval of minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, and conflicts.
4. Problems which impede construction schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedures required to regain projected schedule.
7. Revisions to construction schedule.
8. Plan progress and schedule for succeeding work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
11. Maintenance of quality standards
12. Review proposed changes for:
    a. Effect on construction schedule and on completion date.
    b. Effect on other contracts of the Project.
13. Other business.

1.4 PRE-INSTALLATION

A. When required in individual Specification Section, schedule a pre-installation meeting at the job-site prior to starting the work of the Section.

B. Require attendance of entities directly affecting, or affected by, the work of the Section.

C. Notify Owner’s Project Manager two weeks in advance of meeting date.

END OF SECTION

SECTION 01 32 00

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included:
   1. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Article 3.01 below.
   2. Upon completion of the Work, transfer the recorded changes to a set of Record Documents, as described in Article 3.02 below.

B. Related Work:
   1. Documents affecting the work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Other requirements affecting Project Record Documents may appear in other pertinent Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Architect.

B. Accuracy of Records:
   1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry in required to show the change properly.
   2. Accuracy of records shall be such that future searches for items shown in the Contract Documents may reasonably rely on information obtained from the approved Project Record Documents.

C. Make entries within 24 hours after receipt of information the change has occurred.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 23.

B. Prior to submitting request for final payment, submit the final Project Record Documents to the Architect and secure his approval.

PART 2 - PRODUCTS

2.1 RECORD DOCUMENTS

A. Job set: Promptly following the receipt of the Owner's Notice to Proceed, secure from the Architect at no charge to the Contractor one complete set of all Documents comprising the Contract.

B. Final Record Documents: At a time nearing the completion of the Work, secure from the Architect at no charge to the Contractor one complete set of all Drawings in the Contract.

PART 3 - EXECUTION

3.1 MAINTENANCE OF JOB SET

A. Immediately upon receipt of the job set described in Paragraph 2.01A above, identify each of the Documents with the title "RECORD DOCUMENTS - JOB SET".

B. Preservation:
1. Do not use the Job Set for any purpose except entry of new data and for review by the Architect.
2. Maintain the Job Set at the site of work.

C. Making entries on the Drawings:
1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
2. Date all entries.
3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
4. In the event of overlapping changes, use different colors for overlapping changes.

D. Make entries in the pertinent other Documents as approved by the Architect.

E. Conversion of Schematic Layouts:
1. In some cases on the Drawings, arrangements of conduits, circuits, ducts, and similar items are shown schematically and are not intended to portray precise physical layout.
   a) Final physical arrangement is determined by the Contractor, subject to the Architect's approval.
   b) However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.

2. Show on the Job Set of Record Documents, by dimension, accurate within one inch, the centerline of each run of items such as are described in subparagraph 3.01E.1 above.
   a) Clearly identify the item by accurate note such as "cast iron drain", "galv. water", and the like.
   b) Show, by symbol or note, the vertical location of the item, such as "under slab", "in ceiling", "exposed", and the like.
   c) Make all identification sufficiently descriptive that it may be related reliably to the Specifications.

3. The Architect may waive the requirements for conversion of schematic layouts where, in the Architect's judgment, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Architect.

3.2 FINAL PROJECT RECORD DOCUMENTS

A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the work to proceed without lengthy and expensive site measurement, investigation, and

examination.

B. Approval of recorded data prior to transfer:
   1. Following receipt of the drawings described in Paragraph 2.01B above, and prior to start of transfer of recorded data thereto, secure the Architect's approval of all recorded data.
   2. Make required revisions.

C. Transfer of data to Drawings:
   1. Carefully transfer change data shown on the Job Set of Record Drawings to the corresponding transparencies, coordinating the changes as required.
   2. Clearly indicate at each affected detail and other Drawing a full description of changes made during construction, and actual location of items described in subparagraph 3.01E above.
   3. Call attention to each entry by drawing a "cloud" around the area or areas affected.
   4. Make changes neatly, consistently, and with the proper media to assure longevity and clear reproduction.

D. Transfer data to other Documents:
   1. If the Documents other than the Drawings have been kept clean during the progress of the Work, and if entries thereon have been orderly to the approval of the Architect, the job set of those Documents other than Drawings will be accepted as final Record Documents.
   2. If any such Document is not so approved by the Architect, secure a new copy of that Document from the Architect at the Architect's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the approval of the Architect.

E. Review and Submittal:
   1. Submit the completed set of Project Record Documents to the Architect as described in Paragraph 1.03D above.
   2. Participate in review meetings as required.
   3. Make required changes and promptly deliver the final Project Record Documents to the Architect. The Architect will be responsible for delivering a copy of record documents to the Owner's Project Manager.

3.3 CHANGES SUBSEQUENT TO ACCEPTANCE

A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

END OF SECTION

SECTION 01 33 23

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. Refer to paragraphs 1.2.12, and 4.2 and 3.12 of the General Conditions.

B. In the event of conflict between requirements of the General Conditions and this Section covering shop drawings, product data and samples, the requirements of Section 01 33 23 shall govern. Unaltered provisions remain in effect.

1.2 DESCRIPTION

A. Submit to the Architect shop drawings, product data and samples required by specification sections.

B. Prepare and submit the Construction Schedule, a separate schedule listing dates for submission and dates reviewed shop drawings, product data and samples will be needed for each product.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

A. Submit one full sized “PDF” electronic copy of each drawing of certain trade shop drawings requested by Architect. Include fabrication, erection, layout and setting drawings and other such drawings as required under various sections of the specifications until final approval is obtained. Reproduction of Contract Drawings will not be used for Shop Drawings.

B. Date and mark shop drawings to show name of the Project, the Architect, Contractor, originating Subcontractor, Manufacturer or Supplier, and separate details as pertinent.

C. Completely identify on shop drawings specification section and locations at which materials or equipment are to be installed.

2.2 PRODUCT DATA

A. Submit sufficient copies of manufacturer’s descriptive data including catalog sheets for materials, equipment and fixtures, showing dimensions, performance characteristics and capacities, wiring diagram and controls, schedule and other pertinent information as required. Provide in “PDF” electronic format when available.

B. Submit brochures and other submittal data in “PDF” electric format allowing electronic distribution and reproduction. Mark product data to show the name of the Project, Architect, Contractor, originating Subcontractor, Manufacturer or Supplier, and separate details if pertinent.

C. Completely identify on product data specification section and location at which materials or equipment are to be installed.

D. Clearly mark to show pertinent data applicable to the Project.

2.3 SAMPLES

A. Submit physical examples of materials in duplicate when required by specification sections to illustrate materials, workmanship or to establish standards by which completed work shall be judged.

B. Date samples and mark to show the name of the project, Architect, Contractor, originating Subcontractor, Manufacturer or Supplier and separate details if pertinent.

C. Completely identify on samples specification section and location in which materials or equipment are to be installed.

2.4 CONTRACTOR RESPONSIBILITIES

A. Review shop drawings, product data and samples prior to submission to the Architect.

B. Include on submittals the Contractor's stamp, initialed or signed, certifying review of submittals, verification of field dimensions and compliance with Contract Documents. Shop drawings, product data and samples not so stamped, and checked and approved by the Contractor will not be reviewed by the Architect, but will be returned to the Contractor. Shop drawings stamped and signed as approved by the Contractor but showing evidence that they have not been carefully checked by the Contractor may be returned to the Contractor to be re-checked and re-submitted to the Architect.

2.5 SUBSTITUTIONS

A. Approval required:
1. The Contract is based on the standards of quality established in the Contract Documents.
2. All products proposed for use, including those specified by required attributes and performance, require approval by the Architect before being incorporated into the Work.
3. Do not substitute materials, equipment or methods unless such substitution has been specifically approved for this Work by the Architect.
4. Product substitutions shall only be considered as outlined within the review process of specification section 01 00 00 Basic Requirements 1.60 Substitutions. Substitutions will not be considered at any time during the submittal process of the project and will be immediately rejected.

B. "Or equal":
1. Where the phrase "or equal" or "or equal as approved by the Architect" occurs in the Contract Documents, do not assume that materials, equipment or methods will be approved as equal unless the items have been specifically approved for this Work by the Architect.
2. Substitutions shall be judged against the specified item for quality, durability, operation, appearance, and other applicable qualities including fitness for use in this situation. The decision of the Architect is final.

PART 3 - EXECUTION

3.1 SUBMISSION REQUIREMENTS

A. Schedule submissions at least two weeks before date reviewed submittals will be needed.

B. Accompany submittals with transmittal letters containing the date, project title, Contractor's name and address, number of each shop drawing, product data and samples submitted, and notification of deviation from Contract Documents.

1. Material Safety Data Sheet

   Contractor shall furnish to the Architect, for review, for (4) four copies of Material Safety Data Sheets (MSDS) for all products as specified or required. Allow ample time for Architect's comment and review.

   Do not install products until confirmation of review is obtained.

   MSDS copies should be included at the same submittal with shop drawings or product submittal. The following products must include the MSDS copy with the shop drawing or submittal:

   a. Mechanical Insulation
   b. Mastic or Adhesive
   c. Ceiling Tiles or other Composite Materials
   d. Sealants or Caulking
   e. Materials containing or releasing volatile organic compounds (VOC's)
   f. Paints, Varnishes, Stains or other similar coatings

   - The Contractor shall maintain (1) one full set of Material Safety Data Sheets at ready access on site through out the constructions duration.

2. Flame Spread Certificates

   Contractor shall furnish to the Architect, for review, four (4) copies of Flame Spread Certificates for all products as specified or required.

   Allow ample time for Architect's comment and review.

   Do not install products until confirmation of review is obtained.

   Flame Spread Certificate copies should be included within the same submittal with shop drawings or product submittal.

3.2 RESUBMISSION REQUIREMENTS

A. Shop Drawings: Revise initial drawings as required and resubmit as specified for initial submittals. Clearly identify on drawings any changes which have been made other than those requested by the Architect.

B. Product Data and Samples: Submit new datum and samples as required for initial submittal.

3.3 DISTRIBUTION OF SHOP DRAWINGS AND SUBMITTALS

A. Contractor is still responsible for obtaining and distributing prints of shop drawings as necessary after as well as before final approval and for coordination of submittals between his subcontractors and suppliers.

B. Make prints of approved shop drawings from sepia transparencies which carry the Architect's appropriate stamp.

C. The cost of printing sepias and prints is the responsibility of the Contractor.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide temporary facilities and controls needed for the work including, but not necessarily limited to:
   1. Temporary utilities such as heat, water, electricity, and telephone;
   2. Sanitary facilities;
   3. Enclosures such as tarpaulins, barricades, and canopies;
   4. Fire protective measures;
   5. Staging and scaffolding.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Except that equipment furnished by subcontractors shall comply with requirements of pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the work are not part of this Section.
   3. Permanent installation and hookup of the various utility lines are described in other Sections.

1.2 PRODUCT HANDLING

A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

PART 2 - PRODUCTS

2.1 UTILITIES

A. Temporary Toilet Facilities
   1. Provide suitable toilet facilities, conforming to all code requirements, for use by his staff, representatives of the Owner and the Architect, and for all workmen on the job. Keep in neat and sanitary condition and provide reasonable heat during the winter months.

B. Temporary Services
   1. Water:
      a. Coordinate access to onsite services water with owner’s facilities staff.
      b. Make all connections, furnish and install all pipes and fittings, including meter, and remove all temporary materials when this service is no longer required.
      c. Use due care to prevent waste of water, maintain in perfect condition at all times; pipes, hoses, valves, and connections.
      d. Provide adequate drinking water satisfactorily cooled for all workmen on the job; water units shall be strategically located throughout the job.

   2. Temporary Electricity:

a. Make arrangements with owner for temporary electric service, pay expenses in connection with installation and removal thereof.
b. Temporary equipment and wiring for power and lighting shall be in accordance with applicable provisions of governing codes. Temporary wiring shall be maintained in safe manner and utilized so as not to constitute a hazard to persons or property.
c. When permanent electrical power and lighting systems are in operating condition, they may be used for temporary power lighting for construction purposes, provided that Contractor obtains written approval of Architect and Owner, assumed full responsibility for entire power and lighting systems, and pays costs for operation and restoration of systems.
d. At completion of construction work or at such time as Contractor makes use of permanent electrical installation, temporary wiring, lighting and other temporary electrical equipment and devices shall be properly removed by Contractor.

2.2 STAGING AND SCAFFOLDING

A. Furnish, erect, and maintain all staging and scaffolding (exterior and interior) eight (8) feet or over in height for all trades for such use. Furnish, erect and maintain all staging and scaffolding (exterior and interior) for his own use during construction of the building. Staging and scaffolding shall be of approved design, erected and removed by experienced stage builders and shall have all accident prevention devices required by Federal, State, and Local Laws.

B. Erect such staging and scaffolding in sufficient time and in proper sequence so as not to delay work. Subcontractors shall schedule and commence their work so that building progress is not delayed or obstructed once staging and scaffolding come available.

C. Each Subcontractor entering upon the work shall furnish, erect, and maintain all staging and scaffolding under 8 feet in height required for work under his subcontract, and where so indicated all other staging and scaffolding required for his work. On completion of his work, each Subcontractor shall dismantle and remove such staging and scaffolding.

D. Erection of all staging, scaffolding, rigging, etc., shall be supervised and directed by a Licensed Rigger and inspected by a Registered Engineer. A certified affidavit shall be submitted to the Architect by this Engineer stating that all staging, scaffolding, rigging, etc., has been safely erected and conforms in all respects to State and Local Codes. The General Contractor shall pay for all services in connection with the erection and inspection of all staging, scaffolding, and rigging, etc.

E. Above facilities shall be constructed and maintained in accordance with applicable requirements of "American Standard Safety Code of Building and Construction", published by USASI, and be removed after they have served their purpose or when directed by Architect.

F. Permanent stairs shall be erected as soon as possible and Contractor shall provide suitable temporary treads, risers, etc., as required to protect permanent stair members, and provide temporary railing as required for safety.

2.3 TEMPORARY STRUCTURES

A. The Contractor and Subcontractor shall construct and maintain, in locations approved by the Architect, all temporary structures, sheds, and similar needs for the storing of their respective materials for the duration of the Contract. The GC shall provide appropriate storage containers as required to properly store and contain project materials. The GC shall further provide (1) additional full sized storage container for dedicated use by the Owner

throughout the construction process.

B. All temporary structures shall be of substantial construction and weather tight. Temporary structures shall be removed from site when no longer needed by the Contractor or trade responsible for their erection.

PART 3 - EXECUTION

3.1 FIRE PROTECTIVE MEASURES

A. The Contractor shall maintain a rubbish-free building and building site, and shall provide metal barrels into which all luncheon refuse shall be deposited. All such barrels shall have tight-fitting covers.

B. Store materials so they do not create natural pockets for papers or other combustible materials.

C. Construction debris shall not be thrown from the windows of the building but shall be removed through tight strong chutes, and all debris shall be wet down if necessary, or as directed by Architect.

D. When building materials with combustible contents are stored in the building during construction, they shall be located within easy reach of fire protection equipment.

E. An approved number of fire extinguishers shall be placed throughout work areas, temporary paint shop and within easy reach of mechanics who are operating plumber's furnaces, burning or welding apparatus. The number and location shall be approved from time to time by the local fire department.

F. It shall be the duty and responsibility of the General Contractor or any subcontractor performing any cutting or welding, to comply with the safety provisions of the national Fire Protection Association's "National Fire Codes" pertaining to such work and the respective contractor shall be responsible for all damages resulting from a failure to do so comply.

G. The contractor shall provide a continuous fire watch during any and all instances when the existing fire protection systems are down and non-functioning. Coordinate requirements and monitoring with owner.

3.2 POLICE, FIREMEN AND INSPECTORS

A. Any police officer, fireman or inspector required by the local authorities having jurisdiction over the work, shall be employed by the Contractor and paid the standard rate or wage for the respective occupation of the work area. All personnel employed shall be covered by Workman's Compensation and Employer's Liability Insurance by the Contractor.

3.3 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the work.

B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Architect.

END OF SECTION

SECTION 01 56 00

TEMPORARY BARRIERS, ENCLOSURES & EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide temporary facilities and controls needed for the work including, but not necessarily limited to:
   1. Enclosures such as tarpaulins, barricades, and canopies
   2. Fire protective measures
   3. Staging and scaffolding
   4. Air Filtration & exhaust
   5. Noise control
   6. Protection of patients & staff from construction dust and debris

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Equipment furnished by subcontractors shall comply with requirements of pertinent safety regulations. Such equipment normally furnished by the individual trades, in execution of their own portions of the work, are not part of this Section.
   3. Permanent installation and hookup of the various utility lines are described in other Sections.

1.2 PRODUCT HANDLING

A. Maintain temporary equipment and controls in proper, tight and safe condition throughout progress of the work.

PART 2 - PRODUCTS

2.1 UTILITIES

A. Temporary Services
   1. Water:
      a) Do not cut or otherwise disturb existing potable or process water lines during operating hours and without the consent of the owner's facilities staff.
      b) Use due care to prevent water waste, maintain pipes, hoses, valves and connections in perfect condition at all times.

2.2 STAGING AND SCAFFOLDING

A. Furnish, erect, and maintain all staging and scaffolding (exterior and interior) eight (8) feet or over in height for all trades for such use. Staging and scaffolding shall be of approved design, erected and removed by experienced stage builders and shall have all accident prevention devices required by Federal, State, and Local Laws.

B. Erect such staging and scaffolding in sufficient time and in proper sequence so as not to delay work. Subcontractors shall schedule and commence their work so that building progress is not delayed or obstructed once staging and scaffolding become available.

C. Each Subcontractor shall furnish, erect, and maintain all staging and scaffolding, under 8 feet in height, required for work under his subcontract. On completion of his work, each Subcontractor shall dismantle and remove such staging and scaffolding.

D. Erection of all staging, scaffolding, rigging, etc., shall be supervised and directed by a Licensed Rigger and inspected by a Registered Engineer. A certified affidavit shall be submitted to the Architect by this Engineer stating all staging, scaffolding, rigging, etc., has been safely erected and conforms in all respects to State and Local Codes. The General Contractor shall pay for all services in connection with the erection and inspection of all staging, scaffolding, and rigging, etc.

E. Staging and scaffolding shall be constructed and maintained in accordance with applicable requirements of "American Standard Safety Code of Building and Construction", published by USASI, and be removed after they have served their purpose or when directed by Architect.

F. Permanent stairs shall be erected as soon as possible; General Contractor shall provide suitable temporary treads, risers, etc., as required, to protect permanent stair members, and provide temporary railing as required for safety.

2.3 TEMPORARY STRUCTURES & BARRIERS

A. The Contractor and Subcontractor shall construct and maintain, in locations approved by the Architect, all temporary structures, sheds, and similar needs for the storing of their respective materials for the duration of the Contract.

B. All exterior temporary structures shall be of substantial construction and weather tight. Temporary structures shall be removed from site when no longer needed by the Contractor or trade responsible for their erection.

C. Construct temporary barriers to separate the construction area from areas occupied by patients or staff. Barrier placement shall be coordinated with owner's staff such as to avoid disrupting and interfering with the normal operations.

D. Interior temporary barriers shall consist of a minimum of 2.5" metal studs @ 24" o.c. covered with ½" gypsum drywall on both sides, and covered with 6 mil plastic on the construction activity side.

E. Interior temporary barriers shall run continuously from floor to the underside of structural deck above, and be sealed against the passage of air borne dust or contaminants.

F. Location of temporary barriers shall in no way impede means of egress and shall be so located as to minimize impacts to space functionality.

2.4 HVAC SYSTEM

A. HVAC system(s) servicing the work zone shall be temporary isolated and restricted as follows:

1. Return air grilles within the work zone shall be sealed and or relocated outside the work zone to prevent mold, dust and debris from entering the HVAC System.

2. Adjust the supply air diffusers; air volume (CFM) within the work zone to achieve a negative space pressure incorporating the 4 air charges per hour exhaust rate.
3. At the completion of the work all adjustments made shall be restored to their previous conditions.

2.5 EXHAUST

A. Provide and install temporary exhaust system to maintain negative pressure within the work zone during times of construction. The system design shall include but not limited to the following:
1. Size and select an exhaust fan for a minimum of 4 air charges per hour.
2. Locate fan on the exterior of building to eliminate high-pressure ductwork within the building.
3. Exhaust discharge to atmosphere shall maintain a 20-foot radius from fresh air intakes, operable windows and public meeting areas.
4. Install airflow-monitoring devices within the work zone to verify negative pressure and airflow to that of adjacent areas; device equal to a magnehelic gauge with pressure range from 0 to 0.25 (inches water gauge)
5. Install low pressure flex duct to inlet of exhaust fan.
6. Provide HEPA filters at the fan discharge if item 3 above cannot be achieved.

PART 3 - EXECUTION

3.1 DUST CONTROL MEASURES

A. Prior to commencement of any construction activity, the Owner's Project Manager shall convene a team with the Contractor, Sub Contractors, and Architect to conduct an infection control risk assessment.

B. This risk assessment shall include the assumption that demolition activities will dislodge mold spores into the air. Temporary barriers, filters and exhausts shall be implemented to prevent mold dust from reaching occupied areas.

C. Prior to commencing demolition or construction activities in an occupied clinic, erect substantial dust tight temporary partitions to isolate the construction area from the occupied spaces.

D. Prior to commencement of demolition or construction activities, install exhaust fans to the exterior, capable of keeping the construction area under negative pressure. If it is not feasible to exhaust to the exterior, install HEPA filters before the air is returned to the HVAC system.

E. Cover all return air grilles in the construction area with an airtight barrier of plastic sheet or similar material.

F. Cover all fire detection and fire alarm devices in the construction area with airtight plastic during construction activity. Uncover such devices at night, or when construction activities are not in progress.

G. Provide Protect Tacky Mats, or equal at all openings connecting the construction area with occupied spaces.

3.2 FIRE PROTECTIVE MEASURES

A. The Contractor shall maintain a rubbish-free building and building site, and shall provide metal barrels into which all luncheon refuse shall be deposited. All such barrels shall have tight-fitting covers.

B. Store materials so they do not create natural pockets for papers or other combustible materials.

C. Construction debris shall not be thrown from the windows of the building but shall be removed through tight, strong chutes, and all debris shall be wet down if necessary, or as directed by Architect.

D. When building materials with combustible contents are stored in the building during construction, they shall be located within easy reach of fire protection equipment.

E. An approved number of fire extinguishers shall be placed throughout work areas, temporary paint shop and within easy reach of mechanics who are operating plumber's furnaces, burning or welding apparatus. The number and location shall be approved by the local fire department.

F. It shall be the duty and responsibility of the General Contractor or any subcontractor performing any cutting or welding, to comply with the safety provisions of the National Fire Protection Association's "National Fire Codes" pertaining to such work and the respective contractor shall be responsible for all damages resulting from a failure to comply.

3.3 POLICE, FIREMEN AND INSPECTORS

A. Any police officer, fireman or inspector required by the local authorities having jurisdiction over the work, shall be employed by the Contractor, and paid the standard rate or wage for the respective occupation of the work area. All personnel employed shall be covered by Workman's Compensation and Employer's Liability Insurance by the Contractor.

3.4 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the work.

B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Architect.

END OF SECTION

SECTION 01 66 00

PRODUCT HANDLING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

B. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Additional procedures also may be prescribed in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURERS' RECOMMENDATIONS

A. Except as otherwise approved by the Architect and Owner, determine and comply with manufacturers' recommendations on product handling, storage and protection.

1.4 PACKAGING

A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
   1. Maintain packaged materials with seals unbroken and labels intact until time of use.
   2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

B. The Owner may reject as non-complying such material and products that do not bear identification satisfactory to the Owner as to manufacturer, grade, quality and other pertinent information.

1.5 PROTECTION

A. Every precaution shall be taken to see that all building materials and equipment of all descriptions and parts of the building under construction are properly braced and secured, protected from injury by water, fire, accident, weather or other cause; both during work hours and non-working hours.

B. Furnish, erect and maintain exterior barricades, fences and all other safety protection measures required by traffic, municipal and state safety regulation. Remove all enclosures when no longer needed.

C. All damage to materials shall be replaced at no cost to the Owner.

D. Temporary wood doors with self-closing hardware and padlocks shall be provided for exterior entrances and elsewhere as required.

E. Provide protection for all concrete and finished floors, treads, platforms and the like against mechanical damage, oil, grease, paint and other material which will stain the floor finish. Install and maintain adequate strips of Polyethylene laminated to sisal reinforced paper on finished floors where further work will be done by trades or where subject to traffic.

F. After the installation of work by a given Subcontractor is properly completed, the Contractor shall be responsible for protection and for repair, replacement or cleaning should the subject work be damaged by other trades or by any other cause. All work shall be in perfect condition at the time of final acceptance of the project.

G. Keep all access roads, walks and common corridors clear of construction equipment, materials, debris and all other items. Repair all work disturbed by construction operation and leave in as good or better condition after completion as found before new work started.

H. Protect everything on the premises from injury by water, frost, wind, fire, accident of other cause and any interference.

I. Provide ways and means to control the flow of water from every source, which may cause inconvenience or damage during the building operation.

J. All temporary protection and coverage shall be removed at the completion of the work.

1.6 REPAIRS AND REPLACEMENTS

A. In event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the Owner.

B. Additional time required to secure replacements and to make repairs will not be considered by the Owner to justify an extension in the Contract Time of Completion.

1.7 BROKEN GLASS

A. The Contractor shall be responsible for all broken, scratched and cracked glass, regardless of cause and no matter by whom damaged, from the time construction has begun until the project is accepted by the Owner. He shall replace all damaged glass and deliver the entire job with all glazing intact and clean.

END OF SECTION

SECTION 01 70 00

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide an orderly and efficient transfer of the completed Work to the Owner.

B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Activities relative to Contract closeout are described in, but not necessarily limited to, Paragraphs 9.8, 9.9, and 9.10 of the General Conditions.
3. "Substantial Completion" is defined in Paragraph 9.8.1 of the General Conditions.

1.2 QUALITY ASSURANCE

A. Prior to requesting inspection by the Owner, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.

1.3 PROCEDURES

A. Substantial Completion:
1. Prepare and submit the punch list required by the first sentence of Paragraph 9.8.2 of the General Conditions.
2. Within a reasonable time after receipt of the list, the Owner will inspect to determine status of completion.
3. Should the Owner determine that the Work is not substantially complete:
   a) The Owner promptly will so notify the Contractor, in writing, giving the reasons therefore.
   b) Contractor shall remedy the deficiencies promptly, and notify the Owner when ready for reinspection.
   c) The Owner will reinspect the Work.

4. When the Owner concurs that the Work is substantially complete:
   a) The Architect will prepare a "Certificate of Substantial Completion" on AIA Form G704, accompanied by the Contractor's list of items to be completed or corrected, as verified by the Owner.
   b) The Architect will submit the Certificate to the Owner and to the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

B. Final Completion:
1. Prepare and submit the notice required by the first sentence of paragraph 9.10.1 of the General Conditions.
2. Verify that the Work is complete including, but not necessarily limited to, the items mentioned in Paragraph 9.10.2 of the General Conditions.
3. Certify that:
   a) Contract Documents have been reviewed;

b) Work has been inspected for compliance with the Contract Documents;
c) Work has been completed in accordance with the Contract Documents;
d) Equipment and systems have been tested as required, and are operational;
e) Work is completed and ready for final inspection.

4. If the Contractor is not complete for any of the above requested inspections, the Contractor shall bear the cost of any subsequent inspections to examine the work not complete at previously requested inspections. Costs due Fresenius Medical Care, Inc. will include any travel costs and related direct hourly costs from the Architect, Project Manager, Chief Technician and Administrator.
5. The Owner will make an inspection to verify status of completion.
6. Should the Owner determine that the Work is incomplete or defective:
   a) The Owner promptly will so notify the Contractor, in writing, listing the incomplete or defective work.
   b) Contractor shall remedy the deficiencies promptly, and notify the Owner when ready for reinspection.

7. When the Owner determines that the work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals.

C. Closeout submittals include, but are not necessarily limited to:
1. Project Record Documents described in Section 01 32 00;
2. Complete operation and maintenance manuals, and data for items so listed in pertinent other Sections of these Specifications, and for other items when so directed by the Owner; Two copies of these documents shall be submitted on CD in electronic (PDF) format.
3. Warranties and bonds; Submit one project binder containing all warranty documentation for all materials utilized for the project.
5. Evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to:
   a) Certificates of Inspection;
   b) Certificates of Occupancy;
6. Certificates of Insurance for products and completed operations;
7. Evidence of payment and release of liens (see Lien Release Form at the end of this Section);
8. List of Subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends and holidays.
9. Project data catalog sheets and shop drawing approved and returned by architect described in section 01 33 23.
10. Item numbers 2, 3, 6, 7, 8, 9 and 10 above shall be tabulated and bound into one (1) three ring binder with the project name firmly affixed to the binder spline. Note; Two (2) total bound binders due at end of project.

D. Final adjustment of accounts:
1. Submit a final statement of accounting to the Owner, showing all adjustments to the Contract Sum.
2. If so required, the Owner will prepare a final Change Order showing adjustments to the Contract Sum which were not made previously by Change orders.

1.2 INSTRUCTION

A. Provide training and introduction for the Owner's personnel in proper operation and maintenance of all systems and equipment, after acceptance of Operation and Maintenance Manual. Provide at the Final Completion walkthrough a schedule of such training, allowing the following time periods:

Various systems and system facilities tie-in related to the general space operation and equipment use – 1-hour.

It is intended for all system to be reviewed with owner's personnel on one complete day prior to the opening and operation of the facility.

CONDITIONAL AFFIDAVIT AND WAIVER OF LIEN

STATE OF: _____

COUNTY OF: _____

_____, being duly sworn upon his oath, deposed and says:

That he makes this Affidavit on behalf of _____ having heretofore entered into an Agreement with Northern Utilities, Inc. for_____ in connection with _____located at _____ _____, that all labor, materials, and services committed for have been fully paid and indebtedness discharged to date of this Affidavit.

Upon receipt of the outstanding balance of the contract in the sum of _____ Dollars ($_____) the undersigned does hereby waive, release and relinquish all rights of lien which the undersigned may now have upon the premises above described for labor and material, general supervision, of construction of alterations and/or otherwise.

FURTHERMORE, the undersigned will hold Northern Utilities, Inc. harmless, and pay any judgments or settlements, resulting from lien(s) filed by any supplier of materials or labor in connection with the above referenced project.

_____
COMPANY

By: _____

SUBSCRIBED IN MY PRESENCE AND SWORN TO BEFORE ME THIS _____ day of _____ _____, 20_____.

_____
Notary Public

My commission expires:

END OF SECTION

SECTION 01 74 13

CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Throughout the construction period, maintain the building, work area and site in a standard of cleanliness as described in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.

B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

A. General:
   1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
   2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
   3. Once per day, and more often if necessary and required by the Owner, completely remove all scrap, debris, and waste material from the job site.
   4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

B. Site:
1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of subparagraph 3.01-A-1 above.
3. Maintain the site in a neat and orderly condition at all times.

C. Structures:
1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
   a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
   a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Owner, may be injurious to the finish floor material.
5. For work performed on continuously operated facilities, premises shall be cleaned on a daily basis and more often as necessary in order to maintain premises free of dust. In these instances clean shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand held wet mop.

3.2 FINAL CLEANING

A. "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.01 above.

C. Site:
1. Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site.
2. Completely remove the resultant debris.

D. Structures:
1. Exterior:
   a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
   b. Remove all traces of splashed materials from adjacent surfaces.
   c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
   d. In the event of stubborn stains not removable with water, the Owner may require light sandblasting or other cleaning at no additional cost to the

Owner.

E. Schedule final cleaning as approved by the Owner. Provide to the Owner a completely cleaned limit of work area.

3.3 CLEANING DURING OWNER'S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Owner in accordance with the General Conditions of the Contract.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for salvaging, recycling and disposing of construction waste.

1.2 RELATED SECTIONS

A. Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS:
   1. Environmental-protection measures during construction.

B. Section 02 41 19 – SELECTIVE DEMOLITION:
   1. Demolition and selective demolition activities.

1.3 DEFINITIONS

A. Asphalt Pavement, Brick, and Concrete (ABC) Rubble: Rubble that contains only weathered (cured) asphalt pavement, clay bricks and attached mortar normally used in construction, or concrete that may contain rebar. The rubble shall not be mixed with, or contaminated by, another waste or debris.

B. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

C. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

D. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

E. Recycle: Diversion of demolition and construction waste from the landfill for reuse.

F. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

G. Salvage for Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

A. General: Develop waste management plan to meet requirements of authority having jurisdiction and that results in end-of-Project rates for salvage/recycling of 75 percent by weight of total waste generated by the Work.

B. Salvage/Recycle Requirements: Salvage and recycle as much non-hazardous demolition and construction waste as possible including the following materials:

1. Demolition Waste:
   a. Concrete and concrete reinforcing steel.
   b. Brick and concrete masonry units.
   c. Wood studs, wood joists, plywood, oriented strand board, paneling and trim.
   d. Structural steel, miscellaneous steel and rough hardware.
   e. Roofing.
   f. Insulation.
   g. Metal studs.
   h. Gypsum board (new unpainted scrap).
   i. Acoustical tile and panels.
   j. Equipment.
   k. Plumbing fixtures, piping, supports, hangers, valves and sprinklers.
   l. Mechanical equipment and refrigerants.
   m. Electrical conduit, copper wiring, lighting fixtures, lamps, and ballasts.

