STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

STANDARD LOW BID PROJECT
Project Budgets Over $100,000

June 10, 2009

COMPLETION OF SHELLED AUDITORIUM

SOUTHERN UTAH UNIVERSITY

CEDAR CITY, UTAH

DFCM Project Number 09013730

MHTN Architects, Inc.
420 East South Temple, Suite 100
Salt Lake City, Utah 84111
801-595-6700

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Current copies of the following documents are hereby made part of these contract documents by reference. These documents are available on the DFCM web site at http://dfcm.utah.gov or are available upon request from DFCM.

DFCM Supplemental General Conditions dated July 15, 2008
DFCM General Conditions dated May 25, 2005.
DFCM Application and Certification for Payment dated May 25, 2005.

Technical Specifications : Attached and dated June 8, 2009
Drawings: Attached and Dated June 8, 2009

The Agreement and General Conditions dated May 25, 2005 have been updated from versions that were formally adopted and in use prior to this date. The changes made to the General Conditions are identified in a document entitled Revisions to General Conditions that is available on DFCM's web site at http://dfcm.utah.gov

NOTICE TO CONTRACTORS

Sealed bids will be received by the Division of Facilities Construction and Management (DFCM) for:

COMPLETION OF SHELLED AUDITORIUM
SOUTHERN UTAH UNIVERSITY – CEDAR CITY, UTAH
DFCM PROJECT NO: 09013730

Bids will be in accordance with the Contract Documents that will be available on **Wednesday, June 10, 2009,** and distributed in electronic format only on CDs from DFCM, 4110 State Office Building, Salt Lake City, Utah and on the DFCM web page at http://dfcm.utah.gov. For questions regarding this project, please contact Jeff Reddoor, DFCM, at 801-971-9830. No others are to be contacted regarding this bidding process. The construction estimate for this project is $423,000.00.

A **mandatory** pre-bid meeting will be held at **10:30 AM on Wednesday, June 17, 2009** at Southern Utah University New Facility Building, Cedar City, Utah. All bidders wishing to bid on this project are required to attend this meeting.

Bids will be received until the hour of **3:00 PM on Wednesday, July 1, 2009** at DFCM, 4ll0 State Office Building, Salt Lake City, Utah 84114. Bids will be opened and read aloud in the DFCM Conference Room, 4110 State Office Building, Salt Lake City, Utah. NOTE: Bids must be received at 4110 State Office Building by the specified time.

A bid bond in the amount of five percent (5%) of the bid amount, made payable to the Division of Facilities Construction and Management on DFCM's bid bond form, shall accompany the bid.

The Division of Facilities Construction and Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of DFCM.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
Joanna Reese, Contract Coordinator
4110 State Office Building, Salt Lake City, Utah 84114

PROJECT DESCRIPTION

Completion of shelled auditorium in the Sharwin Smith Center.
Project includes finish sheet rocking, electrical, stage lighting, drop in ceiling, carpet, seating, audio.Also mechanical completion of HVAC system including new AHU and related ducting, controls, a new chair lift for wheel chairs will be included in this project.

Project must be completed by October 15, 2009

PROJECT SCHEDULE

PROJECT NAME: COMPLETION OF SHELLED AUDITORIUM
SOUTHERN UTAH UNIVERSITY – CEDAR CITY, UTAH
DFCM PROJECT NO. 09013730

Event	Day	Date	Time	Place
Bidding Documents Available	Wednesday	June 10, 2009	5:00 PM	DFCM 4110 State Office Bldg SLC, UT and the DFCM web site *
Mandatory Pre-bid Site Meeting	Wednesday	June 17, 2009	10:30 AM	SUU – New Facility Management Building Cedar City, Utah
Last Day to Submit Questions	Monday	June 22, 2009	3:00 PM	*Jeff Reddoor* – DFCM E-mail jreddoor@utah.gov Fax 435-743-6624
Addendum Deadline (exception for bid delays)	Wednesday	June 24, 2009	3:00 PM	DFCM web site *
Prime Contractors Turn In Bid and Bid Bond	Wednesday	July 1, 2009	3:00 PM	DFCM 4110 State Office Bldg SLC, UT
Sub-contractor List Due	Thursday	July 2, 2009	3:00 PM	DFCM 4110 State Office Bldg SLC, UT Fax 801-538-3677
Substantial Completion Date	Thursday	October 15, 2009	5:00 PM	

* **NOTE: DFCM's web site address is http://dfcm.utah.gov**

BID FORM

NAME OF BIDDER _____ DATE _____

To the Division of Facilities Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114

The undersigned, responsive to the "Notice to Contractors" and in accordance with the "Instructions to Bidders", in compliance with your invitation for bids for the **Completion of Shelled Auditorium – Southern Utah University – Cedar City, Utah – Project No. 09013730** and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: _____

For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:

_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be Substantially Complete by October 15, 2009, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **$500.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of _____

The undersigned Contractor's License Number for Utah is _____.

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in the Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract.

The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable l00% Performance and Payment bonds are not delivered within the time set forth.

Type of Organization:

_____
(Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws:

_____

Respectfully submitted,

_____
Name of Bidder

ADDRESS:

_____

_____

_____
Authorized Signature

INSTRUCTIONS TO BIDDERS

1. Drawings and Specifications, Other Contract Documents

Drawings and Specifications, as well as other available Contract Documents, may be obtained as stated in the Invitation to Bid.

2. Bids

Before submitting a bid, each contractor shall carefully examine the Contract Documents, shall visit the site of the Work; shall fully inform themselves as to all existing conditions and limitations; and shall include in the bid the cost of all items required by the Contract Documents. If the bidder observes that portions of the Contract Documents are at variance with applicable laws, building codes, rules, regulations or contain obvious erroneous or uncoordinated information, the bidder shall promptly notify the DFCM Representative and the necessary changes shall be accomplished by Addendum.

The bid, bearing original signatures, must be typed or handwritten in ink on the Bid Form provided in the procurement documents and submitted in a sealed envelope at the location specified by the Invitation to Bid prior to the deadline for submission of bids.

Bid bond security, in the amount of five percent (5%) of the bid, made payable to the Division of Facilities Construction and Management, shall accompany bid. THE BID BOND MUST BE ON THE BID BOND FORM PROVIDED IN THE PROCUREMENT DOCUMENTS IN ORDER TO BE CONSIDERED AN ACCEPTABLE BID.

If the bid bond security is submitted on a bid bond form other than DFCM's required bid bond form, and the bid security meets all other legal requirements, the bidder will be allowed to provide an acceptable bid bond by the close of business on the next business day following notification by DFCM of submission of a defective bid bond security. **NOTE: A cashier's check cannot be used as a substitute for a bid bond.**

3. Contract and Bond

The Contractor's Agreement will be in the form found in the specifications. The Contract Time will be as indicated in the bid. The successful bidder, simultaneously with the execution of the Contract Agreement, will be required to furnish a performance bond and a payment bond, both bearing original signatures, upon the forms provided in the procurement documents. The performance and payment bonds shall be for an amount equal to one hundred percent (100%) of the contract sum and secured from a company that meets the requirements specified in the requisite forms. Any bonding requirements for subcontractors will be specified in the Supplementary General Conditions.

4. Listing of Subcontractors

Listing of Subcontractors shall be as summarized in the "Instructions and Subcontractor's List Form", which are included as part of these Contract Documents. The Subcontractors List shall be delivered to DFCM or faxed to DFCM at (801)538-3677 within 24 hours of the bid opening. Requirements for listing additional subcontractors will be listed in the Contract Documents.

DFCM retains the right to audit or take other steps necessary to confirm compliance with requirements for the listing and changing of subcontractors. Any contractor who is found to not be in compliance with these requirements is subject to a debarment hearing and may be debarred from consideration for award of contracts for a period of up to three years.

5. Interpretation of Drawings and Specifications

If any person or entity contemplating submitting a bid is in doubt as to the meaning of any part of the drawings, specifications or other Contract Documents, such person shall submit to the DFCM Project Manager a request for an interpretation thereof. The person or entity submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addenda posted on DFCM's web site at http://dfcm.utah.gov. Neither the DFCM nor A/E will be responsible for any other explanations or interpretations of the proposed documents. A/E shall be deemed to refer to the architect or engineer hired by DFCM as the A/E or Consultant for the Project.

6. Addenda

Addenda will be posted on DFCM's web site at http://dfcm.utah.gov. Contractors are responsible for obtaining information contained in each addendum from the web site. Addenda issued prior to the submittal deadline shall become part of the bidding process and must be acknowledged on the bid form. Failure to acknowledge addenda may result in disqualification from bidding.

7. Award of Contract

The Contract will be awarded as soon as possible to the lowest, responsive and responsible bidder, based on the lowest combination of base bid and acceptable prioritized alternates, provided the bid is reasonable, is in the interests of the State of Utah to accept and after applying the Utah Preference Laws in U.C.A. Title 63, Chapter 56. DFCM reserves the right to waive any technicalities or formalities in any bid or in the bidding. Alternates will be accepted on a prioritized basis with Alternate 1 being highest priority, Alternate 2 having second priority, etc.

8. DFCM Contractor Performance Rating

As a contractor completes each DFCM project, DFCM, the architect/engineer and the using agency will evaluate project performance based on the enclosed "DFCM Contractor Performance Rating" form. The ratings issued on this project will not affect this project but may affect the award on future projects.

9. Licensure

The Contractor shall comply with and require all of its subcontractors to comply with the license laws as required by the State of Utah.

10. Permits

In concurrence with the requirements for permitting in the General Conditions, it is the responsibility of the Contractor to obtain the fugitive dust plan requirements from the Utah Division of Air Quality and the SWPPP requirements from the Utah Department of Environmental Quality and submit the completed forms and pay any permit fee that may be required for this specific project. Failure to obtain the required permit may result in work stoppage and/or fines from the regulating authority that will be the sole responsibility of the Contractor. Any delay to the project as a result of any such failure to obtain the permit or noncompliance with the permit shall not be eligible for any extension in the Contract Time.

11. Right to Reject Bids

DFCM reserves the right to reject any or all Bids.

12. Time is of the Essence

Time is of the essence in regard to all the requirements of the Contract Documents.

13. Withdrawal of Bids

Bids may be withdrawn on written request received from bidder prior to the time fixed for opening. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal of the bid after it has been opened.

14. Product Approvals

Where reference is made to one or more proprietary products in the Contract Documents, but restrictive descriptive materials of one or more manufacturer(s) is referred to in the Contract Documents, the products of other manufacturers will be accepted, provided they equal or exceed the standards set forth in the drawings and specifications and are compatible with the intent and purpose of

the design, subject to the written approval of the A/E. Such written approval must occur prior to the deadline established for the last scheduled addenda to be issued. The A/E's written approval will be in an issued addendum. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design as determined by the A/E.

15. Financial Responsibility of Contractors, Subcontractors and Sub-subcontractors

Contractors shall respond promptly to any inquiry in writing by DFCM to any concern of financial responsibility of the contractor, subcontractor or sub-subcontractor.

16. Debarment

By submitting a bid, the Contractor certifies that neither it nor its principals, including project and site managers, have been, or are under consideration for, debarment or suspension, or any action that would exclude such from participation in a construction contract by any governmental department or agency. If the Contractor cannot certify this statement, attach to the bid a detailed written explanation which must be reviewed and approved by DFCM as part of the requirements for award of the Project.

BID BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and_____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed, (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the STATE OF UTAH, hereinafter referred to as the "Obligee," in the amount of $_____ (5% of the accompanying bid), being the sum of this Bond to which payment the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted to Obligee the accompanying bid incorporated by reference herein, dated as shown, to enter into a contract in writing for the_____ _____ Project.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the said principal does not execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the principal, then the sum of the amount stated above will be forfeited to the State of Utah as liquidated damages and not as a penalty; if the said principal shall execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the Principal, then this obligation shall be null and void. It is expressly understood and agreed that the liability of the Surety for any and all defaults of the Principal hereunder shall be the full penal sum of this Bond. The Surety, for value received, hereby stipulates and agrees that obligations of the Surety under this Bond shall be for a term of sixty (60) days from actual date of the bid opening.

PROVIDED, HOWEVER, that this Bond is executed pursuant to provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several seals on the date indicated below, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

DATED this _____ day of _____, 20_____ .

Principal's name and address (if other than a corporation):

_____

_____

By:_____

Title: _____

Principal's name and address (if a corporation):

_____

_____

By:_____

Title: _____

(Affix Corporate Seal)

Surety's name and address:

_____

_____

By: _____

Attorney-in-Fact (Affix Corporate Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this ____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.
My Commission Expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

INSTRUCTIONS AND SUBCONTRACTORS LIST FORM

The three low bidders, as well as all other bidders that desire to be considered, are required by law to submit to DFCM within 24 hours of bid opening a list of **ALL** first-tier subcontractors, including the subcontractor's name, bid amount and other information required by Building Board Rule and as stated in these Contract Documents, based on the following:

DOLLAR AMOUNTS FOR LISTING

PROJECTS UNDER $500,000: ALL FIRST-TIER SUBS $20,000 OR OVER MUST BE LISTED
PROJECTS $500,000 OR MORE: ALL FIRST-TIER SUBS $35,000 OR OVER MUST BE LISTED

- Any additional subcontractors identified in the bid documents shall also be listed.
- The DFCM Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law.
- List subcontractors for base bid as well as the impact on the list that the selection of any alternate may have.
- Bidder may not list more than one subcontractor to perform the same work.
- If there are no subcontractors for the job that are required to be reported by State law (either because there are no subcontractors that will be used on the project or because there are no first-tier subcontractors over the dollar amounts referred to above), then you do not need to submit a sublist. If you do not submit a sublist, it will be deemed to be a representation by you that there are no subcontractors on the job that are required to be reported under State law. At any time, DFCM reserves the right to inquire, for security purposes, as to the identification of the subcontractors at any tier that will be on the worksite.

LICENSURE:

The subcontractor's name, the type of work, the subcontractor's bid amount, and the subcontractor's license number as issued by DOPL, if such license is required under Utah Law, shall be listed. Bidder shall certify that all subcontractors, required to be licensed, are licensed as required by State law. A subcontractor includes a trade contractor or specialty contractor and does not include suppliers who provide only materials, equipment, or supplies to a contractor or subcontractor.

'SPECIAL EXCEPTION':

A bidder may list 'Special Exception' in place of a subcontractor when the bidder intends to obtain a subcontractor to perform the work at a later date because the bidder was unable to obtain a qualified or reasonable bid under the provisions of U.C.A.Section 63A-5-208(4). The bidder shall insert the term 'Special Exception' for that category of work, and shall provide documentation with the subcontractor list describing the bidder's efforts to obtain a bid of a qualified subcontractor at a reasonable cost and why the bidder was unable to obtain a qualified subcontractor bid. The Director must find that the bidder complied in good faith with State law requirements for any 'Special Exception' designation, in order for the bid to be considered. If awarded the contract, the Director shall supervise the bidder's efforts to obtain a qualified subcontractor bid. The amount of the awarded contract may not be adjusted to reflect the actual amount of the subcontractor's bid. Any listing of 'Special Exception' on the sublist form shall also include amount allocated for that work.

GROUNDS FOR DISQUALIFICATION:

The Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law. Director may withhold awarding the contract to a particular bidder if one or more of the proposed subcontractors are considered by the Director to be unqualified to do the Work or for

such other reason in the best interest of the State of Utah. Notwithstanding any other provision in these instructions, if there is a good faith error on the sublist form, at the sole discretion of the Director, the Director may provide notice to the contractor and the contractor shall have 24 hours to submit the correction to the Director. If such correction is submitted timely, then the sublist requirements shall be considered met.

CHANGES OF SUBCONTRACTORS SPECIFICALLY IDENTIFIED ON SUBLIST FORM:

Subsequent to twenty-four hours after the bid opening, the contractor may change its listed subcontractors only after receiving written permission from the Director based on complying with all of the following criteria.