2. Construction Waste:
   a. Concrete and concrete reinforcing steel.
   b. Masonry and CMU.
   c. Lumber, wood sheet materials and wood trim.
   d. Metals.
   e. Roofing.
   f. Insulation.
   g. Gypsum board.
   h. Piping.
   i. Wire and cable
   j. Electrical conduit.
   k. Packaging: 100 percent of the following uncontaminated packaging materials: Paper, cardboard, boxes, plastic sheet and film, polystyrene packaging, wood crates, plastic pails.

C. In the event the Contractor encounters previously unidentified material that is reasonably believed to be hazardous, asbestos containing, coated with lead-based paint, or oily debris, the Contractor shall immediately stop work in the affected area and report the condition to the Architect. At no time shall such material be handled or disposed of by the Contractor. The Contractor agrees to cooperate with the Owner and any consultants engaged by Owner to perform services with respect to the analysis, detection, removal, containment, treatment and disposal of such regulated materials.

1.5 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: LEED Accredited Professional by U.S. Green Building Council, or three years documented experience with construction waste management activities.

B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program, using recycling/recovery equipment that has a current EPA Registration.

C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Waste Management Conference: Conduct conference at Project site. Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.
6. Provide recycling education and recycling information to Contractor and subcontractor employees working on the project.

1.6 WASTE MANAGEMENT PLAN

A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. Indicate quantities by weight throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
   1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
   2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
   3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
   4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
   5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
   6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
   1. Total quantity of waste.
   2. Estimated cost of disposal (cost per ton). Include hauling and tipping fees and rental cost of collection containers for each type of waste.
   3. Total cost of disposal (with no waste management).
   4. Revenue from salvaged materials.
   5. Revenue from recycled materials.
   6. Savings in hauling and tipping fees by donating materials.
   7. Savings in hauling and tipping fees that are avoided.
   8. Handling and transportation costs. Include cost of collection containers for each type of waste.

9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by the Owner. Provide containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
3. Provide recycling education for all workers, subcontractors and suppliers engaged in on-site activities.
4. Distribute recycling educational literature.
5. Provide appropriate recycling signage for containers and workspaces.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with project requirements for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:
1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Sale not permitted on Project site. Labor for loading donated items acceptable to local trade practices; union labor if applicable.

C. Salvaged Items for Owner's Use:
1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.

3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area off-site.
5. Protect items from damage during transport and storage.

D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to the Owner

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical. For waste which cannot be separated at Project site, co-mingle only with waste which is to be separated later at a recycling facility. Contamination of recycling containers with trash or other contaminants is subject to a penalty of $750.00 per container, payable to the Owner.
1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

D. On-site crushing of asphalt pavement, brick, and concrete (ABC) rubble is not allowed. All ABC waste must be transported off-site to an asphalt batching plant or to an ABC crushing or recycling operation that has been sited and permitted for that purpose.

3.4 RECYCLING DEMOLITION WASTE

A. Concrete: Deposit all debris in designated container to be transported to approved aggregate recycling facility to be crushed and screened for use as satisfactory soil for fill or sub-base.

B. Masonry: Deposit all masonry debris in designated container to be transported to approved aggregate recycling facility to be. crushed and screened for use as satisfactory soil for general fill or satisfactory soil for fill or sub-base. Clean and stack undamaged whole masonry units on wood pallets for reuse.

C. Wood Materials: Sort and stack salvageable members according to size, type, and length. Separate lumber waste and deposit into appropriate container. Separate engineered wood products, panel products, and treated wood materials into designated containers.

D. Metals: Separate metals by type if practical. Stack salvageable structural steel members according to size, type of member, and length.

E. Gypsum Board: Deposit clean gypsum scrap into appropriate containers. Protect from weather. Remove edge trim and sort with other metals. Remove and dispose of fasteners and other contaminants.

F. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets, stretch wrap and store in a dry location. Separate suspension system, trim, and other metals from panels and tile and sort with other metals.

G. Plumbing Fixtures: Separate by type and size fixtures suitable for reuse. Deposit all other fixtures into designated containers by material type to be transported to approved recycling facility.

H. Piping: Separate piping materials by material composition. Deposit in designated containers. Separate supports, hangers, valves, sprinklers, and other components by material type and deposit in designated containers for transport to approved recycling facility.

I. Lighting Fixtures: Separate lamps by type and protect from breakage.

J. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

K. Conduit: Deposit conduit and fittings into designated container.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:
1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Site-Clearing Wastes: Chip brush, branches, and trees on-site.

C. Concrete: Deposit all debris in designated container to be transported to approved aggregate recycling facility to be crushed and screened for use as satisfactory soil for fill or sub-base.

D. Masonry: Deposit all masonry debris in designated container to be transported to approved aggregate recycling facility to be. Crushed and screened for use as satisfactory soil for general fill or satisfactory soil for fill or sub-base. Clean and stack undamaged whole masonry units on wood pallets for reuse.

E. Metals: Separate metals by material type if practical. Stack salvageable structural steel members according to size, type of member, and length.

F. Wood Materials:
1. Clean Cut-Offs of Lumber: Deposit into designated clean wood container to be transported to designate recycling facility for use as mulch or bio-fuel.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

G. Clean Gypsum Board: Deposit scraps of clean gypsum board into designated container protected from weather and transport to appropriate gypsum recycling facility to be processed into new gypsum board.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
   1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   3. For solid waste disposal facilities, dispose of materials only in facilities which currently comply with applicable local regulations.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off the property and legally dispose of waste materials.

END OF SECTION

Division 2

Sitework

Refer to Civil Drawings

Division 3

Concrete

Division 4

Masonry

SECTION 04 05 03

MASONRY MORTAR AND GROUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

A. Mortar and grout for masonry.

1.3 SUBMITTALS

A. Samples: Submit two samples of mortar, illustrating mortar color and color range.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 and ACI 530.1, and TMS MSJC Code and Specifications.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Hot and Cold Weather Requirements: Comply with ACI 530.1/TMS 602.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement: ASTM C150, Type I gray color, low alkali content.

B. Mortar Aggregate: ASTM C144, standard masonry type, washed sand.

C. Hydrated Lime: ASTM C207, Type S.

D. Mortar Color: Mineral oxide pigment color as follows:
1. Color as selected by Architect from manufacturer’s complete line of color options.

E. Grout Aggregate: ASTM C404.

F. Water: Clean and potable, salt free.

G. Bonding Agent: Epoxy type.

H. Prism Strength: Type S Mortar – 1,800 psi.

2.2 MORTAR MIXES

A. Mortar for Load Bearing Walls and Partitions: ASTM C270, Type M using the Property Method.

B. Mortar for Reinforced Masonry: ASTM C270, Type S using the Property Method.

2.3 MORTAR MIXING

A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270.

B. Add mortar color in accordance with manufacturer's instructions.

C. Do not use anti-freeze compounds to lower the freezing point of mortar. The use of calcium chloride is strictly prohibited.

D. Mortar preparation shall be per admixture manufacturer’s standard recommendations.

2.4 GROUT MIXES

A. Bond Beams, Engineered Masonry: 3,000 psi strength at 28 days; 8-10 inches slump; premixed type in accordance with ASTM C94 .

2.5 GROUT MIXING

A. Mix grout in accordance with ASTM C94.

B. Do not use anti-freeze compounds to lower the freezing point of grout.

2.6 MIX TESTS

A. Testing of Mortar Mix: In accordance with ASTM C780.

B. Testing of Grout Mix: In accordance with ASTM C1019.

2.7 MORTARS, GROUTS Recycled Content

A. Portland Cement:
   1. Fly Ash: Comply with ASTM C593.
      a. Recycled Content: Minimum **10** percent post-consumer recycled content, or minimum **40** percent pre-consumer recycled content at contractor’s option.

   2. Slag: Comply with ASTM C989; Grade **100**.
      a. Recycled Content: Minimum **10** percent post-consumer recycled content, or minimum **40** percent pre-consumer recycled content at contractor’s option.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install mortar in accordance with TMS MSJC Specifications.

B. Work grout into masonry cores and cavities to eliminate voids. Do not displace reinforcement.

3.2 SCHEDULES

A. Concrete Masonry Unit Assemblies: Type S mortar, in colors as scheduled.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes concrete masonry units and reinforcement, anchorage, and accessories.

B. Allowances: Not used.

1.2 SUBMITTALS

A. Product Data: Submit masonry units and fabricated wire reinforcement, wall ties, anchors and other accessories.

B. Samples: Submit two samples of masonry units to illustrate color, texture and extremes of color range.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with MSJC Code (ACI 530/ASCE 5/TMS 402) and MSJC Specification (ACI 530.1/ASCE 6/TMS 602).

1.4 ENVIRONMENTAL REQUIREMENTS

A. Hot and Cold Weather Requirements: MSJC Specification.

PART 2 - PRODUCTS

2.1 UNIT MASONRY ASSEMBLIES

A. Manufacturers: Concrete Masonry Units

1. Genest Concrete Works, Inc.
2. Gagne and Son Concrete Block, Inc.
3. Trenwyth Industries, Inc.
4. Substitutions: Permitted.

2.2 COMPONENTS

A. Hollow Non-Load Bearing Concrete Masonry Units: ASTM C129, Type I - Moisture Controlled; normal weight.

1. Where concrete blocks are installed in walls exposed to the weather, provide the following:
   a) All concrete blocks installed in walls exposed to weather shall be manufactured with an integral liquid polymeric water repellant admixture. This admixture shall be equal to “Dry-Block” CMU admixture as produced by Grace Construction Products, or Rheopel as produced by Master Builders. The admixture product shall be compatible with the mortar admixture product utilized for the project. Reference the Mortar and Masonry specification section 04 05 03.

B. Fire Rated Concrete Masonry Units: **UL Fire Rated units**, classification as required to meet the fire rating of the assembly as indicated within the drawings.

C. Concrete Masonry Unit Size and Shape: Nominal modular sizes of 8x8x16 inches as indicated. Furnish special units for 90 degree corners, bond beams, lintels, and bullnosed corners and caps.

2.3 ACCESSORIES

A. Single Wythe Joint Reinforcement: Truss type; **ASTM A 951/A951M, hot dipped galvanized wire**, 3/16 inch side rods with 9 ga. cross ties.
1. Hohmann & Barnard “Lox-All Truss-Mesh”, or equal.

B. Multiple Wythe Joint Reinforcement: Truss type; with moisture drip; adjustable type, **ASTM A 951/A951M hot dipped galvanized**, 3/16 inch side rods with 9 ga. cross ties.
1. Hohmann & Barnard “Cavity Truss Twin-Mesh”, or equal.

C. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, deformed billet bars, galvanized finish at exterior walls, uncoated finish at interior construction.

D. Strap Anchors: bent steel shape, 8x2 inch size x 1/8 inch thick, hot dip galvanized to ASTM A153/A153M B2 finish.

E. Wall Ties: Formed **hot dipped galvanized** wire, triangular shape, 3/16” diameter, adjustable, with 14 gage sheet metal anchor section with spacer legs, **ASTM A153/A153M.**
1. Hohmann & Barnard “X-Seal Anchor”, or equal.

F. Mortar and Grout: As specified in Section 04 05 03.

G. Copper/Kraft Paper Flashings: 5 oz/sq ft rolled sheet copper bonded to fiber reinforced asphalt treated Kraft paper.

H. Lead Coated Copper Flashings: 16 oz lead coated copper, hemmed edge.

I. Stainless Steel Flashings: 0.015” thick, soft temper.

J. Lap Sealant: Butyl type as specified in Section 07 90 00.

K. Preformed Control Joints Neoprene material. Furnish with corner and tee accessories, cement fused joints.

L. Joint Filler: Closed cell polyethylene; oversized 50 percent to joint width; self expanding.

M. Building Paper: ASTM D226, No. 30 asphalt saturated felt.

N. Weeps: Preformed polypropylene ‘maze’ cells, hollow.
1. Hohmann & Barnard “Quadro-Vent”, or equal.

O. Cavity Protection: Preformed HDPE or nylon mesh, 90 % open to allow passage of water and prevent mortar clogging of cavity.
1. Hohmann & Barnard “Mortar Net”, or equal.

P. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials, recommended by masonry unit manufacturer.

1. PROSOCO “Sure-Klean Restoration Cleaner”, or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

A. Coordinate placement of anchors supplied by other sections.

3.3 INSTALLATION

A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

B. Coursing of Concrete Masonry Units:
1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches.
3. Mortar Joints: Concave.

C. Placing and Bonding:
1. Isolate masonry partitions from vertical structural framing members with movement joint as indicated on Drawings.
2. Isolate top of masonry from horizontal structural framing members and slabs or decks with compressible joint filler.

D. Weeps and Vents: Install weeps and vents in outer wythe at 24 inches oc horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls.

F. Joint Reinforcement and Anchorage - Single Wythe Masonry:
1. Install horizontal joint reinforcement 16 inches oc. Place joint reinforcement continuous in first and second joint below top of walls.
2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

I. Masonry Flashings:
1. Extend flashings horizontally through outer wythe at foundation walls, above ledge or shelf angles and lintels, at bottom of walls and turn down on outside face to form drip.
2. Turn flashing up minimum 8 inches and bed into mortar joint of masonry, seal to sheathing over wood framed back-up.
3. Lap end joints and seal watertight.
4. Turn flashing, fold, and seal at corners, bends, and interruptions.

K. Grouted Components:
1. Reinforce bond beam and pilasters as detailed.
2. Support and secure reinforcing bars from displacement.
3. Place and consolidate grout fill without displacing reinforcing.
4. At bearing locations, fill masonry cores with grout for minimum 12 inches both sides of opening.

L. Control and Expansion Joints:
1. Do not continue horizontal joint reinforcement through control and expansion joints.

2. Control joints shall be located no greater than 25’-0” apart and shall be installed along each side of all openings greater than 6’-0” in width.
2. Install preformed control joint device in continuous lengths. Seal butt and corner joints.
3. Size control joint in accordance with Section 07 90 00 for sealant performance.
4. Form expansion joint as detailed.

M. Built-In Work:
1. As work progresses, install built-in metal door and glazed frames, fabricated metal frames, anchor bolts, plates and other items to be built in the work furnished by other sections.
2. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout or mortar. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

N. Cutting and Fitting:
1. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location.

O. Parging:
1. Dampen masonry walls prior to parging.
2. Parge masonry walls in two uniform coats of mortar to total thickness approximately 3/8 inch.

P. Cleaning
1. Remove excess mortar and mortar smears as work progresses.
2. Clean soiled surfaces with cleaning solution.

Q. Tolerances
1. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
2. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

END OF SECTION

Division 5

Metals

Not Applicable

Division 6

Wood & Plastics

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 DESCRIPTION

A. Includes all labor, materials, services, equipment and related items required for the complete installation of Rough Carpentry work as indicated by the Contract Documents.

B. Related Work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Meet Requirements and recommendations of applicable portions of Standard listed.

1.	Products Standards	PS
2.	American Plywood Association	APA, DFPA
3.	Architectural Woodwork Institute	AWI
4.	American Wood Preservers Institute	AWPI
5.	National Forest Products Association	NFPA
6.	Southern Pine Inspection Bureau	SPIB

C. Material Grading
1. The grades of the materials used shall be defined by the rules of the recognized associations of lumber manufacturers producing the material specified, but the maximum defects permissible in any specific grade shall not exceed the limitations of the American Lumber Standards.
2. Defects expressly prohibited by this Section shall not appear in the material used, even if permissible in the grade specifications.
3. The sized specified are nominal board measure dimensions unless otherwise noted.

1.3 SUBMITTALS

A. Submit product data in accordance with Section 01 33 23.

B. Certification:
1. Pressure treated wood: Submit certification by treating plant stating chemicals and process used, net amounts of salts retained, and conformance with applicable standards.
2. Preservation treated wood: Submit certification for water-borne preservative that moisture content was reduced to 19% maximum, after treatment.

C. Comply with pertinent provision of Section 01 33 23.

1.4 PRODUCT HANDLING

A. Immediately upon delivery to the job site, place materials in an area protected from water.

B. Store materials a minimum of 6" above ground on framework or blocking and cover with protective waterproof covering providing for adequate air circulation and ventilation.

C. Do not store seasoned materials in wet or damp portions of building.

D. Protect fire retardant materials against high humidity and moisture during storage and erection.

E. Protect sheet materials from corner breakage and surface damage, while unloading.

F. Comply with pertinent provisions of Section 01 66 00.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bracing, Blocking and Grounds: Grade marked No. 2 com. Southern Yellow Pine or construction grade Douglas Fir or KD Spruce, moisture content under 19%, S4S.

B. Rough Hardware: Nails, spikes, screws, bolts, etc., shall be of the proper types and sizes, and used in such numbers and quantities as is the usual custom in good practice for securing the various items and members. Underlayment fasteners shall be 3d (1 1/4”) ring or screw shank nail, min. 12 1/2 gauge (0.999 in) shank diameter.

C. Plywood backer board at electrical, telephone, video and alarm equipment: 3/4” APA rated fire rated, A/C Plywood, Exterior-grade. Paint finish black.

D. Plywood blocking for shelving: 5/8” plywood installed under gypsum board fastening into studs 8” o.c., typical. Seal all vertical joints, and top, bottom and ends with Sealant.

2.2 PRESERVATIVES

A. Use lumber pressure treated with a water-borne salt preservative, Wolman, Erdalith, or Chemowater Zinc Chloride in accordance with AWPI Specifications P-5 for abutting concrete or masonry in damp locations, where in contact with the ground, concrete, plaster, stucco or steel, including use for sills, plates, screeds, cant strips, blocking, nailers and bucks.

B. Reduce moisture content to 19% or less after treatment for 2" thick lumber.

C. Reduce moisture content to 23% or less after treatment for over 2" thick lumber.

D. Furnish certificate from lumber treating company showing treatment amount and moisture content after drying.

E. Brush coat surfaces that have been cut after treatment with preservatives.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Cutting and Repairing: Do such work as normally required and done for mechanical and other trades.

B. Blocking: Furnish and install blocking, furring, brackets, etc., as required to properly carry out all work shown and reasonably inferred by the Drawings and Specifications.

C. Nailers and Wood Cants: Nailers, 2" stock unless otherwise noted, of the proper widths. Bevel nailers for concrete 1/2" both sides and properly place in forms. Bolt nailers in place on steel or masonry. Furnish ledgers bolted to wall in locations shown and as required.

D. Shoring: Furnish and place all necessary shoring and bracing of types and sizes best suited for the conditions to be met. Shoring must comply with all governing requirements.

E. Provide wood curbs, required blocking and cants around all openings through the roof indicated on all architectural, mechanical and electrical drawings. Check drawings for all trades and furnish for all openings indicated.

F. Studs for interior walls shall be solid and continuous from floor plates to double plate at trusses, and shall not be cut for straightening; warped studs shall be replaced.

G. Studs shall be doubled at all corners, openings, and beam bearing points, unless noted otherwise on the drawings.

H. Headers over openings in walls shall be as noted on structural drawings.

END OF SECTION

SECTION 06 41 00

ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section includes custom-fabricated base cabinet units; custom fabricated wood wall cabinets, custom casework, custom wall panels, counter tops; cabinet hardware; preparation for installing utilities in cabinets.

B. Related Sections:
1. Section 06 10 00 - Rough Carpentry: Grounds and support framing.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI A156.9 - Cabinet Hardware.
2. ANSI A208.1 - Mat-Formed Wood Particleboard.

B. Architectural Woodwork Institute:
1. AWI - Quality Standards Illustrated.

C. ASTM International:
1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

D. Federal Specification Unit:
1. FS A-A-1936 - Adhesive, Contact, Neoprene Rubber.

E. Forest Stewardship Council:
1. FSC Guidelines - Forest Stewardship Council Guidelines.

F. Green Seal:
1. GS-36 - Aerosol Adhesives.

G. Hardwood Plywood and Veneer Association:
1. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.

H. National Electrical Manufacturers Association:
1. NEMA LD 3 - High Pressure Decorative Laminates.

I. National Fire Protection Association:
1. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

J. South Coast Air Quality Management District:
1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

1.3 SUBMITTALS

A. Section 01 33 23 – Shop Drawings, Product Data and Samples: Submittal procedures.

B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.

C. Product Data: Submit data for hardware accessories.

D. Samples:
   1. Submit two, 3 x 6 inch size samples, illustrating counter top finish.
   2. Submit one sample of drawer pulls, hinges, and door/drawer locks, illustrating hardware finish.

E. Certification: Submit copy of fabricator's authorization to use AWI Grade Stamps. AWI Quality Certification Program license and Project specific letters.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with AWI (Architectural Woodwork Institute) Architectural Woodwork Quality Standards Illustrated, Standard 400 Premium Grade.

B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.5 QUALIFICATIONS

A. Fabricator: Authorized to use AWI Grade Stamps. Licensed by AWI Quality Certification Program.

1.6 MOCKUP

A. Construct mockup of full size base cabinet and upper cabinet including, hardware, accessories, and fitments.

B. Locate where directed by Architect for use in final assembly.

1.7 PRE-INSTALLATION MEETINGS

A. Section 01 31 19 - Project Meetings: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 66 00 - Product Handling: Product storage and handling requirements.

B. Protect units from moisture damage.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Section 01 66 00 - Product Handling.

B. During and after installation of Work of this section, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.

1.10 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 CUSTOM CABINETS

A. Fabricators:
1. Shall meet the above qualification requirements.

2.2 COMPONENTS

A. Softwood Lumber: AWI Grade II maximum moisture content of 6-8 percent; and the following:
1. Species of Wood: Douglas Fir
2. Cut or Slicing of Wood:

B. Hardwood Plywood: AWI Grade AA veneer; HPVA HP-1; with particleboard, medium density fiberboard core; type of glue recommended for application; and the following:
1. Species of Veneer: Natural Birch
2. Cut or Slicing of Veneer: Plain Sliced
3. Matching of Individual Leaves to Each Other: book matching.
4. Matching Across the Panel Face: running matching.
5. Matching or Relationship of Panels to Each Other: premanufactured sets.
6. Interior Composite Wood and Agrifiber Products: Contain no added urea-formaldehyde resins.

C. Wood Particleboard: ANSI A208.1 Type 1; composed of wood chips or sawdust, medium density, made with water resistant adhesive; sanded faces.
1. Interior Composite Wood and Agrifiber Products: Contain no added urea-formaldehyde resins.

D. High Pressure Decorative Laminate: NEMA LD 3, GP50 for horizontal surfaces (HPL), GP28 for vertical surfaces, CL20 for cabinet liner surfaces, BK20 for undecorated backing sheets, PF42 for post forming. Colors and surface textures as selected.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following.
a. Refer to the Interior Finish Legend for color selections and manufacturer information.
b. Types of Laminates;
1. Class II or III Horizontal Grade (HGS) (Flame Spread 0-200) – For use on all exposed horizontal work subject to high use. Provide .050” Horizontal Grade.
2. Class II and III Post-formed Surfaces (HGP)(Flame Spread 0-75) – For use on all post-formed countertops. Provide .042” Post-Formed grade equal to Formica Brand12/HGP Grade.
3. Class I Post-Formed Surfaces (HGP/FR) (Flame Spread 0-25) – For use when Class I flame spread rating is required. Provide .042 fire rated Post-Formed grade.
4. Class I, II, and III Vertical Surfaces (VGS) (Flame Spread 0-200) – For use on all exposed vertical surfaces such as drawer fronts, door fronts, and all edges. Provide .028” Vertical grade equal to Formica Brand 55/VGS Grade.
5. Class I, II, and III Lined Surfaces (LSS)(Flame Spread 0-200):
a. Drawers
1. Backs of drawer fronts
2. Both sides of drawer sides

3. Front of drawer backs
4. Tops of drawer bottoms

b. Cabinets
1. Back of door fronts
2. Tops, bottoms, and edges of shelves
3. Inside, sides, backs and bottoms of cabinets
4. Inside, tops of wall cabinets

6. Class I, II and III Backer Surfaces (BSS) (Flame Spread 0-200) – For use on all items which are called to receive a finish plastic laminate on exposed surface, but not on the concealed surface such as countertops, shall have underside or concealed surface faced with .020" plastic laminate Backer to avoid warpage and bowing.

2.3 CABINET AND WORKSTATION COMPONENTS

A. Cabinets: Flush, Overlay Construction. Doors and drawer fronts shall have overlapping edges.

1. Frames shall be ¾" kiln-dried hardwood lumber with glued and nailed mitered and splined joints.
2. Sides shall be of ¾" particle board.
3. Backs shall be a ¼" thick minimum.
4. Bottoms shall be ¾" particle board.
5. Doors shall be ¾" particle board with all exterior and interior surfaces finished with p-lam. All edges shall be finished with 3mm PVC edge banding.
6. Concealed Hinging only.
7. Concealed magnetic latches.
8. 4" brushed, stainless steel wire pulls
9. Wall cabinet tops shall be 3/8" particle board.
10. Cabinet shelves shall be 11" deep, ¾" particle board. Provide plastic laminate finishes all sides and edges.
    a. 15" high cabinets – no internal shelf
    b. 24" high cabinets – one adjustable internal shelf
    c. 30" high cabinets – two adjustable internal shelves
11. Nailer: Hanging strips shall be ¾" x 3-5/8"
12. Metal corner braces shall be set at top of cabinet.
13. Toe kick shall be ¾" x 4" pine.
14. Finish: ALL SURFACES – Inside and out, shall be plastic laminate. Reference Interior Finish Schedule for further information. The use of melamine laminate is acceptable.

B. Drawers:

1. Fronts shall be ¾" plywood with plastic laminate finish on all faces and edges. Attach to drawer with screws (no glue) from rear.
2. Sides, backs and sub-front shall be a minimum of ½" lumber, veneer core panel product, or particle panel product.
3. Drawer fronts shall be ¾" particle board with all exterior and interior surfaces finished with p-lam. All edges shall be finished with 3mm PVC edge banding.
4. Drawer bottoms shall be 1/4" thick panel product and shall be set into members in grooves ¼" deep with 3/8" minimum standing seam spot glued and reinforced with glue blocks.
5. Drawer joinery shall be multiple dovetail joints, lock shouldered or French dovetail or a combination of either.
6. All joints shall be glued and nailed except dovetail joints shall be glued only.
7. Double drawer slides shall be full extension, heavy-duty (250lbs.) metal guides with ball bearing wheels.
8. 4" brushed, stainless steel wire pulls.

2.4 COUNTERTOP AND WORK SURFACE COMPONENTS

A. Countertops: Laminate

1. All laminate countertops shall be provided with post-formed back and side splashes.
2. All leading edges of laminate countertops shall square edge with continuous 3 mm PVC edge banding unless noted otherwise.
3. Provide edge detailing as shown on the drawings.
4. All general purpose countertops shall be made of ¾" medium density particle board (37 to 50 pcf).
5. All countertops shall be constructed to Premium Grade standards as specified by AWI.

2.5 ACCESSORIES

A. Adhesive for High Pressure Decorative Laminates: FS A-A-1936 contact adhesive.

1. Interior Adhesives: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.

B. Veneer Edge Band: Standard wood veneer edge band matching face veneer. 3mm PVC edge banding.

C. Fasteners and Anchors:
1. Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
2. Nails and Staples: ASTM F1667.

D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; Finishes to match hardware to greatest extent possible.

E. Concealed Joint Fasteners: Threaded steel.

F. Grommets: Plastic material for cut-outs.

G. Shelf Brackets: Formed steel brackets, formed for attachment with lugs satin finish.

H. Drawer and Door Pulls: Brush stainless steel wire pulls - 4".

I. Cabinet Locks: Keyed cylinder, two keys for each lock satin finish.

J. Catches: Magnetic.

K. Drawer Slides: Galvanized steel construction, ball bearings separating tracks, full extension type.

L. Hinges: Concealed type, satin finish.

2.6 FABRICATION

A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

B. Fit shelves, doors, and exposed edges with edging. Use one piece for full length only.

C. Cap exposed high pressure decorative laminate finish edges with material of same finish and pattern.

D. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

E. Apply high pressure decorative laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.

F. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

G. Fabricate cabinets and counter tops with cutouts for plumbing fixtures, inserts, appliances,[outlet boxes, fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal all cut edges.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify adequacy of backing and support framing.

C. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

A. Set and secure casework in place; rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinets and counter tops.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch.

E. Secure cabinet and counter bases to the floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.3 ADJUSTING

A. Section 01 70 00 - Contract Closeout: Testing, adjusting and balancing.

B. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

A. Section 01 70 00 – Contract Closeout: Final cleaning.

B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

Division 7

Thermal and Moisture Protection

SECTION 07 21 00

THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract including General and Supplementary Conditions and Division 1 specification sections apply to Work of this section.

1.2 SECTION INCLUDES

A. Acoustical batt insulation.
B. Thermal batt insulation.

1.3 SYSTEM DESCRIPTION

A. System performance to provide continuity of thermal barrier and vapor retarder at building enclosure elements.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Install insulation adhesives in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Sound Attenuation Batt Insulation: ASTM C 665, Type I & ASTM E 136, preformed glass fiber batt, conforming to the following:
   1. Sound Transmission Class:
      a. Interior Walls: 3 5/8" and 6” completely filling the stud depth.
   2. Facing: Unfaced.

B. Exterior Wall Insulation: Exterior Wall Infill and Thermal Bridge Control Points: Unfaced Thermal Batt Insulation: Equal to Owen’s Corning ASTM C665, Type I, ASTM E 136, preformed glass fiber batt, conforming to the following:
   1. Thermal Performance:
      a. Provide thicknesses as required to complete fill voids. R-13 Minimum.
   2. Facing: Unfaced.
   3. Surface Burning Characteristics: Flame Spread 10, Smoke Developed 10
   4. Provide continuous vapor retarder.

2.2 ADHESIVES

A. Adhesive: Type recommended by insulation manufacturer for application.

2.3 ACCESSORIES

A. Vapor Retarder: 6 Mil poly vapor retarder

B. Tape: Polyester self-adhering type

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

B. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.

3.2 INSTALLATION - BATT INSULATION

A. Install insulation, ventilation baffles and vapor retarder in accordance with insulation manufacturer's instructions.

B. Install in exterior walls and ceiling spaces without gaps or voids.

C. Fit insulation tight in spaces. Leave no gaps or voids.

D. Install friction fit insulation tight to framing members, completely filling prepared spaces.

E. Place vapor retarder on warm side of insulation by securing in place. Extend vapor retarder tight to full perimeter of adjacent window and door frames and other items interrupting the plane of membrane. Tape seal in place.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

A. Section includes flashings and counter flashings, sheet metal roofing trim, roof edge flashing and trim, window flashing and trim and other fabricated sheet metal items as indicated within the drawings.

B. Related Sections:

1. Section 06 10 00 - Rough Carpentry: Wood blocking for metal roofing substrate profiles and roof edge/parapet framing.
2. Section 07 90 00 - Joint Protection.

1.2 REFERENCES

A. American Architectural Manufacturers Association:
1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

B. ASTM International:
1. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
2. ASTM A625/A625M - Standard Specification for Tin Mill Products, Black Plate, Single Reduced.
3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
5. ASTM B32 - Standard Specification for Solder Metal.
6. ASTM B101 - Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction.
7. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
8. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
9. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.
10. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
11. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
12. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.

C. Copper Development Association Inc.:
1. CDA - Copper in Architecture - Handbook.

D. Federal Specification Unit:
   1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

E. Sheet Metal and Air Conditioning Contractors:
   1. SMACNA - Architectural Sheet Metal Manual.

1.3 DESIGN REQUIREMENTS

A. Sheet Metal Flashings: Conform to the following criteria of SMACNA "Architectural Sheet Metal Manual."

B. Gutter and Downspout Components: Conform to SMACNA Manual for sizing of components for rainfall intensity determined by storm occurrence of 1 in 100 years.

C. Maintain one copy of each document on site.

1.4 SUBMITTALS

A. Section 01 33 23 – Shop Drawings, Product Data and Samples: Submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Product Data: Submit data on manufactured components metal types, finishes, and characteristics.

D. Samples:
   1. Submit two samples 6x6 inch in size illustrating metal finish color.

1.5 QUALIFICATIONS

A. Fabricator and Installer: Company specializing in sheet metal work with minimum three years experience.

1.6 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 66 00 - Product Handling: Product storage and handling requirements.

B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials causing discoloration or staining.

1.8 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate Work within all divisions.

PART 2 PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM

A. Manufacturers:
   1. Centria
   2. Cheney Flashing Co.
   3. Keystone Flashing Co.
   4. Metl-Span
   5. Substitutions: Section 01 00 00 - Basic Requirements.

B. Galvanized Steel: ASTM A653/A653M; structural steel sheet, G90 zinc coating; core steel thicknesses as indicated within the drawings or as required by the application to avoid waving and oil-canning effects.

C. Pre-Finished Galvanized Steel Sheet: ASTM A755/A755M; structural steel sheet, G90 zinc coating; l, core steel thicknesses as indicated within the drawings or as required to avoid waving and oil-canning effects, shop pre-coated with fluoropolymer top coating; color as scheduled by architect from manufacturer's standard color line.

2.2 ACCESSORIES

A. Fasteners: Same as material and finish as flashing metal.

B. Underlayment: ASTM D226; Type II, No. 30 unperforated asphalt felt.

C. Primer: Zinc molybdate or Galvanized iron type.

D. Sealant: Type E butyl sealant specified in Section 07 90 00.

E. Reglets: Surface mounted galvanized steel.

F. Downspout, Boots and Shoes: Pre-finished galvanized steel.

G. Solder: ASTM B32; type suitable for application and material being soldered.

2.3 FABRICATION

A. Form sections shape indicated on Drawings, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet metal, interlocking with sheet.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Fabricate corners from one piece with minimum 24 inch long legs; seam or solder for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

H. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.