(1) The contractor has established in writing that the change is in the best interest of the State and that the contractor establishes an appropriate reason for the change, which may include, but not is not limited to, the following reasons: the original subcontractor has failed to perform, or is not qualified or capable of performing, and/or the subcontractor has requested in writing to be released.
(2) The circumstances related to the request for the change do not indicate any bad faith in the original listing of the subcontractors.
(3) Any requirement set forth by the Director to ensure that the process used to select a new subcontractor does not give rise to bid shopping.
(4) Any increase in the cost of the subject subcontractor work is borne by the contractor.
(5) Any decrease in the cost of the subject subcontractor work shall result in a deductive change order being issued for the contract for such decreased amount.
(6) The Director will give substantial weight to whether the subcontractor has consented in writing to being removed unless the Contractor establishes that the subcontractor is not qualified for the work.

EXAMPLE:

Example of a list where there are only four subcontractors:

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONTRACTOR LICENSE #
ELECTRICAL	ABCD Electric Inc.	$350,000.00	123456789000
LANDSCAPING	"Self" *	$300,000.00	123456789000
CONCRETE (ALTERNATE #1)	XYZ Concrete Inc	$298,000.00	987654321000
MECHANICAL	"Special Exception" (attach documentation)	Fixed at: $350,000.00	(TO BE PROVIDED AFTER OBTAINING SUBCONTRACTOR)

* Bidders may list "self", but it is not required.

PURSUANT TO STATE LAW - SUBCONTRACTOR BID AMOUNTS CONTAINED IN THIS SUBCONTRACTOR LIST SHALL NOT BE DISCLOSED UNTIL THE CONTRACT HAS BEEN AWARDED.

SUBCONTRACTORS LIST

FAX TO 801-538-3677

PROJECT TITLE: _____

Caution: You must read and comply fully with instructions.

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #

We certify that:

1. This list includes all subcontractors as required by the instructions, including those related to the base bid as well as any alternates.
2. We have listed "Self" or "Special Exception" in accordance with the instructions.
3. All subcontractors are appropriately licensed as required by State law.

FIRM: _____

DATE: _____ SIGNED BY: _____

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR OWNER'S REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY OWNER. ATTACH A SECOND PAGE IF NECESSARY.

CONTRACTOR'S AGREEMENT

FOR:

_____
_____
_____

THIS CONTRACTOR'S AGREEMENT, made and entered into this ____ day of _____, 20__, by and between the DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT, hereinafter referred to as "DFCM", and _____, incorporated in the State of _____ and authorized to do business in the State of Utah, hereinafter referred to as "Contractor", whose address is _____.

WITNESSETH: WHEREAS, DFCM intends to have Work performed at _____ _____.

WHEREAS, Contractor agrees to perform the Work for the sum stated herein.

NOW, THEREFORE, DFCM and Contractor for the consideration provided in this Contractor's Agreement, agree as follows:

ARTICLE 1. SCOPE OF WORK. The Work to be performed shall be in accordance with the Contract Documents prepared by _____ and entitled "_____."

The DFCM General Conditions ("General Conditions") dated May 25, 2005 and Supplemental General Conditions dated May 5, 2008 ("also referred to as General Conditions") on file at the office of DFCM and available on the DFCM website, are hereby incorporated by reference as part of this Agreement and are included in the specifications for this Project. All terms used in this Contractor's Agreement shall be as defined in the Contract Documents, and in particular, the General Conditions.

The Contractor Agrees to furnish labor, materials and equipment to complete the Work as required in the Contract Documents which are hereby incorporated by reference. It is understood and agreed by the parties hereto that all Work shall be performed as required in the Contract Documents and shall be subject to inspection and approval of DFCM or its authorized representative. The relationship of the Contractor to the DFCM hereunder is that of an independent Contractor.

ARTICLE 2. CONTRACT SUM. The DFCM agrees to pay and the Contractor agrees to accept in full performance of this Contractor's Agreement, the sum of _____ _____ DOLLARS AND NO CENTS ($_____.00), which is the base bid, and which sum also includes the cost of a 100% Performance Bond and a 100%

Payment Bond as well as all insurance requirements of the Contractor. Said bonds have already been posted by the Contractor pursuant to State law. The required proof of insurance certificates have been delivered to DFCM in accordance with the General Conditions before the execution of this Contractor's Agreement.

ARTICLE 3. TIME OF COMPLETION AND DELAY REMEDY. The Work shall be Substantially Complete by _____. Contractor agrees to pay liquidated damages in the amount of $_____ per day for each day after expiration of the Contract Time until the Contractor achieves Substantial Completion in accordance with the Contract Documents, if Contractor's delay makes the damages applicable. The provision for liquidated damages is: (a) to compensate the DFCM for delay only; (b) is provided for herein because actual damages can not be readily ascertained at the time of execution of this Contractor's Agreement; (c) is not a penalty; and (d) shall not prevent the DFCM from maintaining Claims for other non-delay damages, such as costs to complete or remedy defective Work.

No action shall be maintained by the Contractor, including its or Subcontractor or suppliers at any tier, against the DFCM or State of Utah for damages or other claims due to losses attributable to hindrances or delays from any cause whatsoever, including acts and omissions of the DFCM or its officers, employees or agents, except as expressly provided in the General Conditions. The Contractor may receive a written extension of time, signed by the DFCM, in which to complete the Work under this Contractor's Agreement in accordance with the General Conditions.

ARTICLE 4. CONTRACT DOCUMENTS. The Contract Documents consist of this Contractor's Agreement, the Conditions of the Contract (DFCM General Conditions, Supplementary and other Conditions), the Drawings, Specifications, Addenda and Modifications. The Contract Documents shall also include the bidding documents, including the Invitation to Bid, Instructions to Bidders/ Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

All such documents are hereby incorporated by reference herein. Any reference in this Contractor's Agreement to certain provisions of the Contract Documents shall in no way be construed as to lessen the importance or applicability of any other provisions of the Contract Documents.

ARTICLE 5. PAYMENT. The DFCM agrees to pay the Contractor from time to time as the Work progresses, but not more than once each month after the date of Notice to Proceed, and only upon Certificate of the A/E for Work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and ninety-five percent (95%) of the value of materials furnished in place or on the site. The Contractor agrees to furnish to the DFCM invoices for materials purchased and on the site but not installed, for which the Contractor requests payment and agrees to

safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

Such evidence of labor performed and materials furnished as the DFCM may reasonably require shall be supplied by the Contractor at the time of request for Certificate of Payment on account. Materials for which payment has been made cannot be removed from the job site without DFCM's written approval. Five percent (5%) of the earned amount shall be retained from each monthly payment. The retainage, including any additional retainage imposed and the release of any retainage, shall be in accordance with UCA 13-8-5 as amended. Contractor shall also comply with the requirements of UCA 13-8-5, including restrictions of retainage regarding subcontractors and the distribution of interest earned on the retention proceeds. The DFCM shall not be responsible for enforcing the Contractor's obligations under State law in fulfilling the retention law requirements with subcontractors at any tier.

ARTICLE 6. INDEBTEDNESS. Before final payment is made, the Contractor must submit evidence satisfactory to the DFCM that all payrolls, materials bills, subcontracts at any tier and outstanding indebtedness in connection with the Work have been properly paid. Final Payment will be made after receipt of said evidence, final acceptance of the Work by the DFCM as well as compliance with the applicable provisions of the General Conditions.

Contractor shall respond immediately to any inquiry in writing by DFCM as to any concern of financial responsibility and DFCM reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third parties prior to any payment by DFCM to Contractor.

ARTICLE 7. ADDITIONAL WORK. It is understood and agreed by the parties hereto that no money will be paid to the Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. The DFCM specifically reserves the right to modify or amend this Contractor's Agreement and the total sum due hereunder either by enlarging or restricting the scope of the Work.

ARTICLE 8. INSPECTIONS. The Work shall be inspected for acceptance in accordance with the General Conditions.

ARTICLE 9. DISPUTES. Any dispute, PRE or Claim between the parties shall be subject to the provisions of Article 7 of the General Conditions. DFCM reserves all rights to pursue its rights and remedies as provided in the General Conditions.

ARTICLE 10. TERMINATION, SUSPENSION OR ABANDONMENT. This Contractor's Agreement may be terminated, suspended or abandoned in accordance with the General Conditions.

ARTICLE 11. DFCM'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE USE THEREOF. The DFCM may withhold from payment to the Contractor such amount as, in DFCM's judgment, may be necessary to pay just claims against the Contractor or Subcontractor at any tier for labor and services rendered and materials furnished in and about the Work. The DFCM may apply such withheld amounts for the payment of such claims in DFCM's discretion. In so doing, the DFCM shall be deemed the agent of Contractor and payment so made by the DFCM shall be considered as payment made under this Contractor's Agreement by the DFCM to the Contractor. DFCM shall not be liable to the Contractor for any such payment made in good faith. Such withholdings and payments may be made without prior approval of the Contractor and may be also be prior to any determination as a result of any dispute, PRE, Claim or litigation.

ARTICLE 12. INDEMNIFICATION. The Contractor shall comply with the indemnification provisions of the General Conditions.

ARTICLE 13. SUCCESSORS AND ASSIGNMENT OF CONTRACT. The DFCM and Contractor, respectively bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement, and to partners, successors, assigns and legal representatives of such other party with respect to all covenants, provisions, rights and responsibilities of this Contractor’s Agreement. The Contractor shall not assign this Contractor’s Agreement without the prior written consent of the DFCM, nor shall the Contractor assign any moneys due or to become due as well as any rights under this Contractor’s Agreement, without prior written consent of the DFCM.

ARTICLE 14. RELATIONSHIP OF THE PARTIES. The Contractor accepts the relationship of trust and confidence established by this Contractor's Agreement and covenants with the DFCM to cooperate with the DFCM and A/E and use the Contractor's best skill, efforts and judgment in furthering the interest of the DFCM; to furnish efficient business administration and supervision; to make best efforts to furnish at all times an adequate supply of workers and materials; and to perform the Work in the best and most expeditious and economic manner consistent with the interests of the DFCM.

ARTICLE 15. AUTHORITY TO EXECUTE AND PERFORM AGREEMENT. Contractor and DFCM each represent that the execution of this Contractor's Agreement and the performance thereunder is within their respective duly authorized powers.

ARTICLE 16. ATTORNEY FEES AND COSTS. Except as otherwise provided in the dispute resolution provisions of the General Conditions, the prevailing party shall be entitled to reasonable attorney fees and costs incurred in any action in the District Court and/or appellate body to enforce this Contractor's Agreement or recover damages or any other action as a result of a breach thereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contractor's Agreement on the day and year stated hereinabove.

CONTRACTOR: _____

_____
Signature Date

Title: _____

State of _____)
)
County of _____)

_____
Please type/print name clearly

On this ____ day of _____, 20____, personally appeared before me, _____, whose identity is personally known to me (or proved to me on the basis of satisfactory evidence) and who by me duly sworn (or affirmed), did say that he (she) is the _____ (title or office) of the firm and that said document was signed by him (her) in behalf of said firm.

_____
Notary Public

(SEAL)

My Commission Expires _____

APPROVED AS TO AVAILABILITY OF FUNDS:

_____
David D. Williams, Jr. Date
DFCM Administrative Services Director

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

_____
Lynn A. Hinrichs Date
Assistant Director Construction Management

APPROVED AS TO FORM:
ATTORNEY GENERAL
May 5, 2008
By: Alan S. Bachman
Asst Attorney General

APPROVED FOR EXPENDITURE:

_____
Division of Finance Date

PERFORMANCE BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

That _____ hereinafter referred to as the "Principal" and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah, hereinafter referred to as the "Obligee, " in the amount of _____ _____ DOLLARS ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____, for the approximate sum of _____ _____ Dollars ($_____), which Contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall faithfully perform the Contract in accordance with the Contract Documents including, but not limited to, the Plans, Specifications and conditions thereof, the one year performance warranty, and the terms of the Contract as said Contract may be subject to Modifications or changes, then this obligation shall be void; otherwise it shall remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the state named herein or the heirs, executors, administrators or successors of the Owner.

The parties agree that the dispute provisions provided in the Contract Documents apply and shall constitute the sole dispute procedures of the parties.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the Provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____ (Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20___, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney in-fact of the above-named Surety Company and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

PAYMENT BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____ _____, a corporation organized and existing under the laws of the State of _____authorized to do business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); with its principal office in the City of _____, hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah hereinafter referred to as the "Obligee," in the amount of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____ for the approximate sum of _____ _____ Dollars ($_____), which contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall pay all claimants supplying labor or materials to Principal or Principal's Subcontractors in compliance with the provisions of Title 63, Chapter 56, of Utah Code Annotated, l953, as amended, and in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise it shall remain in full force and effect.

That said Surety to this Bond, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder, or the specifications or drawings accompanying same shall in any way affect its obligation on this Bond, and does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to the Work or to the specifications or drawings and agrees that they shall become part of the Contract Documents.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____ (Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20_____, personally appeared before me _____ _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT _____ PROJECT NO: _____

AGENCY/INSTITUTION _____

AREA ACCEPTED _____

The Work performed under the subject Contract has been reviewed on this date and found to be Substantially Completed as defined in the General Conditions; including that the construction is sufficiently completed in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the State of Utah can occupy the Project or specified area of the Project for the use for which it is intended.

The DFCM - (Owner) accepts the Project or specified area of the Project as Substantially Complete and will assume full possession of the Project or specified area of the Project at _____ (time) on _____ (date).

The DFCM accepts the Project for occupancy and agrees to assume full responsibility for maintenance and operation, including utilities and insurance, of the Project subject to the itemized responsibilities and/or exceptions noted below:

_____

_____

The Owner acknowledges receipt of the following closeout and transition materials:

As-built Drawings | O & M Manuals | Warranty Documents | Completion of Training Requirements

A list of items to be completed or corrected (Punch List) is attached hereto. The failure to include an item on it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents, including authorized changes thereof. The amount of _____(Twice the value of the punch list work) shall be retained to assure the completion of the punch list work.

The Contractor shall complete or correct the Work on the list of (Punch List) items appended hereto within _____ ____calendar days from the above date of issuance of this Certificate. The amount withheld pending completion of the list of items noted and agreed to shall be: $_____. If the list of items is not completed within the time allotted the Owner has the right to be compensated for the delays and/or complete the work with the help of independent contractor at the expense of the retained project funds. If the retained project funds are insufficient to cover the delay/completion damages, the Owner shall be promptly reimbursed for the balance of the funds needed to compensate the Owner.

_____ by: _____

CONTRACTOR (include name of firm) (Signature) DATE

_____ by: _____

A/E (include name of firm) (Signature) DATE

_____ by: _____

USING INSTITUTION OR AGENCY (Signature) DATE

_____ by: _____

DFCM (Owner) (Signature) DATE

4110 State Office Building, Salt Lake City, Utah 84114 cc: Parties Noted
telephone 801-538-3018 • facsimile 801-538-3267 • http://dfcm.utah.gov DFCM, Director

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

General Contractor Performance Rating Form

Project Name:		DFCM Project#	
Contractor: (ABC Construction, John Doe, 111-111-1111)	A/E: (ABC Architects, Jane Doe, 222-222-2222)	Original Contract Amount:	Final Contract Amount:
DFCM Project Manager:		Contract Date:	
Completion Date:		Date of Rating:	

Rating Guideline	QUALITY OF PRODUCT OR SERVICES	COST CONTROL	TIMELINESS OF PERFORMANCE	BUSINESS RELATIONS
5-Exceptional	Contractor has demonstrated an exceptional performance level in any of the above four categories that justifies adding a point to the score. Contractor performance clearly exceeds the performance levels described as "Very Good"			
4-Very Good	Contractor is in compliance with contract requirements and/or delivers quality product/service.	Contractor is effective in managing costs and submits current, accurate, and complete billings	Contractor is effective in meeting milestones and delivery schedule	Response to inquiries, technical/service/ administrative issues is effective
3-Satisfactory	Minor inefficiencies/errors have been identified	Contractor is usually effective in managing cost	Contractor is usually effective in meeting milestones and delivery schedules	Response to inquires technical/ service/administrative issues is somewhat effective
2-Marginal	Major problems have been encountered	Contractor is having major difficulty managing cost effectively	Contractor is having major difficulty meeting milestones and delivery schedule	Response to inquiries, technical/service/administrative issues is marginally effective
1-Unsatisfactory	Contractor is not in compliance and is jeopardizing achievement of contract objectives	Contractor is unable to manage costs effectively	Contractor delays are jeopardizing performance of contract objectives	Response to inquiries, technical/service/administrative issues is not effective

1. Rate Contractors quality of workmanship, management of sub contractor performance, project cleanliness, organization and safety requirement.	**Score**
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

2. Rate Contractor administration of project costs, change orders and financial management of the project budget.	Score
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

3. Rate Contractor's performance and adherence to Project Schedule, delay procedures and requirements of substantial completion, inspection and punch-list performance.	Score
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

4. Evaluate performance of contractor management team including project manager, engineer and superintendent also include in the rating team's ability to work well with owner, user agency and consultants.	Score
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

5. Rate success of Contractor's management plan, completion of the plans mitigation of project risks and performance of value engineering concepts.	Score
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

Signed by:	Date:	Mean Score

Additional Comments:

P R O J E C T M A N U A L

SHARWAN SMITH CENTER AUDITORIUM REMODEL

SOUTHERN UTAH UNIVERSITY

DFCM PROJECT NO 09013730

MHTN PROJECT NO 2009516.00
15 MAY 2009

MHTN
ARCHITECTS

vision made **real**

420 East South Temple, Suite 100 . Salt Lake City . Utah . 84111 . 801.595.6700 . Fax 801.595.6717 . www.mhtn.com

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SHARWAN SMITH CENTER
AUDITORIUM REMODEL

SOUTHERN UTAH UNIVERSITY

MHTN PROJECT NO 2009516.00
DFCM PROJECT NO 09013730

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5/15/2009

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Sharwan Smith Center Auditorium Remodel

1. Project Location: Southern Utah University

B. Architect Identification: The Contract Documents, were prepared for the Project by MHTN Architects, 420 East South Temple, Salt Lake City, Utah 84111

C. The project consists of remodeling of a space within the existing Sharwan Smith Center with the addition of finishes and seating to complete the lecture hall.