I. Fabricate gutters to rectangular profile. Profile and size indicated within the drawings.

J. Fabricate downspouts to profile and size specified in Design Requirements Article of this Section.

K. Fabricate accessories in profile and size to suit gutters and downspouts.
   1. Anchorage Devices: In accordance with SMACNA requirements.
   2. Gutter Supports: Brackets. Straps.
   3. Downspout Supports: Brackets. Straps.

L. Seal metal joints.

2.4 FACTORY FINISHING

A. Fluoropolymer Coating: Multiple coats as specified for sheet metal system, thermally cured, conforming to AAMA 2604 and AAMA 2605.

B. Washcoat: Finish concealed side of metal sheets with washcoat compatible with finish system, as recommended by finish system manufacturer.

C. Color: Match existing metal wall panel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

C. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets to lines and levels indicated on Drawings. Seal top of reglets with sealant.

C. Paint concealed metal surfaces with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

A. Insert flashings into reglets to form tight fit. Secure in place with plastic wedges. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.

B. Secure flashings in place using concealed fasteners to greatest extent practicable. Use exposed fasteners only where pre-approved.

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

F. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

G. Secure gutters and downspouts in place using concealed fasteners.

H. Slope gutters minimum 1/4 inch per foot.

I. Connect downspouts to downspout boots, downspout shoes and storm water system. Seal connection watertight.

J. Seal metal joints watertight.

3.4 FIELD QUALITY CONTROL

A. Section 01 70 00 - Contract Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspection will involve surveillance of Work during installation to ascertain compliance with specified requirements.

3.5 PROJECT SPECIFIC SCHEDULE

A. Coping, Cap, Parapet, Sill and Ledge Flashings:

B. Counterflashings at Curb-Mounted Roof Items, including roof hatches:

C. Roofing Penetration Flashings, for Pipes, Structural Steel, and Equipment Supports:

D. Interior wall joint trim and joint covers:

END OF SECTION

SECTION 07 84 13

THROUGH-PENETRATION FIRESTOP SYSTEMS

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 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. Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

C. Openings and penetrations in fire-rated partitions or walls containing fire doors.

D. 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 07 90 00 - Joint Sealers
2. Section 09 21 16 - Gypsum Board Assemblies
3. Mechanical Plumbing scopes of work
4. Fire Suppression scope of work
5. Division 26 - Electrical

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. 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)

D. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

E. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.

F. Inspection Requirements: ASTM E 2174, “Standard Practice for On-site Inspection of Installed Fire Stops.”

G. All major building codes: ICBO, SBCCI, BOCA, IBC and Building Code of the City of New York.

H. NFPA 101 - Life Safety Code

I. NFPA 70 - National Electric Code

THROUGH-PENETRATION UL CLASSIFICATION SYSTEM

	Fire Stopping Systems	UL Classification System		
		Construction Penetrated	Type Of Construction	System Identification
1	No Penetrating Items	F, W, C	A, B, J, K, L	0001-0999
2	Metallic Pipes, Conduit or Tubing	F, W, C	A, B, J, K, L	1001-1999
3	Nonmetallic Pipe, Conduit or Tubing	F, W, C	A, B, J, K, L	2001-2999
4	Electric Cables	F, W, C	A, B, J, K, L	3001-3999
5	Cable, Trays with Electric Cables	F, W, C	A, B, J, K, L	4001-4999
6	Insulated Pipes	F, W, C	A, B, J, K, L	5001-5999
7	Electrical Bussduct Penetrations	F, W, C	A, B, J, K, L	6001-6999
8	Mechanical Ductwork Penetrations	F, W, C	A, B, J, K, L	7001-7999
9		F, W, C	A, B, J, K, L	8000-8999

Construction Penetration

F	Floor penetration
W	Wall penetration
C	Either floor or wall penetration

Type of Construction

A-	
B-	
J-	
K-	
L-	Framed walls

1.06 QUALITY ASSURANCE

A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

B. Firestop System installation must meet requirements of ASTM E 814 or UL 1479 tested assemblies that provide a fire rating equal to that of construction being penetrated.

C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Firestop 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 for all project conditions. Include and manufacturer's installation instructions and all applicable UL Details.

B. Manufacturer's engineering judgment identification number and drawing 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.

D. Submit contractor’s qualifications demonstrating conformance with 1.08.

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 manufacturer’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. The work is to be installed by a contractor with at least one of the following qualifications:

FM 4991 Approved Contractor
UL Qualified Contractor
Hilti Accredited Firestop Specialty Contractor

C. Installer shall have not less than 3 years experience with fire stop installation.

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.

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. 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) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturer as identified below:

1. Hilti, Inc., Tulsa, Oklahoma
   800-879-8000
   www.us.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 or ASTM E 814 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 CP 680-P Cast-In Place Firestop Device
   a. Add Aerator adaptor when used in conjunction with aerator (“solvent”) system.
2. Hilti CP 681 Tub Box Kit for use with tub installations.
3. Hilti CP 680-M Cast-In Place Firestop Device for use with noncombustible penetrants.
4. Hilti CP 653 Speed Sleeve for use with cable penetrations.
   a. All pass-through devices shall have the following Maximum L-Ratings:
      a. Empty (No penetrant): <1 cfm / SF
      b. Less than 100% Visual Fill: 5 cfm / SF (CAT 5 or 6)
      c. 100% Visual Fill: 5 cfm / SF (CAT 5 or 6)
5. Hilti CFS-DID Drop-In Device

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 FS-ONE Intumescent Firestop Sealant
2. Hilti CP 604 Self-leveling Firestop Sealant
3. Hilti CP 620 Fire Foam
4. Hilti CP 606 Flexible Firestop Sealant
5. Hilti CP 601s Elastomeric Firestop Sealant

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

1. Hilti CP 601s Elastomeric Firestop Sealant
2. Hilti CP 606 Flexible Firestop Sealant
3. Hilti FS-ONE Intumescent Firestop Sealant

E. 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 FS-ONE Intumescent Firestop Sealant

F. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant
2. Hilti CP 620 Fire Foam
3. Hilti CP 601s Elastomeric Firestop Sealant
4. Hilti CP 606 Flexible Firestop Sealant

G. Non curing, re-penetrable, intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
1. Hilti CP 618 Firestop Putty Stick
2. Hilti CFS-PL Firestop Plug

H. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:

1. Hilti CP 617 Firestop Putty Pad
2. Hilti Firestop Box Insert

I. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:

1. Hilti CP 643N Firestop Collar
2. Hilti CP 644 Firestop Collar
3. Hilti CP 648E/648S Wrap Strips

J. 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:

1. Hilti CP 637 Firestop Mortar
2. Hilti CFS-BL Firestop Block
3. Hilti CP 620 Fire Foam
4. Hilti CP 675T Firestop Board

K. Non curing, re-penetrable 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:

1. Hilti CFS-BL Firestop Block
2. Hilti CP 675T Firestop Board

L. 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 CP 658T Firestop Plug

M. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E 814 which is equal to the time rating of construction being penetrated.

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.

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 location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.

B. Responsible trades to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

3.03 INSTALLATION

A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration materials.

1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.

3. 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.

4. Protect materials from damage on surfaces subjected to traffic.

C. Method Documentation and Labeling: The fire stopping contractor shall provide the following record of work documentation.

1. Documentation Binder: The contractor shall keep and maintain a project firestopping binder to be turned over to the owner upon project completion. The binder shall include the following;

A. Photographic documentation of above ceiling firestopped conditions.

B. All pertinent UL Details utilized for the project.
C. All engineering judgments obtained during the course of the project.
D. Manufacturer's product information.
E. Installed contact information

2. Above Ceiling Firestopping Packet: At locations indicated by the building owner or architect, the contractor shall mount a clear paper holder to a wall surface above the ceiling. Each packet shall contain photographic records, UL details and engineering judgment documentation utilized within the applicable room or area demarked. Include within this packet product information and installed information.

3. Penetration Labeling: Each firestopped penetration shall be given a number based upon the building's master grid location system. This number shall be clearly written on the surface penetrated. A label shall also be adhered to the surface directly adjacent to the firestopped penetration. Each Label shall include a description the product or products utilized; the approved UL Detail utilized for the condition at hand, the company name and address of the installer and the date in which the work was completed.

4. Photograph wall areas and place hardcopy record images within the above referenced packets and binders above.

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.

D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.05 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.

END OF SECTION

SECTION 07 90 00

JOINT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract including General and Supplementary Conditions and Division 1 specification sections apply to Work of this section.

1.2 SECTION INCLUDES

A. Sealants and joint backing.

1.3 SUBMITTALS

A. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, color availability.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

PART 2 - PRODUCTS

2.1 SEALANTS

A. Type A - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single or multi- component.
   1. Color as selected from complete color line.
   2. Applications: Use for:
      a. Joints between concrete and other materials.
      b. Joints between metal frames and other materials.
      c. Joints between siding and other materials.
      d. Other exterior joints for which no other sealant is indicated.

B. Type B - Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, non-skinning, non-curing.
   1. Applications: Use for:
      a. Concealed sealant bead in sheet metal work.
      b. Bedding for door thresholds.

C. Type C - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.
   1. Colors as selected.
   2. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.

2.2 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant D1667, closed cell PVC oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

C. Remove loose materials and foreign matter which might impair adhesion of sealant.

D. Clean and prime joints in accordance with manufacturer's instructions.

E. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

3.2 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

END OF SECTION

Division 8

Openings

SECTION 08 11 00

METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide metal doors, and metal door and window frames, which are not specifically described in other Sections of these Specifications, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Hardware - see Section 08 71 00
3. Glazing – see Sections 08 80 00
4. Painting - see Section 09 90 00

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of contract including General and Supplementary Conditions and Division 1 specification sections apply to Work of this section.

1.3 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Unless specifically otherwise approved by the Architect, provide all products of this Section from a single manufacturer.

C. Perform Work in accordance with the following:
1. ANSI 250.8 – Recommended Specifications for Standard Steel Doors and Frames.
2. DHI – Door Hardware Institute – The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builders Hardware.
3. Fire Rated Doors and Frames:
   a. Product Construction: NFPA 252.
   b. Product Installation: NFPA 80.

1.4 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 23.

B. Product Data: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Shop Drawings showing details of each frame type, elevations of door designs, details of openings, and details of construction, installation and anchorage.

4. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide hollow metal doors and frames manufactured by a single firm specializing in the production of this type of work.

B. Provide doors and frames complying with the Steel Door Institute "Recommended Specifications for Standard Steel Doors and Frames": (SDI 100), and as herein specified.

C. Manufacturers offering products to comply with the requirements for hollow metal doors and frames include the following:
1. Curries Company, Models 707, 747
2. Ceco Corporation
3. Amweld, American Welding and Manufacturing Co.
Steelcraft
4. Stainless Doors Inc.
5. Approved equals

2.2 FIRE RATED ASSEMBLIES

A. Wherever a fire-resistance classification (3 hour, 1-1/2 hour, etc., or "A", "B", etc.) is shown or scheduled for hollow metal doors, provide fire rated hollow metal doors and frames that have been investigated and tested as a fire door assembly, complete with type of fire door hardware to be used in the work. Identify each fire door and frame with UL labels, indicating the applicable fire rating of both door and frame.

B. Fabricate and install assemblies to comply with NFPA Standard No. 80, and as herein specified.

2.3 MATERIALS

A. Hot Rolled Steel Sheets and Strips
1. Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

B. Cold Rolled Steel Sheets:
1. Commercial quality carbon steel type E, matte-finish complying with ASTM A 366 and ASTM A 568.

C. Hot-dip Galvanized Steel Sheets
1. Zinc-coated carbon steel sheets of commercial quality complying with ASTM A 526, with 1.25 oz "Commercial" zinc coating, mill-phospatized, complying with ASTM A 525, G60.

D. Supports and Anchors
1. Provide units galvanized after fabrication, where built into exterior walls, complying with ASTM A 153, Class B.

E. Inserts, Bolts, and Fasteners

1. Provide manufacturer's standard units, except hot-dip galvanize all items to be built into exterior walls, complying with ASTM A 153.

F. Shop-Applied Paint
1. Provide manufacturer's standard shop-applied baked-on prime-coat paint to all metal surfaces.
2. Primer for galvanized surfaces: Provide a zinc-duct/ zinc-oxide prime paint, complying with FS-TT P 641 (Type II).

2.4 METAL DOORS

A. Provide hollow metal doors of the types and styles indicated on the Drawings or Schedules and complying with SDI 100-98 for minimum materials and construction requirements.

B. Exterior and Interior Doors: Level 3, Extra Heavy Duty, Model 1, Full Flush, 1-3/4” thick, insulated, minimum 16 gauge steel (galvanized at exterior doors).

C. End Closure: Channel, 0.04 inch thick, flush.

D. Thermal Insulated Doors (Exterior): Total insulation R-Value of 7, measured in accordance with ASTM C 1363.

2.5 METAL FRAMES

A. Provide metal frames for doors and other openings as shown on the Drawings and Schedules. Conceal all fastenings unless otherwise shown. Countersink exposed screws using Phillips flat head screws.

B. Door Frames: Level 3, nominal 16 gauge sheet steel (14 gauge galvanized steel at exterior door frames). Frames shall be combination type with integral stop. Reinforce each miter joint internally with 18 gauge channel shaped reinforcements. Equip frames with one welded-in floor anchor in each jamb. Provide three field inserted steel lock-in anchors (maximum of 24" oc.) at each jamb. Anchor to construction involved (i.e. wood frame, masonry, concrete or steel stud). Fabricate all frames to fit surrounding wall construction snugly; no plastic, vinyl, or other fillers will be accepted.
1. Frames for Masonry Openings: Provide self-aligning tabs and slots for secure locking and miter and continuously arc-weld on the frame face (spot weld at corners) to form a one-piece neat mitered corner assembly.
2. Frames for Drywall Openings: Provide for installation after the wall is erected. Supply head frame with an oval countersunk head sheet metal screw, located out of view, for securing the header and jambs. Provide headers and jambs with mating tabs and slots for alignment of the assembly. Provide neat mitered joints at all corners. Provide two welded-in steel stiffeners at each jamb member to maintain a tight grip on the wall and equip with welded-in sill anchors.

C. Rubber Door Silencers: Drill stops to receive 3 silencers on strike jambs of single-swing frames and 4 silencers on heads of double-swing frames. Install plastic plugs to keep holes clear during construction.

D. Plaster Guards: Provide 22 gauge steel plaster guards or mortar boxes welded to the frame, at the back of all finish hardware cutouts where mortar or other materials might obstruct hardware operation.

PART 3 - EXECUTION

3.1 GENERAL

A. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, accurately formed to the required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment to assure proper assembly at the project site. Dress all welded joints on exposed surfaces flush and smooth, to be invisible when prime painted. Use of metallic filler to conceal manufacturing defects is not acceptable.

3.2 FINISH HARDWARE PREPARATION

A. Prepare hollow metal units at the manufacturer's plant to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling, and tapping. Comply with applicable requirements of ANSI A-15 "Specifications for Door and Frame Preparation". Prepare for other mortised and concealed finish hardware to the templates of the manufacturer of each finish hardware item required in the work.

B. Reinforce hollow metal units at the manufacturer's plant to receive surface-applied hardware. Drill and tap for surface applied finish hardware at the project site during installation.

3.3 MOLDING LOCATIONS

A. Provide moldings around solid, glazed or louvered panels in hollow metal units for a rigid and secure installation.

B. Provide non-removable molding on the outside of exterior hollow metal units and the corridor side of interior hollow metal units.

C. Provide removable moldings at other locations, unless otherwise shown.

3.4 PLACING FRAMES

A. Place frames prior to the construction of masonry enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

B. Install fire-rated frames in accordance with NFPA Standard No. 80.

C. In drywall metal stud partitions, follow manufacturer's recommendations for installation of frames.

3.5 DOOR HARDWARE INSTALLATION

A. Door hardware installation is specified under Section 08 71 00.

3.6 CLEARANCES

A. Fire rated doors shall be manufactured and installed with clearances as specified by NFPA Standard No. 80.

B. All doors shall be manufactured and installed with clearances specified by SDI 100.

3.7 ADJUST AND CLEAN

A. Final Adjustments:

1. Check and readjust operating finish hardware items in hollow metal work just prior to final inspection.
2. Leave work in compete and proper operating condition.
3. Remove defective work and replace with work complying with the specified requirements.

B. Immediately after erection, sand smooth all rusted and damaged areas of prime coat, and apply touchup of compatible air-drying primer.

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Solid core veneer-faced doors.
2. Fire-resistant composite core doors.
3. Factory finishing.
4. Factory glazing installation. Glazing stops and preparation of flush doors to receive glazing.
5. Sizing by manufacturer.
6. Machining by manufacturer.

B. Related Requirements:
1. Section 088000 "Glazing" for glass view panels in flush wood doors for field installation.
2. Section 087100 “Door Hardware”

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.

C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical examples of color and grain to be expected in finished work.
2. Provide construction samples of doors, approximately 5 by 5 inches with door faces and vertical edges representing actual construction to be used.

    a. Provide unfinished samples for each species of veneer and required if factory furnishing is not required, approximately 8 by 10 inches.

3. Louver blade and frame sections, minimum 6 inches long, for each material and finish specified.
4. Frames for light openings, minimum 6 inches long, for each material, type, and finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body when FSC Certified wood is specified.
2. A qualified manufacturer that is a member in good standing of the Window and Door Manufacturers Association.

B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body when FSC Certified wood is specified

C. Product Performance: Provide documents showing compliance to the following WDMA attributes, validating the specified WDMA Performance Duty Level:

1. Adhesive Bonding Durability: WDMA TM-6
2. Cycle Slam: WDMA TM-7
3. Hinge Loading: WDMA TM-8
4. Screw Holding: WDMA TM-10

    a. Door Face
    b. Vertical Door Edge
    c. Horizontal Door Edge (applies when hardware is attached)

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package factory-finished doors individually in manufacturer's standard plastic bags, stretch wrap, or cardboard cartons.

C. Mark each door on top rail with opening number used on Shop Drawings. Include manufacturer's order number and date of manufacture.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
   b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Marshfield DoorSystems, Inc. flush wood doors or a comparable product by one of the following:

1. Algoma Hardwoods, Inc.
2. Marshfield Door Systems

B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A-11, "Architectural Wood Flush Doors."

B. Regional Materials: Where available based on inclusive list of approved manufacturers, flush wood doors shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

C. Certified Wood: Flush wood doors shall be certified according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and to FSC STD-40-004, "FSC Standard for

Chain of Custody Certification." FSC claims are to be based on "new" wood contribution only. All recycled, reclaimed, and recovered material, even if it is FSC Recycled, must be applied towards the MR 4 credit.

D. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain added urea formaldehyde.

E. Low-Emitting Materials: Fabricate doors that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers." All composite wood and agrifiber products must meet this requirement. Prefer products that are third party certified through SCS Indoor Advantage Gold.

F. WDMA I.S.1-A Performance Grade:

1. Heavy Duty unless otherwise indicated.

    a. All doors must meet specified WDMA Performance Duty Level, including face screw holding requirement. Surface applied hardware shall be installed with screws; through bolts are not acceptable.

G. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.
1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 250 deg F above ambient after 30 minutes of standard fire-test exposure.
2. Cores: Provide core specified or fire-resistant composite core as needed to provide fire-protection rating indicated.
3. Blocking: Provide composite blocking approved for use in doors of fire-protection ratings indicated as needed to maintain WDMA performance level and eliminate through-bolting hardware.
4. Edge Construction: Category A - intumescents included in door construction where required.
5. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals.
6. Pairs: Provide formed-steel edges and astragals with intumescent seals as required.

    a. Provide steel edges and astragals primed for field painting.
    b. Provide veneer wrapped steel edges and astragals. Veneer shall be same specie as face.
    c. Finish steel edges and astragals with baked enamel, color as selected from manufacturer's standard offering.
    d. Provide stainless steel edges and astragals.

H. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Marshfield DoorSystems; "Signature Series"

2. Veneer Grade: A.
3. Species: Match existing door veneers (White Birch with clear finish) - Verify in field.
4. Cut: Plain sliced.
5. Match between Veneer Leaves: Book match.
6. Assembly of Veneer Leaves on Door Faces: Center-balance match.
7. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions. Provide sets up to four doors.
8. Exposed Vertical Edges: Veneer of same species as face, bonded to structural composite lumber, concealing edges for crossband.
9. Horizontal Edges: Structural composite lumber. Bond smooth PVC edgeband to structural composite lumber, providing cleanable surface.
10. Core: Wood-based Particleboard, Structural composite lumber, fire-resistant composite, or specialty core as required per Article 2.2 and schedule.
11. Construction: Five plies. Stiles and rails are bonded to core, and then entire unit is abrasive planed before veneering.
12. WDMA I.S.1-A Performance Grade: As specified in Article 2.2.

2.4 LIGHT FRAMES AND LOUVERS

A. Factory or Field Glazing: Refer to Section 088000 "Glazing" for glass view panels in flush wood doors. Factory install glass as required. Fill glazing bead nail holes in factory finished doors.

B. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard flush wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads, profile per Marshfield W-7.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips as required and approved for such use.

C. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated. Profile per Marshfield Veneer Clad Light Bead, matching non-rated W-6 profile.

D. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch thick, cold-rolled steel sheet; factory primer for paint, and approved for use in doors of fire-protection rating indicated.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in fire rated and in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.6 SHOP PRIMING

A. Doors for Transparent Finish: Factory finish door faces and vertical stile edges with stain where required.

2.7 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces and vertical edges, seal top and bottom edges as required for warranty purposes

B. Factory finish doors.

C. Factory finish doors that are indicated to receive transparent finish.

D. Factory finish doors where indicated in schedules or on Drawings as factory finished.

E. Transparent Finish:

1. Grade: **Premium**.
2. Finish: Manufacturer's standard UV cured polyurethane, equal to WDMA TR-6 catalyzed polyurethane.
3. Staining: Not Applicable. It is the intent of this project to match existing door finishes. We believe that the existing doors and clear finished. Verify in field prior to manufacturing. Provide samples for field verification prior to manufacturing.
4. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs. Any deficiencies must be corrected prior to door installation.
2. Reject doors with defects.

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

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware.

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.
2. Install smoke- and draft-control doors according to NFPA 105.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.

    a. Comply with NFPA 80 for fire-rated doors.

2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
3. Trim bottom rail only to extent permitted by labeling agency.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Do not trim factory finished doors for width.

3.3 ADJUSTING

A. Operation: Correct any deficiency that prohibits the door from swinging or operating freely. Do not remove hinge screws after initial insertion. Shims used for alignment purposes must be inserted between hinge and frame. Do not insert shims between hinge and door.

B. To prevent stile failure, insure that door closers are properly adjusted and do not limit the door opening swing. Limit door opening swing only with a properly located stop.

C. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 08 33 13

OVERHEAD COILING FIRE DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Overhead coiling fire service doors.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications: Support framing and framed opening.

B. Section 06 10 00 - Rough Carpentry: Solid Wood Blocking

1.3 REFERENCES

A. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

C. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

E. NEMA MG 1 - Motors and Generators.

F. NFPA-80 – Standard for Fire Doors and Fire Windows.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Fire Rated Assemblies: Provide assemblies complying with NFPA 80 and listed in UL Directory or Intertek Testing Services (Warnock Hersey Listed) Directory.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 23.

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. Details of construction and fabrication.
4. Installation methods.

C. Shop Drawings: Include detailed plans and elevations, details of framing members, anchoring methods, clearances, hardware, and accessories.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and patterns.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

G. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years of experience.

B. Installer Qualifications: Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

C. Store materials in a dry, warm, ventilated weathertight location.

1.8 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.

1.9 COORDINATION

A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.10 WARRANTY

A. Manufacturer’s Warranty: Provide manufacturer’s two year limited warranty.

B. Warranty: Manufacturer’s limited door and operators System warranty of all parts and components of the system except counterbalance spring and finish for 3 years or 20,000 cycles, whichever comes first.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Overhead Door Corp., 2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067. ASD. Tel. Toll Free: (800) 275-3290. Phone: (469) 549-7100. Fax: (972) 906-1499. Web Site: www.overheaddoor.com. E-mail: info@overheaddoor.com.

B. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 01 00 00.

2.2 OVERHEAD COILING FIRE SERVICE DOORS

A. Overhead Coiling Fire service Doors: FireKing Series 630 Fire Doors.
   1. Label: Provide fire doors certified with the following listing.
      a. Rolling fire doors up to 152 sf (14.12 sm) and 13 feet 6 inches (4.11 m) in width or height shall be labeled:
         1) UL 1-1/2 Hour Class B Label for non-masonry, masonry and steel fire walls.
      b. Provide UL labeled smoke protection where indicated. Comply with with UL label for "Leakage Rated Assembly" or "S" label.
         1) Comply with NFPA 105 air leakage requirements.
         2) Pass UL test procedure 1784.
   2. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
      a. Flat profile type F-265 for doors thru 14 feet (4.27 m) wide by 12 feet (3.65 m) high, fabricated of:
         1) 20 gauge galvanized steel.
   3. Finish:
      a. Galvanized Steel: Slats and hood galvanized steel to ASTM A 653 finished with a rust-inhibitive roll coating process, including bonderizing, a 0.2 mils thick baked prime paint, and a 0.6 mils thick baked top coat.
         1) Polyester Top Coat.
            (a) Gray polyester.
      b. Non-galvanized exposed ferrous surfaces shall be black powder coated.
   4. Bottom Bar: Two black powder coated structural steel angles 1-1/2 inch by 1-1/2 inch by 1/8 inch (38 mm by 38 mm by 3 mm) minimum.
   5. Guides: Three structural steel angles with minimum thickness of 3/16 inch (5 mm) for doors over 12 feet (3.65 m) wide or high. Guides for between jamb doors shall be structural angles.
      a. Finish: PowderGuard Weathered finish with iron/black powder.
      b. Finish: PowderGuard Zinc Finish for guides, bottom bar and head plate.
      c. Fastening Guides to Non-Masonry Fire Walls: Comply with the manufacturer’s listing.
   6. Brackets: To support counterbalance, curtain and hood
      a. Hot rolled steel with PowderGuard Zinc finish.
   7. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.
   8. Hood:
      a. Fabricate of 24 gauge galvanized primed steel for wall openings thru 19 feet (5.79 m) wide.
      b. Hood equipped with thermally controlled, internal, galvanized steel flame baffle as required for FM listing.
      c. Provide one intermediate support bracket for wall openings over 13 feet 6 inches (4.11 m) wide
   9. Manual Operation:
      a. Floor resettable chain hoist.
   10. Automatic Closure Standard Fire Door: UL approved release mechanism equipped with a 165 degree fusible link.

a. Doors will be equipped with chain hoist release mechanism, requiring only one sash chain to be routed to the operated side (sash chain not required to be routed to adjusting wheel side.)
    1) Release mechanism includes planetary gear differential system.
    2) Door will close by a thermally actuated link rated @165 degrees F, or by an optional listed releasing device, or by manually activating the release handle.
    3) All counterbalance spring tension shall be maintained when the release mechanism is activated.
    4) After closing by manual activation of the release handle, the door shall be able to be reset by one person from one side of the door (re-engaging the release handle). No tools are required to reset the release mechanism.

b. Fire Sentinel time-delay release mechanism provides an added measure of safety to control the doors' closure.
    1) Model FSBX24V:
        (a) Voltage input 24 VDC only, Voltage output 24 VDC.
        (b) Must be powered by a building alarm system with a backup power source.
        (c) Release time delay: Factory set at 10 seconds. Can be field adjusted by dipswitch settings to 20, 30 and 60 seconds,
        (d) Can use normally open proximity switch to detect door is closed will not release on alarm, will release during power outage.
        (e) Unit can support 2 or 4 wire smoke detector system (maximum of 4 Class B Style A detectors). Release devices are normally open contacts. Provided with 4 wire detectors when detectors are specified with an end of line relay.
        (f) Load Rating: Support and Release 40 lbs maximum.
        (g) Box dimension: 9.7 inches high by 7.5 inches wide by 5 inches deep.

11. Governor: If required by the size for chain hoist doors, provide a viscous governor to regulate the rate of descent of door in a quiet manner. Use an engagement type that is not engaged during normal door operation, but after cable release, will retard the speed during automatic door closure to under 24 inches per second and not less than 6 inches per second per NFPA 80.
12. Locking:
    a. Two Bottom Bar Slide Bolts
13. Wall Mounting Condition:
    a. Face-of-wall mounting.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify opening sizes, tolerances and conditions are acceptable.

B. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.

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. Install in accordance with manufacturer's instructions.

B. Install rolling counter fire doors in compliance with requirements of NFPA 80. Test fire-release system and reset components after testing.

C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

D. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

E. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

F. Coordinate installation of electrical service with Section 16150. Complete wiring from disconnect to unit components.

G. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.

H. Install perimeter trim and closures.

3.4 ADJUSTING

A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.

B. Adjust hardware and operating assemblies for smooth and noiseless operation.

3.5 CLEANING

A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.

B. Remove labels and visible markings.

C. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 PROTECTION

A. Protect installed products until completion of project.

END OF SECTION

SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Exterior and interior aluminum-framed storefronts.
2. Exterior Window Units.
3. Interior Window Units

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 07 90 00 - JOINT PROTECTION for installation of joint sealants installed with aluminum-framed systems and for sealants to the extent not specified in this Section.
2. Section 08 71 00 - DOOR HARDWARE for hardware type, lock cylinders and keying.
3. Section 08 80 00 - GLAZING for glazing requirements to the extent not specified in this Section.

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:

1. Structural loads.
2. Thermal movements.
3. Dimensional tolerances of building frame and other adjacent construction.
4. Failure includes the following:

    a. Deflection exceeding specified limits.
    b. Thermal stresses transferred to building structure.
    c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
    d. Noise or vibration created by wind and thermal and structural movements.
    e. Loosening or weakening of fasteners, attachments, and other components.
    f. Sealant failure.
    g. Failure of operating units to function properly.

B. Structural Loads: Wind and seismic loads as indicated on the Structural Drawings, but not less than that required by Code.

C. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches (and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or

an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller, amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components directly below to less than 1/8 inch and clearance between members and operable units directly below to less than 1/16 inch.

D. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

E. Air Infiltration Test: Test unit in accordance with ASTM E 283, as follows:

1. Static Air Pressure Difference: 6.24 psf for fixed storefront units, and 1.567 psf for doors.
2. Performance: Maximum air leakage shall not exceed the following: fixed storefront units, 1.0 cfm/sf.: glazed entrance door units, 0.3 cfm/sf of other areas.

F. Water Leakage Test: Test fixed framing system in accordance with ASTM E 331.

1. Test Pressure: 8 psf.
2. Performance: No leakage as defined in test method at specified test pressure. No uncontrolled water penetrating system or appearing on normally exposed interior surfaces.

G. Solar Heat-Gain Coefficient: Provide units with a whole-unit SHGC maximum as required by Code, determined according to NFRC 200 procedures. Submit proof of compliance with submittals as specified.

H. Thermal Transmittance: Provide window units that have a U-value as required by Code rated in BTU/hour/sq. ft./degrees F at 15-mph exterior wind velocity, when tested in accordance with AAMA 1503.1. Test unit to be 4 ft. x 6 ft. Submit proof of compliance with submittals as specified.

I. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 45 for fixed storefront units and not less than 48 for doors when tested according to AAMA 1503.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated. Include manufacturer's specification and other data to provide compliance with specified requirements.

B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include structural analysis data signed and sealed by the qualified professional engineer, licensed by the local authorities having jurisdiction, responsible for their preparation.

2. Include structural analysis of story drift and deflection from anticipated live loads, and determination whether head receptors are required.
3. Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.
4. For entrances, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

D. Qualification Data: For Installer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems.

F. Performance Reports: Based on systems, components and glazing methods proposed for use on this Project, proof that units as glazed for this Project meet or exceed Code requirements for the following:

1. U-value.
2. Solar heat-gain coefficient.

G. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

H. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.

1. Engineering Responsibility: Preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.

B. Accessible Entrances: Comply with local Architectural Access Board and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating aluminum-framed systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.6 WARRANTY

A. Upon completion of work and as a condition of its acceptance, deliver to the architect two copies of written warranty agreeing to replace work of this section, which fails due to defective materials or workmanship. This includes, failures in operation of components, or components leakage, or air infiltration in excess of specified standard, defects which contribute to unsightly appearance, potential safety hazard or potential untimely failure of work of this section or work as a whole within three years after substantial completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide and install glass, aluminum frames and related hardware provided under section 08 71 00 as shown on architectural drawings.

1. Exterior Storefront Window Units, insulated, 2 inch by 4-1/2 inch profile:

a. Kawneer, VG451T.
b. Approved equal

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction for Exterior Framing: Thermal-break.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

E. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.

F. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.

2.4 GLAZING SYSTEMS

A. Glazing: As specified in Section 08 80 00 - GLAZING.

B. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.

2.5 DOORS

A. Doors: Manufacturer's standard glazed doors, for manual swing operation.

1. Door Construction: Mechanical clip fastening, SIGMA deep penetration plus welds and 1-1/8 inch long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type and EPDM glazing gaskets reinforced with non-stretchable cord.

2.6 DOOR HARDWARE

A. General: Provide heavy-duty units in sizes and types indicated in SECTION 08 71 00 – Door Hardware. Coordinate and install hardware in the factory as required. Provide all hardware required for a proper and complete installation.

1. Opening-Force Requirements:

a. Egress Doors: Not more than 30 lbf required to set door in motion and not more than 15 lbf required to open door to minimum required width.
b. Accessible Interior Doors: Not more than 5 lbf .

B. Pivot Hinges: BHMA A156.4, Grade 1.

C. Locking Devices, General: As specified in section 08 71 00 – Door Hardware. Do not require use of key, tool, or special knowledge for operation.

1. Opening-Force Requirements:

a. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force of not more than 15 lbf (67 N) for not more than 3 seconds.
b. Latches and Exit Devices: Not more than 15 lbf (67 N) required to release latch.

D. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.

E. Panic Exit Devices: As specified in Section 08 71 00 - Door Hardware. Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

1. Standard: BHMA A156.3, Grade 1.

F. Cylinders: As specified in Section 08 71 00 – Door Hardware.

G. Strikes: As specified in Section 08 71 00 – Door Hardware. .

H. Operating Trim: BHMA A156.6.

I. Closers: Refer to Section 08 71 00.

J. Concealed Overhead Holders: Refer to Section 08 71 00 BHMAA156.8, Grade 1.

K. Surface-Mounted Holders: Refer to Section 08 71 00 BHMA A156.16, Grade 1.

L. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.

M. Weather Stripping: Manufacturer's standard replaceable components at exterior doors.

1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.

N. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip, at exterior doors. As specified in Section 08 71 00 – Door Hardware.

O. Silencers: BHMA A156.16, Grade 1.

P. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

Q. Finishes: Match framing, as indicated below.

2.7 ACCESSORY MATERIALS

A. Insulating Materials: As specified in Section 07 21 00 - THERMAL INSULATION.

B. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Section 07 90 00 - JOINT PROTECTION.

C. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.8 FABRICATION

A. Form aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. 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 fitted joints with ends coped or mitered.
3. Means to drain water passing joints, condensation occurring 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. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing (without projecting stops).

E. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.
2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

F. Doors: Reinforce doors as required for installing hardware.

1. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.

2. At exterior doors, provide weather sweeps applied to door bottoms.

G. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 ALUMINUM FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. Class I, Clear Anodized Finish: AA-M10C22A41/A31 Architectural Class I or Class II pending samples review and color coordination.

Color: Dark Bronze

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure non-movement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight, unless otherwise indicated.
7. Comply with original design and approved shop drawings and governing codes and regulations.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.

2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Set continuous sill members and flashing in full sealant bed as specified in Section 07920 - JOINT SEALANTS and to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades, without warp or rack.

F. Install glazing as specified in Section 08 80 00 - GLAZING.

1. Structural-Sealant Glazing:

a. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
b. Install weatherseal sealant according to Section 07920 - JOINT SEALANTS and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

G. Entrances: Install to produce smooth operation and tight fit at contact points.

1. Exterior Entrances: Install to produce tight fit at weather stripping and weathertight closure.
2. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:

1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
2. Alignment:

a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.

3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive stages as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.

1. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing under Part 1 "Performance Requirements" Article, but not more than 0.09 cfm/sq. ft. of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.
2. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum cyclic static-air-pressure difference of 0.67 times the static-air-pressure difference specified for laboratory testing under Part 1 "Performance Requirements" Article, but not less than 4.18 lbf/sq. ft., and shall not evidence water penetration.
3. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

C. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 ADJUSTING

A. Entrances: Adjust operating hardware for smooth operation according to hardware manufacturers' written instructions.

1. For doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.

END OF SECTION

SECTION 08 71 00

FINISH HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DESCRIPTION OF WORK:

A. Definition: "Finish Hardware" includes items known commercially as finish hardware which are required for swing, sliding and folding doors.

B. Extent of finish hardware required is indicated on drawings and in schedules.

C. Types of finish hardware required include the following:

1. Hinges.
2. Lock cylinders and keys.
3. Lock and latch sets.
4. Bolts.
5. Exit devices.
6. Bifold door hardware.
7. Closers.
8. Miscellaneous door control devices.
9. Door trim units.
10. Protection plates.
11. Weatherstripping for exterior doors.
12. Sound stripping for interior doors.
13. Astragals or meeting seals on pairs of doors.

D. Silencers included integral with aluminum and hollow metal frames are specified with door frames elsewhere in Division 8.

1.3 QUALITY ASSURANCE:

A. Manufacturer: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

B. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFIPA Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of door and door frame labels.

1. Where emergency exit devices are required on fire-rated doors (with supplementary marking on doors' UL or FM labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL or FM label on exit devices indicating "Fire Exit Hardware".

C. ANSI Standards: Provide hardware that meets or exceeds the performance requirements of ANSI A 156.2 for the following applications:

1. Doors: Series 4000, Grade 1.

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.

B. Hardware Schedule: Submit hardware schedule in manner indicated below. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware.

C. Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Cross reference to designations in door and hardware schedules in Contract Documents.

D. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

E. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Review shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

1.5 PRODUCT HANDLING:

A. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

B. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

PART 2 - PRODUCTS

2.1 SCHEDULED HARDWARE:

A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware is indicated in the Finish Hardware Schedule. Products are identified by using hardware designation numbers of the following.

B. Manufacturer's Product Designations: One or more manufacturers are listed for each hardware type required, whose product designation is used in the Hardware Schedule for purposes of establishing minimum requirements. Provide either the product designated, or, where more than one manufacturer is listed, the comparable product of one of the other manufacturers which comply with requirements including those specified elsewhere in this section.

1. Manufacturer: Provide products of one of the following matching existing building hardware products and manufacturers:

    a. Locksets: Sargent 10-Line
    b. Closers: Sargent 1431 Series at Interior doors, Sargent 281 Series at exterior doors.
    c. Hinges: McKinney / Stanley
    d. Panic Devices: Sargent.
    e. Door Trim and Accessories: Ives, Rockwood.
    f. Thresholds at exterior doors: Pemko

C. ANSI/BHMA designations used elsewhere in this section or in schedules to describe hardware items or to define quality or function are derived from the ANSI A 156.1 standards. Provide products complying with these standards and requirements specified elsewhere in this section.

2.2 MATERIALS AND FABRICATION:

A. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door as shown.

B. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

C. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for the applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

D. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

E. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

F. Provide concealed fasteners for hardware units which are exposed when door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use hex screw fasteners.

2.3 HINGES, BUTTS AND PIVOTS:

A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

B. Screws: Furnish Phillips flat-head or machine screws for installation of units, except furnish Phillips flat-head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.

C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

1. Steel Hinges: Steel pins.
2. Non-ferrous Hinges: Stainless steel pins.
3. Exterior Doors: Non-removable pins.
4. Out-swing Corridor Doors: Non-removable pins.
5. Interior Doors: Non-rising pins.
6. Tips: Flat button and matching plug, finished to match leaves.
7. Pivot Hinges / Side Pivot

D. Provide only ball bearing hinges at doors with closers.

E. Number of hinges: Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90" or less in height.

2.4 LOCK CYLINDERS AND KEYING:

A. General: Supplier will meet with Owner to finalize keying requirements and obtain final instructions in writing. Comply and match Owner's existing masterkeying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.

B. Standard System: Provide new building exterior keying system keyed off the existing master key system. Replace all lock cylinders within all exteriors door assemblies accordingly. Key new interior doors to existing key system as determined within the above referenced coordination meeting.

C. Equip locks with manufacturer's special 6-pin tumbler cylinder, Sargent cylinders and keyways matching existing building system with construction master key feature, which permits voiding of construction keys without cylinder removal, or with cylinders for interchangeable-core pin tumbler inserts. Furnish only temporary inserts for the construction period, and remove these when directed.

D. Metals: Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.

F. Key Material: Provide keys of nickel silver only.

G. Key Quantity: Furnish 5 change keys for each lock and 5 submaster keys.

1. Furnish one extra blank for each lock.
2. Deliver keys to Owner's representative and obtain receipt.

H. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of the number of locks required for the project.

2.5 LOCKS, LATCHES AND BOLTS:

A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.

B. Provide dust-proof strikes for foot bolts, except where special threshold construction provides non-recessed strike for bolt.

C. Lock Throw: Comply with UL requirements for throw of bolts and latch bolts on rated fire openings. Provide 1/2" minimum throw on other latch and deadlock bolts.

D. Flush Bolt Heads: Minimum of 1/2" diameter rods of brass, bronze or stainless steel, with minimum 12" long rod for doors up to 7'-0" in height.

2.6 CLOSERS AND DOOR CONTROL DEVICES:

A. Type of Units: Overhead surface mounted, parallel arm door closers with hold open.

B. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.

C. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ADA provisions for door opening force and delayed action closing.

D. Fire-Guard, Alarm actuated Manual Closers: Where indicated provide closers capable of being tied to the fire alarm system such that while in the hold open position the door closes upon alarm actuation.

2.7 DOOR TRIM UNITS:

A. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units (kick plates, edge trim, viewers, knockers, mail drops and similar units); either machine screws of self-tapping screw.

B. Fabricate protection plates (armor) not more than 1-1/2" less than door width on stop side and not more than 1/2" less than door width on pull side, x the height indicated. Provide armor plates on each side of door at locations indicated within the Door and Door Frame Schedule.

1. Metal Plates: Stainless steel, 1/8" (0.125") thick.

2.8 WEATHERSTRIPPING:

A. General: Except as otherwise indicated, provide continuous weatherstripping at each edge of every exterior door leaf. Provide type, sizes and profiles shown or scheduled. Provide non-corrosive fasteners as recommended by manufacturer for application indicated.

2.9 HARDWARE FINISHES:

A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch-lock sets) for color and texture.

B. Provide finishes which match those established by BHMA.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for the applicable units of hardware by referenced standards.

D. Lockset finish to be 26D. All other hardware component shall match this to the greatest extent possible.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware" for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect. Comply with ADA and ICC/ANSI A117.1-2003.

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.

C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

3.2 ADJUST AND CLEAN:

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace items which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Clean adjacent surfaces soiled by hardware installation.

C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and

finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

D. Initial maintenance: Return to the work one month after occupancy and inspect all doors, adjust hardware as necessary for proper operation and instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes.

3.3 HARDWARE SCHEDULE

Hardware Heading #1: Doors 202, 212

1	Each	Passage Function Lockset	10U15	Sargent 10-Line
3	Each	Hinges	2714 Ball Bearing	McKinney
1	Set	Silencers	SR64/SR65	Ives
1	Each	Wall Stop	WS407CCV	Ives
1	Each	Wall Stop	FS436	

Hardware Heading #2A: Door 203, 209

1	Each	Office Function Lockset	10G05	Sargent 10-Line
1	Each	Lock Cylinder		Sargent
3	Each	Hinges	T4A3386	McKinney
1	Set	Silencers	SR64/SR65	Ives
1	Each	Wall Stop	WS407-1/2	Ives

Hardware Heading #2B: Doors 157C

3	Each	Hinges	2714 Ball Bearing	McKinney
1	Each	Office Function Lockset	10G05	Sargent 10-Line
1	Each	Lock Cylinder		Sargent
1	Each	Surface Closer w/ hold open	1430/1431 Series	Sargent
2	Each	Armor Plate 30X36 each side	8400 Series	Ives

Hardware Heading #3A: Door 209

1	Each	Storage Function Lockset	10G04	Sargent 10-Line
1	Each	Lock Cylinder		Sargent
1	Each	Hinges	2714 Ball Bearing	McKinney
1	Each	Door Closer	1430/1431	Sargent
1	Set	Silencers	SR64/SR65	Ives
1	Each	Wall Stop	WS407-1/2	Ives

Note:
1. Door to be tied to card access system. Electric strike to be provided by security system contractor. Reference Security System Drawings.

Hardware Heading #3B: Door 138, 210, 213

1	Each	Storage Function Lockset	10G04	Sargent 10-Line
1	Each	Lock Cylinder		Sargent
1	Each	Hinges	2714 Ball Bearing	McKinney
1	Each	Door Closer	1430/1431	Sargent
1	Set	Silencers	SR64/SR65	Ives
1	Each	Wall Stop	WS407-1/2	Ives

Hardware Heading #4: Door 100A

1	Each	Lock Cylinder		Sargent

Note:
1. Modify existing aluminum storefront frame as required for the incorporation of the new electric strike at existing deadbolt. Door to be tied to card access system. Electric strike to be provided by security system contractor. Reference security drawings.
2. Replace existing lock cylinder keyed off the existing master key system.

Hardware Heading #5: Door 100B

1	Each	Deadbolt	485 Series	Sargent

Note:
1. Modify existing aluminum storefront frame as required for the incorporation of the new electric strike and deadbolt. Door to be tied to card access system. Electric strike to be provided by security system contractor. Reference security drawings.
2. Provide push-button electric strike release. Locate push-button at the workstation directly adjacent to the door within room 101.

Hardware Heading #6: Doors 125

1	Each	Storage Function Lockset	10G04	Sargent 10-Line
1	Each	Lock Cylinder		Sargent
1	Each	Hinges	2714 Ball Bearing	McKinney
1	Each	Door Closer	1430/1431	Sargent
1	Set	Silencers	SR64/SR65	Ives
1	Each	Wall Stop	WS407-1/2	Ives

Hardware Heading #7: Not used

Hardware Heading #8: Doors 123, 146

1	Each	Storage Function Lockset	10G04	Sargent 10-Line

Hardware Heading #9: Doors 141A

1	Each	Electrified Panic Device	59-8500	Sargent
1	Each	Lock Cylinder		Sargent

Note:
1. Replace existing panic device on left leaf with electrified panic device. Tie electric strike to card access system. Remove existing deadbolt on left leaf and plug holes. Reference Security drawing for more information.
2. Exist device shall always allow exiting.
3. Provide new lock cylinder keyed off the existing master key system.

Hardware Heading #10: Doors 152

1	Each	Lock Cylinder	Sargent

Note:
1. Modify existing hollow metal frame as required for installation of new electric strike. Door to be tied to card access system. Electric strike to be provided by security system contractor. Reference security drawings.
2. Replace existing lock cylinder keyed off the existing master key system.

Hardware Heading #11 Not used

Hardware Heading #12: Door 142B

1	Each	Lock Cylinder	Sargent

Note:
1. Replace existing lock cylinder keyed off the existing master key system.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Glass and glazing for the following products and applications:
      a. Metal doors, frames and sidelights specified in Section 08 11 00 - Metal Doors and Frames.
      b. Wood doors specified in Section 08 14 00 - Flush Wood Doors
      c. Interior and exterior aluminum storefront systems specified in Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
      d. Exterior aluminum curtain wall systems specified in Section 08 44 13 Glazed Aluminum Curtain Walls.

1.02 RELATED SECTIONS

A. Section 01 30 00 – ADMINISTRATIVE REQUIREMENTS

1.03 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

F. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.04 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
   a. Specified Design Wind Loads: As required by Code.
   b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
      1) Load Duration: 60 seconds or less/
   c. Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
      1) For monolithic-glass lites heat treated to resist wind loads.
      2) For insulating glass.
      3) For laminated-glass lites.
   d. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units with lites 6.0 mm thick and a nominal 1/2-inch-wide interspace.
4. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
   a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F.
   b. Solar Heat Gain Coefficient: NFRC 200.
   c. Solar Optical Properties: NFRC 300.
   d. Visual Light Transmittance.

1.05 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: For the following products, in the form of 12-inch- square samples for glass.
1. Fire Rated Glass.
2. Tempered glass.

3. Insulating glass for each designation indicated.
5. For each color (except black) of exposed glazing sealant.

C. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

D. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.

E. Qualification Data: For installers.

F. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

H. Product Test Reports: For each of the following types of glazing products:
1. Coated float glass.
2. Insulating glass.
3. Glazing film.
4. Glazing sealants.
5. Glazing gaskets.

I. Warranties: Special warranties specified in this Section.

1.06 QUALITY ASSURANCE

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

B. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, laminated glass and insulating glass.

C. Source Limitations for Glass Sputter-Coated with Solar-Control Low-E Coatings: Where solar-control low-e coatings of a primary glass manufacturer that has established a certified fabricator program is specified, obtain sputter-coated solar-control low-e-coated glass in fabricated units from a manufacturer that is certified by coated-glass manufacturer.

D. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

E. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.
1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.

F. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glazing material type,

tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
5. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.

G. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

H. Safety Glazing Products: Comply with testing requirements in 16 CFR 120 and, for wired glass, ANSI Z97.1.

1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency] acceptable to authorities having jurisdiction.
2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

I. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

J. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.

K. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

L. Comply with pertinent codes and regulations.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
   1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F.

1.09 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to the Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
   1. Warranty Period: Ten years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form, made out to the Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
   1. Warranty Period: Five years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to the Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
   1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Interior Glazing:
   1. ACH Glass Operations.
   2. AFG Industries, Inc.
   3. Cardinal Glass
   4. Guardian Industries Corp.
   5. PPG Industries.

B. Exterior Glazing: PPG Industries, Solarban – Solar Control Low-E Glass
   1. Product – 1” Low E, 70XL, clear

2.01 INTERIOR GLAZING

A. Clear Glass: Annealed, Heat strengthened, and Tempered float glass as required by code; Class 1 clear.
   1. Clear annealed glass (FG-CA).
   2. Clear heat strengthened glass (FG-CH).
   3. Clear tempered glass (FG-CT).
   4. Minimum Thickness: Provide minimum glass thickness required by overall sheet size shown within the drawings for all doors, windows and interior aluminum storefront systems, no less than 1/4".

2.02 FIRE-RATED GLAZING MATERIALS – Interior fire rated door and window units

A. Supplier: FireLite® NT as supplied by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065, voice 1-800-426-0279, fax 1-800-451-9857, e-mail sales@fireglass.com, web site www.fireglass.com

B. Properties:
   1. Thickness: 3/16 inch [5 mm] FireLite®.
   2. Film: Fire-rated surface film as approved by manufacturer.
   3. Weight: 2.4 lbs./sq. ft.
   4. Approximate Visible Transmission: 88 percent.
   5. Approximate Visible Reflection: 9 percent.
   6. Hardness (Vicker's Scale): 700.
   7. Fire-rating: 20 minutes to 3 hours for doors; 20 minutes to 90 minutes for other applications.
   8. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
   9. Positive Pressure Test: UL 10C, UBC 7-2 and 7-4; passes.
   10. Surface Finish:
      a. Premium Grade-Ground and polished on both sides
      b. Standard Grade-Comparable to alternative fire-rated products marketed as "Premium"
      c. Obscure-Patterned surface

C. Maximum sheet sizes based on surface finish:
   1. Premium: 48 inches by 96 inches.
   2. Standard: 48 inches by 96 inches.
   3. Obscure: 36 inches by 96 inches.

D. Labeling: Permanently label each piece of FireLite® NT with the FireLite® logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the FireLite® label only for sizes that exceed the listing (as approved by the local authority having jurisdiction).

E. Fire Rating: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2074-00 and ASTM E2010-01.

F. Substitutions: No substitutions allowed.

2.03 SEALED INSULATING GLASS UNITS: Exterior door and window units

A. General: Provide preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E 774 for

performance classification indicated as well as with other requirements specified for glass characteristics, air space, sealing system, sealant, spacer material, corner design and desiccant.

B. For properties of individual glass panes making up units, refer to product requirements specified elsewhere in this section applicable to types, classes, kinds and conditions of glass products indicated.

C. Provide heat-treated panes of kind and at locations indicated or, if not indicated, provide heat-strengthened panes where recommended by manufacturer for application indicated and tempered where indicated or where safety glass is designated or required.
1. Performance Classification per ASTM E 774: Class A.
2. Thickness of Each Pane: 1/4".
3. Air Space Thickness: 1/2".
4. Sealing System: Manufacturer's standard.
5. Spacer Material: Manufacturer's standard metal.
6. Desiccant: Manufacturer's standard; either molecular sieve or silica gel or blend of both.
7. Corner Construction: Manufacturer's standard corner construction.

2.04 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:
1. Compatibility: Verify glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
1. Single-Component Neutral- and Basic-Curing Silicone Glazing Sealants:
a. Dow Corning Corporation; 790.
b. GE Silicones; SilPruf LM SCS2700.
c. Tremco; Spectrem 1 (Basic).

2.05 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for project conditions.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
   1. Type 1, for glazing applications in which tape acts as the primary sealant.
   2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.06 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.07 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep system.
   3. Minimum required face or edge clearances.
   4. Effective sealing between joints of glass-framing members.
   5. Do not remove labels from glass until so directed by the architect.

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

3.02 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.03 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.04 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.05 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.06 CLEANING AND PROTECTION

A. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. All loose lights shall be removed and reset before acceptance.

F. Final cleaning shall be done by the contractor under supplementary general conditions.

END OF SECTION

Division 9

Finishes

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Gypsum board with joint treatment.

B. Metal stud wall framing.

1.3 SYSTEM DESCRIPTION

A. Acoustic Attenuation for Identified Interior Partitions: 50-54 STC in accordance with ASTM E90.

1.4 SUBMITTALS

A. Product Data: Provide for gypsum board, joint treatment, accessories and metal framing.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C840. GA-201 - Gypsum Board for Walls and Ceilings. GA-214 - Recommended Specification: Levels of Gypsum Board Finish. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board. GA-600 - Fire Resistance Design Manual.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD SYSTEM

A. Manufacturers:
   1. Domtar Gypsum Co.
   2. Georgia Pacific Corp.
   3. Gold Bond Building Products /Div. National Gypsum Co.
   4. United States Gypsum Co.

B. Interior Wall Studs and Tracks: ASTM C645; GA-216 and GA-600; galvanized sheet steel, 25 gage unless otherwise indicated, C shape. Provide (2) 20 ga. studs each side of all door jambs.

C. Interior Wall Studs and Tracks at partitioning 15’-0” and higher above finish floor: Equal to Marino 6SW20. 6x1-5/8, 20GA, Min. Ix of 1.838, Sx of 0.58. Steel stud manufacturer to adjust wall thickness if required due to the excessive floor to underside of deck conditions within the scope of work.

D. Gypsum Board Types: 5/8 inch thick, maximum available length in place; ends square cut, tapered edges; unless noted otherwise as follows:

1. Fire Rated Type “X”: ASTM C36 fire resistive, UL rated, 5/8” thick.
2. Moisture Resistant, Fire Rated Type “MRX”: ASTM C630, 5/8” thick.

2.2 ACCESSORIES

A. Acoustic Insulation: ASTM C665, preformed mineral wool, friction fit type, unfaced, 2.5 inch thick.

B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.

C. Corner Beads: Metal.

D. Edge Trim: GA-201 and GA-216, Type LC bead.

E. Joint Materials: ASTM C475 GA-201 and GA-216, reinforcing tape, joint compound, adhesive, and water.

F. Fasteners: ASTM C1002 Type S12 hardened screws. GA-216.

G. Adhesive: ASTM C557 and GA-216.

H. Textured Finish Materials: Latex based texturing material containing fine aggregate.

I. Lead discs, lead sheet strips as required for proper closure and seals at joints and fastenings. Fully isolate all electrical device boxes as required within X-Ray room.

PART 3 - EXECUTION

3.1 INSTALLATION - METAL STUDS

A. Install studding in accordance with ASTM C754. GA-201, GA-216, GA-600. and manufacturer's instructions.

B. Metal Stud Spacing: As indicated on drawings.

C. Partition Heights: Full height to floor or roof construction above where indicated. Install additional bracing for partitions extending above ceiling.

3.2 INSTALLATION - GYPSUM BOARD

A. Install gypsum board in accordance with GA-201, GA-216, GA-600, and manufacturer's instructions.

B. Fasten gypsum board to furring or framing with screws.

C. Place control joints consistent with lines of building spaces as directed.

D. Place corner beads at external corners as indicated. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

E. Seal cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.

3.3 JOINT TREATMENT

A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes, minimum of three coats.

B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.

C. Sanding and final coat of fill is not required at concealed surfaces above ceilings and in inaccessible spaces.

D. Tape all joints within exterior sheathing system.

3.4 TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 51 23

ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. This Section includes acoustical panel ceilings installed with exposed suspension systems.

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of product specified.

C. Samples for verification purposes of each acoustical panel type, pattern, and color.

1.4 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an experienced Installer who has successfully completed acoustical ceilings similar in material, design, and extent to those indicated for Project.

B. Fire-Performance Characteristics: Provide acoustical ceilings that are identical to those tested for the following fire-performance characteristics, per ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

C. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.

1. Flame Spread: 25 or less.
2. Smoke Developed: 50 or less.

D. Single-Source Responsibility for Ceiling Units: Obtain each type of acoustical ceiling unit from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

E. Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment and fire-suppression system components.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them as recommended by manufacturer in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

1.6 EXTRA MATERIAL:

A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish quantity of full-size units equal to 5.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Products of one or more manufacturers are listed in schedules to establish standards of performance and characteristics of appearance. Equivalent products of other listed manufacturers may be accepted, as judged solely by the Architect.

2.2 MANUFACTURERS:

A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:

1. Acoustical Panels:
   a. Armstrong
   b. Hunter Douglas Ceilings

2. Steel Suspension Systems:
   a. Armstrong

2.3 ACOUSTICAL CEILING UNITS, GENERAL:

A. Standard for Acoustical Ceiling Units: Provide manufacturer's standard units of configuration as scheduled that comply with ASTM E 1264 classifications in reference to types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated.

B. Colors and Patterns: Provide products to match appearance characteristics as scheduled for each product type.

1. Product: ACT-1: 24x48x1, Armstrong, Mesa #684 Angled Tegular set within 15/16" Grid System.

2.4 METAL SUSPENSION SYSTEMS, GENERAL:

A. Standard for Metal Suspension Systems: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

1. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated.

B. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

1. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper.
2. Gage: Provide wire sized to that stress at 3 times hanger design load (ASTM C 635, Table 1, Direct-Hung), will be less than yield stress of wire, but provide not less than 0.106-inch diameter (12 gage).
3. Hanger Rods and Flat Hangers: Mild steel, zinc coated. or protected with rust inhibitive paint.

2.5 NON-FIRE-RESISTANCE-RATED DIRECT-HUNG SUSPENSION SYSTEMS:

A. 15/16” Exposed Tee System Equal to Armstrong “Standard Prelude XL Series – Match existing: Main and cross-runners roll-formed from prepainted or electrolytic zinc-coated cold-rolled steel sheet, with prefinished metal caps on flanges; other characteristics as follows:

1. Structural Classification: Intermediate-Duty System.

2.6 MISCELLANEOUS MATERIALS:

A. Concealed Acoustical Sealant: Nondrying, nonhardening, nonskinning, nonstaining, nonbleeding, gunnable sealant complying with requirement specified in Division 7 Section "Joint Sealers".

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates and structural framing to which ceiling system attaches or abuts, with Installer present, for compliance with requirements specified in this and other sections that affect installation and anchorage of ceiling system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half-width units at borders, and comply with reflected ceiling plans.

3.3 INSTALLATION:

A. General: Install acoustical ceiling systems to comply with ASTM C 636 and ASTM E 580 installation standards, per manufacturer's instructions and CISCA "Ceiling Systems Handbook."

B. Arrange acoustical units and orient directionally patterned units in a manner shown by reflected ceiling plans.

C. Suspend ceiling hangers from building structural members and as follows:

1. Install hangers plumb, secure to substrate and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of other construction within ceiling plenum produces hanger spacings different than required to support standard suspension system members, install supplemental suspension members and hangers. Size supplemental members and hangers to support ceiling loads within performance limits established by referenced standards.
3. Secure hangers either directly to structures or to inserts, eyescrews, or other devices that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

D. Install edge moldings at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical units.

1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.

E. Screw-attach moldings to substrate at intervals not over 24 inches oc. and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of 1/8 inch in 12'-0". Miter corners accurately and connect securely.

F. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

3.4 CLEANING:

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

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract including General and Supplementary Conditions and Division 1 specification sections apply to Work of this section.

1.2 SECTION INCLUDES

A. Resilient sheet vinyl, Vinyl composite tile flooring, wall base and accessories.

1.3 SYSTEM DESCRIPTION

A. Resilient Flooring: Conform to applicable code for flame/smoke rating requirements of 75/450 in accordance with ASTM E84 and critical radiant flux (CRF) of 0.45 per ASTM E648.

1.4 EXTRA MATERIAL

A. Provide 5% of resilient flooring of each type, color and pattern.

PART 2 - PRODUCTS

2.1 LUXURY VINYL TILE: Refer to Master Finish Legend for schedule of materials.

A. Commercial Grade High Performance Luxury Tile: ASTM F 1700, Class III Printed Vinyl Plank, Type B Embossed.
   1. ASTM E-648-10 Class I
   2. Wearing Surface: Smooth
   3. Total Thickness: 0.098" inch.
   4. Colors: As indicated within the Master Finish Legend

2.2 VINYL COMPOSITION TILE: Refer to Master Finish Legend for schedule of materials.

A. Commercial Grade Static Dissipative Tile: ASTM F 1700, Class III Printed Vinyl Plank, Type B Embossed.
   1. ASTM F-1066 Class 2 - Through Pattern
   2. Wearing Surface: Smooth
   3. Total Thickness: 1/8" inch.
   4. Colors: As indicated within the Master Finish Legend

2.3 ACCESSORIES

A. Subfloor Filler: Type recommended by floor material manufacturer.

B. Primers and Adhesives: Waterproof, type recommended by floor material manufacturer. Provide moisture mitigating adhesive as required due to moisture content levels within slab assemblies. Provide SDT adhesive at all Static Dissipative Tile locations as required by manufacturer.

C. Base: Vinyl top set coved (toe) wall base as schedule: Refer to Master Finish Legend Legend for schedule of materials.
1. Height: 4 inch.
2. Thickness: 0.080 inch thick.
3. Finish: Satin
4. Length: Roll.
5. Manufacturers:
   a. Burke

D. Base: Vinyl top set straight wall base as schedule: Refer to Interior Finish Legend for schedule of materials.
1. Height: 4 inch.
2. Thickness: 0.080 inch thick.
3. Finish: Satin
4. Length: Roll.
5. Manufacturers:
   a. Johnsonite

E. Moldings and Edge Strips: Vinyl, manufactured by Johnsonite, Refer to Master Finish Legend for schedule of materials.

F. Stair Tread: Resilient Thermoplastic Normal Duty Vinyl Stair Treads: Refer to Master Finish Legend for schedule of materials.
1. 1 1/2" Square nose

G. Sealer and Wax: Types recommended by floor material manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Prepare and clean substrates according to resilient flooring manufacturer's written instructions for substrate indicated.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Prepare floor substrate in accordance with ASTM F710-11, ‘Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring’.
2. Repair damaged and deteriorated concrete according to resilient flooring manufacturer's written recommendations.

C. Moisture Testing:

1. The GC shall provide concrete-slab-on-grade moisture testing.
2. Maintain ambient temperatures of not less than 65 F or more than 85 F in spaces to receive testing for 48 hours prior to commencement of and during testing.
3. Maintain relative humidity between 40 and 60 percent in spaces to receive testing for 48 hours prior to commencement of and during testing.
4. Perform anhydrous calcium chloride test in accordance with ASTM F 1869-11, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride and manufacturer’s instruction.

a. The number of test required is determined by the square-footage of the project:
1. Three (3) tests are required for the first 1,000 square feet, and One (1) additional test for each 1,000 square feet or fraction thereof.

5. Perform relative humidity test in accordance with ASTM 2170-11 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes
   a. The number of test required is determined by the square-footage of the project:
      1. Three (3) tests are required for the first 1,000 square feet, and One (1) additional test for each 1,000 square feet or fraction thereof.
6. Perform pH testing in accordance with ASTM F 710-11 'Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring' at the same time as m testing.

D. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

E. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

F. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install resilient products until they are same temperature as space where they are to be installed.

G. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREINSTALLATION TESTING BY CONTRACTOR

A. Bond Test: Determine suitability of concrete subfloor for receiving specified floor covering with regard to moisture content and curing compounds. Use bond test recommended by flooring manufacturer.

B. Perform bond test per ASTM C1583 at all newly poured trench fills.

3.3 RESILIENT FLOORING INSTALLATION, GENERAL

A. Install resilient flooring in strict accordance with the latest edition (available at the time of installation) of flooring manufacturer's installation instructions.

B. Adhesive Application
1. After the material has been trimmed to fit the room, it should be tubed or lapped back to expose the underfloor.
2. On porous substrates, adhesive should be applied with a 1/16" wide, 1/32" deep spaced 1/32" apart notched trowel.
3. Two-component urethane adhesives must be used on all non-porous substrates and in areas demanding high performance.
4. Follow all directions on adhesive container. Some adhesives have a low initial tack, it may be necessary to apply weights, particularly in the seam area, until adhesive sets. V-95 should be applied with a 1/16" wide, 1/32" deep, spaced 1/32" apart notched trowel.
5. The adhesive must be spread over 100% of the exposed subfloor, leaving no gaps or puddles. Uniform coverage can be maintained by keeping the trowel clean and properly notched.
6. After the adhesive has been applied, roll the sheet forward into the adhesive to eliminate trapping air. Do not drop or flop the material into the adhesive. Roll the floor covering with a three-section 100 lb. or heavier floor in both directions. After the first half of the sheet has been adhered and rolled, fold back the second half and repeat the procedure. Utilize a 100 lb. floor roller within one hour after the flooring in installed per manufacturers installation instructions.