Modifications include

Mechanical, Electrical & Fire-Sprinkler systems, Audio-Visual systems and specialty lighting, interior finishes, fixed seating and installation of acoustic insulation below existing roof decking.

The work within the existing structure requires a high level of dust control and noise containment to avoid conflicts with the on-going operation of the facility.

Modifications must be installed in a manner that prevents damage to the existing structure and assemblies. Mechanical fasteners and other attachments supporting new systems must be placed with care to avoid penetrating existing roofing, or compromising existing fire-rated construction and thremally insulated walls.

1.3 CONTRACTS

A. Project will be constructed under a general construction contract

1.4 CONSTRUCTION SCHEDULE – MANPOWER REQUIREMENTS

A. The Work shall be performed during summer recess for the school

B. Contractors shall provide adequate personnel and extend workdays and work weeks to comply with the schedule requirements of this project.

C. Milestones may be established to verify the project remains on schedule throughout the course of the work

D. Project schedule is as follows:

1. Notice to Proceed- 06/30/2009
2. Start Construction Date – 06/31/2009
3. Substantial Completion 10/07/2009
4. Final Completion 10/14/2009

1.5 USE OF PREMISES

A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.

1. Limits: Confine constructions operations to immediate areas of the work of this contract as shown on Drawings.
2. Owner Occupancy: Allow for Owner occupancy of existing facility outside work area.
3. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

B. Use of Existing Building: Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.6 OCCUPANCY REQUIREMENTS

A. Partial Owner Occupancy: Owner reserves the right to occupy and to place and install equipment in and around completed areas of the work, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of building and assume responsibility for maintenance and custodial service for occupied portions of building.

1.7 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the be-

ginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

    a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not used)

END OF SECTION 011000

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

ALTERNATE #1 – Provide Carpet Tiles and Resilient accessories in aisles as specified in Division 9 Sections.

ALTERNATE #2 – Provide Projector and Projection Screen mounted above platform

END OF SECTION 012300

SECTION 012500 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections include the following:
   1. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710**, "**Architect's Supplemental Instructions**."**

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

   1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
   2. Within **7 days** after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

5. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on **AIA Document G701**.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: **Architect** may issue a Construction Change Directive on AIA Document G714. Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the **Construction** Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections include the following:

1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Division 1 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

   a. Application for Payment forms with Continuation Sheets.
   b. Submittals Schedule.

2. Submit the Schedule of Values to Architect at earliest possible date but no later than **seven** days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

a. Project name and location.
b. Name of Architect.
c. Architect's project number.
d. Contractor's name and address.
e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value.

      1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

   a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Allowances (if required): Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

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

   1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Forms: Use **AIA Document G702 and AIA Document G703 Continuation Sheets** as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

   1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
   2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit 2 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

   1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

   1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
   2. When an application shows completion of an item, submit final or full waivers.
   3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
   4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.

      a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

   5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

   1. List of subcontractors.
   2. Schedule of Values.

3. Contractor's Construction Schedule (preliminary if not final).
4. Products list.
5. Schedule of unit prices (if any)
6. Submittals Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. Copies of building permits.
9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
10. Initial progress report.
11. Report of preconstruction conference.
12. Certificates of insurance and insurance policies if not provided to Owner at contract signing.
13. Performance and payment bonds.
14. Initial settlement survey and damage report if required.

H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination Drawings.
4. Administrative and supervisory personnel.
5. Project meetings.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Summary" for a description of the Work and responsibility for coordination activities not in this Section.
2. Division 1 Section "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
3. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
4. Division 1 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

A. Coordination: Contractor shall coordinate its construction operations with those of other contractors in separate phases where required, and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Indicate relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Refer to Division 16 Section "Basic Electrical Materials and Methods" for specific Coordination Drawing requirements for electrical installations.

B. Staff Names. Within 5 days of starting construction operations, submit a list of the principal staff assignments, including superintendent and other personnel in attendance at Project site. List addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

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

1. Include special personnel required for coordination of operations with sub-contractors.

1.6 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: The Architect will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and subcontractors, within 2 days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

a. Tentative construction schedule.
b. Critical work sequencing.
c. Designation of responsible personnel.
d. Procedures for processing field decisions and Change Orders.
e. Procedures for processing Applications for Payment.
f. Distribution of the Contract Documents.
g. Submittal procedures.
h. Preparation of Record Documents.
i. Use of the premises.
j. Responsibility for temporary facilities and controls.
k. Parking availability.
l. Office, work, and storage areas.
m. Equipment deliveries and priorities.
n. First aid.
o. Security.
p. Site Upkeep.
q. Working hours.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before construction activities that requires coordination with other construction as a part of weekly progress meetings.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related Change Orders.

d. Purchases.
e. Deliveries.
f. Submittals.
g. Possible conflicts.
h. Compatibility problems.
i. Time schedules.
j. Weather limitations.
k. Manufacturer's written recommendations.
l. Warranty requirements.
m. Compatibility of materials.
n. Acceptability of substrates.
o. Temporary facilities and controls.
p. Space and access limitations.
q. Regulations of authorities having jurisdiction.
r. Testing and inspecting requirements.
s. Required performance results.
t. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements.
4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress and coordination meetings at **weekly** intervals as directed by Owner. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner and Architect, each subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.

12) Quality and work standards.
13) Change Orders.
14) Documentation of information for payment requests.

3. Reporting: The Architect will prepare and distribute minutes of the meeting to each party present and to parties who should have been present.

   a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule
2. Submittals Schedule.
3. Daily construction reports.
4. Field condition reports.
5. Special reports.

B. Related Sections include the following:
1. Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 1 Section "Submittal Procedures" for submitting schedules and reports.
4. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.
5. Division 1 Section "Closeout Procedures" for submitting Project Record Documents at Project closeout.

1.3 SUBMITTALS

A. Submittals Schedule: Submit **three** copies of schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of subcontractor.
5. Description of the Work covered.
6. Scheduled date for Architect's final release or approval.

B. Contractor's Construction Schedule: Submit **two** printed copies of initial schedule, one a reproducible print and one a blue- or black-line print, large enough to show entire schedule for entire construction period.

C. Daily Construction Reports: Submit one copy at **weekly** intervals.

D. Field Condition Reports: Submit one copy at time of discovery of differing conditions.

E. Special Reports: Submit one copy at time of unusual event.

1.4 QUALITY ASSURANCE

A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
   1. Discuss constraints, including **phasing and storage areas**.
   2. Review time required for review of submittals and resubmittals.
   3. Review requirements for tests and inspections by independent testing and inspecting agencies, If required
   4. Review time required for completion and startup procedures.
   5. Review and finalize list of construction activities to be included in schedule.
   6. Review submittal requirements and procedures.
   7. Review procedures for updating schedule.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

   1. Secure time commitments for performing critical elements of the Work including delivery of equipment from parties involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

   1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
   2. Initial Submittal: Include crtitical submittals required as soon as possible following commencement of the work. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

   3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for **commencement of the Work or the Notice to Proceed** to date of **Substantial Completion**.

C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 30 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
2. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
3. Startup and Testing Time: Include days for startup and testing as required by the Electrical Consultant.
4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Work Restrictions: Show the effect of the following items on the schedule:

   a. Coordination with existing construction.
   b. Uninterruptible services.
   c. Use of premises restrictions including coordination with the Owner to restrict dust and noise.
   d. Provisions for future construction.
   e. Environmental control.

2. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

   a. Subcontract awards, if any.
   b. Submittals.
   c. Purchases.
   d. Fabrication.
   e. Sample testing.
   f. Deliveries.
   g. Installation.
   h. Tests and inspections.
   i. Adjusting.
   j. Startup and placement into final use and operation.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, Percentage completion mile stones and Final Completion.

F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date from **the Notice of Award** as shown in Division 1 Section “Summary”.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require 1 month or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2. For multiple sites – indicate start/stop and milestone dates for each activity and concurrent or separate operations for each site to Final Completion.

2.4 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site(s), if any.
2. List of separate contractors at Project site where applicable
3. Approximate count of personnel at Project site.
4. High and low temperatures and general weather conditions.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Emergency procedures.
10. Orders and requests of authorities having jurisdiction.
11. Change Orders received and implemented.
12. Construction Change Directives received.
13. Services connected and disconnected.
14. Equipment or system tests and startups.
15. Partial Completions.
16. Substantial Completions.

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

2.5 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one day before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Owner, sub-contractors, testing and inspecting agencies, if applicable and other parties identified by Contractor with a need-to-know schedule responsibility.

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

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

B. Related Sections include the following:

1. Division 1 Section "Payment Procedures" for submitting Applications for Payment.
2. Division 1 Section "Project Management and Coordination" for submitting Coordination Drawings.
3. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule
4. Division 1 Section "Quality Requirements" for submitting test and inspection reports and Delegated-Design Submittals.
5. Division 1 Section "Closeout Procedures" for submitting warranties Project Record Documents and operation and maintenance manuals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings will **not** be provided by Architect for Contractor's use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

   a. **Architect reserves** the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on **Architect's** receipt of submittal.

1. Initial Review: Allow 15 business days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

2. Concurrent Review: Where concurrent review of submittals by Architect's consultants, Owner, or other parties is required, allow 21 business days for initial review of each submittal.

3. Direct Transmittal to Consultant: Where the Contract Documents indicate that submittals may be transmitted directly to Architect's consultants, provide duplicate copy of transmittal to Architect. Submittal will be returned to Architect before being returned to Contractor.

4. If intermediate submittal is necessary, process it in same manner as initial submittal.
5. Allow 10 additional days for processing each resubmittal.
6. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately **4 by 5 inches (100 by 125 mm)** on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:

   a. Project name.
   b. Date.
   c. Name and address of Architect
   d. Name and address of Contractor.
   e. Name and address of subcontractor, if any
   f. Name and address of supplier.
   g. Name of manufacturer.
   h. Unique identifier, including revision number.
   i. Number and title of appropriate Specification Section.
   j. Drawing number and detail references, as appropriate.
   k. Other necessary identification.

F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.

1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

2. Additional copies submitted for maintenance manuals will **not** be marked with action taken and will be returned.

H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will **return submittals, without review,** received from sources other than Contractor.

1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
3. Transmittal Form: Provide locations on form for the following information:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Submittal and transmittal distribution record.
i. Remarks.
j. Signature of transmitter.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Number of Copies: Submit four copies of each submittal, unless otherwise indicated. Architect will return one copy. Mark up and retain copy as a Project Record Document.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's written recommendations.
b. Manufacturer's product specifications.

c. Manufacturer's installation instructions.
d. Standard color charts.
e. Manufacturer's catalog cuts.
f. Wiring diagrams showing factory-installed wiring.
g. Printed performance curves.
h. Operational range diagrams.
i. Standard product operating and maintenance manuals.
j. Compliance with recognized trade association standards.
k. Compliance with recognized testing agency standards.
l. Application of testing agency labels and seals.
m. Notation of coordination requirements.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Include the following information, as applicable:

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shopwork manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Design calculations.
j. Compliance with specified standards.
k. Notation of coordination requirements.
l. Notation of dimensions established by field measurement.

2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).

4. Number of Copies: Submit copies of each submittal, as follows:
a. Initial Submittal: Submit four blue- or black-line prints. Architect**,** will return one print.
b. Final Submittal: Submit four blue- or black-line prints, unless prints are required for operation and maintenance manuals. Submit nine prints where prints are required for operation and maintenance manuals. **Mark up and retain one returned print as a Project Record Drawing.**

D. Coordination Drawings: Comply with requirements in Division 1 Section "Project Management and Coordination."

E. Samples: Prepare physical units of materials or products, including the following:
1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, tex-

ture, and pattern; color range sets; and components used for independent testing and inspection.

3. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:

   a. Generic description of Sample.
   b. Product name or name of manufacturer.
   c. Sample source.

4. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:

   a. Size limitations.
   b. Compliance with recognized standards.
   c. Availability.
   d. Delivery time.

5. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.

   a. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

   b. Samples including , but not limited to, metals, toilet partitions, fabrics, signage panels are to be submitted as a part of materials to be used in the work.

6. Number of Samples for Initial Selection: Submit two full set**s** of available choices where establishment of a level of quality is required to be selected from manufacturer's product line. Architect will return submittal with options selected.

7. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

F. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

   1. Type of product. Include unique identifier for each product.
   2. Location .

G. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for Construction Manager's action.

H. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

I. Application for Payment: Comply with requirements in Division 1 Section "Payment Procedures."

J. Schedule of Values: Comply with requirements in Division 1 Section "Payment Procedures."

K. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit four copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of Contractor, testing agency, or design professional responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of the company.
3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."

B. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.

H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

J. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.

K. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

M. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

N. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "**Closeout Procedures**."

O. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable.

P. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

Q. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

R. Material Safety Data Sheets: Submit information directly to Owner. If submitted to Architect, Architect will not review this information but will return it with no action taken.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect .

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 013300

License and Indemnification Agreement

Project: SHARWAN SMITH CENTER AUDITORIUM REMODEL

MHTN Project Number: 2009516.00

In response to the Receiver's request to obtain Drawings, Specifications, electronic data, and/or other Instruments of Service (the "Information") produced by MHTN Architects, Inc. ("MHTN") for the above referenced project, MHTN and the Receiver agree to the following:

Receiver's authorized representative to initial Receiver's assent to each term in the space provided.

_____ 1. MHTN grants to the Receiver a non-exclusive license to the Information for production of the Receiver's portion of the work for this project only. The Receiver shall not transfer or assign this license. MHTN retains its copyrights, the right to retain electronic data or other reproducible copies of the Information, and the right to use information, ideas, and/or concepts contained in the Information in the normal course of the its professional activities.

_____ 2. The Information is for information purposes only. Under no circumstances shall the conveyance of the Information be deemed a sale by MHTN. MHTN makes no warranties, express or implied, of merchantability or of fitness of the Information for a particular purpose.

_____ 3. The Receiver shall remove all title blocks and other references to MHTN, MHTN's consultants, and the project owner from the electronic data contained in the Information upon receipt.

_____ 4. The Receiver shall remove all notes, text, and detail cuts from the electronic data contained in the Information upon receipt.

_____ 5. Use of the Information shall be at Receiver's sole risk and without liability to MHTN or its consultants. The Receiver shall make no claim against MHTN or its consultants. The Receiver shall defend, indemnify, and hold harmless MHTN, MHTN's consultants, and agents and employees of any of them from and against all claims, damages, losses, and expenses, including but not limited to attorney fees and costs, arising out of the Receiver's use of the Information.

Receiver Company Name: _____

Officer & Title (printed): _____

Officer & Title (signed): _____

Date: _____

_____

MHTN Architects, Inc.