7. Wait 1-2 hours then re-roll again to ensure full contact and to remove any trapped air.

   CAUTION: When providing open time, do not permit the adhesive to 'skin' over or dry. Too much open time will result in insufficient bonding.

C. Finishing the Job
   1. Cover all exposed edges.
   2. Use wood molding or vinyl cove base along the walls, cabinet toekicks, etc.
   3. Use metal strips in doorways or where new flooring joins another floor covering.
   4. Caulk along tubs, toilet bowls, etc.
   5. Do not wash the floor for 48 hours after installation.
   6. After 48 hours, damp mop to remove residual surface dirt.
   7. Follow appropriate maintenance schedule for heterogeneous flooring products.

D. Cautions and Miscellaneous
   1. Do not place heavy items on newly installed floor covering for at least 48 hours after completion of the installation. Heavy furniture should be equipped with suitable non-staining, wide-bearing casters.
   2. Furniture should be moved on to the newly installed floor using an appliance hand truck over hardboard runways.
   3. Floor covering subjected to excessive heat and light exposure is subject to thermal degradation. Use appropriate precautions to minimize potential affects on the floor covering.
   4. Oil or petroleum-based products can result in surface staining. Do not track asphalt driveway sealer or automobile oil drips on to the vinyl floor covering.
   5. Use non-staining walk-off mats at building entrances to remove excess dirt and grit from foot traffic – rubber can discolor vinyl floor covering.

3.4 RESILIENT TILE INSTALLATION

A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
   1. Lay tiles in pattern indicated.

B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

D. Extend tiles into toe spaces, door reveals, closets, and similar openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

F. Install tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

G. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

H. Static Dissipative tile shall be installed in strict accordance with manufactures recommendations. Utilize proper adhesive and grounding strips as required.

3.5 RESILIENT WALL BASE INSTALLATION

A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

D. Do not stretch wall base during installation.

E. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.

F. Inside Corners: Meter, scribe or wrap base at inside corner.

G. Outside Corners: Wrap base around outside corners. Shave a strip approximately 1/4″ wide and 1/4 the thickness from the back of the wall base where the corner will be positioned.

3.6 RESILIENT ACCESSORY INSTALLATION

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

3.7 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing resilient product installation:
1. Remove adhesive and other blemishes from exposed surfaces.

2. Sweep and vacuum surfaces thoroughly.

3. Damp-mop surfaces to remove marks and soil.
   a. Do not wash surfaces until after time period recommended by manufacturer.

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

1. Apply protective floor polish to all horizontal surfaces once they are free from soil, visible adhesive and surface blemishes as recommended in writing by manufacturer.
   a. Coordinate selection of floor polish with the Owner's maintenance service.

2. Cover products installed on horizontal surfaces with un-dyed, untreated building paper until Substantial Completion.

3. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

C. Provide owner or owner's representative with in-service training seminar on manufacturer recommended application and maintenance of new resilient flooring surfaces at or prior to Substantial Completion.

3.8 WARRANTIES

A. Provide a 5 year warranty on all products that are installed according to the manufacturer's installation instructions. Proper slab testing must be in place prior to flooring installation. Document all installations of flooring and adhesive and slab moisture testing reports in order to achieve the full flooring installation warranty from Mannington.

END OF SECTION

SECTION 09 68 13

TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes carpet tile, fully adhered; and accessories.

B. Related Sections:
   1. Reference Division 1 Specifications

1.2 REFERENCES

A. Carpet and Rug Institute:
   1. CRI 104 - Standard for Installation of Commercial Carpet.
   2. CRI Green Label Plus Testing Program.

B. Consumer Products Safety Commission:
   1. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.

C. National Fire Protection Association:
   1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate layout of joints, direction of carpet pile and location of edge moldings.

C. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

D. Samples:
   1. Submit two carpet tile illustrating color and pattern design for each carpet color selected.
   2. Submit two inch long samples of edge strip and transition strips.

E. Manufacturer's Installation Instructions: Submit special procedures and information pertaining to perimeter conditions requiring special attention.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum 5 years documented experience.
   1. FCIB or IFCI certified carpet installers.

1.5 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Store materials in area of installation for 48 hours prior to installation.

1.7 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Supply one box of carpet tiles of each color and pattern selected.

PART 2 PRODUCTS

2.1 CARPET TILE

A. Manufacturers:
   1. Mohawk - Lateral Surface
   2. No Substitutions

2.2 COMPONENTS

A. Carpet Tile Type: Tufted, manufactured in one color dye lot. Reference Master Finish Schedule for manufacture, style and product information.

   1. Tile Size: 24 x 24 inch, nominal.
   2. Pile Thickness: .117 inch.
   3. Surface Texture: Level Patterned Loop
   4. Gauge: 1/12
   5. Density: 5231
   6. Weight Density: 88,927
   7. Stitches Per Inch: 11.6
   8. Dye Method: Solution Dyed
   9. Face Weight: 17.0 oz.
   10. Backing Material: Ecoflex ICT
   11. Fiber Type: ColorStrand SD Nylon

2.3 ACCESSORIES

A. Sub-Floor Filler: Cementitious. Type recommended by flooring material manufacturer.

B. Moldings, Transition Strips and Edge Strips: Vinyl. Reference Section 09 65 00 and the Master Finish Schedule for further information.

C. Contact Adhesive: As recommended by carpet manufacturer.

1. Interior Adhesives: Maximum volatile organic compound content in accordance with local code and regulations.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify floor surfaces are smooth and flat within manufacturer's tolerance and are ready to receive work.

3.2 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

C. Prepare and clean substrates in accordance with the carpet manufacturer's standard recommendations. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

D. Provide moisture testing in accordance with accordance with specification section 09 65 00.

E. Utilize only accepted adhesives that are in conformance with the manufacturers recommendations based upon the above referenced test results.

3.3 INSTALLATION

A. Install carpet tile in accordance with CRI 104.

B. Do not mix carpet from different cartons unless from same dye lot.

C. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

D. Install carpet tile in square pattern, with pile direction alternating one quarter turn to next unit aligned as indicated on shop drawings.

E. Locate change of color or pattern between rooms under door centerline.

F. Fully adhere carpet tile to substrate.

G. Adhere carpet tile with self-stick adhesive backing by removing protective membrane and pressing tile back onto clean and dry substrate.

H. Adhere carpet tile as base finish up vertical surfaces to form base. Terminate top of base with cap strip.

I. Trim carpet tile neatly at walls and around interruptions.

J. Complete installation of edge strips, concealing exposed edges.

K. Installation On Stairs:
   1. Use one piece of carpet for each tread and riser below. Apply seam adhesive to cut edges.
   2. Install carpet with pile direction in length of stair.
   3. Adhere carpet tight to stair treads and risers.

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. Remove excess adhesive from floor, base, and wall surfaces without damage.

C. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract including General and Supplementary Conditions and Division 1 specification sections apply to Work of this section.

1.2 SECTION INCLUDES

A. Surface preparation and field application of paints and coatings.

1.3 SYSTEM DESCRIPTION

A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.4 SUBMITTALS

A. Product Data: Provide data on all finishing products.

B. Samples: Submit coating samples for selection, illustrating range of colors and textures available for each surface finishing product scheduled.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Store and apply materials in environmental conditions required by manufacturer's instructions.

1.6 EXTRA MATERIALS

A. Provide minimum of two (2) gallons of each type and color of coating specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers: Products of one or more manufacturers are listed in Finish Schedules to establish appearance, performance and quality characteristics. Products of other manufacturers may be accepted subject to preapproval by owner.
   1. Sherwin Williams
   2. No Substitutions

B. Coatings: Ready mixed except field catalyzed coatings of good flow and brushing properties, capable of drying or curing free of streaks or sags.

C. VOC Content: Provide coatings with low or zero VOC content to the greatest extent possible. As a minimum, comply with requirements of Green Seal GS-11:
   1. Non flat: 150 g/l.
   2. Flat: 50 g/l.

D. Quality: Manufacturer’s best quality of each type of product specified.

E. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials required to achieve the finishes specified, as recommended by coating manufacturer..

2.2 **FINISHES**

A. Refer to schedule at end of section for surface finish schedule.

PART 3 - EXECUTION

3.1 **EXAMINATION AND PREPARATION**

A. Verify that substrate conditions are ready to receive Work.

B. Measure moisture content of porous surfaces using an electronic moisture meter. Do not apply finishes unless moisture content is less than 12 percent.

C. Correct minor defects and clean surfaces which affect work of this section.

D. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

E. Gypsum Board Surfaces: Fill minor defects with latex compounds. Spot prime defects after repair.

F. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

G. Uncoated Ferrous Surfaces: Remove scale by wire brushing, sandblasting, clean by washing with solvent. Apply treatment of phosphoric acid solution. Prime paint after repairs.

H. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust, hand or power tool clean, clean surfaces with solvent. Prime bare steel surfaces.

3.2 **APPLICATION**

A. Apply products in accordance with manufacturer's instructions.

B. Sand transparent finishes lightly between coats to achieve required finish.

C. Back prime interior and exterior woodwork scheduled to receive paint finish with primer paint.

D. Back prime interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

E. Minimum Coating Thickness: As recommended by manufacturer.

F. Prime Coats: Prime material as recommended by manufacturer. Recoat primed surfaces as required to cover suction spots or unsealed areas.

G. Pigmented Surfaces: Completely cover to achieve an opaque, smooth surface of uniform finish, color and appearance. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other imperfections will not be accepted.

H. Transparent Finishes: Provide smooth surface of uniform luster, free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes or other imperfections.

3.3 **CLEANING**

A. As work proceeds, promptly remove finishes where spilled, splashed, or spattered.

3.4 **SCHEDULE - INTERIOR and EXTERIOR SURFACES**

TAG	APPLICATION	COLOR NAME	COLOR NUMBER	FINISH	PRODUCT
	Concrete Block Wall Assemblies	Color to match existing.		Satin	Primer: 1-Coat S-W PrepRite Block Filler, B25W25 Finish: 2-Coats S-W Pro Industrial 0 VOC Satin B66 Series
	GWB wall assemblies within Housekeeping and Janitor's Closets	Ref. Master Finish Legend and Finish Plans		Semi-Gloss	Primer: 1-Coat S-W Promar 200 Zero VOC Interior Latex Primer B28W2600 0 g/l VOC Finish: 1-Coat S-W Macropoxy 646-100 Fast Cure Epoxy B58-620 Finish: 1-Coat S-W Macropoxy Hardener B58V-620
	Interior Doors and Metal Trim	Ref. Master Finish Legend and Finish Plans		Semi-Gloss	Primer: 1-Coat S-W Pro Industrial Pro-Cryl Universal Primer B66-310 Finish: 2-Coats S-W Pro Industrial 0 VOC Acrylic B66-650
	Exterior Doors, Handrails, and Trim. Stair Stringers, Risers and Rails	Ref. Master Finish Legend and Finish Plans		Semi-Gloss	Primer: 1-Coat S-W Macropoxy 646-100 Fast Cure Epoxy B58-620 Finish: 2-Coats S-W Macropoxy 646-100 Fast Cure Epoxy B58-620
	GWB Wall Assemblies	Ref. Master Finish Legend and Finish Plans		Egg-Shell	Primer: 1 Coat S-W Promar 200 Zero VOC Interior Latex Primer B28W2600 0 g/l VOC Finish: 2 Coats S-W Promar 200 Zero VOC Eg-Shel B20-2600 Series o g/l VOC
	GWB Soffit Assemblies	Ref. Master Finish Legend and Finish Plans		Flat	Primer: 1 Coat S-W Promar 200 Zero VOC Interior Latex Primer B28W2600 0 g/l VOC Finish: 2 Coats S-W Promar 200 Zero VOC Eg-Shel B30-2600 Series o g/l VOC

END OF SECTION

Division 10

Specialties

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. This Section includes the following:

1. Fire extinguishers.
2. Fire extinguisher cabinets.
3. Mounting brackets.

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of product specified. For fire extinguisher cabinets include rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.

1.4 QUALITY ASSURANCE:

A. Single-Source Responsibility: Obtain fire extinguishers and cabinets from one source from a single manufacturer.

B. Coordination: Verify that fire extinguisher cabinets are sized to accommodate fire extinguishers of type and capacity indicated.

C. UL-Listed Products: Fire extinguishers UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Allenco.
2. Amerex.
3. Bobrick Washroom Equipment, Inc.
4. JL Industries.
5. Larsen's Manufacturing Co.
6. Potter-Roemer/Div. Smith Industries, Inc.
7. Walter Kidde, Division of Kidde, Inc.
8. Watrous/Div. American Specialties Inc.

2.2 FIRE EXTINGUISHERS

A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard, which comply with requirements of governing authorities.

B. Fill and service extinguishers to comply with requirements of governing authorities and manufacturer.

C. Multipurpose Dry Chemical Type: UL-rated 2-A:10-B:C, 5-lb. nominal capacity, in enameled steel container.

2.3 MOUNTING BRACKETS:

A. Provide brackets designed to prevent accidental dislodgment of extinguisher, of sizes required for type and capacity of extinguisher indicated in plated finish.

B. Provide brackets for extinguishers not located in cabinets.

2.4 FIRE EXTINGUISHER CABINETS:

A. General: Provide fire extinguisher cabinets where indicated, of suitable size for housing fire extinguishers of types and capacities indicated.

B. Construction: Manufacturer's standard enameled steel box, with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.

D. Cabinet Type: Suitable for mounting conditions indicated, of the following types:

1. Semi-recessed: Cabinet box partly recessed in walls.

2. Trim Style: Fabricate trim in one piece with corners mitered, welded, and ground smooth.

3. Exposed Trim: One-piece stainless steel combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

a. Radius Trim with 2-1/2-inch projection.

4. Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.

a. Steel: Manufacturer's baked enamel standard finish, hollow steel door construction with tubular stiles and rails.

5. Door Style: Manufacturer's standard design, vertical duo panel with wired glass.

E. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam action latch, or door pull, exposed or concealed, and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 deg.

F. Identify fire extinguisher in cabinet with lettering spelling "FIRE EXTINGUISHER" applied to door. Provide lettering to comply with requirements indicated for letter style, color,

size, spacing, and location or, if not otherwise indicated, as selected by Architect from manufacturer's standard arrangements.

1. Application Process: Silk screen.

G. Identify bracket-mounted extinguishers with red letter decals spelling "FIRE EXTINGUISHER" applied to wall surface. Letter size, style, and location as selected by Architect.

2.5 FINISHES FOR FIRE EXTINGUISHER CABINETS, GENERAL:

A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.

B. Protect mechanical finishes on exposed surfaces from damage by application of strippable, temporary protective covering prior to shipment.

2.6 STEEL FIRE EXTINGUISHER CABINET FINISHES:

A. Surface Preparation: Solvent-clean surfaces in compliance with SSPS-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel in compliance with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).

B. Baked Enamel Finish: Immediately after cleaning and pretreatment, apply manufacturer's standard 2-coat baked enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's instructions for application and baking to achieve a minimum dry film thickness of 2.0 mils.

C. Color and Gloss: White.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities and ADA.

B. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.

C. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

D. Where exact location of surface-mounted cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by Architect.

END OF SECTION

Division 12

Furnishings

Not Applicable

Division 21

Fire Suppression

SECTION 211313

AUTOMATIC FIRE PROTECTION

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required to design, install and test modifications to the existing pressurized, fully supervised, wet pipe fire protection system for full building protection in accordance with NFPA, IBC, and the Owner's insurance underwriter. Areas subject to freezing shall have a dry pipe system, dry pendent or sidewall heads, or glycol-and-water loop per NFPA.

B. The building sprinkler system design shall be based on NFPA13 requirements.

1.2 RELATED DOCUMENTS

A. The drawings and the specifications including Section 23 05 00 "Supplemental Mechanical General Requirements" are hereby made a part of the work of this section.

B. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.

C. Coordinate with Section 01290 Price And Payment Procedures.

1.3 QUALIFICATIONS

A. The Fire Protection Work shall be performed by a qualified Contractor primarily engaged in the design and installation of Fire Protection Systems. The fire protection system design shall be performed under the direction of, and sealed by, a professional engineer registered in the State of Maine or with NICET Level III (minimum) Certification.

B. Welding qualifications of individuals installing welded piping shall be certified by the National Certified Welding Bureau for the type(s) of weld(s) proposed for use in piping assembly.

1.4 SUBMITTALS

A. Items for which the submittal requirements of section 23 05 00, Supplemental Mechanical General Requirements, apply are as Follows:

1. System components.
2. Hydraulic calculations.
3. Piping layout, details and control diagram.
4. Flushing and testing records.
5. Certificate of installation.
6. Copy of Fire Protection Contractors License.
7. Welding certificates of individual welding technicians.
8. Sprinkler heads.
9. Firestopping materials and methods.

Submit equipment descriptive data, hydraulic calculations and system layout for review by the Owner's Insurance Underwriter. Submit the system layout to the Architect for review. The Architect's review will be limited to checking for conformance with the design concept of the project and general compliance with the contract documents and will in no way assume liability for review for compliance with codes, standards and laws.

B. Section 01330 - Submittal Procedures: Submittal procedures.

C. Product Data: Submit data on product characteristics, performance criteria and limitations.

D. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 SPRINKLER COVERAGE

A. Sprinkler head coverage shall conform with NFPA 13 requirements for the use of the building. Coverage shall be increased accordingly where required by the Authority having jurisdiction.

B. If the requirements of the inspection agency or the Owner's insuring agent are more rigorous than those stated herein, then the more rigorous requirements shall govern.

PART 2 PRODUCTS

2.1 SYSTEM COMPONENTS AND HARDWARE

A. Pipe, Fittings, Joints, Hangers, Valves, Fire Department Connections, Alarms: Conform to NFPA 13, Installation of Sprinkler Systems.

B. Sprinkler Heads:

1. Interior Heated Spaces: Conform to NFPA 13, commercial quick response type. Sprinkler heads in acoustical tile or GWB ceilings shall be “semi-recessed” type with recessed escutcheon to match the ceiling finish. Dry pendent or sidewall heads, where allowed by the Architect, may be standard response type.

1. Provide a spare head cabinet with wrenches, the amount of spare heads for each orifice size, finish, temperature classification, pattern and length furnished in the project shall be in accordance with the following schedule:

Sprinkler Heads on Project	Number of Spare heads of each type.
Less than 300	6
300-999	12
1000 or more	24

3. Provide head protection guards where required.

4. Sprinkler heads in unheated areas shall be dry pendent or sidewall type, or served by a glycol and water loop or separate dry-pipe system.

2.2 WATER SUPPLIES

A. EXISTING

2.3 DEVICES

A. Detection devices and associated wiring both within the fire protection system and to the building Fire Alarm System shall be the responsibility of the Sprinkler Contractor.

2.4 BACKFLOW PREVENTER

A. EXISTING.

2.5 PIPING SYSTEM IDENTIFICATION

A. Piping system and valve identification and color coding shall be in accordance with ANSI.

PART 3 EXECUTION

3.1 PIPING LAYOUT AND DESIGN

A. System requirements, installation requirements, design, plans, and calculations: Conform to NFPA 13, Installation of Sprinkler Systems.

B. Sprinkler piping shall be run concealed above ceilings / soffits in occupied areas. Piping in other areas may be run exposed. Piping shall not be exposed in occupied spaces unless indicated on the drawings.

C. Pipe penetrations through walls and floors shall be in accordance with Section 23 05 00 - Supplemental Mechanical General Requirements. Traverse points of piping shall be escutcheoned with split chrome floor and ceiling plates and spring anchors, where visible to occupancy. Penetrations through walls shall be sleeved in accordance with Section 23 05 00. Sleeves shall be provided by the Fire Protection Contractor.

D. Coordinate design and layout with building structure and building systems. The work shown in the contract documents has precedence for space requirements. Work of other trades may be modified or moved only with permission of the trade involved. Costs associated with modifications or relocations shall be the same as for "Substitutions" Section 23 05 00.

E. The Architect shall review proposed system layout and reserve the right to relocate heads, revise sprinkler head type and location and in general review the final layout for components visible in occupied spaces.

3.2 SYSTEM ACCEPTANCE

A. Approval, flushing, hydrostatic testing, instructions, and certificates of installation: Conform to NFPA 13, Installation of Sprinkler Systems.

B. Disinfect the water piping in accordance with AWWA C601. Fill the piping systems with solution containing a minimum of 50 parts per million of available chlorine and allow solution to stand for minimum of 24 hours. Repeat disinfection if chlorine residual is less than 10 parts per million after 24 hours. Flush the solution from the systems with clean water until maximum residual chlorine contents is not greater than 0.2 parts per million.

C. Closing in Work:

1. General: Cover up or enclose work after it has been properly and completely reviewed.

2. No additional cost to the Owner will be allowed for uncovering and recovering, work that is covered or enclosed prior to required review and acceptance.

D. Cleanup and Corrosion Prevention:

1. Upon completion of the work thoroughly clean and flush piping systems to the sewer with water.

2. Piping and equipment shall be thoroughly cleaned. Dirt, dust, and debris shall be removed and the premises left in a clean and neat condition.

3. Before uncovered piping is permitted to be concealed, corrosion and rust shall be wire brushed and cleaned and in the case of iron products, a coat of approved protective paint applied to these surfaces. When corrosion is from the effects of hot solder paste, the areas shall be cleaned and polished and a wash of bicarbonate of soda and water used to neutralize the acid condition.

E. Instructions: On completion of the project, provide a technician familiar with the system to thoroughly instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed four (4) hours. The time of instruction shall be arranged with the Owner.

F. Warranty: For a period of one (1) year after completion of the installation repair or replace any defective materials or workmanship. Upon completion of the installation, the system shall be turned over to the Owner fully inspected and tested, and in operational condition.

3.3 FIRESTOPPING

A. Firestopping shall be performed in accordance with Specification Section 07841 “Firestopping”. All penetrations of fire-rated assemblies including walls and floors by mechanical system components (piping, ductwork, conduits, etc.) shall be firestopped as specified.

* END OF SECTION *

Division 22

Plumbing

SECTION 220000

PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The drawings and the specifications including Section 230500 “Supplemental General Mechanical Conditions” are hereby made a part of the work of this section.

1.2 DESCRIPTION

A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections, and incidentals and the performing of operations required to provide a complete and functional plumbing system.

B. Work shall be in accordance with the current edition of the Maine Plumbing Code and applicable local ordinances.

1.3 SUBMITTALS

A. Substitutions: Your attention is directed to Section 230500-"Substitutions", relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.

B. The items for which the submittals paragraph in Section 230500, Supplemental General Mechanical Requirements, apply are as follows:

1. Piping materials.
2. Valves.
3. Pipe hangers.
4. Fixtures and trim.
5. Miscellaneous equipment.
7. Piping, valves and equipment identification.
8. Floor drains and cleanouts.
9. Firestopping materials and methods.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Soil and Waste (Sanitary), and Vent Piping: Schedule 40 PVC or service weight cast iron with push-on joints below grade. Schedule 40 PVC or cast iron "no Hub" above grade. “Vents thru roof” shall be Schedule 40 ABS.

B. Domestic Water Piping and Condensate Drain Piping: Type L hard copper tubing and cast bronze or wrought copper solder fittings.

.

C. Exposed Water and Waste Piping at Fixtures: I.P.S. copper with cast brass fittings chrome plated finish, with deep one piece escutcheon plates at traverse points.

D. Solder: Lead-free (ONLY), Englehard Silvabrite 100, 440^{o}F melting point, ASTM B32.

2.2 GAS PIPING SYSTEM

A. Gas Piping: Schedule 40 carbon steel pipe conforming to ASTM 120 or A53, with threaded joints and malleable iron fittings (Above grade). Exterior piping shall be painted. Piping 3” and larger shall be welded.

B. Ball Valves for Gas Service: Copper alloy with chromium plated floating ball per Federal Specification WW-V-35B, Type II, Class 3. Blowout-proof stem, reinforced teflon seats, threaded ends, quarter turn on-off, 600 WOG rating, 250 psi rating for natural-gas, UL-listed as a natural-gas shutoff valve, Apollo Model 80-100 series.

2.3 NO HUB COUPLINGS

A. For DWV piping, couplings shall be Clamp-All HI-TORQ125, shall maintain 15 PSI hydrostatic seal, constructed 304SS housing and ASTM C-564 neoprene gasket. Couplings shall meet FM 1680, IBC and local codes and requirements.

2.4 VALVES

A. Ball Valves: Copper alloy with stationary seat ring and chromium plated or stainless steel floating ball per Federal Specification WW-V-35B. Blowout proof stem, reinforced PTFE seal. Sizes 2" and larger shall have threaded ends. Provide lever handle with stem extension as required to allow operation without interfering with pipe insulation.

B. Check Valves: Horizontal Swing, MSS SP-80, Type 3, Class 125.

C. Drain Valves: Provide ball valves with 3/4" hose connection and brass cap and chain.

D. Fixture Service Stop Valves: Angle Loose Key Stop, ASME A112.18M.

1. Each plumbing fixture and item of equipment shall have individual stop valves in the hot and cold supplies.

2. Service stop valves exposed in finished areas shall be chrome-plated brass; in non-finished areas, ball valves shall be used in lieu of chromed supplies.

E. Icemaker Outlet: Guy Gray “MIB”-series, with ¼ turn ball valve, water hammer arrester and ½” cold water connection, metal powder-coated.

2.5 PIPE HANGERS

A. Adjustable Swivel Hangers:

1. Pipe sizes 2" and less: Carpenter and Paterson Fig. 800, oversize for insulated piping systems.

2. Pipe sizes larger than 2": Carpenter and Paterson Fig. 100, oversize for insulated piping systems.

B. Riser Clamp: Carpenter and Paterson Fig. 126 CT copper plated for copper piping, Fig. 126 for iron and PVC piping.

C. Insulation Shields: 18 ga. galvanized steel, 180^{o} wrap, Carpenter and Paterson Fig. 265P, Type H.

2.6 FIXTURES AND TRIM

A. (P-4) ADA Kitchen Sink, Single Bowl: Elkay LRAD2521, Just, or approved equal, 20 gauge Type 304 stainless steel, 25"x21.25" overall size, 6” deep, 3 faucet holes on 4" centers, fully sound deadened.

1. Faucet: Grohe “Eurodisc #33-330 single lever handle, dual spray pull out spout, polished chrome finish, ceramic control cartridge.

2. Strainer: Removable basket and neoprene stopper.

3. Where applicable the installation of and accessories shall meet ADA guidelines and ANSI A117.1.

B. (P-4A) Kitchen Sink, Double Bowl: Elkay LRAD3322, Just, or approved equal, 20 gauge Type 304 stainless steel, 33"x22" overall size, 6” deep bowls, 3 faucet holes on 4" centers, fully sound deadened.

1. Faucet: Grohe “Eurodisc #33-330 single lever handle, dual spray pull out spout, polished chrome finish, ceramic control cartridge.

2. Strainer: Removable basket and neoprene stopper.

C. Acceptable fixture manufacturers are as follows: American-Standard, Eljer, Crane, Just, Toto, Zurn, Elkay, Kohler.

2.7 MISCELLANEOUS EQUIPMENT

A. Floor Drains (FD): Zurn Z-415, MIFAB, or Smith, cast iron body with 2" or 3" bottom or side outlet, as indicated, combination invertible membrane clamp and adjustable collar. Floor drains shall have “deep seal” traps and trap primer connection.

1. Strainer: 7" diameter Zurn "Type B", polished nickel-bronze.

B. Floor Cleanout (FCO): Zurn Z-1400, MIFAB, or Smith, adjustable floor cleanout, cast iron body, with gas and watertight ABS tapered thread plug. Provide size equal to piping served with maximum size of 4".

1. Concrete floor finishes: Scoriated round polished bronze top.

2. Sheet tile finishes: Scoriated square polished bronze top recessed to receive tile.

3. Carpeted finishes: Scoriated round polished bronze top and carpet marker.

C. Wall Cleanout (WCO): Sanitary tee with threaded raised nut or countersunk-nut cleanout plug located behind Zurn Z-1468, MIFAB or Smith, round stainless steel wall access cover.

D. Water Hammer Arrestors (Shock Absorbers): Plumbing and Drainage Institute listed, Zurn or MIFAB.

Schedule:

"A" - Size #100 PDI - 0-11 Fixture Units
"B" - Size #200 PDI - 12-32 Fixture Units
"C" - Size #300 PDI - 33-60 Fixture Units

E. Vacuum Breaker: Watts Model N36, 3/4" size, 20 CFM capacity.

F. Strainer: Watts Series 777, MIL-S-16293, epoxy-coated or bronze body wye-type, 200 WOG rating, screwed end connections, 20 mesh stainless steel, monel, or bronze screen.

2.8 PIPING, VALVE, AND EQUIPMENT IDENTIFICATION

A. Piping identification: Provide plastic "wrap-around" identification markers indicating flow and fluid flowing for the following:

1. Domestic Hot Water
2. Domestic Cold Water
3. Vent Piping
4. Exposed Above Ground Sanitary Drain Piping

B. Markers shall be placed 30-50 ft. apart for piping in accessible areas.

C. Markers shall be placed outside the pipe insulation and in the most obvious location for viewing.

D. Valve Tags:

1. Attach to each valve a 1-1/2" round or octagonal brass tag with 1/2" indented numerals filled with a durable black compound. In addition to the valve numbers, each tag shall identify the system it controls. Service stop valves exposed in finished areas need not be tagged.

2. Tags shall be securely attached to stems of valves with copper or brass "S" hooks, or chains.

3. Valve charts shall be provided for each piping system and shall consist of schematic drawings of piping layouts, showing and identifying each valve and describing its function. Upon completion of the work, one (1) copy of each chart, sealed to rigid backboard with clear lacquer placed under glass and framed, shall be hung where directed. Two (2) additional unmounted copies shall be delivered to the Engineer.

4. Tags and charts shall be coordinated with Section 15700 Heating System and when completed this work shall have been done sequentially.

E. Equipment Identification: Provide laminated plastic nameplates for equipment, pumps, mixing valves, backflow preventers, and balancing valves. Nameplates shall be laminated 0.125-inch thick melamine plastic conforming to Fed. Spec. L-P-387, black with white center core. Surface shall be a matte finish, corners shall be square. Accurately align lettering and engrave into the white core. Minimum size of nameplates shall be 1.0 inch by 2.5 inches. Lettering shall be minimum of 0.25-inch high normal block lettering.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.

2. Verify that plumbing may be installed in strict accordance with pertinent codes and regulations and the reviewed Shop Drawings.

3.2 INSTALLATION OF PIPING

A. Provide and erect in accordance with the best practice of the trade piping shown on the drawings and as required to complete the intended installation. Make offsets as shown or required to place piping in proper position to avoid other work and to allow the application of insulation and finish painting to the satisfaction of the Engineer.

B. The size and general arrangements, as well as the methods of connecting piping, valves, and equipment, shall be as indicated, or so as to meet the requirements of the Engineer.

C. Piping shall be erected so as to provide for the easy and noiseless passage of fluids under working conditions.

D. Install unions to facilitate removal of equipment.

E. Copper pipe shall be reamed to remove burrs.

F. Connections between copper and steel piping shall be made with brass fittings.

G. Solder joints shall be made with lead free solder. Clean surfaces to be soldered and use a paste flux. Wash joints with sodium bicarbonate and water to remove corrosive effects of heated solder paste. Caution: Lead-bearing solder is not permitted.

H. Pipe penetrations through walls, floors and ceilings shall have pipe sleeves and shall be in accordance with Section 230500 "Supplemental General Mechanical Requirements". Traverse points of piping shall be escutcheoned with split chrome floor and ceiling plates and spring anchors, where visible to occupancy.

I. Provide a cleanout in the vertical position at the base of each sanitary drain riser.

J. Sanitary and vent piping shall be sized and installed at 1/4" per foot slope or as indicated and in no case less than 1/8" per foot.

3.3 PIPE HANGERS

A. Impact driven studs are prohibited.

D. Copper Tubing: supported at intervals with rod sizes as follows, double nuts on hangers and on beam clips.

Copper Size	Hanger Intervals	Rod Sizes
1/2"	5'	3/8"
3/4"	6'	3/8"
1"	6'	3/8"
1-1/4"	8'	3/8"
1-1/2"	8'	3/8"
2"	10'	3/8"

C. Cast Iron Pipe: Supported at intervals with rod sizes as follows, double nuts on hangers and on beam clips.

Cast Iron Size	Hanger Intervals	Rod Sizes
1-1/2"	5'	3/8"
2"	5'	3/8"
2-1/2"	5'	1/2"
3"	6'	1/2"
4"	7'	5/8"

D. PVC and CPVC Pipe: Supported at 4-foot intervals.

E. Verticals: Supported by use of clamp hangers at every story height, and at not more than 6 feet intervals for copper piping 1-1/4" and smaller size.

3.4 CLOSING IN UNINSPECTED WORK

A. General: Cover up or enclose work after it has been properly and completely reviewed.

B. If any of the work is covered or enclosed prior to required inspections and review, uncover the work as required for the test and review. After review, tests and acceptance, repairs and replacements shall be made by the appropriate trades with such materials as necessary for the acceptance by the Architect and at no additional cost to the Owner.

3.5 CLEANUP AND CORROSION PREVENTION

A. Upon completion of the work thoroughly clean and flush piping systems to the sewer with water.

B. Fixtures, piping and equipment shall be thoroughly cleaned. Dirt, dust, and debris shall be removed and the premises left in a clean and neat condition.

C. Caulk around fixtures at floor and wall.

D. Before covering is applied to piping systems, clips, rods, clevises and other hanger attachments, and before uncovered piping is permitted to be concealed, corrosion and rust shall be wire brushed and cleaned and in the case of iron products, a coat of approved protective paint applied to these surfaces. When corrosion is from the effects of hot solder paste, the areas shall be cleaned and polished and a wash of bicarbonate of soda and water used to neutralize the acid condition.

3.6 DISINFECTING

A. After the entire potable water system is completed, cleaned and tested, and just before the building is ready to be occupied, disinfect the system as follows: After flushing the mains, introduce a water and chlorine solution for a period of not less than three hours before final flushing of the system.

3.7 TESTS

A. Sanitary soil, waste and vent piping: Fill with water to top of vents, and test as required by Code.

B. Water piping shall be tested to a pressure of 100 lbs. per square inch for at least 30 minutes. Pressure drop in this period shall not exceed two pounds per square inch. Leaks shall be repaired and system retested. Notify Architect / Engineer 24 hours before test is to be performed.

3.8 INSTRUCTIONS

A. On completion of the project, provide a competent technician to thoroughly instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed four (4) hours. The time of instruction shall be arranged with the Owner.

3.9 FIRESTOPPING

A. Firestopping shall be performed in accordance with Specification Section 078413 “Firestopping”. All penetrations of fire-rated assemblies including walls and floors by mechanical system components (piping, ductwork, conduits, etc.) shall be firestopped as specified.

* END OF SECTION *

Division 23

Heating, Ventilation, and Air Conditioning (HVAC)

SECTION 230000

HVAC SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION

A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required to install the heating, ventilating and air conditioning systems indicated.

1.2 RELATED DOCUMENTS

A. The drawings and the specifications including SECTION 230500 "SUPPLEMENTAL MECHANICAL GENERAL REQUIREMENTS" are hereby made a part of the work of this section.

1.3 SUBMITTALS

A. Substitutions: Your attention is directed to Section 230500-"Substitutions", relative to competition and the (ONLY) notation. Familiarity with this section should be achieved before reading the PRODUCTS section of this specification.

B. The items for which the submittals paragraph in Section 230500, Supplemental Mechanical General Requirements, apply are as follows:

1. Piping materials.
2. Hangers.
3. Valves.
4. Piping, valve and equipment identification.
5. Fans.
6. Packaged Rooftop Air Handlers.
7. Gas-fired unit heaters

PART 2 PRODUCTS

2.1 EQUIPMENT IDENTIFICATION

A. Equipment Identification:

1. Provide laminated plastic nameplates for boilers, pumps, and air handling units. Laminated plastic shall be 0.125-inch thick melamine plastic conforming to Fed. Spec. L-P-387, black with white center core. Surface shall be a matte finish, corners shall be square. Accurately align lettering and engrave into the white core. Minimum size of nameplates shall be 1.0 inch by 2.5 inches. Lettering shall be minimum of 0.25-inch high normal block lettering.

2.2 PACKAGED ROOFTOP AIR HANDLING UNITS

A. Provide high efficiency packaged air conditioning units and coils of manufacturer, model and performance indicated, Trane, York, Daikin or approved equal.

B. The air conditioning units shall consist of a fan section, gas-fired furnace, coil sections, coils, and filter/mixing box section with economizer dampers and barometric relief. Performance shall be ARI 430 certified. Provide access doors in each section. Furnish unit in downflow discharge/return configuration with 12” tall, factory manufactured base curb and high static pressure drive. Furnish with unit-mounted disconnect switch and powered GFCI electrical receptacle.

C. Cabinet Construction: Steel reinforced and braced with steel angle framework, factory-assembled, sectionalized fan and coil sections, removable access panels to internal parts. Metal parts galvanized steel or chemically cleaned, phosphatized, primed and finished with enamel topcoat. Cabinets shall be double wall with a minimum R-4 insulation between the walls.

D. Fans: Shall be as scheduled, multiblade centrifugal type, statically and dynamically balanced and tested. Bearings shall be self-aligning, grease lubricated ball type. Fan motor shall be 1800 RPM, open drip-proof or TEFC type, with greasable ball bearings, variable pitch sheave and mounted on an adjustable base. Provide extended grease lines. The fan drive shall have a 1.5 service factor for the maximum rated horsepower. Motors shall be premium high efficiency with minimum motor efficiency conforming to Section 15000 "Electric Motors and Motor Controls". Submit certificate of conformance for motor efficiency. Motors shall be inverter-duty rated by Baldor, Magnetek or Toshiba conforming to the Consortium for Energy Efficiency Standard.

E. Coils: Capacities and pressure drops shall be rated in accordance with ARI 410. Coils shall be pressure tested at 300 psig and shall be suitable for 150 psig service.

1. Coils: Copper tubes, aluminum fins and copper headers. Casings shall be 16 gage galvanized steel.

F. Mixing box section: Outside air and return air dampers shall be "low leak" type. Blade seals shall be neoprene and jamb seals shall be compressible aluminum or stainless steel.

G. Filters: MERV-13 rated, provide two spare sets of filters.

H. Submit fan curves for each fan with the design operating point clearly marked.

I. The compressors shall be direct-drive, scroll or reciprocating hermetic type with two (2) independent refrigeration circuits. Provide with a five (5) year warranty for parts and labor. Motors shall be suction gas cooled with crankcase heater, low pressure switches, internal temperature and current sensitive motor overloads. Provide with an anti-recycle timer.

J. The air-cooled condenser shall of a copper tube and aluminum finned heat exchanger and direct-drive, dynamically and statically balanced fans with permanently lubricated motors and built-in thermal overload protection.

K. The gas heating section shall be suitable for heating on natural-gas with corrosion-resistant stainless steel components.

2.3 GAS-FIRED HORIZONTAL UNIT HEATERS

A. Horizontal unit heaters shall be manufactured by Reznor, separated combustion, direct ignition, natural gas-fired with external gas connection and single stage heater with flame rollout safety switch. Unit fan shall be axial with 115v fan motor and fan relay. Casings shall be galvanized steel. Cabinets shall be finish painted in a factory-applied baked enamel.

B. Furnish with factory-mounted disconnect switch.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.

2. Verify that the heating system may be installed in accordance with pertinent codes and regulations and the reviewed Submittals.

3.2 CLOSING IN WORK

A. Cover up or enclose work after it has been properly and completely tested and reviewed.

B. No additional cost to the Owner will be allowed for uncovering or recovering any work that is covered or enclosed prior to required test and review.

3.3 TEST AND ADJUST

A. After the installation is complete and ready for operation, test the system under normal operating conditions in the presence of the Architect and demonstrate that the system functions as designed.

B. Correct defects which develop in operational testing, conduct additional testing until defect free operation is achieved.

C. Provide balancing and adjusting of terminal devices in accordance with Specification Section 15990.

3.4 CLEANUP AND CORROSION PREVENTION

A. Piping and equipment shall be thoroughly cleaned. Dirt, dust, and debris shall be removed and the premises left in a clean and neat condition.

B. Before covering is applied to piping systems, clips, rods, clevises and other hanger attachments, and before uncovered piping is permitted to be concealed, corrosion and rust shall be wire brushed and cleaned and in the case of iron products, a coat of approved protective paint applied to these surfaces. When corrosion is from the effects of hot solder paste, the areas shall be cleaned and polished and a wash of bicarbonate of soda and water used to neutralize the acid condition.

3.5 INSTRUCTIONS

A. On completion of the project, instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed four (4) hours. The time of instruction shall be arranged with the Owner. In addition to the prime Mechanical Contractor, the control system Contractor, Balancing Contractor, and Owner's representative shall be present and participate in the Owner's instruction.

3.6 FIRESTOPPING

A. Firestopping shall be performed in accordance with Specification Section 078400 “Firestopping”. All penetrations of fire-rated assemblies including walls and floors by

mechanical system components (piping, ductwork, conduits, etc.) shall be firestopped as specified.

* END OF SECTION *

SECTION 230500

SUPPLEMENTAL MECHANICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Conditions, Supplemental General Conditions and Instructions to Bidders shall apply to this work. Read these to be familiar with conditions related to the installation of the work.

1.2 WORK SHOWN ON DRAWINGS

A. The drawings accompanying this specification, as a part thereof, are working drawings indicating the location and arrangement of the increments of the systems of this section of work. Material deviation from this arrangement, process or means of application, shall bear the Engineer's review stamp before the change is made on the job or materials are ordered. Changes made without such review shall be ordered removed and items installed as specified shall be provided at no additional expense to the Owner.

B. The drawings are not intended to show in minute detail minor items of installation or materials such as specific fittings or findings.

1.3 MATERIALS AND LABOR

A. Furnish materials and labor necessary to deliver to the Owner a complete and operable system installed in accordance with the contract documents.

B. Materials shall be of the best quality. Workmanship shall be of highest grade and construction shall be done according to best practices of the trade.

C. Provide, when required, labeled samples of material or equipment specified herein or proposed to be used in this work.

D. Where words "furnish", "provide", or "install" are mentioned, either singly or in combination, these words are hereby interpreted to mean "furnish and install" or "provide and install", including materials complete with connections, supplemental devices, accessories and appurtenances, unless specifically otherwise noted. These words are likewise hereby interpreted as being prefixed to materials, equipment, and apparatus hereinafter mentioned, either in abbreviated or scheduled information or in the technical sections of the specifications.

1.4 EQUIPMENT INSTALLATION IN HEATING SEASON

A. The system shall be installed such that the construction area will have sufficient heat to maintain temperature above 40^{o}F throughout the construction period.

1.5 COOPERATION BETWEEN TRADES

A. Provide information sufficiently in advance of this work, so that work by the other trades may be coordinated and installed without delays. Furnish and locate sleeves, supports, anchors and necessary access panels.

B. Where work is concealed, assure it does not project beyond finished lines of floors, ceilings, or walls.

C. Equipment or piping requiring access found to be located above sheetrock ceilings shall be brought immediately to the attention of the Architect for resolution.

1.6 VISITING THE PREMISES

A. Visit the premises to observe existing conditions prior to submitting bid.

1.7 ORDINANCES, AUTHORITIES, PERMITS, AND FEES

A. Obtain necessary permits and licenses, give notices and comply with laws, ordinances, rules, regulations or orders affecting the work, and pay fees and charges in connection therewith.

B. The "authority having jurisdiction" is the organization, office, or individual responsible for "approving" equipment, an installation, or a procedure.

1.8 PROTECTION OF WORK AND MATERIALS

A. Protect and care for materials delivered and work performed until the completion of the work. Defective equipment or equipment damaged in the course of storage, installation or test shall be replaced or repaired to the satisfaction of the Engineer at no additional cost to the Owner.

1.9 INSURANCE

A. Purchase and maintain Public Liability and Property Insurance during the progress of the work and until completion and acceptance of the entire project by the Owner in the amounts as specified in the General Conditions.

1.10 APPLICABLE CODES

A. Work and materials shall conform to the latest rules and regulations listed below and these rules and regulations hereby are made part of this specification. They include, but are not necessarily limited to the following:

American Society for Testing and Materials (ASTM)
Underwriters' Laboratories, Inc. (UL)
Air Moving and Conditioning Assoc. (AMCA)
American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
American Society of Mechanical Engineers (ASME)
National Electrical Manufacturers Association (NEMA)
Institute of Electrical and Electronics Engineers (IEEE)
American National Standards Institute (ANSI)
National Fire Protection Association (NFPA)
American Water Works Association (AWWA)
Local Fire Code
Local Plumbing Codes
American Welding Society
International Building Code (IBC)

1.11 SHOP DRAWINGS

A. Submit shop drawings, manufacturers' data and certificates for equipment, materials and finish, and pertinent details for each system where specified in each individual section, five (5) copies, to be submitted to the Architect. Shop drawings will be returned "No

Exceptions Taken", "Make Corrections Noted", "Amend and Resubmit", "Submit Specified Item", or "Rejected" less two (2) copies. Work shall progress in accordance with "Reviewed" shop drawings (ONLY).

B. Groups of similar shop drawings shall be submitted as individual bound documents with covers and indexes. Typical similar items would be "Diffusers and Registers", "Valves and Controls". Rejection of individual items shall not be cause for rejection of the entire document.

C. Clearly indicate item(s) to be reviewed on each submission by highlighting or underlining intended item(s). Submissions not clearly marked shall be returned "Amend and Resubmit".

D. Shop drawings must bear the Engineer's review stamp. In the event that the Engineer returns shop drawings "Amend and Resubmit" or "Rejected", the shop drawing must be revised and resubmitted for review.

E. Furnishing of the specified item must still produce the results and performance, dependability and quality reasonably to be expected within the spirit of the specifications, drawings, and the standard of good mechanical performance normal to the trade.

1.12 SUBSTITUTIONS

A. Where the specifications allow the substitution of a product, still this product is subject to review by the Engineer in accordance with the paragraph entitled "Shop Drawings". Review of a substitute item is an indication only that the substitute item is compatible with the specified item as a claim of the manufacturer. Insure dimensional propriety, performance, and quality of the substitute item.

B. Reference in the specifications or on the drawings to any product, material, fixture, form or type of construction, by proprietary name, manufacturer, make or catalog number, establishes a standard of quality or design and is not meant to limit competition. Use any equivalent substitute provided favorable written review by the Engineer is first obtained. The (ONLY) notation in the specification is an exception to this and leaves no option.

C. For materials or equipment which are supplied with integral or factory applied finish, the colors will be considered in evaluating substitutions.

D. For the purpose of avoiding conflicts with other trades, contracts, and adjoining work where more than one (1) article, device, material, fixture, form or proprietary name, manufacturer, make or catalog number, the first named shall be used as the basis of design and details. The cost of any changes because of substituted item shall be borne by the Contractor requesting such change.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 EQUIPMENT SUPPORTS

A. Furnish and install equipment supports for mechanical equipment as required. Supports shall be subject to review by the Engineer.

3.2 SLEEVES AND PREPARED OPENINGS

A. Coordinate cutting, patching and setting of sleeves, frames, framing and lintels for openings with other trades. Sleeves shall be furnished by the Contractor. All penetrations through concrete shall be sleeved as required by IBC. Penetrations of fire-rated assemblies shall be sleeved, sleeve material shall be the same as the component penetrating the assembly.

B. Failure to give timely notice of and to locate openings and furnish sleeves shall cause no additional expense to the Owner.

3.3 CONNECTION TO EQUIPMENT

A. Provide piping connections, supports, brackets, compensators or flexible connections to prevent application of excessive stresses to equipment.

B. Equipment shall be installed with flanges or unions in such a manner as to permit disconnecting for removal of tubes, coils, elements and other equipment for inspection, service and repairs.

3.4 ACCESS TO EQUIPMENT

A. The installation of work performed shall provide reasonable accessibility for operation, inspection, and maintenance of equipment and accessories. The Engineer shall determine the adequacy of such accessibility.

3.5 ACCESS PANELS

A. Access panels shall be provided where indicated on the drawings and as required for access to valves and other serviceable components.

B. Access panels installed in fire-rated assemblies shall have the same fire rating as the assembly.

3.6 PAINTING OF EQUIPMENT

A. Exposed ironwork, including steel supports and hangers in unfinished spaces, mechanical rooms, pits, and trenches shall be properly cleaned, prepared and painted with two (2) coats of black asphaltum varnish.

3.7 GUARDS

A. Exposed moving and rotating elements of mechanical equipment items shall be protected with suitable guards for personnel protection. Guards shall be of rigid construction, firmly positioned. Holes shall be provided in guards at shaft centers to facilitate tachometer readings.

3.8 LUBRICATION

A. Furnish and install grease fittings for points requiring lubrication. Furnish extension type fittings as required to provide easy access for maintenance lubrication.

B. Furnish initial charges of lubricants for equipment. Lubricants shall be in conformance with the manufacturer's requirements and recommendations.

3.9 ELECTRIC MOTORS AND MOTOR CONTROLS

A. Unless otherwise noted, motors, motor starters and other electrical accessories which are specified under Mechanical specifications shall be selected with characteristics as follows:

1/2 Horsepower and less - 120 volt, 1 phase, 60 Hz.
3/4 Horsepower and greater - 460 volt, 3 phase, 60 Hz.

B. Motors shall be built in accordance with the latest applicable NEMA, IEEE and ANSI Standards. Motors shall be of the latest type and quality specified under individual items of equipment.

C. Magnetic motor starters for mechanical items of equipment shall be furnished under Division 16 unless the starter is an integral part of a factory packaged item of equipment. Each starter furnished as an integral item of equipment shall be provided with overload heater elements. Starters shall have single phase protection or shall have relays installed to provide this feature. Starters shall be equipped with suitable step-down transformers to provide required control voltage.

D. Motors shall have a minimum continuous duty service factor of 1.15. Minimum motor efficiency shall be:

MOTOR HORSEPOWER	PERCENTAGE EFFICIENCY		
	(1200RPM)	(1800 RPM)	(3600 RPM)
1	80.0	82.5	-----
1-1/2	84.0	84.0	82.5
2	85.5	84.0	84.0
3	86.5	86.5	84.0
5	87.5	87.5	85.5

3.10 CLEANING OF SYSTEMS

A. Piping systems shall be thoroughly cleaned and flushed prior to initial operation.

B. Thoroughly clean exposed portions of the mechanical installation, removing labels and foreign substance.

C. Furnish detergents, solvents, cleaning compounds, and tools required for cleaning operations.

D. Keep the premises free from accumulation of waste material or rubbish and at the completion of the work, remove from the job site tools, scaffolding, surplus materials, and rubbish, leaving the work areas "broom" clean.

3.11 STARTING OF EQUIPMENT

A. Testing or starting of equipment shall be done in collaboration with trades concerned to insure safe and proper operation of the equipment.

B. Prior to starting equipment, provide lubrication at required points. Before starting any electrical or electric motor driven equipment, a check must be made to insure that proper heater coils are installed in the starters and that the equipment is rotating in the proper direction.

3.12 OPERATIONAL TESTING

A. Operate systems until successful operation is demonstrated to the Engineer. This initial operation shall be in addition to the testing of the system and shall be done after the system is cleaned and finished.

3.13 RECORD DRAWINGS

A. During construction, keep an accurate record of deviations to the installation of the work as indicated on the drawings. Upon completion of the work, furnish a copy of this record to the Engineer. Submit record drawings before requesting final payment.

3.14 MANUFACTURER'S REPRESENTATIVE

A. As indicated in the Technical Sections of this specification or as directed by the Engineer, provide the services of a factory trained Engineer or Technician to inspect, adjust, and place in proper operating condition the equipment or item involved. No additional compensation will be allowed for such service.

3.15 MANUFACTURER'S INSTRUCTIONS, OPERATION AND MAINTENANCE DATA

A. Provide for each item of equipment or apparatus furnished, a complete set of printed instructions obtained from the manufacturer covering proper operation, maintenance, lubrication, cleaning, servicing, adjustment, and safety instructions.

B. Manufacturer's data shall include performance data (curves are preferred where applicable) complete parts lists, recommended spare parts lists, piping, and wiring diagrams.

C. Arrange data in complete sets, properly indexed and marked.

D. Data shall include a complete set of shop drawings.

E. Material shall first be submitted in preliminary form for review by the Engineer. After review, submit two (2) copies in bound volumes to the Engineer for distribution.

3.16 GUARANTEES

A. An item becomes "defective" when it ceases to conform to the Contract Documents. Guarantees begin on the date of issuance of a certificate authorizing final payment or certificate of substantial completion with the Owner taking occupancy or beneficial use thereafter.

B. Upon completion of the work and before applying for final payment, furnish a written guarantee, stating that the work complies with the provisions of codes listed herein and the local enforcing authorities, and that it will be free from defects of material and workmanship for not less than one (1) year. Guarantee shall further state that the Contractor will, at his own expense, repair or replace any of his material and work which may become defective during the time of guarantee, together with other work damaged as a consequence of such defects.

C. Repeated malfunctioning or failure in service of any item or work of the system is sufficient cause for the Engineer to order the removal of the item, and its replacement with new item at the expense of the Contractor.

3.17 EXISTING UTILITIES AND EQUIPMENT

A. Care shall be taken to protect or replace damaged existing utilities. Information indicated in the contract documents is the best information available as to the location of underground and concealed utilities and equipment.

3.18 FIRESTOPPING

A. Firestopping shall be performed in accordance with Specification Section 07840 “Firestopping”. All penetrations of fire-rated assemblies including walls and floors by mechanical system components (piping, ductwork, conduits, etc.) shall be firestopped as specified.

* END OF SECTION *

SECTION 230593

TESTING AND BALANCING AIR SYSTEMS

PART 1 GENERAL

1.1 DESCRIPTION

A. The work covered by this section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required for testing and balancing the air systems.

1.2 GENERAL REQUIREMENTS

A. The provisions of Section 230593, "Supplemental Mechanical Requirements", apply to this section.

1.3 DEFINITIONS

A. Adjust: To regulate the specified fluid flow rate and air patterns at the terminal equipment, (e.g., reduce fan speed, throttling).

B. Balance: To proportion flows within the distribution system (submains, branches and terminals) in accordance with specified design quantities.

C. Procedure: Standardize approach and execution of sequence of work operations to yield reproducible results.

D. Report Forms: Test data sheets arranged for collection of test data in logical order to submission and review. This data should also form the permanent record which shall be used as the basis for any future testing, adjusting, and balancing required.

E. Test: To determine quantitative performance of equipment.

1.4 SUBMITTALS: Submit the following:

A. Standards Compliance:

Testing Agency
Testing Agency Personnel
Professional Engineers
Instrument Calibration

1.5 TESTING AND BALANCING AGENCY

A. Air Systems Testing and Balancing: Upon completion of the installation and field testing, performance test and adjust the supply, return, make-up, and exhaust air systems to provide the air volume quantities indicated. Accomplish work in accordance with the agenda and procedures specified and AABC 71679 and standards of the NEBB. Correct air and water system performance deficiencies disclosed by the test before balancing the systems.

B. Agency Qualifications: Obtain the services of a qualified testing organization to perform the testing and balancing work as herein specified. Prior to commencing work under this section of the specifications, the testing organization shall have been reviewed by the Architect. The criteria for determining qualifications shall be membership in the AABC, or certification by the NEBB, or the testing organization shall have submitted proof to satisfy the Architect that the organization meets or exceeds the technical standards for membership of the AABC as

published in the AABC 71679. The testing organization shall be independent of both the installing contractors and equipment suppliers for this project.

1.6 AGENDA

A. Preliminary Report: Review drawings and specifications prior to installation of any of the affected system. Submit a written report to the Architect indicating any deficiencies in the system that would preclude the proper adjusting, balancing, and testing of the systems.

1.7 PROCEDURES, GENERAL

A. Requirements: Adjust systems and components thereof that perform as required by drawings and specifications.

B. Test Duration: Operating tests of heating and cooling coils, fans and other equipment shall be of not less than 4 hours duration, after stabilized operating conditions have been established. Capacities shall be based on temperatures and air and water quantities measured during such tests.

C. Instrumentation: Method of application of instrumentation shall be in accordance with the manufacturer's instructions. Furnish personnel, instruments, and equipment for tests specified herein.

D. Accuracy of Instruments: Instruments used for measurements shall be accurate. Provide calibration histories for each instrument for examination. Calibrate each test instrument by an reviewed laboratory or by the manufacturer. The Architect has the right to request instrument recalibration, or the use of other instruments and test methodology, where accuracy of readings is questionable.

E. Accuracy of Thermometers: Plus or minus one graduation at the temperatures to be measured. Graduations shall conform with the following schedule:

Medium	Design Temperature Differential (^{o}F)	Maximum Graduation (^{o}F)
Air	10 or less	1/2
Air	over 10	1

F. Flow Rate Tolerance: Values are based on discussion in ASHRAE "HVAC Applications", Chapter 34. Air filter resistance during tests, artificially imposed if necessary, shall be 80 percent of final values.

1. Air Handling Unit CFM: Minus 0 percent to plus 10 percent.

2. Other Fans: Minus 0 percent to plus 10 percent.

3. Air Terminal Units (VAV Boxes): Minus 5 percent to plus 10 percent.

4. Minimum Outside Air (for manually set dampers): Minus 0 percent to plus 10 percent.

5. Individual Room Air Outlets and Inlets, and Air Flow Rates Not mentioned Above: Minus 10 percent to plus 10 percent.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 AIR SYSTEM PROCEDURES

A. Adjustments: Adjust air handling systems to provide the required design air quantity to, or through, each component. Conduct adjusting and balancing of systems during periods of the year approximating maximum seasonal operation.

B. Balance: Use flow adjusting (volume control) devices to balance air quantities only; i.e., proportion flow between various terminals comprising system, and only to the extent that their adjustments do not create objectionable air motion or sound, i.e., in excess of specified limits.

C. Balancing Between Runs (submains, branch mains, and branches): Use flow regulating devices at, or in, the divided - flow fitting. Minimize restriction imposed by flow regulating devices in or at terminals.

D. Final Measurements of Air Quantity: Make final measurements of air quantity, after the air terminal has been adjusted to provide the optimum air patterns of diffusion.

E. Fan Adjustment: Total air system quantities, generally, shall be varied by adjustment of fan speeds, or axial-flow fan wheel blade pitch. For systems with direct-connected fans (without adjustable pitch blades), damper restrictions of a system's total flow or variable speed rheostats shall be adjusted as appropriate.

F. Air Measurement:

1. Pitot Tube: Except as specifically indicated herein, make pitot tube traverses of each duct to measure air flow therein. Pitot tubes, associated instruments, traverses, and techniques shall conform with the ASHRAE Handbook Fundamentals.

2. Pitot Tube Traverse: Pitot-tube traverse may be omitted if the duct serves only a single room or space and its design volume is less than 2000 cfm. In lieu of Pitot-tube traverse, determine air flow in the duct by totalling volume of individual terminals served, measured as described herein.

3. Measurements of Air Quantity: Where duct's design velocity and air quantity are both less than 1000 (fpm/cfm), air quantity may be determined by measurements at terminals served.

G. Air Terminal Balancing: Measurement of flow rates by means of velocity meters applied to individual terminals, with or without cones or other adapters, shall be used only for balancing.

3.2 CERTIFIED REPORTS

A. Submittal: Submit three copies of the reports described herein, covering air and water system performance, air motion (fpm), to the Architect prior to final tests and inspection.

B. Instrument Records: Include types, serial numbers, and dates calibration of instruments.

C. Reports: Reports shall identify conspicuously items not conforming to contract requirements, or obvious maloperation and deficiencies.

D. Certification: The reports shall be certified by an independent Registered Professional Engineer who is versed in the field of air and water balancing and who is not affiliated with any firm involved in the design or construction phases of the project.

3.3 AIR SYSTEM DATA

A. Report: The certified report shall include for each air-handling system the data listed below:

1. Equipment (fan or factory fabricated station unit):

a. Installation Data:

1) Manufacturer and Model
2) Size
3) Arrangement, Discharge, and Class
4) Motor H.P., Voltage, Phase, Cycles, and Full Load Amps.
5) Location and Local Identification Data

b. Design Data: Data listed in schedules on drawings and specifications.

c. Fan Recorded (Test) Data

1) C.F.M.
2) Static Pressure
3) R.P.M.
4) Motor Operating Amps.
5) Motor Operating B.H.P.

2. Duct Systems:

a. Duct Air Quantities (Maximum and Minimum) - Main, Submains, Branches, Outdoor (Outside) Air, Total-Air, and Exhaust

1) Duct size(s)
2) Number of Pitot-tube (Pressure) Measurements
3) Sum of Velocity Measurement, excluding pressure measurements
4) Average Velocity
5) Recorded (Test) C.F.M.
6) Design C.F.M.

b. Individual Air Terminals:

1) Terminal Identification (Supply or Exhaust, Location and Number Designation)
2) Type Size, Manufacturer, and Catalog Identification
3) Design and Recorded Quantities - C.F.M.
4) Deflector Vane or Diffusion Cone Settings
5) Applicable Factor for Application, Velocity, Area
6) Design and Recorded Velocities - F.P.M. (State "core" "inlet," as applicable)

3.4 FINAL TESTS, REVIEW, AND ACCEPTANCE

A. Capacity and Performance Tests: Make tests to demonstrate that capacities and general performance of air and water systems comply with contract requirements.

B. Final Inspection: At the time of final review, recheck, in the presence of the Engineer, random selections of data water and air quantities and air motion recorded in the certified report.

C. Points and Areas for Recheck: As selected by the Architect.

D. Measurement and Test Procedures: As reviewed for work forming basis of certified report.

E. Selections for Recheck (specific plus random): In general, selections for recheck will not exceed 25 percent of the total number tabulated in the report.

F. Retests: If random tests elicit a measured flow deviation of ten percent or more from that recorded in the certified report listings, at ten percent or more of the rechecked selections, the report shall be automatically rejected. In the event the report is rejected, systems shall be readjusted and tested, new data recorded, new certified reports submitted, and new inspection tests made.

G. Marking of Settings: Following final acceptance of certified reports by the Architect, the settings of valves, dampers, and other adjustment devices shall be permanently marked, so that adjustment can be restored if disturbed at any time. Do not mark devices until after final review.

* END OF SECTION ***

SECTION 230700

INSULATION

PART 1GENERAL

1.1 RELATED DOCUMENTS

A. The drawings and the specifications including Section 230500 “Supplemental General Mechanical Conditions” are hereby made a part of the work of this section.

1.2 DESCRIPTION

A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required to insulate the heating, ventilating, air conditioning, and plumbing systems.

1.3 SUBMITTALS

A. Substitutions: Your attention is directed to Section 230500-"Substitutions", relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.

B. The items for which the submittals paragraph in Section 230500, Supplemental General Mechanical Requirements, apply are as follows:

1. Piping insulation.
2. Duct insulation.
3. Insulation application schedule.
4. Vapor barrier coating.

1.4 DEFINITIONS

A. Finished Spaces: Spaces other than furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels, unless specifically listed below as an unfinished space.

B. Unfinished Spaces: Mech/Elect Rooms and attic.

C. Unconditioned Spaces: Spaces exposed to near outside ambient temperatures and spaces not air conditioned.

C. Outside: Areas beyond the exterior side of walls or above the roof, unexcavated spaces, and crawl spaces.

D. Concealed: Not visible in finished or unfinished spaces. For example, above ceilings, below floors, between double walls, furred-in areas, pipe and duct shafts, and similar spaces.

E. Exposed: Visible from a finished or unfinished space.

1.5 MANUFACTURER'S STAMP OR LABEL

A. Packages or standard containers of insulation, jackets, cements, adhesives, and coatings delivered to the project site for use must have the manufacturer's stamp or label attached giving name of manufacturer, brand, and description of material. Insulation shall be asbestos-free.

1.6 FLAME SPREAD AND SMOKE DEVELOPED RATINGS

A. Materials shall have a flame-spread rating of not more than 25 and a smoke developed rating of not more than 50 when tested in accordance with NFPA 255, ASTM E84, or UL 723.

B. Provide materials with flame resistant treatments not subject to deterioration due to aging, moisture, high humidity, oxygen, ozone, or heat.

C. Materials Exempt From Fire-Resistant Rating: Nylon anchors for securing insulation to ducts or equipment.

PART 2PRODUCTS

2.1 PIPING INSULATION

A. Fiberglass: Heavy density preformed fiberglass with thermal conductivity of 0.29 Btu-in/hr-ft^2-^{o}F at 150^{o}F mean temperature. Insulation shall conform to ASTM C547 Class I and shall be suitable for 450^{o}F service. Fitting insulation shall be of same material used for pipe.

1. Insulation Jacket: All service (ASJ) type conforming to Fed. Spec. HH-B-100B Type I. Jacket permeability shall not exceed 0.02 perms (ASTM E96). Pipe fitting jacket shall be factory premolded, one-piece, PVC covers with pressure sensitive taped joints. Jackets in exposed locations shall have a white surface suitable for field painting. Provide vapor barrier as required by service.

2. Aluminum Jackets: ASTM B 209M (ASTM B 209), Temper H14, minimum thickness of 27 gage (0.016 inch), with factory-applied polyethylene and kraft paper moisture barrier on inside surface. Provide smooth surface jackets for jacket outside diameters less than 8 inches. Provide corrugated surface jackets for jacket outside diameters 8 inches and larger. Provide 1/2" wide stainless steel bands. Provide factory prefabricated aluminum covers for insulation on fittings, valves, and flanges.

3. PVC Jacket: ASTM 1784, minimum thickness 0.030", over insulation and vapor barrier. Jacket shall be overlapped 2" minimum on down side.

B. Flexible Unicellular: Flexible unicellular with thermal conductivity of 0.27 Btu-in/hr-ft^2-^{o}F at 75^{o}F mean temperature. Insulation shall conform to ASTM C534, Type I, Tubular and shall be suitable for 200^{o}F service. Fitting insulation shall be of same material used for pipe. Permeability shall not exceed 0.10 perms (ASTM E96). Insulation adhesive shall conform to Mil. Spec. MIL-A-24179A, Type II, Class 1.

C. Fittings, Flanges, and Valves: Provide insulation for fittings, flanges, and valves premolded, precut, or job fabricated of the same thickness and conductivity as used on adjacent piping.