Representative & Title (printed): _____

Representative & Title (signed): _____

Date: _____

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": The term "approved," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.

D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.

E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

I. "Installer": An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.

J. The term "experienced," when used with the term "installer," means having successfully completed a minimum of **five** previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name,

such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

K. "Project site" is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.

C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.

E. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

PART 2 - PRODUCTS (Not Used)

PART3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

B. Temporary utilities include, but are not limited to, the following:
   1. Water service distribution from existing outlets
   2. Sanitary facilities. Use of existing is permitted.
   3. Electric power distribution service.
   4. Lighting.

C. Support facilities include, but are not limited to, the following:
   1. Waste disposal facilities.
   2. Storage and fabrication trailers
   3. Lifts and hoists.
   4. Construction aids and miscellaneous services and facilities.

D. Security and protection facilities include, but are not limited to, the following:

   1. Environmental protection.
   2. Temporary enclosures.
   3. Temporary partitions.
   4. Fire protection.

E. Related Sections include the following:
   1. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
   2. Division 1 Section "Execution Requirements" for progress cleaning requirements.
   3. Divisions 3 through 33 for temporary heat, ventilation, and humidity requirements for products in those Sections.
   4.

1.3 USE CHARGES

A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
   1. Architect.
   2. Testing agencies.
   3. Personnel of authorities having jurisdiction.

B. Water Service: Use water from Owner's existing water system without metering and without payment of use charges.

C. Electric Power Service: Use electric power from Owner's existing system without metering and without payment of use charges.

1.4 SUBMITTALS

A. Implementation and Termination Schedule: Within 15 days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

1.5 QUALITY ASSURANCE

A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.

1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

A. Temporary Utilities

1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.

B. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

C. Water: Potable.

2.2 EQUIPMENT

A. General: Provide equipment suitable for use intended.

B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

C. Electrical Outlets: Properly configured, heavy duty extension cords, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Connect to existing service in place

1. Avoid interruptions in service to make connections for temporary services.
2. Provide adequate capacity at each stage of construction.

B. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

1. Provide rubber hoses as necessary to serve Project work area.

2. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.

C. Sanitary Facilities: Use of existing will be allowed.

1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
2. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
3. Maintain toilets in clean condition throughout course of the work.

D. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from

adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

E. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

F. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.

1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
2. Provide warning signs at power outlets other than 110 to 120 V.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions, only if existing lighting is not adequate to perform the work.

1. Telephone Service: Provide cell phone for superintendent , equipped with voice mail.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Locate storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
2. Provide incombustible construction for sheds and trailers located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.
3. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.

1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.

2. Locate dumpster where directed by Owner, and to avoid interference with traffic access to the area.
3. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.

C. Janitorial Services: Provide janitorial services on a daily basis for work areas and egress areas into the building

D. Storage and Fabrication Trailers: Provide trailers sized, furnished, and equipped to accommodate materials and equipment involved.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.

B. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from access by others and similar activities.
   1. Vertical Openings: Close openings of 25 sq. ft. (2.3 sq. m) or less with plywood or similar materials.
   2. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.

C. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

   1. Construct dustproof, floor-to-ceiling partitions of not less than nominal 4-inch (100-mm) studs, 2 layers of 3-mil (0.07-mm) polyethylene sheets, inside and outside temporary enclosure.
   2. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
   3. Protect air-handling equipment.
   4. Weatherstrip openings.

D. Temporary Fire Protection:maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

   1. Provide fire extinguishers, visible and accessible from space being served.

      a. Class ABC.
      b. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.

   2. Store combustible materials in containers in fire-safe locations.
   3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities and access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
   4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
   5. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.

C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. Substitution Requests: Will not be considered due to the limited construction time frame of this Project.

B. Related Sections include the following:
1. Division 1 Section "Closeout Procedures" for submitting warranties for contract closeout.
2. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility]. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design", “Design Standard” or similar, including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

C. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

D. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
2. Form: Tabulate information for each product under the following column headings:

   a. Specification Section number and title.
   b. Generic name used in the Contract Documents.
   c. Proprietary name, model number, and similar designations.
   d. Manufacturer's name and address.
   e. Supplier's name and address.
   f. Installer's name and address.
   g. Projected delivery date or time span of delivery period.
   h. Identification of items that require early submittal approval for scheduled delivery date.

3. Initial Submittal: Within 5 days after date of commencement of the Work, submit 8 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.

   a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.

4. Completed List: Within 7 days after date of commencement of the Work, submit 8 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
5. Architect's Action: Architect will respond in writing to Contractor within 7 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement that products comply with the Contract Documents.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.

2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products to allow for inspection and measurement of quantity or counting of units.
6. Store materials in a manner that will not endanger Project structure.
7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
9. Protect stored products from damage.

B. Storage: Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

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

1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.

2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name single manufacturers or sources, provide a product by the manufacturer or from the source named that complies with requirements.

3. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.

4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.

5. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

6. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

7. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches satisfactorily.

    a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on "substitutions" for selection of a matching product.

8. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.

    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that does not include premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.

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PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

Advancement of Construction Technology

SUBSTITUTION REQUEST
(After the Bidding Phase)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 yrs old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

☐ Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

Savings to Owner for accepting substitution: _____ ($ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

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SUBSTITUTION REQUEST
(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: _____

_____

_____

_____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

_____

_____

_____

_____

_____

_____

_____

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SECTION 017000 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. General installation of products.
3. Coordination of Owner-installed products.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.
7. Correction of the Work.

B. Related Sections include the following:

1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
2. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
3. Division 1 Section "Closeout Procedures" for Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services to avoid any interference with work of this Contract.

B. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

   a. Description of the Work.
   b. List of detrimental conditions, including substrates.
   c. List of unacceptable installation tolerances.
   d. Recommended corrections.

2. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify **Architect** not less than **two** days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without **Architect's** written permission.
   Service interruption must be coordinated with times the facility will be shut down.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. **Submit requests on CSI Form 13.2A, "Request for Interpretation",** included at end of this Section.

3.3 CONSTRUCTION LAYOUT

A Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to existing benchmarks. If discrepancies are discovered, notify Architect promptly.

1. Establish benchmarks and control points as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Architect when deviations from required lines and levels occur.

3.4 INSTALLATION

A General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of **8 feet (2.4 m)** in utility spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."

B. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

C. Restore permanent facilities used during construction to their specified condition.

D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

END OF SECTION 017000

SECTION 017310 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:

1. Division 1 Section "Selective Demolition" for demolition of selected portions of the building and site for alterations.
2. Divisions 3 through 26 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

    a. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 25 and 26 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 DEFINITIONS

A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 5 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted. Coordinate with Owner’s requirements to avoid shut-down of any portion of the facility

6. **Architect's** Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Equipment supports.
4. Piping, ductwork, vessels, and equipment.
5. Noise- and vibration-control elements and systems.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut where required.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to **avoid** interruption of services to occupied areas unless full use is afforded the Contractor during the course of construction.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or ad-

joining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Asphalt Paving: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 017310

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Project Record Documents.
3. Operation and maintenance manuals.
4. Warranties.
5. Instruction of Owner's personnel. Including orientation of owner's personnel to new mechanical equipment
6. Final cleaning.

B. Related Sections include the following:

1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.
3. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
5. Divisions 2 through 26 Sections for specific closeout and special cleaning requirements for products of those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, and similar final record information.

6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Complete startup testing of systems.
8. Submit test records.
9. Terminate and remove temporary facilities from Project site, along with construction tools, and similar elements.
10. Complete final cleaning requirements, including touchup painting.
11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit **three** copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of areas in sequential order
2. Include the following information at the top of each page:

a. Project name.
b. Date.
c. Name of Architect
d. Name of Contractor.
e. Page number.

1.6 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

   a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
   b. Accurately record information in an understandable drawing technique.
   c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
   d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.

2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Note related Change Orders, Record Drawings and Product Data, where applicable.

D. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Drawings**,** and Record Specifications, where applicable.

E. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.7 OPERATION AND MAINTENANCE MANUALS

A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:

   a. Emergency instructions and procedures.
   b. System, subsystem, and equipment descriptions, including operating standards.
   c. Operating procedures, including startup, shutdown, seasonal, and weekend operations as applicable
   d. Description of controls and sequence of operations.
   e. Piping diagrams, if applicable

2. Maintenance Data:

   a. Manufacturer's information, including list of spare parts.
   b. Name, address, and telephone number of Installer or supplier.
   c. Maintenance procedures.
   d. Maintenance and service schedules for preventive and routine maintenance.
   e. Maintenance record forms.
   f. Sources of spare parts and maintenance materials.
   g. Copies of maintenance service agreements.
   h. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.8 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Provide instructors experienced in operation and maintenance procedures.
2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
3. Schedule training with Owner**,** through Architect**,** with at least seven days' advance notice.

B. Division 15 Contractor shall include as a part of their bid a MINIMUM of an additional 40 hours to demonstrate to building owner that proper installation, operation, air and water balance, and controls has been completed properly for all equipment, material or systems provided and/or installed by Division 15 contractor.

3.2 FINAL CLEANING

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

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

   a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
   b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
   c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
   d. Remove tools, construction equipment, machinery, and surplus material from Project site.
   e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
   f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, and similar spaces.
   g. Sweep concrete floors broom clean in unoccupied spaces.
   h. Clean transparent materials, including glass in doors and windows where dust generated by cutting may have soiled existing surfaces
   i. Remove labels that are not permanent.
   j. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

      1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

   k. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication,and other foreign substances.
   l. Replace parts subject to unusual operating conditions.
   m. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the 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. Demolition and removal of selected portions of the structure, including sprinklers where system is to be extended, and removal of existing unit heater and related power feed and piping.
   2. Patching and repairs where existing finishes and systems are disturbed.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Summary of Work" for use of the building and phasing requirements.
   2. Division 1 Section "Cutting and Patching" for cutting and patching procedures for selective demolition operations.
   3. Division 1 Section "Project Management and Coordination" for selective demolition schedule requirements.
   4. Division 1 Section "Construction Facilities and Temporary Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures for selective demolition operations.
   5. Division 23 Sections for cutting, patching, or relocating mechanical items.
   6. Division 26 Sections for cutting, patching, or relocating electrical items.

1.3 DEFINITIONS

A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.

B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.

C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.

D. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, for information only, unless otherwise indicated.

B. Proposed dust-control measures to protect areas outside the limits of work.

C. Proposed noise-control measures.

D. Schedule of selective demolition activities indicating the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
2. Interruption of utility services.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
6. Locations of temporary partitions and means of egress.

E. Inventory of items to be removed and salvaged.

F. Inventory of items to be removed by Owner.

G. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Predemolition Conference: Conduct conference at Project site to comply with preinstallation conference requirements of Division 1 Section "Project Management and Coordination"

1.7 PROJECT CONDITIONS

A. Owner will occupy portions of the building immediately adjacent to selective demolition area.

B. If conflicts with Owner’s operation arise, conduct selective demolition so that Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

C. Owner assumes no responsibility for actual condition of area affected by selective demolition.

1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

D. Asbestos: It is not expected that asbestos will be encountered in the Work. If any materials suspected of containing asbestos are encountered, do not disturb the materials. Immediately notify the Architect and the Owner.

E. Storage or sale of removed items or materials on-site will not be permitted.

PART 2 - PRODUCTS (Not Applicable)

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.

1. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equals or surpasses that of existing materials.

B. Existing Finishes, insulation and spray applied fireproofing in place will require replacement where disturbed

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Architect.

E. Survey the condition of the building to determine whether removing any element might result in structural deficiency of any portion of the structure during selective demolition.

F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

A. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.

a. Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.

B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving building area to be selectively demolished.
1. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.
2. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, or other dangerous materials before proceeding with selective demolition operations.

B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
1. Protect walls, ceilings, floors, and other existing finish work that are to remain and are exposed during selective demolition operations.
2. Cover and protect furniture, furnishings, and equipment that have not been removed.

D. Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas not affected by the work of this contract from fumes and noise. Confirm areas requiring dustproof partitions with Owner.

1. Construct dustproof partitions of not less than nominal 4-inch (100-mm) studs, 5/8-inch (16-mm) gypsum wallboard with joints taped on occupied side, and 1/2-inch (13-mm) fire-retardant plywood on the demolition side.
2. Insulate partition to provide noise protection to occupied areas.
3. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
4. Protect air-handling equipment.
5. Weatherstrip openings.

E. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.

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

3.4 SELECTIVE DEMOLITION

A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Maintain adequate ventilation when using cutting torches.
5. Remove decayed or unsuitable materials and promptly dispose of off-site.
6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
7. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
9. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.

B. Remove air-conditioning equipment without releasing refrigerants.

3.5 PATCHING AND REPAIRS

A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.

B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

1. Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material that produces surfaces and textures identical to existing work that remains. Apply according to manufacturer's printed recommendations.

C. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

D. Patch and repair floor and wall surfaces in the new space where demolished walls or partitions extend one finished area into another. Provide a flush and even surface of uniform color and appearance.

1. Closely match texture and finish of existing adjacent surface.
2. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
3. Where patching smooth painted surfaces, extend final paint coat over entire unbroken surface containing the patch after the surface has received primer and second coat.
4. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
5. Inspect and test patched areas to demonstrate integrity of the installation, where feasible.

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

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Sweep the Work area and the building broom clean on completion of selective demolition operation.

B. Change filters on air-handling equipment on completion of selective demolition operations.

END OF SECTION

SECTION 033605 – SPECIAL CONCRETE FLOOR FINISHES

PART 1 GENERAL

1. 01 SUMMARY

A. This section includes the following.
1. Applying Sealer and Hardener to existing slab and polishing concrete to a gloss finish level for existing concrete surfaces. Base Bid includes all concrete areas. Alternate No. 1 eliminates polishing at areas indicated to receive carpet tile

1.02 REFERENCES

A. American Society for Testing and Materials:
1. ASTM-C779, Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces
2. ASTM C805, Impact Strength
3. ASTM G23-81, Ultraviolet Light & Water Spray
4. ASTM 1028, Co-Efficient of Friction

1.03 SUBMITTALS

A. Comply with pertinent provisions of Division 1 Section 016000- Product Requirements.

B . Product data:
1. Submit special concrete finishes manufacturer's specifications, test data and other data required for each type of manufactured material and product indicated.
2. Submit special concrete finishes describing products to be provided, giving manufacturer’s name, product name, and product line number for the specified material proposed to be provided under this section.
3. Submit special concrete finishes 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.
4. Submit special concrete finishes technical data sheet giving descriptive data, curing time, and application requirements.
   a. Provide material analysis and generic type.
5. Submit special concrete finishes manufacturer’s Material Safety Data Sheet (MSDS) and other safety requirements.
6. Follow all special concrete finishes published manufacturer’s installation instructions.

C. Test Reports:
1. Provide certified test reports, prepared by an independent testing laboratory, confirming compliance with specified performance criteria.

1.04 QUALITY ASSURANCE

A. Installer Qualifications:
1. Use an experienced installer and adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.

2. The special concrete finish manufacturer for each specified material and process shall certify applicator.
3. Applicator shall be familiar with the specified requirements and the methods needed for proper performance of work of this section.

B. Manufacturer's Certification:
1. Provide letter of certification from concrete finish manufacturer or specialized applicator stating that installer is certified applicator of special concrete finishes, and is familiar with proper procedures and installation requirements required by the manufacturer.

C. Mock-ups:
1. Apply mock-ups of each type finish, to demonstrate typical joints, surface finish, color variation (if any), and standard of workmanship.
   a. Build mock-ups approximately 50 square feet in the location indicated or if not indicated, as directed by the Architect or Owner Representative within the field of work affected by work of this Section.
   b. Notify Architect or Owner Representative seven days in advance of dates and times when mock-ups will be constructed.
   c. Obtain from the Architect or Owner Representative approval of mock-ups before starting construction.
   d. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work. Standards will include level of sheen, uniformity of concrete finish that receives surface finish.
   e. Approved mock-ups may become part of the completed work if undisturbed at time of substantial completion.

D. Protection
1. Prevention of exposure to fluids is essential to prevent petroleum stains from the concrete surface.
   a. All hydraulic powered equipment must be diapered to avoid staining of the concrete.
   b. No pipe cutting machine will be used on the inside floor slab.
   c. Steel will not be placed on interior slab to avoid rust staining.