2.2 DUCT INSULATION

A. Fiberglass (Ductwrap): Fiberglass duct wrap with foil-scrim-kraft facing/vapor barrier, 1.0 lb/cu.ft. density (0.75 lb/cu.ft. for 3" thickness only), 0.29 Btu-in/hr-ft2-oF conductivity at 75°F mean temperature, 0.05 permeance rating. Insulation shall meet the requirements of NFPA 90A & B and shall be UL rated. Provide foil-scrim-kraft (FSK) tape.

2.3 VAPOR BARRIER COATING

A. Raw (cut) ends of fiberglass pipe insulation shall be finished (protected) with the application of a suitable vapor barrier coating or finishing cement (mastic) to maintain the continuous

visual and functional integrity of the insulation jacket. Mastic shall be Childers “Chil-Perm” CP-30, elastomeric resin, or approved equal, applied in accordance with the manufacturer’s recommendations.

2.4 EQUIPMENT INSULATION

A. Flexible Unicellular (Cold Equipment): Flexible unicellular with thermal conductivity of 0.27 Btu-in/hr-ft^2-^{o}F at 75^{o}F mean temperature. Insulation shall conform to ASTM C534, Type II, sheet and shall be suitable for 200^{o}F service. Permeability shall not exceed 0.10 perms (ASTM E96). Insulation adhesive shall conform to Mil. Spec. MIL-A-24179A, Type II, Class 1.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.

2. Verify that the insulation systems may be installed in accordance with pertinent codes and regulations and the reviewed Submittals.

3.2 GENERAL

A. Insulate after system tests have been completed and surfaces to be insulated have been cleaned of dirt, rust, and scale and are dry.

B. Install insulation with jackets drawn tight and cement down longitudinal and end laps. Do not use scrap pieces where a full length section will fit. Insulation shall be continuous through sleeves, wall and ceiling openings, except at fire dampers in duct systems and pipe penetrations through fire rated assemblies. Extend surface finishes to protect ends, and raw edges of insulation. Apply coatings and adhesives at the manufacturer's recommended coverage per gallon. Individually insulate piping and ductwork. Keep insulation dry during the application of the finish. Bevel and seal the edges of exposed insulation.

C. Unless otherwise indicated, do not insulate the following:

1. Factory pre-insulated flexible ductwork.
2. Factory pre-insulated ductwork, plenums, casings, mixing boxes, and filter boxes.
3. Chrome plated pipes and fire protection pipes.
4. Vibration isolating connections
5. Adjacent insulation
6. ASME stamps, nameplates, access plates
7. Ductwork exposed to view in a normally occupied space.
8. Hydronic specialties: Low water cutoff, relief valves, relief valve discharge piping, pressure reducing valves, and expansion tanks.
9. Unions and flanges at equipment required for frequent service.

3.3 PIPING INSULATION

A. Pipe Insulation (Fiberglass): Place sections of insulation around the pipe and joints, tightly butt into place. Draw jacket laps tight and smooth. Secure jacket with fire resistant adhesive, or factory applied self sealing lap. Cover circumferential joints with butt strips, not less than 3-inches wide, of material identical to the jacket material. Overlap longitudinal laps

of jacket material not less than 1-1/2 inches. Adhesive used to secure the butt strip shall be the same as used to secure the jacket laps.

B. Flanges, Unions, Valves and Fittings Insulation (Fiberglass): Factory fabricated removable and reusable insulation covers. Place factory premolded, precut or field-fabricated segmented insulation of the same thickness and conductivity as the adjoining pipe insulation around the flange, union, valve, and fitting abutting the adjoining pipe insulation. Install factory premolded one-piece PVC fitting covers over the insulation and secure by stapling or with metal or plastic tacks made for securing PVC fitting covers and secure with PVC vapor barrier tape.

C. Pipe Insulation (Flexible Unicellular): Bond cuts, butt joints, ends, and longitudinal joints with adhesive. Miter 90-degree turns and elbows, tees, and valve insulation. Insulate flanges, unions, valves, and fittings.

D. Where penetrating roofs and exterior walls, insulate piping to a point flush with the underside of the deck or wall and seal with a vapor barrier coating.

E. Hangers and Anchors: Pipe insulation shall be continuous through pipe hangers. Where pipe is supported by the insulation, provide MSS SP-58, Type 40 galvanized steel shields (16 gage maximum). For fiberglass insulation systems on pipe sizes 2 inches through 3", provide insulation inserts at points of hangers and supports. Insulation inserts shall be of molded glass fiber (minimum 12 pcf). Insulation inserts shall cover the bottom half of the pipe circumference, 180 degrees, and be not less than 4" long. Vapor-barrier facing of the insert shall be of the same material as the facing on the adjacent insulation. Seal inserts into the insulation. Insulation inserts for pipe sizes 4" and larger shall be welded pipe saddles. Install insulation in void area of saddle of same material used on adjacent insulation. For pipe sizes 2" and smaller, insulation inserts for flexible unicellular insulation systems shall be wooden doweling set on end of length equal to insulation thickness. Seal dowel to insulation with adhesive.

F. PVC or Metal Jackets: Provide over insulation. Machine cut jacket to smooth edge of circumferential joints. Overlap metal jacket not less than 2 inches at longitudinal and circumferential joints and secure with metal bands at not more than 9 inch centers. Overlap longitudinal joints down to shed water. Seal circumferential joints with a coating recommended by insulation manufacturer for weatherproofing. Solvent weld PVC jacket system to provide continuous watertight seal.

3.4 DUCT INSULATION

A. Flexible Blanket Insulation: Apply insulation with joints tightly butted. Staple laps of jacket with outward clinching staples and seal with foil scrim kraft (FSK) tape. Sagging of flexible duct insulation shall not be permitted. For ductwork over 24-inches wide on horizontal duct runs, provide pins, washers and clips. Install speed washers with pins and pin trimmed to washer. Cut off protruding ends of pins after clips are secured. Seal with FSK tape, extend tape 1" minimum around pin. Use pins on sides of vertical ductwork being insulated. Space pins and clips on 18 inch centers and not more than 18 inches from duct corners. Carry insulation over standing seams and trapeze-type hangers.

B. Fiberglass (Ductboard): Fiberglass insulation board with foil-scrim-kraft facing/vapor barrier, 3.0 lb./CF density, 0.25 Btu-in/hr-ft^2-^oF conductivity at 75^oF mean temperature, 0.05 permeance rating. Insulation shall meet the requirements of NFPA 90A and B and shall be UL rated. Provide foil-scrim-kraft (FSK) tape.

3.5 EQUIPMENT INSULATION

A. General Procedures: Apply equipment insulation suitable for temperature and service to fit as closely as possible to equipment. Join sections of insulation with adhesive. Bevel insulation around name plates, ASME Stamp, and access plates. For insulation on equipment that must be opened periodically for inspection, cleaning, or repair, construct insulation to be removable and replaceable without damage. Provide vapor barrier seal at joints and seams for "cold" equipment.

B. Cold Equipment: Provide flexible unicellular sheet insulation, bond cuts, butt joints, longitudinal joints and ends with vapor barrier adhesive. Vapor seal exposed edges to equipment.

3.6 INSULATION APPLICATION SCHEDULE

SERVICE	THICKNESS	MATERIAL/JACKET
PIPING:		
Domestic Cold Water Piping		
1" and smaller	1/2"	Fiberglass w/ASJ or Flexible Unicellular
1-1/4" and larger	1"	Fiberglass w/ASJ or Flexible Unicellular
Domestic Hot Water Piping and Domestic Hot Water Recirculation Piping		
2" and smaller	1-1/2"	Fiberglass w/ASJ or Flexible Unicellular
Water and Drain Piping Under Handicap Accessible Fixtures		Insulation Kit
DUCTWORK:		
Supply Ductwork from the Air Handlers to spaces served	1-1/2"	Ductwrap, FSK
Exhaust Ductwork from a point three (3) feet interior of the motorized control damper or backdraft damper to the exterior wall, roof, or louver.	3"	Ductboard, FSK

3.7 FIELD INSPECTION

A. Visually inspect to ensure that materials used conform to specifications. Inspect installations progressively for compliance with requirements.

* END OF SECTION *

SECTION 230900

AUTOMATIC TEMPERATURE CONTROLS

PART 1 GENERAL

1.1 DESCRIPTION

A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required to install the automatic temperature control system indicated. The system shall be an electric/electronic system.

B. The automatic temperature controls system shall be provided and installed by trained control mechanics regularly employed in the installation and calibration of ATC equipment by the manufacturer of such equipment. Control installation by any Contractor whose principle business is not direct manufacture and installation is prohibited.

1.2 ACCEPTABLE MANUFACTURERS

A. Honeywell, Inc.
B. Siebe / Invensys, Maine Controls.
C. Siemens
D. York (JCI)
E. Andover Controls (Basix)

1.3 RELATED DOCUMENTS

A. The drawings and the specifications including SECTION 230500 "SUPPLEMENTAL MECHANICAL GENERAL REQUIREMENTS" and SECTION 260000 “ELECTRICAL” are hereby made a part of the work of this section.

1.4 SUBMITTALS

A. Substitutions: Your attention is directed to Section 230500 relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.

B. The items for which the shop drawings paragraph in Section 230500, Supplemental General Mechanical Requirements, apply are as follows:

1. Temperature control system schematic including variables, flow diagrams, ladder diagrams, and point to point wiring diagrams, indicating set points, reset ranges, throttling ranges, controller gains, differentials, operating ranges, normal positions, controller action, dial ranges, voltages, currents, mounting locations, indicators, and terminal strip points.

2. Sequence of operation for each system and function.

3. Generic, functional description of each control component indicated.

4. Equipment interlocks required by sequence of operation.

5. Automatic valve schedule showing flow, Cv, and pressure drop.

6. Manufacturer's Data:

a. Dampers, valves and operators.
b. Controllers, including wiring and connection diagrams.
c. Thermostats, temperature sensors, including wiring and connection diagrams.
d. Temperature and pressure indicators.
e. Pressure sensors, including wiring and connection diagrams.
f. Switches, relays, transmitters, transformers, including wiring and connection diagrams.

PART 2PRODUCTS

2.1 CONTROL PANELS

A. In general, relays, transformers, or other control devices (not including room thermostats or duct-mounted instruments) shall be grouped and mounted in a factory-built cabinet enclosure.

2.2 AUTOMATIC CONTROL DAMPERS

A. Automatic dampers not furnished with equipment shall be furnished under this paragraph. Automatic dampers shall be constructed and installed in accordance with the following specifications:

1. Damper Blades: All automatic dampers, including dampers for static pressure control, shall be of the balanced type, factory-fabricated, with fully gasketed galvanized steel airfoil blades, mounted in welded frames. Damper blades shall be not more than 8 inches wide, shall have interlocking edges, edge and jamb seals and be capable of operation against 4" static pressure differential. Dampers shall be Arrow "Arrow-Foil" Model PBDAF-206, OBDAF-207, Ruskin Model CD-60 or Tamco Series 1000.

2. Modulating Dampers: All modulating dampers shall be of the opposed blade type.

3. Damper Size and Bearings: Damper blades shall have steel trunnions mounted in oil-impregnated bearings. Dampers shall be not more than 48 inches in length between bearings.

4. Frames: Damper frames shall be of welded channel or angle-iron, with heavy steel corner gussets and braces or stiffened with steel tie-rods where necessary. Frames shall be painted with aluminum paint to prevent rusting.

5. Dampers shall be guaranteed to close tightly, and shall provide substantially the full area of the opening when open. All outdoor air intakes and all exhaust ducts to outside and all fresh air, return air and exhaust air dampers in systems shall have damper blades with inflatable seals or other devices to guarantee low leakage, not to exceed 4 CFM/SF at 1 in. WG pressure differential.

6. Damper Linkages: Damper-operating links shall be cadmium plated steel or brass rods, adjustable in length with ball and socket joints and of such proportions that they will withstand, without appreciable deflection, a load equal to not less than twice the maximum operating force of the damper motor. Linkages shall be concealed in the frame.

B. Damper Actuators: For each automatically controlled damper, a suitable damper actuator or actuators shall be provided in accordance with the following specifications:

1. Actuator: Damper actuators shall be electronic, direct-coupled, spring-return type and have a rating of not less than twice the torque needed for actual operation of the damper.

2. Adjustments: Provide adjustable stops for the open and closed positions.

3. Mounting: Damper actuators shall be direct-coupled over the shaft. The damper actuators and mounting base shall not be mounted directly on cold or insulated ducts and casings, but shall be mounted outside the insulated covering in such a manner as to prevent sweating and interference with the insulation.

4. Where indicated, damper actuators shall be provided with an auxiliary switch rated at 120 V AC, and accept a 4 to 20 ma input.

2.3 TEMPERATURE SENSORS

A. Temperature Sensors: RTD Elements, accuracy of +0.1% at 70^{o}F, sensors shall be securely attached to a single gang electrical box or other suitable base, securely mounted on the wall or other building surface. Each sensor shall be located where shown or, if not shown, where it will respond to the average temperature in the room. Sensors, generally, shall be mounted 48 inches above the floor within ADA reach guidelines, and shall not be mounted on outside walls if other locations are possible. If located on an outside wall, it shall have an insulated base. Sensors shall have adjustment devices, by means of which the operating points can be adjusted through a range of not less than 10 degrees above and below the operating points specified.

B. No devices containing mercury are permitted.

2.4 SEQUENCE OF CONTROL

A. Provide and install electric/electronic components to enable the mechanical system to operate in the following sequences:

1. Packaged Rooftop Air Handler – Office Areas:

a. Supply Fan: Shall run operate continuously during the occupied mode.

b. Outside Air Damper: Shall be open to the minimum position while the system is operating in the occupied mode.

c. Space temperature control: The unit controls shall operate the gas heating, dx-cooling and economizer cooling as necessary to maintain the space temperature setpoint. .

d. Unoccupied Mode: The outside air damper shall be closed. The supply fan shall cycle and the gas heating/dx-cooling shall operate to maintain the unoccupied setpoint.

2. Exhaust Fans (EF-1): Shall operate continuously.

3. Exhaust Fan (EF-2): Shall operate based on a wall mounted switch.

4. Exhaust Fan (EF-3): Shall operate based on a wall mounted switch.

5. Gas-fired unit heater (GFUH-1): On a call for heat from the space temperature sensor, the fan shall be energized and the gas heater shall fire.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.

2. Verify that the automatic temperature control and system may be installed in strict accordance with pertinent codes and regulations and the reviewed Shop Drawings.

3.2 INSTALLATION

A. Provide wiring, and conduit to connect the ATC components for an operational ATC system. Wiring and installation shall conform to NFPA 70.

B. Identification: Label or code each field wire at each end. Permanently label or code each point of field terminal strips to show the instrument or item served. Color-coded cable with annotated cable diagrams may be used to accomplish cable identification.

C. Temperature Sensors: Stabilize sensors to permit on-the-job installation that will require minimum field adjustment or calibration. Temperature sensor assemblies shall be readily accessible and adaptable to each type of application to allow quick, easy replacement and servicing without special tools or skills. Strap-on sensor mountings, using helical screw stainless steel clamps, shall be permitted on new piping for unit heater or other on-off operation only, after pipe is cleaned to bright metal. Strap-on bulb and pipe shall be insulated after installation. Strap-on sensor mountings are also permitted for hot water piping sizes up to 2 inches. Other liquid temperature sensors shall be provided with wells.

D. Duct Sensors: Provide sensors in ductwork; specific location within duct shall be selected to accurately sense air properties. Do not locate sensors in dead air spaces or positions obstructed by ducts or equipment. Installation shall be within the vibration and velocity limits of the sensing element. Where an extended surface element is required to sense the average or lowest air temperature, position and securely mount sensor within duct in accordance with sensor manufacturer's recommendations. Temperature sensing elements shall be thermally isolated from brackets and supports. Provide separate duct flange for each sensing element; securely seal ducts where elements or connections penetrate duct. Seal penetrations of duct insulation vapor barrier with vapor barrier coating compound to provide a vapor-tight covering. Mount sensor enclosures to allow easy removal and servicing without disturbance or removal of duct insulation or vapor barrier. On downstream side of each sensor, provide access doors.

E. Pipe Sensors: Provide wells for sensors measuring temperatures in pressure vessels or in pipes. Wells shall be noncorrosive to the medium being measured and shall have sufficient physical strength to withstand the working and test pressures and velocities. Locate wells to sense continuous flow conditions. Do not install wells using extension couplings. Where piping diameters are smaller than the length of the wells, provide wells in the piping at elbows to effect proper flow across the entire area of the well. Wells may either look upstream or downstream. Provide thermal transmission material within the well to speed the response of temperature measurement. Provide wells with sealing nuts to contain the thermal transmission material and allow for easy removal. Wells shall not restrict flow area to less than 70 percent of line-size-pipe normal flow area. Increase piping size as required to avoid restriction.

3.3 ADJUSTMENTS

A. Adjust controls and equipment to maintain the conditions indicated, to perform the functions indicated, and to operate in the sequence specified.

3.4 INSTRUCTING OPERATING PERSONNEL

A. Upon completion of the work and when designated by the Architect, furnish the services of a competent technician regularly employed by the temperature control manufacturer for the instruction of Owner in the operation and maintenance of each automatic space temperature control system. The period of instruction shall be for not less than one 4 hour period and shall include video tape demonstration of controllers.

3.5 FIELD INSPECTION AND TESTS

A. Tests shall be performed or supervised by employees of the ATC system or manufacturer of the ATC system, or by an authorized representative of the ATC manufacturer. Give Architect 14 calendar days advance written notice prior to the date of the field acceptance testing. If the Architect witnesses tests, such tests shall be subject to approval. If the Architect does not witness tests, provide performance certification.

B. Plan for Inspections and Tests: Furnish a written inspections and tests plan at least 60 days prior to the field acceptance test date. This plan shall be developed by the manufacturer of the ATC system. The plan shall delineate the inspections and testing procedures required for the ATC system to demonstrate compliance with the requirements specified. Additionally, the test plan shall indicate how ATC system is to be tested, what variables will be monitored during test, names of individuals performing tests, and what criteria for acceptance should be used. Indicate how operation of H&V system and ATC system in each seasonal condition will be simulated.

C. Field Acceptance Testing: Upon completion of 72 hours of continuous H&V and ATC systems operation and before final acceptance of work, test the automatic temperature control systems in service with the heating, ventilating and air conditioning systems to demonstrate compliance with contract requirements. Test controls through each cycle of operation, including simulation of each season insofar as possible. Test safety controls to demonstrate performance of required function. Adjust or repair defective or malfunctioning automatic space temperature control equipment or replace with new equipment. Repeat tests to demonstrate compliance with contract requirements.

* END OF SECTION *

SECTION 233000

DUCTWORK AND ACCESSORIES

PART 1GENERAL

1.1 RELATED DOCUMENTS

A. The drawings and the specifications including SECTION 230500 "SUPPLEMENTAL MECHANICAL GENERAL REQUIREMENTS" are hereby made a part of the work of this section.

1.2 DESCRIPTION OF WORK

A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required to install the ductwork systems indicated.

1.3 SUBMITTALS

A. Substitutions: Your attention is directed to Section 230500-"Substitutions", relative to competition and the (ONLY) notation. Familiarity with this section should be achieved before reading the PRODUCTS section of this specification.

B. The items for which the submittals paragraph in Section 230500, Supplemental General Mechanical Requirements, apply are as follows:

1. Ductwork.
2. Ductwork accessories.
3. Air devices.
4. Firestopping materials and methods.
5. Dampers.
6. Ductwork sealing products.

PART 2PRODUCTS

2.1 DUCTWORK

A. Classification of Ductwork: Low pressure ductwork: up to 2" W.G. static pressure.

B. Materials: Unless otherwise indicated low pressure ductwork shall be galvanized steel. Galvanized sheet metal shall be new galvanized steel sheets of lock forming quality with zinc coating that will not flake or peel under forming operation.

C. Construction for Low Pressure Round and Rectangular Ductwork:

1. Material: Galvanized steel conforming to ASTM A527, weight of galvanized coating shall be not less than 1-1/4 ounces total for both sides of one sq.ft. of a sheet. Construction, metal gage, and reinforcements shall conform with SMACNA "Duct Construction Standards" and NFPA 90A for 2" W.G. pressure class.

2. Fittings: Shall be constructed in accordance with SMACNA Standards and shall be of the types indicated (ONLY).

3. Longitudinal joints shall be Pittsburgh lockseam (ONLY). Button punch snap locks are not acceptable.

4. Joints shall be sealed to SMACNA seal class B.

2.2 DUCTWORK ACCESSORIES

A. Access Doors: Ruskin Model ADC2, 12"x12" size, 24 gauge galvanized steel, steel on both sides of door, foam gasket seals, 1" insulation, 2 cam locks, no hinge.

B. Flexible Duct Connections: Ventfabrics, Inc. neoprene coated glass fabric.

C. Drawbands for Flexible Ducts: Clinch type stainless steel with screwdriver adjustment, or nylon with lever action tightening tool provided by the drawband manufacturer.

D. Fire Dampers: Greenheck FD-series, Ruskin Model IBD2, or Cesco, curtain type, 100% free area (ONLY), Style C for round duct installations, and Style B for rectangular duct applications. Fire dampers located immediately behind transfer grilles may be Style A dampers. The dampers shall be UL rated for 1-1/2 hours and have a 165^{o}F fusible link. Fire dampers shall comply with UL “Standard for Safety” 555.

E. Turning Vanes: (Low Pressure):

1. Solid blade, mounted with the long edge down stream in accordance with duct construction details indicated. Submit a 12"x12" sample elbow for review prior to fabrication.

F. Volume Dampers:

1. Factory fabricated as specified, or shop fabricated in accordance with SMACNA "HVAC Duct Construction Standards".

2. Rectangular: Ruskin Model MD-35, or American Warming and Ventilating, 12 gauge galvanized steel, locking quadrant, opposed blade over 11", single blade 11" and under.

3. Round: Ruskin Model MDRS25, or American Warming and Ventilating, 20 gauge galvanized steel with locking quadrant (ONLY). Dampers may be provided integral with spin-in fittings.

G. Flexible Ductwork:

1. Low Pressure Duct Systems: Wiremold type WGCF, polyester core with wire helix, 1-1/2" thick, 3/4 lb fiberglass insulation, polyolefin jacket/vapor barrier, 2" W.G. rated pressure.

H. Joint Sealer:

1. Hardcast Two-Part II DT tape with RTA-50 indoor/outdoor activator.

2. Hardcast Duct-Seal 321 water based indoor/outdoor sealant.

2.3 AIR DEVICES (Krueger, Price, Metal Aire, Titus) ONLY

A. Material and Finishes: Construct diffusers, registers, and grilles of aluminum. Exterior and exposed edges shall be rolled, or otherwise stiffened and rounded. Steel parts shall be factory zinc-phosphate treated prior to priming and painting or have a baked-on enamel finish. Aluminum parts shall be finish painted. Provide frame style compatible with ceiling or

wall type. Colors shall be selected by Architect. Devices to be installed on exposed duct installations shall be furnished in primer suitable for field application of color coat.

B. Sound Pressure Level: Manufacturer certified sound pressure level rating of inlets and outlets in accordance with ADC 1062 R4. Conform with the permissible room sound pressure level for each device as scheduled.

C. Throw: Defined as distance from the diffuser, register, or grille to the point which the resultant room air velocity is 50 to 35 feet per minute.

D. Ceiling Diffusers: Equip with core styles required to provide air distribution pattern indicated. Internal parts shall be removable through the diffuser-neck for access to the duct and without the use of special tools. Construct each diffuser of four or more concentric elements designed to deliver air in a generally horizontal direction. The interior elements of square and rectangular ceiling diffusers may be square or rectangular as manufacturer's standard. Screws or bolts in exposed face of frames or core elements are not acceptable. Diffusers shall have an opposed blade volume damper in the diffuser neck. Diffusers shall have a 24"x24" lay-in panel for areas with acoustical ceilings and surface-mount frame for GWB ceilings.

E. Variable volume diffusers shall be Metalaire MSE-CH series electronically controlled zone diffuser with flow control actuator and digital wall mount thermostat.

E. Grilles and Registers: Construction and finish as indicated, 1/2" louver spacing, 45^{o} curved blade. Registers shall have opposed-blade volume dampers with screwdriver adjuster. Unless otherwise indicated, registers shall be provided.

F. General: The interior of all sheetmetal connections to grilles, registers and diffusers shall be painted with a non-specular flat black paint so that no sheetmetal surfaces are visible from the finished space.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.

2. Verify that the duct systems may be installed in accordance with pertinent codes and regulations and the reviewed Submittals.

3.2 INSTALLATION OF DUCTWORK AND AIR DEVICES

A. Provide and erect in accordance with the best practice of the trade ductwork shown on the drawings and as required to complete the intended installation. Make offsets as shown or required to place ductwork in proper position to avoid conflicts with other work and to allow the application of insulation and finish painting to the satisfaction of the Architect. Sizes given are "inside - clear" dimensions and not necessarily that of sheet metal. Ducts shall be arranged to adjust to "field conditions". The Sheet Metal trades shall coordinate his work with other trades. Work shall conform to ASHRAE duct construction recommendations, SMACNA "Duct Construction Standards", NFPA, and the requirements of the IBC code.

B. Joint Sealing: See PRODUCTS section.

C. Longitudinal joints: See PRODUCTS section.

D. Turns shall be made with long radius elbows or, if physically impossible to use long radius elbows, shall be square turns with specified turning vanes. CAUTION: Turns not conforming to this requirement shall be ordered removed and replaced with properly built turns.

E. Access Doors: Provide access doors for concealed apparatus requiring service and inspection in the duct system including but not limited to dampers, sensors and motors, and upstream and downstream from duct coils.

F. Duct Sleeves and Prepared Openings: Install duct sleeves and prepared openings for duct mains, duct branches, and ducts passing through walls, roofs, and ceilings. Insure the proper size and location of sleeves and prepared openings. Allow one-inch clearance between duct and sleeve or one-inch clearance between insulation and sleeve for insulated ducts, except at grilles, registers, and diffusers.

G. Duct Supports: Unless otherwise indicated, provide one-inch wide by 16 gage galvanized steel sheet metal strips on each side of ducts. Anchor risers in the center of the vertical run to allow ends or riser free vertical movements. Attach supports only to structural framing members. Do not anchor supports to metal decking unless a means is provided (architectural review required) for preventing the anchors from puncturing the metal decking. Where supports are required between structural framing members, provide suitable intermediate metal framing. Where C clamps are used, use retainer clips.

H. Flexible Collars and Connections: Provide flexible collars between fans and ducts or casings and where ducts are of dissimilar metals, as indicated or required. For round ducts, securely fasten flexible connections using stainless steel clinch-type draw-band. Nylon drawbands may be used if installed using the drawband manufacturer's lever-action tightening tool. For rectangular ducts, lock flexible connections to metal collars.

I. Flexible Ducts: Provide where indicated. No fiberglass shall be in contact with air flow. Flexible duct length shall not be more than 4'-0". Install with metal band hangers and without excess length, provide maximum extension of flex duct. Securely fasten flexible ducts to metal collars using a stainless steel or tool-tightened nylon drawband on the duct core and a second drawband on the insulation vapor barrier. If the duct exceeds 12 inches diameter, position the drawband behind a bead on the metal collar. Taping in lieu of drawbands is not allowed.

J. Any deviation in the duct system must be submitted as a shop drawing and stamped. CAUTION: Any deviation not submitted and favorably reviewed will be ordered removed from the system and replaced with that which is shown on the Drawings.

K. Discrepancies between actual field conditions and the Contract Documents shall be brought to the attention of the Architect prior to fabrication.

L. Field Changes to Ductwork: Field changes of ducts such as those required to suit the sizes of factory-fabricated equipment actually furnished shall be designed to minimize expansion and contraction. Use 4:1 transitions in field changes as well as modifications to connecting ducts.

M. Transitions with a slope greater than 4 to 1 shall be ordered removed from the system and replaced with a transition which meets this criteria.

N. Joints and seams at intake and exhaust plenums and joints on intake and exhaust ductwork for a distance of 3 feet from the plenum shall be sealed watertight on the bottom and side joints and seams.

O. Isolation dampers at intake and exhaust louvers and vent hoods shall be sealed to the ductwork to provide an airtight assembly with similar performance characteristics to the isolation damper.

3.3 CLOSING IN WORK

A. Cover up or enclose work after it has been properly and completely tested and reviewed.

B. No additional cost to the Owner will be allowed for uncovering or recovering any work that is covered or enclosed prior to required test and review.

3.4 TEST AND ADJUST

A. Before operating any system, the system shall be cleaned out to remove dust and foreign materials.

B. After the installation is complete and ready for operation, test the system under normal operating conditions in the presence of the Architect and demonstrate that the system functions as designed.

C. Correct defects which develop during the test period, conduct additional testing until defect free operation is achieved.

3.5 CLEANUP AND CORROSION PREVENTION

A. Ductwork and equipment shall be thoroughly cleaned. Dirt, dust, and debris shall be removed and the premises left in a clean and neat condition.

B. Before covering is applied to duct systems, clips, rods, clevises and other hanger attachments, and before uncovered piping is permitted to be concealed, corrosion and rust shall be wire brushed and cleaned and in the case of iron products, a coat of approved protective paint applied to these surfaces.

3.6 INSTRUCTIONS

A. On completion of the project, instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed four (4) hours. The time of instruction shall be arranged with the Owner. In addition to the prime Mechanical Contractor, the control system Contractor, Balancing Contractor, and Owner's representative shall be present and participate in the Owner's instruction.

3.7 FIRESTOPPING

A. Firestopping shall be performed in accordance with Specification Section 078400 “Firestopping”. All penetrations of fire-rated assemblies including walls and floors by mechanical system components (piping, ductwork, conduits, etc.) shall be firestopped as specified.

* END OF SECTION *

Division 26

Electrical

SECTION 260519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

B. Related Requirements:

1. Section 271500 "Communications Horizontal Cabling" for cabling used for voice and data circuits.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. General Cable Technologies Corporation.
2. Southwire Incorporated.
3. The Okonite Company.

B. Aluminum and Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.

C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2.

D. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for Metal Clad cable, Type MC or SO cable.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Gardner Bender.
3. Hubbell Power Systems, Inc.
4. Ideal Industries, Inc.
5. Ilsco; a branch of Bardes Corporation.
6. NSi Industries LLC.
7. O-Z/Gedney; a brand of the EGS Electrical Group.
8. 3M; Electrical Markets Division.
9. Tyco Electronics.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

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

B. Comply with NFPA 70.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Feeders: Type THHN-2-THWN-2, single conductors in raceway.

B. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-2-THWN-2, single conductors in raceway.

C. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Metal Clad Cable, Type MC.

D. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway.

E. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

B. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION 260519

SECTION 260533

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Boxes, enclosures, and cabinets.

1.3 DEFINITIONS

A. GRC: Galvanized rigid steel conduit.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Allied Tube & Conduit; a Tyco International Ltd. Co.
3. Anamet Electrical, Inc.
4. Electri-Flex Company.
5. O-Z/Gedney; a brand of EGS Electrical Group.
6. Picoma Industries, a subsidiary of Mueller Water Products, Inc.
7. Republic Conduit.
8. Southwire Company.
9. Thomas & Betts Corporation.
10. Western Tube and Conduit Corporation.
11. Wheatland Tube Company; a division of John Maneely Company.

B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. GRC: Comply with ANSI C80.1 and UL 6.

D. EMT: Comply with ANSI C80.3 and UL 797.

E. FMC: Comply with UL 1; zinc-coated steel or aluminum.

F. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

G. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Fittings for EMT:

a. Material: Steel or die cast.
b. Type: Setscrew.

2. Expansion Fittings: steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.

H. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Adalet.
2. Cooper Technologies Company; Cooper Crouse-Hinds.
3. EGS/Appleton Electric.
4. Erickson Electrical Equipment Company.
5. FSR Inc.
6. Hoffman; a Pentair company.
7. Hubbell Incorporated; Killark Division.
8. Kraloy.
9. Milbank Manufacturing Co.
10. Mono-Systems, Inc.
11. O-Z/Gedney; a brand of EGS Electrical Group.
12. RACO; a Hubbell Company.
13. Robroy Industries.
14. Spring City Electrical Manufacturing Company.
15. Stahlin Non-Metallic Enclosures; a division of Robroy Industries.
16. Thomas & Betts Corporation.
17. Wiremold / Legrand.

B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.

E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.

F. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb (32 kg).

1. Listing and Labeling: Paddle fan outlet boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.

I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

J. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).

K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC.
2. Concealed Conduit, Aboveground: GRC.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC.
4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed: EMT.
2. Concealed in Ceilings and Interior Walls and Partitions: EMT.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
4. Damp or Wet Locations: GRC.
5. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.

2. EMT: Use setscrew, steel fittings. Comply with NEMA FB 2.10.
3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Arrange stub-ups so curved portions of bends are not visible above finished slab.

E. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.

F. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

G. Support conduit within 12 inches (300 mm) of enclosures to which attached.

H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

J. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

K. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

M. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

N. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

O. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.

P. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

Q. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

R. Locate boxes so that cover or plate will not span different building finishes.

S. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

T. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 INSTALLATION OF ELECTRICAL BOXES IN FIRE RATED WALLS

A. Outlet boxes on opposite sides of the wall shall be separated as follows:

1. By a horizontal distance of not less than 24 inches (610 mm);

2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose fill, rockwool or slag mineral wool insulation.

3. By protecting both outlet boxes by listed putty pads, 3M Catalog # MPP+ or equal.

B. Boxes exceeding 16 sq. in. (103 sq. cm) must be protected by listed putty pads, 3M Catalog # MPP+ or equal.

END OF SECTION 260533

SECTION 261900

SUPPORTING DEVICES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Conduit and equipment supports.