E. Pre-Installation Conference:
1. Conduct conference at project site to comply with requirements in Division 1 Section " Project Management and Coordination"

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages and containers, with seal's unbroken, bearing manufacturer labels indicating brand name and directions for storage, mixing with other components, and application.

B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

C. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.

1.06 PROJECT CONDITIONS

A. Environmental limitations:
1. Comply with manufacturers written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.

a. Application of the hardener, densifier, finish shall take place a minimum of 10 days prior to installation of items bearing on slab, providing a complete, uninhibited concrete slab for application.

B. Close areas to traffic during floor application and after application, for time period recommended in writing by manufacturer.

PART 2 – PRODUCTS

2.01 MATERIALS AND MANUFACTURER

A. HARDENING/SEALING AGENT

B. Manufacturers include , but are not limited to, the following:

1. Convergent Concrete Technologies, Pentra-Sil
2. Prosoco , Inc. Consolideck, LS
3. Retro-Plate, Advanced Floor Products, Inc.,

2.04 RELATED MATERIALS

A. Neutralizing Agent: Tri-sodium Phosphate or as required by manurfacturer

B. Water:
1. Potable

PART 3- EXECUTION

3.01 SURFACE CONDITIONS:

A. Examine substrate, with installer present, for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.

B. Prior to application, verify that floor surfaces are free of construction latents.

3.02 APPLICATION

A. Start any of the floor finish applications in presence of manufacturer's technical representative.

B. Apply concrete floor finish in accordance with manufacturer's instructions.

1. Only a certified applicator shall apply hardener/sealer. Applicable procedures must be followed as recommended by the product manufacturer and as required to match approved test sample.

2. Apply Hardener and Densifier at rates recommended by manufacturer for each coat

3. Follow manufacturer's recommendations for drying time between successive coats.

C. Floor Surface Polishing and Treatment:

1. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Provide consistent finish in all contiguous areas.

2. Finish edges of floor finish adjoining other materials in a clean and sharp manner.

3. Diamond polish concrete floor surfaces with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit using dry method.

4. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Level of sheen shall match that of approved mock-up.

5. Expose aggregate in concrete surface only as determined by approved mock-up.

6. All concrete surfaces shall be as uniform in appearance as possible.

C. Application is to take place a minimum of 10 days prior to seating and other installation, thus providing a complete, uninhibited concrete slab for application

1. Apply special concrete sealer finish in accordance with sealer manufacturer's instructions.

E. Finish Appearance:

1. Required finish polish will be equivalent to an 1800 grit, high gloss finish

3.03 WORKMANSHIP AND CLEANING:

A. The premises shall be kept clean and free of debris at all times.
B. Remove spatter from adjoining surfaces, as necessary.

C. Repair damages to surface caused by cleaning operations.

D. Remove debris from jobsite
1. Dispose of materials in separate, closed containers in accordance with local regulations.

3.04 PROTECTION:

A. Protect finished work until fully cured in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the 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. Steel framing and supports for low walls mechanical and electrical equipment.
   2. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.3 SUBMITTALS

A. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
   1. Provide templates for anchors and bolts specified for installation under other Sections.

B. Welding Certificates: Copies of certificates for welding procedures and personnel.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Welding: Qualify procedures and personnel according to the following:

   1. AWS D1.1, "Structural Welding Code--Steel."
   2. AWS D1.3, "Structural Welding Code--Sheet Steel."
   3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on

Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

1.6 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

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

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.

C. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 PAINT

A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

2.4 FASTENERS

A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.

D. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).

E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

F. Wood Screws: Flat head, carbon steel, ASME B18.6.1.

G. Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M).

H. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1 (ASME B18.21.2M).

I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

J. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.5 GROUT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Shear and punch metals cleanly and accurately. Remove burrs.

C. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Weld corners and seams continuously to comply with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. 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 (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

J. Remove sharp or rough areas on exposed traffic surfaces.

K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work.

B. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
   1. Fabricate units from slotted channel framing for hanging mechanical and electrical components
   2. Fabricate supports for wall construction from steel tubes and plates bolted to existing slab

2.8 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.9 STEEL AND IRON FINISHES

A. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
   1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

B. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless

otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

D. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings, if any.

B. Low wall supports to be capable of supporting Concentrated load of 300 lbf (890 N) applied at any point and in any direction.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

END OF SECTION 055000

SECTION 055213 – PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the 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. Stainless steel railings at interior stairs at auditorium.

1.3 DEFINITIONS

A. Definitions in ASTM E 985 for railing-related terms apply to this Section.

1.4 PERFORMANCE REQUIREMENTS

A. General: In engineering handrail and railing systems to withstand structural loads indicated, determine allowable design working stresses of materials based on the following:

1. Stainless Steel: ASCE 8, "Specification for the Design of Cold-Formed Stainless Steel Structural Members."

B. Structural Performance of Handrails and Railing Systems: Engineer, fabricate, and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for handrails, railing systems, anchors, and connections. Apply each load to produce the maximum stress in each of the respective components comprising handrails and railing systems.

1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:

a. Concentrated load of 300 lbf (890 N) applied at any point and in any direction.
b. Uniform load of 50 lbf per linear foot (730 N/m) applied horizontally and concurrently with uniform load of 100 lbf per linear foot (1460 N/m) applied vertically downward.
c. Concentrated and uniform loads above need not be assumed to act concurrently.

2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:

a. Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
b. Uniform load of 50 lbf per linear foot (730 N/m) applied in any direction.
c. Concentrated and uniform loads above need not be assumed to act concurrently.

3. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lbf (890 N) applied to 1 sq. ft. (0.09 sq. m) at any point in the system including panels, intermediate rails, balusters, or other elements composing the infill area.

    a. Above load need not be assumed to act concurrently with loads on top rails of railing systems in determining stress on guard.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for manufacturer's standard product components used in handrails and railings.

C. Shop drawings showing fabrication and installation of handrails and railing systems including plans, elevations, sections, details of components, and attachments to other units of Work.

1. For installed handrails and railing systems indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified professional engineer who was responsible for their preparation.

D. Samples for verification of each type of exposed finish required, prepared on components indicated below of same thickness and metal indicated for final unit of Work. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. 6-inch- (150-mm-) long sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
2. Fittings and brackets.
3. Welded connections.
4. Assembled sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Sample need not be full height.

E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.

1.6 QUALITY ASSURANCE

A. Engineer Qualifications: Professional engineer legally authorized to practice in the jurisdiction where Project is located and experienced in providing engineering services of the kind indicated.

B. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel."

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests within the previous 12 months.
2. If recertification of welders is required, retesting will be Contractor's responsibility.

1.7 STORAGE

A. Store handrails and railing systems inside a well-ventilated area, away from uncured concrete and masonry and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

1.8 PROJECT CONDITIONS

A. Field Measurements: Where handrails and railing systems are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating handrails and railing systems without field measurements. Coordinate other construction to ensure that actual dimensions correspond to guaranteed dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available 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. Stainless-Steel Pipe and Tube Railings:

a. Alumaguard.
b. Architectural Art Mfg., Inc.
c. Blum: Julius Blum & Co., Inc.
d. CraneVeyor Corp.
e. KDI Paragon, Inc.
f. Stainless Fabricators, Inc.
g. Wagner: R & B Wagner, Inc.

2.2 METALS

A. General: Provide metals free from surface blemishes where exposed to view in the finished unit. Exposed-to-view surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable.

B. Stainless Steel: Grade or type designated below for each form required:

1. Tubing: ASTM A 554; Grade MT 304 (interior railings); Grade MT 316L (exterior railings).
2. Pipe: ASTM A 312/A 312M; Grade TP 304 (interior railings); Grade TP 316L (exterior railings).
3. Castings: ASTM A 743/A 743M; Grade CF 8 or CF 20 (interior railings); Grade CF8M or CF3M (exterior railings).
4. Plate: ASTM A 666; Type 304 (interior railings); Grade MT 316L (exterior railings).

B. Brackets, Flanges, and Anchors: Cast or formed metal of the same material and finish as supported rails, unless otherwise indicated.

2.3 WELDING MATERIALS, FASTENERS, AND ANCHORS

A. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of the type, grade, and class required to produce connections that are suitable for anchoring railings to other types of construction indicated and capable of withstanding design loadings.

1. For stainless-steel handrails and railings, use fasteners fabricated from Type 304 or Type 316 stainless steel.
2. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.

2.4 ANCHORING CEMENT

A. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating and is recommended for exterior use by manufacturer.

B. Products: Subject to compliance with requirements, provide one of the following:

1. Erosion-Resistant Anchoring Cement:

a. Bonsal Anchor Cement; W.R. Bonsal Co.
b. Super Por-Rok; Minwax Construction Products Division.

2.5 FABRICATION

A. General: Fabricate handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of hollow members, post spacings, and anchorage, but not less than those required to support structural loads.

B. Assemble handrails and railing systems in the shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

C. Form changes in direction of members as follows:

1. By radius bends of radius indicated.

D. Form curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.

E. Welded Connections: Fabricate handrails and railing systems for connection of members by welding. For connections made during fabrication, weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At tee and cross intersections, cope ends of intersecting members to fit contour of pipe or tube to which end is joined, and weld all around.
5. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

G. Brackets, Flanges, Fittings, and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings, and anchors to interconnect handrail and railing system members to other construction.

H. Provide inserts and other anchorage devices to connect handrails and railing systems to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railing systems. Coordinate anchorage devices with supporting structure.

I. For railing posts set in concrete, provide core drilled holes not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (12 mm) greater than outside dimensions of post, and steel plate forming bottom closure.

J. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

K. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing work.

L. Cut, reinforce, drill, and tap components, as indicated, to receive finish hardware, screws, and similar items.

M. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch (6 mm) or less.

N. Fillers: Provide steel sheet or plate fillers, of thickness and size indicated or required to support structural loads of handrails, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses to produce adequate bearing to prevent bracket rotation and overstressing substrate.

2.6 FINISHES, GENERAL

A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designating finishes.

2.7 STAINLESS-STEEL FINISHES

A. Remove or blend tool and die marks and stretch lines into finish.

B. Grind and polish surfaces to produce uniform, directionally textured polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

1. Directional Satin Finish: No. 4.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installing anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors, that are to be embedded in concrete as masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing handrails and railing systems. Set handrails and railing systems accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.

1. Do not weld, cut, or abrade surfaces of handrails and railing components that have been coated or finished after fabrication and are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/4 inch in 12 feet (2 mm in 1 m).
3. Align rails so that variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (2 mm in 1 m).

B. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and welded surface matches contours of adjoining surfaces.

C. Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated but not less than that required by design loadings.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing handrails and railing systems and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components by welding. Cope or butt components to provide 100 percent contact, or use fittings designed for this purpose.

3.4 ANCHORING POSTS

A. Anchor posts in concrete with holes core-drilled into the slab. After posts have been inserted into sleeves, solidly fill annular space between post and sleeve with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.

1. Anchoring cement.

B. Leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8-inch (3-mm) buildup, sloped away from post.

3.5 ATTACHING HANDRAILS TO WALLS

A. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface.

B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads

C. Secure wall brackets to building construction as follows:

1. For hollow masonry anchorage, use toggle bolts.

3.6 ADJUSTING AND CLEANING

A. Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

3.7 PROTECTION

A. Protect finishes of handrails and railing systems from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 055213

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the 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. Wood nailers, and blocking, pressure treated where in contact with masonry, roofing and concrete.

1.3 DEFINITIONS

A. Miscellaneous Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise specified.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:

1. For fire-retardant-treated wood products, include certification by treating plant that treated materials comply with specified standard and other requirements as well as data relative to bending strength, stiffness, and fastener-holding capacities of treated materials.

C. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.

D. Warranty of chemical treatment manufacturer for each type of treatment.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

B. Single-Source Responsibility for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product from one source and by a single producer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available 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. Fire-Retardant-Treated Materials, Interior Type A:

a. Baxter: J. H. Baxter Co.
b. Chemical Specialties, Inc.
c. Continental Wood Preservers, Inc.
d. Hickson Corp.
e. Hoover Treated Wood Products, Inc.

2. Wood-Preservative-Treated Materials:

a. Baxter: J. H. Baxter Co.
b. Chemical Specialties, Inc.
c. Continental Wood Preservers, Inc.
d. Hickson Corp.
e. Hoover Treated Wood Products, Inc.
f. Osmose Wood Preserving, Inc.

2.2 LUMBER, GENERAL

A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:

1. WCLIB - West Coast Lumber Inspection Bureau.
2. WWPA - Western Wood Products Association.

C. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

1. Provide dressed lumber, S4S, unless otherwise indicated.
2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Comply with applicable requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL; U.S. Testing; Timber Products Inspection, Inc.; or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Research or Evaluation Reports: Provide fire-retardant-treated wood acceptable to authorities having jurisdiction and for which a current model code research or evaluation report exists that evidences compliance of fire-retardant-treated wood for application indicated.

B. Interior Type A: For interior locations, use chemical formulation that produces treated lumber and plywood with the following properties under conditions present after installation:

1. Bending strength, stiffness, and fastener-holding capacities are not reduced below values published by manufacturer of chemical formulation under elevated temperature and humidity conditions simulating installed conditions when tested by a qualified independent testing agency.
2. No form of degradation occurs due to acid hydrolysis or other causes related to treatment.
3. Contact with treated wood does not promote corrosion of metal fasteners.

2.4 WOOD-PRESERVATIVE-TREATED MATERIALS

A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.

1. Do not use chemicals containing chromium or arsenic.

B. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. (4.0 kg/cu. m). After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with concrete.

C. Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to a minimum retention of 0.40 lb/cu. ft. (6.4 kg/cu. m).

D. Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

2.5 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No.2 grade per SPIB;

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M)

F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.

C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. CABO NER-272 for power-driven staples, P-nails, and allied fasteners.
2. Published requirements of metal framing anchor manufacturer.

E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials.

Make tight connections between members. Install fasteners without splitting wood; predrill as required.

3.2 WOOD NAILERS AND BLOCKING

A. Install wood nailers, blocking, and sleepers where shown and where required for attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

END OF SECTION 061053

SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the 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. Plastic-laminate countertops at control room
3. Standing and running trim
4. Shop finishing of interior woodwork.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 6 Section "Miscellaneous Carpentry" for furring, blocking, shims, and hanging strips for installing interior woodwork.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.

C. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcing specified in other Sections.
3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.

D. Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.

1. Shop-applied transparent finishes.
2. Plastic laminates.

E. Samples for verification of the following:

1 Laminate-clad panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.

2. Lumber with or for transparent finish, not less than 50 sq. in. (300 sq. cm), for each species and cut, finished on 1 side and 1 edge.

F. Product certificates signed by woodwork fabricator certifying that products comply with specified requirements.

G. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.

B. Quality Standard: Except as otherwise indicated, comply with the following standard:

1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grades of interior architectural woodwork, construction, finishes, and other requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

B. Do not deliver woodwork until painting and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate field measurements before being enclosed. Record measurements on final shop drawings.
2. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site and coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.7 COORDINATION

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade indicated and, where the following products are part of interior woodwork, with requirements of the referenced product standards that apply to product characteristics indicated:

1. Softwood Plywood: PS 1.

B. Wood Species and Cut for Transparent Finish: Red oak, plain sawn or sliced, to match existing.

C. Formaldehyde Emission Level for Medium-Density Fiberboard: Comply with requirements of NPA 9.

D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated into the Work include, but are not limited to, the following:

a. Formica Corporation.
b. Laminart.
c. Pioneer Plastics Corp.
d. Wilsonart International; Div. of Premark International, Inc.

E. Adhesive for Bonding Plastic Laminate: Manufacturer's standard.

2.2 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

B. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.

1. For metal framing supports, provide screws as recommended by metal-framing manufacturer.

C. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

D. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.

2.4 FABRICATION, GENERAL

A. Interior Woodwork Grade: Provide interior woodwork complying with the referenced quality standard and of the following grade:

1. Grade: Premium.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to relative humidity conditions existing during time of fabrication and in installation areas.

D. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated.

E. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Trial fit assemblies at the fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on approved shop drawings before disassembling for shipment.

F. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.

2.5 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Comply with AWI Section 400 requirements for high-pressure decorative laminate countertops.

B. High-Pressure Decorative Laminate Grade: HGP, chemical resistant.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Match Architect's sample.

D. Edge Treatment: Hardwood edge for transparent finish matching wood species and cut on cabinet surfaces.

E. Core Material: Plywood core

F. Bracket Supports: Hafele Hebgo brackets 287.45.468.

2.6 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

A. Quality Standard: Comply with AWI Section 300.

B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

C. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.

D. Wood Species and Cut: Match existing.

2.7 SHOP FINISHING

A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.

1. Grade: Provide finishes of same grades as items to be finished.

B. General: Finish architectural woodwork at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.

C. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523:

1. Grade: Premium.

2. AWI Finish System TR-6: Catalyzed polyurethane.

3. Stain to match existing on exposed surfaces.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.

B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm)

C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.

E. Tops: Anchor securely to support systems as indicated. Calk space between counter and wall with specified sealant.

1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.

F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches (1500 mm) long, except where shorter single-length pieces are necessary.

1. Fill gaps, if any, between edges of running trim and wall with plastic wood filler, sand smooth, and finish to match existing.
2. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches (3 mm in 2400 mm).

3.3 INSTALLATION OF ACCESSORIES

A. Securely fasten adjustable shelving supports and other accessories to partition framing, wood blocking, or reinforcements in partitions.

B. Locate cylinder stabilization mounts where indicated to support gas cylinders against wall surface. Where more than one unit are installed in same space, match heights of adjacent units.

3.4 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.5 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 064023

SECTION 072100 - BUILDING 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 this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Building insulation in batt form - spindle mounted above ceilings.

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 7 Section “Firestopping” for safing insulation installed as part of firestopping systems.
3. Division 7 Roofing Section for roof insulation specified as part of roofing construction.
4. Division 9 Section "Gypsum Board Assemblies." for sound attenuation insulation installed as part of metal-framed wall and partition assemblies

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 insulation product specified.

C. Product test reports from and based on tests performed by qualified independent testing laboratory evidencing compliance of insulation products with requirements including r-values, fire performance characteristics, perm ratings, water absorption ratings, and other properties, based on comprehensive testing of current products.

1.4 QUALITY ASSURANCE

A. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristic: ASTM E 84.
2. Fire Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

B. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

B. Protect plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide insulation products of one of the following:

1. Manufacturers of Glass Fiber Insulation:

a. CertainTeed Corp.
b. Knauf Fiber Glass GmbH.
c. Manville: Building Insulations Div., Manville Sales Corp.
d. Owens/Corning Fiberglas Corp.

2.2 INSULATING MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards.

1. Preformed Units: Sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths, and lengths.

B. Mineral-Fiber-Blanket Insulation: Black “therater batts” acoustical blankets per ASTM C 553, type III; consisting of fibers manufactured from **glass**.

1. Class A flame-spread index of 25 or less per UL 723.

2.3 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:

1. **Available** Products:

a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
b. Eckel Industries of Canada; Stic-Klip Type N Fasteners.
c. Gemco; Spindle Type.

2. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.

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3. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.

B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.

1. Available Products:

a. AGM Industries, Inc.; RC150.
b. Gemco; Dome-Cap.

2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions with Installer present, for compliance with requirements of the Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections that might puncture vapor retarders.

3.3 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's instructions applicable to products and application indicated. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.

B. Extend insulation full thickness as indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections that interfere with placement.

C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Set vapor retarder faced units with vapor retarder to warm side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.

1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

3.5 INSTALLATION OF INSULATION

A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. bond units to substrate with mechanical anchorage to provide permanent placement and support of units.

3.6 PROTECTION

A. General: Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 078413 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. The Contractor is responsible for providing code compliant firestop systems complying with local codes for all penetrations and aesthetic requirements of the Project where exposed to view.

C. Related Sections include the following:
   1. Division 15 Sections specifying duct and piping penetrations.
   2. Division 16 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.

   1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
   2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.

B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:

   1. Penetrations located outside wall cavities.
   2. Penetrations located in construction containing fire-protection-rated openings.
   3. Penetrating items larger than 4-inch- (100-mm-) diameter nominal pipe or 16 sq. in. (100 sq. cm) in overall cross-sectional area.

D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
2. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

A. Product Data: For each type of through-penetration firestop system product indicated.

B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.

1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

E. Schedule of Products: Detailed listing of each product and system required for use, based upon project conditions, prepared by Manufacturer and Installer for each condition shown. Indicate code compliance for each product shown.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.

B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:

1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, ITS, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:

   a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
   b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:

      1) UL in "Fire Resistance Directory."
      2) ITS in "Directory of Listed Products."

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

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

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

C. Notify inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.

D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available 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. Hilti Construction Chemicals, Inc.
2. International Protective Coatings Corp.
3. Isolatek International.
4. Nelson Firestop Products.
5. Specified Technologies Inc.
6. 3M Fire Protection Products.
7. Tremco.
8. United States Gypsum Company.

2.2 FIRESTOPPING, GENERAL

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:

   a. Slag-/rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fire-rated form board.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.

2.3 MIXING

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.

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

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for firestop systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

A. Inspecting Agency: Contractor will engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.

1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.

B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.

C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.5 IDENTIFICATION

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Owner of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

B. In areas exposed to view, label locations shall be determined with care to minimize exposure.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

3.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE
FIRESTOP SYSTEMS ARE LISTED USING THE ALPHA-ALPHA-NUMERIC IDENTIFICATION SYSTEM PUBLISHED IN UL'S *FIRE RESISTANCE DIRECTORY*, VOL. 2

TYPE OF PENETRANT	CONSTRUCTION					
	FLOOR PENETRATION SYSTEMS (FIRST ALPHA COMPONENT = C OR F)			WALL PENETRATION SYSTEMS (FIRST ALPHA COMPONENT = C OR W)		
	CONCRETE FLOORS WITH A MINIMUM THICKNESS LESS THAN OR EQUAL TO 5 INCHES	CONCRETE FLOORS WITH A MINIMUM THICKNESS GREATER THAN 5 INCHES	FRAMED FLOORS	CONCRETE OR MASONRY WALLS WITH A MINIMUM THICKNESS LESS THAN OR EQUAL TO 8 INCHES	CONCRETE OR MASONRY WALLS WITH A MINIMUM THICKNESS GREATER THAN 8 INCHES	FRAMED WALLS
NO PENETRATING ITEMS	C-AJ-0001-0999 or F-A-0001-0999	C-BJ-0001-0999		C-AJ-0001-0999, C-BJ-0001-0999, or W-J-0001-0999		W-L-000-1-0999
METALLIC PIPE, CONDUIT, OR TUBING	C-AJ-1001-1999 or F-A-1001-1999	C-BJ-1001-1999, C-BK-1001-1999, or F-B-1001-1999	F-C-1001-1999	C-AJ-1001-1999, C-BJ-1001-1999, or W-J-1001-1999	C-BK-1001-1999 or W-K-1001-1999	W-L-1001-1999
NONMETALLIC PIPE, CONDUIT, OR TUBING	C-AJ-2001-2999 or F-A-2001-2999	C-BJ-2001-2999 or F-B-2001-2999	F-C-2001-2999	C-AJ-2001-2999, C-BJ-2001-2999, or W-J-2001-2999		W-L-2001-2999
ELECTRICAL CABLES	C-AJ-3001-3999 or F-A-3001-3999	C-BJ-3001-3999 or F-B-3001-3999	F-C-3001-3999	C-AJ-3001-3999, C-BJ-3001-3999, or W-J-3001-3999		W-L-3001-3999
CABLE TRAYS WITH ELECTRICAL CABLES	C-AJ-4001-4999 or F-A-4001-4999	C-BJ-4001-4999		C-AJ-4001-4999, C-BJ-4001-4999, or W-J-4001-4999	W-K-4001-4999	W-L-4001-4999
INSULATED PIPES	C-AJ-5001-5999 or F-A-5001-5999	C-BJ-5001-5999	F-C-5001-5999	C-AJ-5001-5999 or W-J-5001-5999		W-L-5001-5999
MISCELLANEOUS ELECTRICAL PENETRANTS	C-AJ-6001-6999 or F-A-6001-6999			C-AJ-6001-6999		W-L-6001-6999
MISCELLANEOUS MECHANICAL PENETRANTS	C-AJ-7001-7999		F-C-7001-7999	C-AJ-7001-7999 or W-J-7001-7999		W-L-7001-7999
GROUPINGS OF PENETRATIONS	C-AJ-8001-8999 or F-A-8001-8999	C-BJ-8001-8999	F-C-8001-8999	C-AJ-8001-8999, C-BJ-8001-8999, or W-J-8001-8999		W-L-8001-8999

For each location where a fire-resistance-rated floor or wall assembly is penetrated, provide a UL-listed through-penetration firestop system selected from the applicable UL number range listed above that complies with Section 078413 - Penetration Firestopping and is suitable for the penetration conditions indicated for the Project.

END OF SECTION 078413

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes sealants for the following applications, including those specified by reference to this Section:

B. This Section includes sealants for the following applications:

1. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:

   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of openings where indicated.
   c. Perimeter joints between interior wall surfaces and frames of interior doors.
   d. Joints between walls and counters.
   e. All joints created by new construction

C. Related Sections include the following:
1. Division 7 Section "Firestopping" for fire-resistant building joint-sealant systems.
2. Division 9 Section "Gypsum Board" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each type and color of joint sealant required. Install joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1. Manufacturers' product data for interior sealants, including printed statement of VOC content.

D. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.

E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.

F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

G. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

H. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current product formulations.

I. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.

1. 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 joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in peel, and indentation hardness.
3. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F (4.4 deg C).
2. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

C. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

D. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:

1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
2. Disintegration of joint substrates from natural causes exceeding design specifications.

3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified in the sealant schedules at the end of Part 3.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.

C. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24) or the following paragraph D., whichever is more restrictive:

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

D. VOC Content of Sealants: Provide sealants with VOC content which is less than the current VOC limits of South Coast Air Quality Management District (SCAQMD) Rule #1168, and all sealants used as fillers must meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

B. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.

C. Stain-Test-Response Characteristics: Where elastomeric sealants are specified in the Elastomeric Joint-Sealant Schedule to be nonstaining to porous substrates, provide products that

have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

2.4 LATEX JOINT SEALANTS

A. Latex Sealant Standard: Comply with ASTM C 834 for each product of this description indicated in the Latex Joint-Sealant Schedule at the end of Part 3.

2.5 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant for Exposed and Concealed Joints: For each product of this description indicated in the Acoustical Joint-Sealant Schedule at the end of Part 3, provide manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following:

1. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.6 JOINT-SEALANT BACKING

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

B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Type C: Closed-cell material with a surface skin.
2. Type O: Open-cell material.
3. Type B: Bicellular material with a surface skin.
4. Type: Any material indicated above.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
   a. Metal.
   b. Glass.
   c. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.

F. Install sealants by proven techniques to comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage

or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

3.6 WASTE MANAGEMENT

A. Close and seal tightly all partly used sealant containers and store protected in well-ventilated, fire-safe area at moderate temperature.

B. Place used sealant tubes and containers in areas designated for hazardous materials.

3.7 ELASTOMERIC JOINT-SEALANT SCHEDULE

A. Low-Modulus Nonacid-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Available products include the following

   a. 790; Dow Corning.
   b. UltraPruf SCS2300; GE Silicones.
   c. HiFlex 331; NUCO Industries, Inc.
   d. 890; Pecora Corporation.
   e. Spectrem 1; Tremco.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement
5. Use Related to Exposure: NT (nontraffic).
6. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

7. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
8. Applications: Building standard -exterior wall joints unless otherwise noted.

B. Mildew-Resistant Silicone Sealant : Where joint sealants of this type are indicated, provide products With a VOC content of nominal 12 grams per liter, not exceeding 45 grams per liter formulated with fungicide that are intended for sealing interior ceramic tile joints and other non-porous substrates that are subject to in-service exposures of high humidity and temperature extremes, and that comply with the following:

1. Products:

   a. 786 Mildew Resistant; Dow Corning.
   b. Sanitary 1700; GE Silicones.
   c. Tremsil 600 White; Tremco.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: NT (nontraffic).

5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.

    a. Use O Joint Substrates: ceramic tile.

6. Applications: Interior expansion joints. Floors, counters

3.8 LATEX JOINT-SEALANT SCHEDULE

A. Latex Sealant: Where joint sealants of this type are indicated, provide products with a VOC content of less than 50 grams per liter complying with the following:

1. Products:

    a. Chem-Calk 600; Bostik Inc.
    b. NuFlex 330; NUCO Industries, Inc.
    c. LC 160 All Purpose Acrylic Caulk; Ohio Sealants, Inc.
    d. AC-20; Pecora Corporation.
    e. PSI-701; Polymeric Systems, Inc.
    f. Sonolac; Sonneborn Building Products Div., ChemRex, Inc.
    g. Tremflex 834; Tremco.

2. Applications: Interior joints in gypsum board applications.

END OF SECTION 079200

SECTION 081114 - STEEL DOOR FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes steel door frames where shown.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 8 Section "Door Hardware" for door hardware.
2 Division 9 Section Gysum Drywall Assemblies for building in door frames
3. Division 9 Section "Painting" for field painting primed door frames.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of frame and panel specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

C. Shop Drawings showing fabrication and installation of steel door frames. Include details of each frame type, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

D. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings.

1.4 QUALITY ASSURANCE

A. Provide frames complying with ANSI/SDI 100 "Recommended Specifications for Standard Steel Doors and Frames" and as specified.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver door frames cardboard-wrapped or crated to provide protection during transit and job storage.

B. Inspect frames on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store door frames at building site under cover. Place units on minimum 4-inch- (100-mm-) high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a

humidity chamber. If cardboard wrappers become wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Steel Doors and Frames:

a. Amweld, Inc.
b. Ceco Door Products.
c. Fenestra Corp.
d. Kewanee Corp.
e. Steelcraft.

2.2 MATERIALS

A. Hot-Rolled Steel Sheets and Strip: Commercial-quality carbon steel, pickled and oiled, complying with ASTM A 569 (ASTM A 569M).

B. Cold-Rolled Steel Sheets: Carbon steel complying with ASTM A 366 (ASTM A 366M), commercial quality, or ASTM A 620 (ASTM A 620M), drawing quality, special killed. Provide galvanized sheet for exterior panels

C. Supports and Anchors: Fabricated from not less than 0.0478-inch- (1.2-mm-) thick steel sheet; 0.0516-inch- (1.3-mm-) thick galvanized steel where used with galvanized steel frames.

D. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153, Class C or D as applicable.

2.3 FRAMES

A. Provide metal frames for doors, sidelights, borrowed lights, and other openings, according to ANSI/SDI 100, and of types and styles as shown on Drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 16-gage cold-rolled steel sheet for interiors.

1. Fabricate frames with mitered or coped and continuously welded corners.

B. Door Silencers: drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.

C. Plaster Guards: Provide minimum 0.0179-inch- (0.45-mm-) thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

2.4 FABRICATION

A. Fabricate steel frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.

B. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."

C. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

D. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

E. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 Series specifications for door and frame preparation for hardware.

F. Reinforce door frames to receive surface-applied hardware, with 10 gauge reinforcement plates at top and bottom hinges. Drilling and tapping for surface-applied hardware may be done at Project site.

G. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual" for recommendations relative to applying and designating finishes.

B. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for steel sheet finishes.

C. Apply primers to door frames after fabrication.

D. Factory Priming for Field-Painted Finish: Apply shop primer that complies with ANSI A224.1 acceptance criteria, is compatible with finish paint systems indicated, and has capability to provide a sound foundation for field-applied topcoats. Apply primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install steel frame and transoms, and accessories according to Shop Drawings, manufacturer's data, and as specified.

B. Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. 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.

1. In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.

3.2 ADJUSTING AND CLEANING

A. Prime Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

END OF SECTION 081114

SECTION 081416 - 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Solid-core doors with wood-veneer faces, rated and non-rated as indicated to match existing
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.
4. Hardware relocated to new doors and new hardware on A/V closet doors

B. Related Sections include the following:

1. Division 8 Section "Steel Frames" for hollow metal door frames.
2. Division 8 Section “Door Hardware” for hardware to operate doors.