B. Fastening hardware.

1.02 RELATED WORK

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

PART 2 PRODUCTS

2.01 MATERIAL

A. Support Channel: Galvanized or painted steel.

B. Hardware: Corrosion resistant.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using pre-cast insert system, expansion anchors, beam clamps.

C. Anchors and Fasteners

1) Concrete Structural Elements: Use pre-cast insert system, expansion anchors, powder actuated anchors and preset inserts.
2) Steel Structural Elements: Use beam clamps, steel ramset fasteners, and welded fasteners.
3) Concrete Surfaces: Use self-drilling anchors and expansion anchors.
4) Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.
5) Solid Masonry Walls: Use expansion anchors and preset inserts.
6) Sheet Metal: Use sheet metal screws.
7) Wood Elements: Use wood screws.

D. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.

E. Do not use powder-actuated anchors.

F. Do not drill structural steel members.

G. Fabricate supports or trapeze hangers from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

H. In wet locations install free-standing electrical equipment on concrete pads.

I. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet one inch off wall.

*** END OF SECTION ***

SECTION 263213

ENGINE GENERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes packaged engine-generator sets suitable for use in applications with the features as specified and indicated where the engine generators will be used as the standby power source for the system.

1.3 DEFINITIONS

A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

B. Emergency Standby Power (ESP): Per ISO 8528: The maximum power available during a variable electrical power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 200 h of operation per year with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. The permissible average power output (Ppp) over 24 h of operation shall not exceed 70 % of the ESP unless otherwise agreed by the RIC engine manufacturer.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.
2. Time-current characteristic curves for generator protective device.
3. Sound test data, based on a free field requirement.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
2. Wiring Diagrams: Control interconnection, Customer connections.

C. Certifications:

1. Submit statement of compliance which states the proposed product(s) is certified to the emissions standards required by the location and application of the Project.

1.5 INFORMATIONAL SUBMITTALS

A. Warranty:
1. Submit manufacturer's warranty statement to be provided for this Project.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 200 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

D. Comply with NFPA 70 (National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702).

E. Comply with NFPA 110 (Emergency and Standby Power Systems) requirements for Level 1 emergency power supply system.

F. Comply with UL 2200.

G. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 15 to plus 40 deg C.
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to 1000 feet (300 m).

1.8 WARRANTY

A. Base Warranty: Manufacturer shall provide base warranty coverage on the material and workmanship of the generator set for a minimum of twenty-four (24) months for Standby product and twelve (12) months for Prime/Continuous product from registered commissioning and start-up.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Only approved bidders shall supply equipment provided under this contract. Equipment by other named suppliers that meets the requirement of this specification are acceptable if approved not less than 2 weeks before scheduled bid date.

1. Cummins Power Generation
2. Caterpillar
3. Kohler

2.2 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

1. Rigging Information: Indicate location of each lifting attachment, generator-set center of gravity, and total package weight in submittal drawings.

C. Capacities and Characteristics:

1. Power Output Ratings: Continuous electrical output power rating for standby operation of not less than as shown on drawings, at 80 percent lagging power factor, 480/277-volt, three phase, 4-wire, 60 hertz.
2. Alternator shall be capable of accepting maximum load in a single step and be capable of recovering to a minimum of 90% of rated no load voltage. Following the application of the specified kVA load at near zero power factor applied to the generator set.
3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component. The engine-generator nameplate shall include information of the power output rating of the equipment.

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 0.5 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds. On application of a 100% load step the generator set shall recover to stable voltage within 10 seconds.
3. Steady-State Frequency Operational Bandwidth: 0.25 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds. On application of a 100% load step the generator set shall recover to stable frequency within 10 seconds.

6. Output Waveform: At full load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for any single harmonic. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50.
8. Start Time: Comply with NFPA 110, Level 1, Type 10, system requirements. Ambient Condition Performance: Engine generator shall be designed to allow operation at full rated load in an ambient temperature under site conditions, based on highest ambient condition. Ambient temperature shall be as measured at the air inlet to the engine generator for enclosed units, and at the control of the engine generator for machines installed in equipment rooms.
9. Noise Output: Engine generator shall be tested by the manufacturer per ANSI S12.34. Data documenting performance shall be provided with submittal documentation.

2.3 ENGINE

A. Fuel: Natural Gas (Base bid). Diesel (Deduct alternate 2). Provide owner with full tank of fuel.

B. (Deduct alternate 2) Double walled fuel tank with 24 hour generator operation capacity.

C. Rated Engine Speed: 1800 rpm.

D. Lubrication System: The following items are mounted on engine or skid:
1. Lube oil pump: shall be positive displacement, mechanical, full pressure pump.
2. Filter and Strainer: Provided by the engine manufacturer of record to provide adequate filtration for the prime mover to be used.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

E. Engine Fuel System: The engine fuel system shall be installed in strict compliance to the engine manufacturer's instructions.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity and performance.
1. Designed for operation on a single 120-volt AC, single phase, 60 hertz power connection. Heater voltage shall be shown on the project drawings.
2. Provided with a 12VDC thermostat, installed at the engine thermostat housing

G. Governor: Adjustable isochronous, with speed sensing.

H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame.

1. The generator set manufacturer shall provide prototype test data for the specific hardware proposed demonstrating that the machine will operate at rated standby load in an outdoor ambient condition of 40C.
2. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
3. Size of Radiator overflow tank: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.

5. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
6. Duct Flange: Generator sets installed indoors shall be provided with a flexible radiator duct adapter flange.

I. Muffler/Silencer: Selected with performance as required to meet sound requirements of the application, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements. For generator sets with outdoor enclosures the silencer shall be inside the enclosure.

J. Air-Intake Filter: Engine-mounted air cleaner with replaceable dry-filter element and restriction indicator.

K. Starting System: 12VDC, as recommended by the engine manufacturer; electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
2. Cranking Cycle: As required by NFPA 110 for level 1 systems**.**
3. Battery Cable: Size as recommended by engine manufacturer for cable length as required. Include required interconnecting conductors and connection accessories.
4. Battery Compartment: Factory fabricated of metal with acid-resistant finish.
5. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation. The battery charging alternator shall have sufficient capacity to recharge the batteries with all parasitic loads connected within 4 hours after a normal engine starting sequence.
6. Battery Chargers: Unit shall comply with UL 1236 and include the following features:

a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.4 CONTROL AND MONITORING

A. Engine generator control shall be microprocessor based and provide automatic starting, monitoring, protection and control functions for the unit

B. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more

separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. (Switches with different configurations but equal functions are acceptable.) When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local (generator set-mounted) and/or remote emergency-stop switch also shuts down generator set.

C. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local (generator set-mounted) and/or remote emergency-stop switch also shuts down generator set.

D. Configuration: Operating and safety indications, protective devices, system controls, engine gages and associated equipment shall be grouped in a common control and monitoring panel. Mounting method shall isolate the control panel from generator-set vibration. AC output power circuit breakers and other output power equipment shall not be mounted in the control enclosure.

E. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:

1. AC voltmeter (3-phase, line to line and line to neutral values).
2. AC ammeter (3-phases).
3. AC frequency meter.
4. AC kVA output (total and for each phase). Display shall indicate power flow direction.
5. Ammeter-voltmeter displays shall simultaneously display conditions for all three phases.
6. Emergency Stop Switch: Switch shall be a red “mushroom head” pushbutton device complete with lock-out/tag-out provisions. Depressing switch shall cause the generator set to immediately stop the generator set and prevent it from operating.
7. Fault Reset Switch: Supply a dedicated control switch to reset/clear fault conditions.
8. DC voltmeter (alternator battery charging).
9. Engine-coolant temperature gage.
10. Engine lubricating-oil pressure gage.
11. Running-time meter.
12. Generator-voltage and frequency digital raise/lower switches. Rheostats for these functions are not acceptable. The control shall adjustment of these parameters in a range of plus or minus 5% of the voltage and frequency operating set point (not nominal voltage and frequency values.)
13. AC Protective Equipment: The control system shall include over/under voltage, over current, short circuit, loss of voltage reference, and over excitation shut down protection. There shall be an overload warning, and overcurrent warning alarm.
14. Status LED indicating lamps to indicate remote start signal present at the control, existing alarm condition, not in auto, and generator set running.
15. A graphical display panel with appropriate navigation devices shall be provided to view all information noted above, as well as all engine status and alarm/shutdown conditions (including those from an integrated engine emission control system). The display shall also include integrated provisions for adjustment of the gain and stability settings for the governing and voltage regulation systems.
16. Panel lighting system to allow viewing and operation of the control when the generator room or enclosure is not lighted.
17. DC control Power Monitoring: The control system shall continuously monitor DC power supply to the control, and annunciate low or high voltage conditions. It shall also provide

an alarm indicating imminent failure of the battery bank based on degraded voltage recover on loading (engine cranking).

F. Control Heater: Generator sets that are installed in outdoor enclosures, or are in tropical or coastal environments shall be provided with control heaters for anti-condensation protection.

G. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.

1. Overcrank shutdown.
2. Coolant low-temperature alarm.
3. Control switch not in auto position.
4. Battery-charger malfunction alarm.
5. Battery low-voltage alarm.

H. Remote Alarm Annunciator: Comply with NFPA 110. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition.

I. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.5 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Overcurrent Protection: The generator set shall be provided with a UL Listed/CSA Certified protective device that is coordinated with the alternator provided to prevent damage to the generator set on any possible overload or overcurrent condition external to the machine. The protective device shall be listed as a utility grade protective device under UL category NRGU. The control system shall be subject to UL follow-up service at the manufacturing location to verify that the protective system is fully operational as manufactured. Protector shall perform the following functions:

1. Initiates a generator kW overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
2. Under single phase or multiple phase fault conditions, or on overload conditions, indicates an alarm conditions when the current flow is in excess of 110% of rated current for more than 10 seconds.
3. Under single phase or multiple phase fault conditions, operates to switch off alternator excitation at the appropriate time to prevent damage to the alternator.
4. The operator panel shall indicate the nature of the fault condition as either a short circuit or an overload.
5. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot greater than 120% of nominal voltage.
6. The protective system provided shall not include an instantaneous trip function.

B. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

2.6 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Class H Electrical Insulation shall be used for systems of under 690V.

D. Temperature Rise: 105C over a 40C environment.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Permanent Magnet Generator (PMG) shall provide excitation power for optimum motor starting and short circuit performance on all alternators rated 30kVA and larger.

G. Voltage Regulator: Separate from exciter, providing performance as specified. The voltage regulation system shall be microprocessor-controlled, full wave rectified, and provide a pulse-width modulated signal to the exciter. No exceptions or deviations to these requirements will be permitted.

H. The alternator shall be provided with anti-condensation heater(s) in all applications where the generator set is provided in an outdoor enclosure, or when the generator set is installed in a coastal or tropical environment.

I. Windings: Two-thirds pitch stator winding.

J. Subtransient Reactance: 15 percent maximum, based on the rating of the engine generator set.

2.7 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Weather protective housing. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Instruments, control, and battery system shall be mounted within enclosure.

B. Construction:
   1. Hinged Doors: With padlocking provisions. Restraint/Hold back hardware to prevent door to keep door open at 180 degrees during maintenance. Rain lips over all doors.
   2. Exhaust System:
      a. Muffler Location: Within enclosure.
   3. Hardware: All hardware and hinges shall be stainless steel.
   4. A weather protective enclosure shall be provided which allows the generator set to operate at full rated load with a static pressure drop equal to or less than 0.5 inches of water.

C. Engine Cooling Airflow through Enclosure: Housing shall provide ample airflow for engine generator operation at rated load in an ambient temperature of 40 degrees Celsius.
   1. Louvers: Fixed-engine, cooling-air inlet and discharge.

D. Sound Performance: Reduce the average sound level of the engine generator while operating at full rated load to a maximum of 80 dBA measured at 7 meters from the engine generator in a free field environment.

E. Site Provisions:
   1. Lifting: Complete assembly of engine generator, and enclosure shall be designed to be lifted into place as a single unit.

2.8 FINISHES

A. Indoor and Outdoor Enclosures and Components: Powder-coated and baked over corrosion-resistant pretreatment and compatible primer. Manufacturer's standard color or as directed on the drawings.

2.9 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
   1. Tests: Comply with NFPA 110, Level 1 Energy Converters. In addition, the equipment engine, skid, cooling system, and alternator shall have been subjected to actual prototype tests to validate the capability of the design under the abnormal conditions noted in NFPA110. Calculations and testing on similar equipment which are allowed under NFPA110 are not sufficient to meet this requirement.

B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

   1. Test engine generator set manufactured for this Project to demonstrate compatibility and functionality.
   2. Full load run.
   3. Maximum power.
   4. Voltage regulation.
   5. Steady-state governing.
   6. Single-step load pickup.
   7. Simulated safety shutdowns.
   8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation, application, and alignment instructions and with NFPA 110.

3.2 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

3.3 SERVICE AGREEMENT:

A. The supplier shall include in the base price, a one-year service agreement. The maintenance shall be performed by factory authorized service technicians capable of servicing both the engine-generator set and the transfer switch. This agreement shall include the following:

B. Generator supplier must have an in-house rental fleet with equipment sized to back up this project site.

C. All engine maintenance as recommended by the service manual.

D. All electrical controls maintenance and calibrations as recommended by the manufacturer.

E. All auxiliary equipment as a part of the emergency systems.

F. The supplier shall guarantee emergency service.

G. All expendable maintenance items are to be included in this agreement.

H. A copy of this agreement and a schedule shall be given to the Owner at the time of his acceptance, showing what work is to be accomplished and when.

END OF SECTION

SECTION 263623

AUTOMATIC TRANSFER SWITCHES

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. This Section includes transfer switches rated 600 V and less, including the following:

1. Automatic transfer switches

B. Related Sections include the following:

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.

1. Technical data on all major components of all transfer switches and other products described in this section. Data is required for the transfer switch mechanism, control system, cabinet, and protective devices specifically listed for use with each transfer switch. Include steady state and fault current ratings, weights, operating characteristics, and furnished specialties and accessories.

B. Manufacturer and Supplier Qualification Data

1. The transfer switch manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.
2. The manufacturer of this equipment shall have produced similar equipment for a minimum period of 10 years. When requested, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

C. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Features and operating sequences, both automatic and manual.
2. List of all factory settings of relays, timers and protective devices; provide setting and calibration instructions where applicable.

D. Warranty documents demonstrating compliance with the project’s contract requirements.

1.4 QUALITY ASSURANCE

A. Only approved bidders shall supply equipment provided under this contract.

B. Manufacturer Qualifications: The equipment supplier shall maintain a service center capable of providing training, parts, maintenance and emergency repairs to equipment, including transfer switch generator sets and remote monitoring equipment (if applicable) at the site within a response period of less than (eight hours or appropriate time period designated for Project) from time of notification.

1. The transfer switch shall be serviced by technicians employed by, and specially trained and certified by, the generator set supplier and the supplier shall have a service organization that is factory-certified in both generator set and transfer switch service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.
2. Submit names, experience level, training certifications, and locations for technicians that will be responsible for servicing equipment at this site.
3. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.

C. Source Limitations: All transfer switches are to be obtained through one source from a single manufacturer. The generator set manufacturer shall warrant transfer switches to provide a single source of responsibility for products provided.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked as suitable for use in emergency, legally required or optional standby use as appropriate for the connected load.

E. The automatic transfer switch installation and application shall conform to the requirements of the following codes and standards:

1. Transfer switches and enclosures shall be UL 1008 listed and labeled as suitable for use in emergency, legally required, and optional standby applications.
2. NFPA 70, National Electrical Code. Equipment shall be suitable for use in systems in compliance with Articles 700, 701 and 702.
3. Comply with NEMA ICS 10-1993 AC Automatic Transfer Switches
4. IBC 2006 – The transfer switch(es) shall be prototype-tested and third-party certified to comply with the requirements of IBC group III or IV, Category D/F. The equipment shall be shipped with the installation instructions necessary to attain installation compliance
5. IEEE 446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
6. IEEE 62.41, AC Voltage Surge Immunity
7. IEEE 62.45, AC Voltage Surge Testing

F. Comply with NFPA 110 – Emergency and Standby Power Systems. The transfer switch shall meet all requirements for Level 1 systems, regardless of the actual circuit level.

G. The manufacturer shall warrant the material and workmanship of the transfer switch equipment for a minimum of one (1) year from registered commissioning and start-up, or eighteen (18) months from date of shipment.

H. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, and etc. during the minimum noted warranty period described above.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:

1. Do not proceed with interruption of electrical service without (Architect/Construction Manager/Owner's) written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cummins Power Generation
2. Russelectric
3. ASCO

B. Equipment specifications for this Project are based on automatic transfer switches manufactured by Cummins Power Generation. Switches manufactured by Russelectric or ASCO that meet the requirement of this specification are acceptable, if approved not less than two weeks before scheduled bid date. Proposals must include a line-by-line compliance statement based on this specification.

C. Transfer switches utilizing molded case circuit breakers do not meet the requirements of this specification and will not be accepted.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Provide transfer switches in the number and ratings that are shown on the drawings. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer.

B. Fault-Current Closing and Withstand Ratings: UL 1008 WCR ratings must be specifically listed as meeting the requirements for use with protective devices at installation locations, under specified fault conditions. Withstand and closing ratings shall be based on use of the same set of contacts for the withstand test and the closing test.

C. Solid-State Controls: All settings should be accurate to +/- 2% or better over an operating temperature range of - 40 to + 60 degrees C (- 40 to + 140 degrees F).

D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

E. Electrical Operation: Accomplished by a non-fused, momentarily energized solenoid or electric motor operator mechanism, mechanically and electrically interlocked in both directions (except that mechanical interlock is not required for closed transition switches).

F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Switches using molded-case switches or circuit breakers, or insulated case circuit breaker components are not acceptable.
2. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in the Source 1 and Source 2 positions.
3. Main switch contacts shall be high-pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.
4. Contacts shall be operated by a high-speed electrical mechanism that causes contacts to open or close within three electrical cycles from signal.
5. The transfer switch operation shall include the ability to switch to an open position (both sources disconnected) for the purpose of load shedding from the generator set.
6. The power transfer mechanism shall include provisions for manual operation under load with the enclosure door closed. Manual operation may be electromechanical or mechanical, but must be coordinated with control function.
7. Transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with components that could be operating at line voltage levels.
8. The transfer switch shall include the mechanical and control provisions necessary to allow the device to be field-configured for operating speed. Transfer switch operation with motor loads shall be as is recommended in NEMA MG1.
    a. Phase angle monitoring/timing equipment is not an acceptable substitute for this functionality.

G. Control: Transfer switch control shall be capable of communicating with the genset control, other switches and remote programming devices over a high-speed network interface.

H. Factory wiring: Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism

I. Terminals: Terminals shall be pressure type and appropriate for all field wiring. Terminal arrangement and cabinet space must be such that feeder conductors can enter from the top, side or bottom of the switch, at the installer's discretion. Control wiring shall be equipped with suitable lugs, for connection to terminal strips.

J. Enclosures: All enclosures shall be third-party certified for compliance to NEMA ICS 6 and UL 508, unless otherwise indicated:

1. The enclosure shall provide wire bend space in compliance to the latest version of NFPA70, regardless of the direction from which the conduit enters the enclosure.
2. Exterior cabinet doors shall provide complete protection for the system's internal components. Doors must have permanently mounted key-type latches. Bolted covers or doors are not acceptable.
3. Transfer switches shall be provided in enclosures that are third party certified for their intended environment per NEMA requirements.
    a. Transfer switches mounted in a controlled indoor environment shall be provided in NEMA Type 1 enclosures (IEC type IP30).

2.3 AUTOMATIC TRANSFER SWITCHES

A. Comply with requirements for Level 1 equipment according to NFPA 110.

B. Indicated current ratings:

1. Refer to the Project drawings for specifications on the sizes and types of transfer switch equipment, withstand and closing ratings, number of poles, voltage and ampere ratings, enclosure type, and accessories.
2. Main contacts shall be rated for 600 VAC minimum.
3. Transfer switches shall be rated to carry 100% of rated current continuously in the enclosure supplied, in ambient temperatures of -40 to +60 degrees C (-40 to +140 degrees F), relative humidity up to 95% (non-condensing), and altitudes up to 10,000 feet (3000 meters).

C. Manual Switch Operation: The power transfer mechanism shall include provisions for manual operation under load with the enclosure door closed. Manual operation may be electromechanical or mechanical, but must be coordinated with control function

D. Relay Signal: Control shall include provisions for addition of a pre-transfer relay signal, adjustable from 0 to 60 seconds, to be provided if necessary for elevator operation, based on equipment provided for the project.

E. Control: Transfer switch control shall be provided with necessary equipment and software to communicate with the genset control, other transfer switches, remote annunciation equipment, and other devices over a high speed control network.

F. Transfer switches that are designated on the drawings as 3-pole shall be provided with a neutral bus and lugs. The neutral bus shall be sized to carry 100% of the current designated on the switch rating.

G. The transfer switch physically located closest to the generator and not more than 50 ft (15 meters) away, except those served by generator paralleling equipment, shall be provided with a battery charger suitable for the requirements of the application and in compliance with NFPA 110 requirements for Level 1 systems. If no transfer switch is located within this distance, a battery charger shall be installed on the generator set.

H. Automatic Transfer Switch Control Features

1. The transfer switch control system shall be configurable in the field for any operating voltage level up to 600 VAC. Voltage sensing shall be monitored based on the normal voltage at the site. Systems that utilize voltage monitoring based on standard voltage conditions that are not field configurable are not acceptable.
2. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device for load shedding purposes. On receipt of this signal, the transfer switch shall switch to a neutral position when connected to Source 2. If Source 1 is available when the load-shed signal is received, the transfer switch shall connect to Source 1.
3. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device to prevent transfer to the generator service.
4. The transfer switch shall provide a relay contact signal prior to transfer or re-transfer. The time period before and after transfer shall be adjustable in a range of 0 to 50 seconds.
5. The control system shall be designed and prototype tested for operation in ambient temperatures from - 40 degrees C to + 60 degrees C (- 40 to +140 degrees F). It shall be designed and tested to comply with the requirements of the noted voltage and RFI/EMI standards.
6. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs and relays on all outputs, to provide optimum protection from line voltage surges, RFI and EMI.

I. Transfer Switch Control Panel: The transfer switch shall have a microprocessor-based control with a sealed membrane panel incorporating pushbuttons for operator-controlled functions, and LED lamps for system status indicators. The panel shall also include an alphanumeric display for detailed system information. Panel display and indicating lamps shall include permanent labels.

1. The indicator panel LEDs shall display:

   a. Which source the load is connected to (Source 1 or Source 2)
   b. Which source or sources are available
   c. When switch is not set for automatic operation, because the control is disabled or the bypass switch is in use
   d. When the switch is in test/exercise mode

2. The indicator shall have pushbuttons that allow the operator to activate the following functions:

   a. Activate pre-programmed test sequence
   b. Override programmed delays, and immediately go to the next operation
   c. Reset the control by clearing any faults
   d. Test all of the LEDs by lighting them simultaneously

3. The alphanumeric digital display shall be vacuum fluorescent-type, clearly visible in both bright sunlight and no-light conditions over an angle of 120 degrees, and shall display the following:

   a. AC voltage for all phases, normal and emergency
   b. Source status: connected or not connected.
   c. Load data, including voltage, AC current, frequency, KW, KVA, and power factor.

4. The display panel shall be password-protected, and allow the operator to view and make adjustments:

   a. Set nominal voltage and frequency for the transfer switch
   b. Adjust voltage and frequency sensor operation set points
   c. Set up time clock functions
   d. Set up load sequence functions
   e. Enable or disable control functions including program transition
   f. View real-time clock data, operation log (hours connected, times transferred, failures) and service history.

J. Control Functions: Functions managed by the control shall include:

1. Software adjustable time delays:

   a. Engine start (prevents nuisance genset starts in the event of momentary power fluctuation): 0 to 120 seconds (default 3 sec)
   b. Transfer normal to emergency (allows genset to stabilize before load is transferred): 0 to 120 seconds (default 3 sec)
   c. Re-transfer emergency to normal (allows utility to stabilize before load is transferred from genset): 0 to 30 minutes (default 3 sec)
   d. Engine cooldown: 0 to 30 minutes (default 10 min)
   e. Programmed transition: 0 to 60 seconds (default 3 sec)

2. Undervoltage sensing: three-phase normal, three-phase emergency source.

a. Pickup: 85 to 98% of nominal voltage (default 90%)
b. Dropout: 75 to 98% of nominal voltage (default 90%)
c. Dropout time delay: 0.1 to 1.0 seconds (default 0.5 sec)
d. Accurate to within +/- 1% of nominal voltage

3. Over-voltage sensing: three-phase normal, three-phase emergency source.

a. Pickup: 95 to 99% of dropout setting (default 95%)
b. Dropout: 105 to 135% of nominal voltage (default 110%)
c. Dropout time delay: 0.5 to 120 seconds (default 3 sec)
d. Accurate to within +/- 1% of nominal voltage

4. Over/under frequency sensing:

a. Pickup: +/- 5 to +/-20% of nominal frequency (default 10%)
b. Dropout: +/-1% beyond pickup (default 1%)
c. Dropout time delay: 0.1 to 15.0 seconds (default 5 sec)
d. Accurate to within +/- 0.2%

5. Voltage imbalance sensing:

a. Dropout: 2 to 10% (default 4%)
b. Pickup: 90% of dropout
c. Time delay: 2.0 to 20 seconds (default 5 sec)

6. Phase rotation sensing:

a. Time delay: 100 msec

7. Loss of single-phase detection:

a. Time delay: 100 msec

K. Control features shall include:

1. Programmable genset exerciser: A field-programmable control shall periodically start the generator, transfer the load to generator for a preset time, then re-transfer and shut down the generator after a preset cool-down period.

a. Push-button programming control shall have a selection of eight different schedules for exercising generator, with or without load.

2. In event of a loss of power to the control, all control settings, real-time clock setting and the engine start-time delay setting will be retained.
3. The system continuously logs information including the number of hours each source has been connected to the load, the number of times transferred, and the total number of times each source has failed. An event recorder stores information, including time and date-stamp, for up to 50 events.
4. Transfer Override Switch: Overrides automatic re-transfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light to indicate override status.

L. Control Interface

1. Provide one set Form C auxiliary contacts on both sides, operated by transfer switch position, rated 10 amps 250 VAC.
2. The transfer switch shall be provided with a network communication card, and configured to allow network-based communication with the transfer switch and other network system components, including the generator set(s) provided for the Project.
3. Unassigned Auxiliary Contacts: Two normally open, 1-pole, double-throw contacts for each switch position, rated 10A at 240 VAC.

M. Engine Starting Contacts

1. One isolated and normally closed, and one isolated and normally open; rated 10A at 32 VDC minimum.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Annunciator and Control Panel Mounting: Surface, unless otherwise indicated.

B. Identify components according to Division 26 Section "Identification for Electrical Systems."

C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.

B. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.

C. Transfer switch shall be provided with AL/CU mechanical lugs sized to accept the full output rating of the switch. Lugs shall be suitable for the number and size of conductors shown on the drawings.

D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 SOURCE QUALITY CONTROL

A. Prior to shipping, factory shall test and inspect components, assembled switches, and associated equipment to ensure proper operation.

B. Factory shall check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements.

C. Factory shall perform dielectric strength test complying with NEMA ICS 1.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: The supplier of the transfer switch(es) and associated equipment shall inspect, test, and adjust components, assemblies, and equipment installations, including connections, and report results in writing.

B. Manufacturer’s representative shall perform tests and inspections and prepare test reports.

C. After installing equipment and after electrical circuitry has been energized, installer shall test for compliance with requirements.

1. Perform recommended installation tests as recommended in manufacturer’s installation and service manuals.

2. After energizing circuits, demonstrate interlocking sequence and operational function for each switch.

    a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
    b. Verify time-delay settings.
    c. Verify that the transfer switch is accurately metering AC voltage and current (when provided).
    d. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
    e. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

3.5 DEMONSTRATION

A. After generator set installation, the generator and transfer switch supplier shall conduct a complete operation, basic maintenance, and emergency service seminar covering generator set and transfer switch equipment, for up to 10 people employed by the Owner.

1. The seminar shall include instruction on operation of the transfer equipment, normal testing and exercise, adjustments to the control system, use of the PC based service and maintenance tools provided under this contract, and emergency operation procedures.
2. The class duration shall be at least 8 hours in length, and include practical operation with the installed equipment.

END OF SECTION 263623

SECTION 265100

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, LEDs and drivers.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.

1.3 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color-rendering index.

C. LER: Luminaire efficacy rating.

D. Lumen: Measured output of lamp and luminaire, or both.

E. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.
2. Emergency lighting units including battery and charger.
3. Energy-efficiency data.
4. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.
5. Lamp data including dimensions, color temperature and power consumption
6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.

a. Testing Agency Certified Data: For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by manufacturer.
b. Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Installation instructions.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps: 10 of each type and rating installed. Furnish at least one of each type.
2. Plastic Diffusers and Lenses: One of each type and rating installed. Furnish at least one of each type.
3. Ballasts: 2 of each type and rating installed. Furnish at least one of each type.
4. Globes and Guards: 1 of each type and rating installed. Furnish at least one of each type.

1.7 QUALITY ASSURANCE

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

B. Comply with NFPA 70.

1.8 COORDINATION

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, product(s) indicated on Drawings.

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Metal Parts: Free of burrs and sharp corners and edges.

C. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

E. Diffusers and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

   a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
   b. UV stabilized.

2. Glass: Annealed crystal glass unless otherwise indicated.

2.3 LEDs:

1. The light source of the luminaires shall consist of LED arrays or bars. If required, the LED arrays or bars shall be removable.
2. The LEDs shall be either white or RGB, according to the light fixture schedule and Drawings. For luminaires specified with white light, it is not acceptable to provide RGB LEDs mixed to produce white light.
3. Refer to the light fixture schedule and Drawings for the specified correlated color temperature (CCT) of each luminaire.
4. Individual LEDs shall be binned by manufacturer to comply with ANSI C78.377.
5. The LEDs shall be manufactured by Cree, Philips, Toshiba, Osram, Samsung, or Nichia, unless otherwise noted.

2.4 DRIVERS:

1. The driver or power supply for the luminaire shall be modular and replaceable.
2. The rated life of the driver shall match the rated life of the LEDs and luminaire.
3. In general, the drive current rating of the driver shall be minimized, while still maintaining the required lumen output, to improve luminaire efficiency and life.
4. The driver shall meet the emission standards of IEC EN-61000-6-3 at a minimum. For healthcare or other applications with EMI sensitive equipment, provide drivers that meet more stringent standards as required.

2.5 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

a. Battery: Sealed, maintenance-free, nickel-cadmium type.
b. Charger: Fully automatic, solid-state type with sealed transfer relay.
c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

2.6 EMERGENCY LIGHTING UNITS

A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.

1. Battery: Sealed, maintenance-free, lead-acid type.
2. Charger: Fully automatic, solid-state type with sealed transfer relay.
3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures:

1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
2. Install lamps in each luminaire.

B. Temporary Lighting: If it is necessary, and approved by Architect, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.

C. Suspended Lighting Fixture Support:

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.

3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
4. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.

D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.2 IDENTIFICATION

A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

3.4 STARTUP SERVICE

A. Burn-in all lamps that require specific aging period to operate properly, prior to occupancy by Owner. Burn-in fluorescent and compact fluorescent lamps intended to be dimmed, for at least 100 hours at full voltage.

3.5 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting aimable luminaires to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Some of this work may be required after dark.

1. Adjust aimable luminaires in the presence of Architect.

END OF SECTION 265100

Division 28

Electrical Safety and Security

SECTION 283112

ZONED (DC LOOP) FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manual fire-alarm boxes.
2. System smoke detectors.
3. Notification appliances.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product compatible with existing **Fire-Lite MS-5UD** control panel.

2.2 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show

visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Single-action mechanism, pull-lever type.
2. Station Reset: Key- or wrench-operated switch.

2.3 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

1. Operating at 24-V dc, nominal.
2. Detectors shall be two-wire type.
3. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
4. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.

B. Photoelectric Smoke Detectors: Comply with UL 268.

2.4 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.

B. Chimes, High-Level Output: Vibrating type, 81-dBA minimum rated output.

C. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.

D. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output:

a. Indicated on Drawings.
b. 15/30/75/110 cd, selectable in the field.

2. Mounting: Wall mounted.
3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
4. Flashing shall be in a temporal pattern, synchronized with other units.
5. Strobe Leads: Factory connected to screw terminals.
6. Mounting Faceplate: Factory finished, red.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with NFPA 72 for installation of fire-alarm equipment.

B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.

1. Connect new equipment to the existing control panel in the existing part of the building.
2. Expand, modify, and supplement the existing monitoring equipment as necessary to extend the existing monitoring functions to the new points. New components shall be capable of merging with the existing configuration without degrading the performance of either system.
3. If the fire alarm system is activated, the gas valve shall close until manually reset. Activating the gas valve with the pushbuttons shall not notify the fire alarm system

C. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.

D. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling.

3.2 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Install framed instructions in a location visible from fire-alarm control unit.

3.3 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by authorities having jurisdiction.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Visual Inspection: Conduct the visual inspection prior to testing.

a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing, and Maintenance" Chapter in NFPA 72.

D. Fire-alarm system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

F. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

END OF SECTION 283112