1.3 SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, trim for openings, and louvers.

1. 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; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire ratings for fire doors.

C. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following:

1. Faces of factory-finished doors with transparent finish. Show the full range of colors available for stained finishes.

D. Samples for Verification: As follows:

1. Corner sections of doors approximately 8 by 10 inches (200 by 250 mm) with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

B. Quality Standard: Comply with the following standard:

1. NWWDA Quality Standard: NWWDA I.S.1-A, "Architectural Wood Flush Doors."
2. AWI Quality Standard: AWI's "Architectural Woodwork Quality Standards" for Finishing , handling and installation requirements

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.
1. Individually package doors in cardboard cartons and wrap bundles of doors in plastic sheeting.

B. Mark each door with individual opening numbers used on Shop Drawings. Use removable tags or concealed markings.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form, signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch (6.35 mm) in a 42-by-84-inch (1067-by-2134-mm) section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 75-mm) span, or do not comply with tolerances in referenced quality standard.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

2. Warranty shall be in effect during the following period of time after the date of Substantial Completion:
   a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available 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. Flush Wood Doors:

   a. Algoma Hardwoods Inc.
   b. Ampco Products, Inc.
   c. Buell Door Co.
   d. Chappell Door Co.
   e. Eggers Industries; Architectural Door Division.
   f. Graham Manufacturing Corp.
   g. Ideal Wood Products, Inc.
   h. Oshkosh

2.2 DOOR CONSTRUCTION, GENERAL

A. Doors for Transparent Finish: Comply with the following requirements:

1. Grade: Premium (Grade AA faces).
2. Faces: Oak to match existing
3. Match between Veneer Leaves: Slip match.
4. Match within Door Faces: Running match.

2.3 SOLID-CORE DOORS

A. Particleboard Cores: Comply with the following requirements:

1. Particleboard: ANSI A208.1, Grade LD-2
2. Blocking: Provide wood blocking at particleboard-core doors as follows:

   a. 5-inch (125-mm) top-rail blocking, at doors indicated to have closers.
   b. 5-inch (125-mm) bottom-rail blocking, at exterior doors and doors indicated to have kick, mop, or armor plates.
   c. 5-inch (125-mm) midrail blocking, at doors indicated to have exit devices.

B. Interior Veneer-Faced Doors: Comply with the following requirements:

1. Core: Particleboard core.
2. Construction: Five or seven plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

2.4 FABRICATION

A. Fabricate flush wood doors in sizes indicated for Project site fitting.

B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-rated doors.

C. 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, DHI A115-W series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard's requirements for factory finishing.

B. Finish wood doors at factory.

C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.

1. Grade: Custom.
2. Finish: Manufacturer's standard finish with performance requirements comparable to AWI System TR-6 catalyzed polyurethane.
3. Staining: Match Architect's sample.
4. Effect: Semifilled finish.
5. Sheen: Satin.

2.6 DOOR HARDWARE

A. Existing hardware to be remounted on existing doors where shown.

B. New doors at A/V closet to receive new hardware as follows – Modify models shown to match building standards as required.

6	HINGES	BB1168 4.5 X 4.5
1	CLASSROOM	75PD RHODES
2	FLUSHBOLT	FB458-12"
2	STOP	FS13
2 SET	SOUND SEAL	S88D

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
2. Reject doors with defects.

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

3.2 INSTALLATION

A. Hardware: For installation, see Division 8 Section "Door Hardware."

B. Manufacturer's Written Instructions: Install wood doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at Project site.

3.3 ADJUSTING AND PROTECTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 081416

SECTION 087100 – 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 this Section.

1.2 - SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed. The hardware shall include the furnishing of all necessary screws, special screws, bolts, special bolts, expansion shields and all other devices necessary for the proper application of the hardware.

1. The schedule included herein is schematic in nature for functions required. The supplier is responsible for a complete functional installation as indicated in the Schedule to be submitted for review to the Architect .

B. This Section includes the following:

1. Hinges.
2. Lock cylinders - Keying by Owner
3. Lock and latch sets.
4. Bolts.
5. Closers.
6. Miscellaneous door control devices.
7. Door trim units.
8. Protection plates.

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 08110 Steel Doors and Frames

D. References:

1. The Americans With disabilities Act (ADA 101-336) Title III Public Accommodations and Services Operated by Private Entities, 1990.

2. American National Standards Institute (ANSI A117.1) Specifications for Making Buildings and Facilities Accessible to and usable by Physically Handicapped People.

3. National Fire Protection Association (NFPA 80) Fire Doors and Fire Windows, 1995 Edition.

4. National Fire Protection Association (NFPA 101) Life Safety Code, 1994 Edition.

5. National Fire Protection Association (NFPA 105) Installation of Smoke-Control Door Assemblies, 1989 Edition.

6. National Fire Protection Association (NFPA 252) Fire Tests of Door Assemblies.

7. Steel Door Institute (SDI 107-84) Hardware on Steel Doors.

8. Steel Door Institute (SDI 100-91) Recommended Specifications for Standard Steel Doors and Frames.

9. Underwriters Laboratories, Inc (UL 305) Panic Hardware.

10. Underwriters Laboratories, Inc (UL 10B) Fire Tests of Door Assemblies.

1.3 - HARDWARE ALLOWANCE (Not Applicable)

1.4 - SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:

a. Type, style, function, size, and finish of each hardware item.
b. Name and manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
e. Explanation of all abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for hardware.
g. Door and frame sizes and materials.

2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.

D. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.5 - QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.

B. Standards: Manufacturers and model numbers listed are to establish a standard of quality.
Similar items by approved manufacturers that are equal in design, function, and quality Will be considered provided required data and physical samples are submitted to the Architect in accordance with section 01600.

C. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

E. Substitutions: All substitutions must be submitted within the procedures and time frame as outlined in Division 1, General Requirement . Approval of products is at the discretion of the architect.

1.6 - DELIVERY, STORAGE AND HANDLING

A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

C. Inventory door hardware jointly with representatives of hardware supplier, general contractor, and installer until each is satisfied that count is correct. **Obtain signed delivery receipts from contractor for all delivered materials.

D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

E. Provide secure lock-up for door hardware delivered to the Project but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.7 - MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 - MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Items indicated as NO SUB are done at the direction of the School District.

1. Butts and Hinges:

a. Hager Hinge Co.
b. McKinney Products Co.
c. Stanley Hardware, Div. Stanley Works.

2. Cylindrical Locksets:

a. Schlage D Series VandalGuard* Keyway as required by Owner - D123 Restricted keyway cylinders, interchangeable core.

3 Bolts:

a. Builders Brass Works Corp.
b. Rockwood
c. Hager Hinge Co.
d. H. B. Ives, A Harrow Company.
e. Quality Hardware Mfg. Co., Inc.; Div. Newman Tonks, Inc.

4 Overhead Closers:

a. LCN

5 Door Control Devices:

a. H. B. Ives, A Harrow Company.
b. Quality Hardware Mfg. Co., Inc.; Div. Newman Tonks, Inc.
c. Hager
d. Glynn Johnson

6. Door Trim Units:
a. Rockwood
b. H. B. Ives, A Harrow Company.
c. Quality
d. Hager

7. Kick, Mop, and Armor Plates:
a. H. B. Ives, A Harrow Company.
e. Rockwood
f. Quality
g. Hager

8 Door Stripping and Seals:

a. Reese Enterprises, Inc.
b. National Guard Products, Inc.
c. Pemko Manufacturing Co., Inc.

9. Sound Stripping:

a. National Guard Products, Inc.
b. Pemko Manufacturing Co., Inc.
c. Reese Enterprises, Inc.

2.2 - SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at the end of this Section. Products are identified by using hardware designation numbers of the following:

1. Manufacturer's Product Designations: The product designation and name of one manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product designated or, where more than one manufacturer is specified under the Article "Manufacturers" in Part 2 for each hardware type, the comparable product of one of the other manufacturers that complies with requirements.

2. 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 following standards. Provide products complying with these standards and requirements specified elsewhere in this Section.

   a. Butts and Hinges: ANSI/BHMA A156.1.
   b. Bored and Preassembled Locks and Latches: ANSI/BHMA A156.2
   c. Exit Devices: ANSI/BHMA A156.3.
   d. Door Controls - Closers: ANSI/BHMA A156.4.
   e. Auxiliary Locks and Associated Products: ANSI/BHMA A156.5.
   f. Architectural Door Trim: ANSI/BHMA A156.6.
   g. Template Hinge Dimensions: ANSI/BHMA A156.7.
   h. Door Controls - Overhead Holders: ANSI/BHMA A156.8
   i. Auxiliary Hardware: ANSI/BHMA A156.16.
   j. Self-Closing Hinges and Pivots: ANSI/BHMA A156.17.
   k. Materials and Finishes: ANSI/BHMA A156.18.

2.3 - MATERIALS AND FABRICATION

A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. 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 applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.

D. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in

surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

E. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of 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 unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.4 - HINGES

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: Provide Phillips flat-head screws complying with the following requirements:

1. For metal doors and frames install machine screws into drilled and tapped holes.
2. For wood doors install wood screws.
3. For fire-rated wood doors install #12 x 1-1/4-inch (32-mm) , threaded-to-the-head steel wood screws.
4. Finish screw heads to match surface of hinges or pivots.

C. Hinges: Except as otherwise indicated, provide hinges as follows:

1. Interior Doors: 1 –3/4” thick up to 3’-0” wide. Standard Weight Bearing (.134) (4-1/2”)

2. Interior Doors: Nonrising pins.

3. Tips: Flat button and matching plug, finished to match leaves.

D. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90 inches (2250 mm) or less in height and one additional hinge for each 30 inches (750 mm) of additional height or fraction there of.

2.5 - LOCK CYLINDERS AND KEYING

A. General : Supplier will meet with Owner to finalize keying requirements and obtain final instructions in writing.
B. Review the keying system with the Owner and provide the type required (Master, grandmaster, or great-grandmaster(either new or integrated with the Owner’s existing system.
C. Equip locks with tumbler cylinders to match Owners standards –.

2.6 - LOCKS AND LATCHES

A. All locksets, latchsets, and trim to be of one manufacturer as hereafter listed for continuity of design and consideration of warranty.

B. Provide metal wrought box strike boxes and curved lip strikes with proper lip length to protect trim of the frame, (7/8” lip to center for the inactive leaf of a pair of doors).

2.7 – CLOSERS AND DOOR CONTROL DEVICES

A. Size of Units: Provide non sized closers and install in compliance with the manufacturer's recommendations for size of door control unit depending on size of door, exposure to wind pressure, weather and anticipated frequency of use.

B. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing.

C. Specified Product: 4041 EDA (Interior Doors) " Rw/PA

1. Parallel closer arms
2. EDA Arm: all closers

2.8 - DOOR TRIM UNITS

A. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.

B. Fabricate edge trim of stainless steel to fit door thickness in standard lengths or to match height of protection plates.

C. Fabricate protection plates not more than 1-1/2" less than door width on hinge side and not more than 1-1/2" less than door width on pull side by height indicated.

Metal Plates: Stainless steel, (BHMA - 630) 0.050 inch (U.S. 18 gage) (1.3 mm).

Kick plates: 10" tall x 1-1/2" Less Door Width (LDW)
Push/Pull Plates: 4" x 16"

2.9 - SEALS

A. General: Provide continuous sound seals on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.

2.10 - HARDWARE FINISHES

A. Provide matching finishes for hardware at each door or opening, to the greatest extent possible, and as otherwise indicated.
B. Provide finishes that match those established by BHMA or, if none established, match the Architect's sample.

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 by referenced standards for the applicable units of hardware.

Finish, Unless otherwise indicated, shall be **SATIN CHROME (BHMA 626) or (BHMA 652 as required).** Protection plate finish shall be **SATIN STAINLESS STEEL (BHMA 630).**

PART 3 - EXECUTION

3.1 - INSTALLATION

A. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.

1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
2. "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.
3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."
4. ANSI A117.1

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

1. Use “Lock-Tite” on all screw threads before installing

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 that 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 complying with requirements specified in Division 7 Section "Joint Sealers."

F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 - ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation 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.

B. Clean adjacent surfaces soiled by hardware installation.

C. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

D. Six-Month Adjustment: Approximately six months after the date of Substantial Completion, the Installer, accompanied by representatives of the manufacturers of latchsets and locksets and of door control devices, and of other major hardware suppliers, shall return to the Project to perform the following work:

1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.
4. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

GROUP ONE

DOOR: SINGLE – CLASSROOM - 209A, 211, 211B,

3	HINGES	BB1168 4.5 X 4.5	
1	CLASSROOM	ND94PD X RHO X 626	
1	CLOSER	4041 H	DELETE CLOSER 209A
1	STOP	WS407	
3	SILENCERS		
1SET	SOUND SEAL	S88D	DOOR 211B ONLY

GROUP TWO

DOOR: SINGLE – NON UL – STOREROOM – 210

3	HINGES	BB1168 4.5 X 4.5
1	STOREROOM	ND96PD X RHO X 626
1	CLOSER	4041 H
1	KICKPLATES	10 X 1.5 LDW
1	STOP	WS407
3	SILENCERS	

GROUP THREE

DOOR: : PAIR – CLASSROOM DOOR 211A

6	HINGES	BB1168 4.5 X 4.5
1	CLASSROOM	ND94PD XRHO X 626
2	AUTO FLUSHBLT	FB31/FB41
1	COORDINATOR COR X BRACKETS X FILLER	
2	CLOSER	4041
2	KICKPLATES	10 X 1.5 LDW
2	STOP	WS407
2 SETS	SOUND SEAL	S88D

END OF SECTION

SECTION 092115 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the 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. Nonload-bearing steel framing members for gypsum board assemblies.
2. Gypsum board assemblies attached to steel framing.

B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 7 Section "Firestopping" for firestopping systems and fire-resistance-rated joint sealants.

1.3 DEFINITIONS

A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 ASSEMBLY PERFORMANCE REQUIREMENTS

A. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those of assemblies whose STC ratings were determined according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

B. Fire Resistance: Provide gypsum board assemblies with fire-resistance ratings indicated.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified.

C. Shop Drawings showing locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work. Locations of abuse resistant gypsum panels where applicable.

D. Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.

B. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

C. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

D. Fire-Test-Response Characteristics: Where fire-resistance-rated gypsum board assemblies are indicated, provide gypsum board assemblies that comply with the following requirements:

1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
2. Gypsum board assemblies indicated are identical to assemblies tested for fire resistance according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
3. Deflection and Firestop Track: Top runner provided in fire-resistance-rated assemblies indicated is labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

1.8 PROJECT CONDITIONS

A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.

B. Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.

C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Steel Framing and Furring:

a. Clark Steel Framing, Inc.
b. Consolidated Systems, Inc.
c. Dale Industries, Inc.
d. Dietrich Industries, Inc.
e. Marino/Ware (formerly Marino Industries Corp.).
f. National Gypsum Co.; Gold Bond Building Products Division.
g. SCAFCO Steel Stud Manufacturing Co.
h. Unimast, Inc.

2. Grid Suspension Assemblies:

a. Armstrong World Industries, Inc.
b. Chicago Metallic Corp.
c. USG Interiors, Inc.
d. Worthington Steel Company (formerly National Rolling Mills).

3. Gypsum Board and Related Products:

a. Domtar Gypsum.
b. Georgia-Pacific Corp.
c. National Gypsum Co.; Gold Bond Building Products Division.
d. Pacific Building Products, Inc.
d United States Gypsum Co.

2.2 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

A. General: Provide components complying with ASTM C 754 for conditions indicated.

B. Wire Ties: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper, 0.062 inch (1.6 mm) thick.

C. Wire Hangers: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper, 0.162-inch (4.1-mm) diameter.

D. Grid Suspension System for Interior Ceilings: ASTM C 645, manufacturer's standard direct-hung grid suspension system composed of main beams and cross-furring members that interlock to form a modular supporting network.

2.3 STEEL FRAMING FOR WALLS AND PARTITIONS

A. General: Provide steel framing members complying with the following requirements:

1. Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating.

B. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch- (5-mm-) wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:

1. Thickness: 0.0396 inch 20 gauge as follows:

a. For head runner, sill runner, jamb, and cripple studs at door and other openings.

2. Depth: As indicated.

C. Deflection Track: Manufacturer's standard top runner designed to prevent cracking of gypsum board applied to interior partitions resulting from deflection of the structure above fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M). Thickness as indicated for studs, and width to accommodated depth of studs, and of the following configuration:

1. Top runner with 2-1/2-inch- (63.5-mm-) deep flanges that either have V-shaped offsets that compress when pressure is applied from construction above or have slots 1 inch (25.4 mm) o.c. that allow fasteners attached to studs through the slots to accommodate structural movement by slipping.

a. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

1) Superior Flex Track System (SFT); Delta Star, Inc.
2) SLP-TRK; Metal-Lite, Inc.

D. Deflection and Firestop Track: Top runner designed to allow partition heads to expand and contract with movement of structure above while maintaining continuity of the assembly. Comply with requirements of ASTM C 645 except configuration, of thickness indicated for studs and width to accommodate depth of studs indicated with flanges offset at midpoint to accommodate gypsum board thickness.

1. Offset Configuration: As indicated.
2. Available Product: Subject to compliance with requirements, a product that may be incorporated in the Work includes, but is not limited to, "Fire Trak" manufactured by Fire Trak Corp.

E. Steel Rigid Furring Channels: ASTM C 645, hat shaped, depth and minimum thickness of base (uncoated) metal as follows:

1. Thickness: 0.0336 inch (0.84 mm), unless otherwise indicated.
2. Depth: 1-1/2 inch (38.1 mm).

F. Steel Flat Strap and Backing Plate: Steel sheet for blocking and bracing complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M), length and width as indicated, and with a minimum base metal (uncoated) thickness as follows:

1. Thickness: 0.0635 inch (1.5 mm) where indicated.

G. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members se-

curely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated.

2.4 GYPSUM BOARD PRODUCTS

A. General: Provide gypsum board of types indicated in maximum lengths available that will minimize end-to-end butt joints in each area indicated to receive gypsum board application.

1. Widths: Provide gypsum board in widths of 48 inches (1219 mm).

B. Gypsum Wallboard: ASTM C 36 and as follows:
1. Type: Type X where required for fire-resistance-rated assemblies.
2. Edges: Tapered and featured (rounded or beveled) for prefilling.
3. Thickness: 5/8 inch (15.9 mm) where indicated.

C. Gypsum Board Base Layer(s) for Multilayer Applications: Gypsum wallboard, ASTM C 36, and as follows:
1. Type: Type X where indicated or required for fire-resistance-rated assemblies.
2. Edges: Manufacturer's standard.
3. Thickness: 5/8 inch (15.9 mm) where indicated.

2.5 TRIM ACCESSORIES

A. Accessories for Interior Installation: Cornerbead, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:

1. Material: Formed metal or plastic, with metal complying with the following requirement:

a. Steel sheet zinc coated by hot-dip process or rolled zinc.

2. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047:

a. Cornerbead on outside corners, unless otherwise indicated.
b. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim, unless otherwise indicated.
c. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.
d. U-bead with face and back flanges; face flange formed to be left without application of joint compound. Use U-bead where indicated.
e. One-piece control joint formed with V-shaped slot and removable strip covering slot opening for control joint pattern as shown.

B. Accessory for Curved Edges: Cornerbead formed of metal, plastic, or metal combined with plastic, with either notched or flexible flanges that are bendable to curvature radius.

2.6 JOINT TREATMENT MATERIALS

A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.

B. Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.

1. Use paper tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.

C. Joint Compounds for Gypsum Board - one of the following types may be used at the Contractor's option.

Setting type Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.

1. For taping and filling only, use formulation that is compatible with other joint compounds applied over it.
2. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer.
3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer.
4. For topping compound, use sandable formulation.

D. Drying-Type Joint Compounds for Gypsum Board: Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.

1. Ready-Mixed Formulation: Factory-mixed product.

a. Taping compound formulated for embedding tape and for first coat over fasteners and face flanges of trim accessories.
b. Topping compound formulated for fill (second) and finish (third) coats.
c. All-purpose compound formulated for both taping and topping compounds.

2.7 ACOUSTICAL SEALANT

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834, VOC content of less than 50 grams per liter and the following requirements:

1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.8 MISCELLANEOUS MATERIALS

A. General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel drill screws complying with ASTM C 1002 for the following applications:

1. Fastening gypsum board to steel members less than 0.033 inch (0.84 mm) thick.
2. Fastening gypsum board to gypsum board.

D. Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

E. Steel drill screws of size and type recommended by unit manufacturer for fastening cementitious backer units.

F. Sound-Attenuation Blankets: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing).
1. Mineral-Fiber Type: Fibers manufactured from glass.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

1. Furnish devices indicated to other trades for installation well in advance of time needed for coordination with other construction.

3.3 INSTALLING STEEL FRAMING, GENERAL

A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.'s "Gypsum Construction Handbook."
a. Install deflection track top runner to attain lateral support and avoid axial loading.
b. Install deflection and firestop track top runner at fire-resistance-rated assemblies where indicated.

1) Attach jamb studs at openings to tracks using manufacturer's standard stud clip.

C. Do not bridge building control and expansion joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.

3.4 INSTALLING STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS

A. Suspend ceiling hangers from building structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
4. Secure flat, angle, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or otherwise fail.
5. Do not attach hangers to steel deck tabs.
6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
7. Do not connect or suspend steel framing from ducts, pipes, or conduit.

B. Sway-brace suspended steel framing with hangers used for support.

C. Install suspended steel framing components in sizes and at spacings indicated, but not less than that required by the referenced steel framing installation standard.

1. Wire Hangers: 48 inches (1219 mm) o.c.
2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.

D. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring or grid suspension members are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) as measured both lengthwise on each member and transversely between parallel members.

E. Wire-tie or clip furring members to main runners and to other structural supports as indicated.

F. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.

1. Where studs are installed directly against exterior walls, install asphalt felt strips or foam gaskets between studs and wall.

B. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.

C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

1. For STC-rated and fire-resistance-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid structural surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed, to support gypsum board closures needed to make partitions continuous from floor to underside of solid structure.

D. Terminate partition framing at suspended ceilings only where indicated.

E. Install steel studs and furring in sizes and at spacings indicated.

1. Space studs 16 inches (406 mm) o.c., unless otherwise indicated.

F. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.

1. Position studs vertically with open sides facing in same direction and engaging floor and ceiling runners. Begin and end each arc with a stud and space intermediate studs equally along arcs at stud spacing recommended by gypsum board manufacturer for radii indicated. Attach studs to runners with 3/8-inch- (9.5-mm-) long pan head framing screws. On straight lengths at ends of arcs, place studs 6 inches (150 mm) o.c. with last stud left free standing.

G. Frame door openings to comply with GA-219, and with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Install 2 studs at each jamb, unless otherwise indicated.
2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (12.7-mm) clearance from jamb stud to allow for installation of control joint.
3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

H. Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.

I. Install insulation as follows:

1. Erect insulation vertically and hold in place with friction fit or supplemental clips if required.

3.6 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.

B. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

D. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

E. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.

F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

G. Attach gypsum panels to framing provided at openings and cutouts.

H. Form control and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.

I. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases that are braced internally.

   1. Except where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
   2. Fit gypsum panels around ducts, pipes, and conduits.
   3. Where partitions intersect open structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

J. Isolate perimeter of nonload-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

K. Where STC-rated gypsum board assemblies are indicated, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of the partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

L. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.

M. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

3.7 GYPSUM BOARD APPLICATION METHODS

A. Single-Layer Application: Install gypsum wallboard panels as follows:

1. On ceilings, apply gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless parallel application is required for fire-resistance-rated assemblies. Use maximum-length panels to minimize end joints.

   a. Stagger abutting end joints not less than one framing member in alternate courses of board.
   b. At stairwells and other high walls, install panels horizontally.
   c. Install abuse resistant panels in corridors and classrooms to a height of 4’-0” AFF.

B. Multilayer Application on Partitions/Walls: Apply gypsum board indicated for base layers and gypsum wallboard face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints. Stagger joints on opposite sides of partitions.

C. Single-Layer Fastening Methods: Apply gypsum panels to supports as follows:

1. Fasten with screws.

D. Multilayer Fastening Methods: Apply base layers of gypsum panels and face layer to base layers as follows:

1. Fasten both base layers and face layers separately to supports with screws.

3.8 INSTALLING TRIM ACCESSORIES

A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.

B. Install cornerbead at external corners.

C. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.

1. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
2. Install L-bead where edge trim can only be installed after gypsum panels are installed.
3. Install U-bead where indicated.
4. Install aluminum trim and other accessories where indicated.

D. Install control joints according to ASTM C 840 and manufacturer's recommendations and in specific locations approved by Architect for visual effect.

3.9 FINISHING GYPSUM BOARD ASSEMBLIES

A. General: Treat gypsum board joints, interior angles, flanges of cornerbead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.

B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.

C. Apply joint tape over gypsum board joints, except those with trim accessories having flanges not requiring tape.

D. Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.

1. Level 1 for ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
2. Level 4 for gypsum board surfaces, unless otherwise indicated.

E. Use one of the following joint compound combinations as applicable to the finish levels specified:

1. Embedding and First Coat: Setting-type joint compound. Fill (Second) Coat: Setting-type joint compound. Finish (Third) Coat: Sandable, setting-type joint compound.

F. For Level 4 gypsum board finish, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration.

G. Where Level 1 gypsum board finish is indicated, embed tape in joint compound.

H. Finish tile backer units to comply with unit manufacturer's directions.

3.10 FIELD QUALITY CONTROL

A. Above-Ceiling Observation: Architect will conduct an above-ceiling observation prior to installation of gypsum board ceilings and report any deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

1. Notify Architect one week in advance of the date and the time when the Project, or part of the Project, will be ready for an above-ceiling observation.
2. Prior to notifying Architect, complete the following in areas to receive gypsum board ceilings:

a. Installation of 80 percent of lighting fixtures, powered for operation.
b. Installation, insulation, and leak and pressure testing of water piping systems.
c. Installation of air duct systems.
d. Installation of air devices.
e. Installation of mechanical system control air tubing.
f. Installation of ceiling support framing.

3.11 CLEANING AND PROTECTION

A. Promptly remove any residual joint compound from adjacent surfaces.

B. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 092115

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes ceilings consisting of acoustical panels and exposed suspension systems – heavy duty to comply with IBC requirements.

B. Compression struts and bracing as required for seismic loading.

1.3 SUBMITTALS

A. Product Data: For each type of product specified.

B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:

1. Ceiling suspension system members.
2. Method of attaching suspension system hangers to building structure.
3. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
4. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual acoustical panels or sections of acoustical panels, suspension systems, and moldings showing the full range of colors, textures, and patterns available for each type of ceiling assembly indicated.

D. Samples for Verification: Full-size units of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.

1. 6-inch- (150-mm-) square samples of each acoustical panel type, pattern, and color.
2. Set of 12-inch- (300-mm-) long samples of exposed suspension system members, including moldings, for each color and system type required.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Product Test Reports: Indicate compliance of acoustical panel ceilings and components with requirements based on comprehensive testing of current products.

G. Research/Evaluation Reports: Evidence of acoustical panel ceiling's and components' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Ceiling Units: Obtain each acoustical ceiling panel from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1. Obtain both acoustical ceiling panels and suspension system from the same manufacturer.

D. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Fire-response tests were performed by UL, ITS/Warnock Hersey, or another independent testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
2. Surface-burning characteristics of acoustical panels comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.
3. Fire-resistance-rated assemblies, which are indicated by design designations from UL's "Fire Resistance Directory," from ITS/Warnock Hersey's "Directory of Listed Products," or from the listings of another testing and inspecting agency, are identical in materials and construction to those tested per ASTM E 119.
4. Products are identified with appropriate markings of applicable testing and inspecting agency.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

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

1.7 COORDINATION

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

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size units equal to 2.0 percent but not less than 4 panels minimum of amount installed for each panel type.
2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated for each designation in the Acoustical Panel Ceiling Schedule at the end of Part 3.

2.2 ACOUSTICAL PANELS, GENERAL

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

1. Mounting Method for Measuring Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical panels are indicated by referencing ASTM E 1264 pattern designations and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range of products that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

C. Panel Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3, including those referencing ASTM E 1264 classifications.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

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

B. Metal Suspension System Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3.

C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.

E. Wire Hangers, Braces, and Ties: Provide wires at Contractor’s option complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
3. Size: Select wire diameter so its stress at three 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- (2.69-mm-) diameter wire.

F. Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners. All edges hemmed straight and true.

G. Roll-Formed, Sheet-Metal Edge Moldings and Trim: As shown on drawings for pans installed directly to deck, provide non perforated stud sections or channel shaped edges of material, finish, and color as that used for exposed flanges of suspension system runners.

1. For circular penetrations of ceiling or bullnose corners, provide edge moldings fabricated to diameter required to fit penetration exactly. Exposed Face will not be stepped but shall match adjacent flat moldings. Flexible moldings mayy be used at bullnose corners.

2. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Comply with paint manufacturer's written instructions for applying and baking and for minimum dry film thickness.

   a. Organic Coating: Manufacturer's standard thermosetting coating system with a minimum dry film thickness of 0.8 to 1.2 mils (0.02 to 0.03 mm).
   b. Color: Match color of finish on flanges of suspension system surfaces.

3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.
b. Celotex Corporation (The); Building Products Division; Architectural Ceilings Marketing Dept.
c. Chicago Metallic Corporation.
d. Fry Reglet Corporation.
e. Gordon, Inc.
f. MM Systems, Inc.
g. USG Interiors, Inc.

2.4 MISCELLANEOUS MATERIALS

A. Sound-Attenuation Blankets: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing).
   1. Mineral-Fiber Type: Fibers manufactured from glass.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.

   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

   1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
   2. CISCA's Guidelines for Systems Requiring Seismic Restraint: Comply with CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies--Seismic Zones 3 & 4., IBC Seismic Zone D.

B. Suspend ceiling hangers from building's structural members and as follows:

   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
7. Do not attach hangers to steel deck tabs.
8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
9. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m). Miter corners accurately and connect securely.
2. Do not use exposed fasteners, including pop rivets, on moldings and trim except at oversized edge angles required for IBC seismic codes.

E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Above-Ceiling Observation: Prior to installation of ceiling panels Architect will conduct an above-ceiling observation and report any deficiencies in the Work observed. Do not proceed with installation of panels until deficiencies have been corrected.

1. Notify Architect one week in advance of the date and the time when the Project, or part of the Project, will be ready for an above-ceiling observation.
2. Prior to notifying Architect, complete the following in areas to receive gypsum board ceilings:

a. Installation of 80 percent of lighting fixtures, powered for operation.
b. Installation, insulation, and leak and pressure testing of water piping systems.
c. Installation of air duct systems.
d. Installation of air devices.
e. Installation of mechanical system control air tubing.
f. Installation of ceiling support framing.

G. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
2. Paint cut panel edges remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
3. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

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

3.5 ACOUSTICAL PANEL CEILING SCHEDULE

A. Water-Felted, Mineral-Base Acoustical Panels for Acoustical Panel Ceiling, provide non-fire rated and fire-resistance-rated if indicated. Acoustical panels, and complying with the following

1. Products: Provide one of the following:
   a. Cortega, Armstrong industries
   b. Baroque; BPB/ Celotex Corp
   c. Radar; USG Interiors, Inc

   Classification: Panels fitting ASTM E 1264 for Type III, mineral base with painted finish; Form 2, water felted.
2. Pattern: Panels fitting ASTM E 1264 pattern designation (description) CD (perforated, small holes.and fissured
3. Color: White
4. Light Reflectance Coefficient: Not less than LR 0.80
5. Noise Reduction Coefficient: NRC 0.55
6. Edge Detail: Square
7. Thickness: 5/8 inch (16 mm
8. Size: 24 x 24 inches as indicated.

B. Structural fiberglass core with non-woven polyester textile surface wrapped on two opposite edges and exposed edges on the other two sides; with properties as follows:
1. Products: Provide the following: Hunter Douglas, Tech Style
2. Panel Thickness: 1.125 inches (28.5 mm).
3. Panel Size: 48 x 48 inches (1220 x 1220 mm).
4. Panel Color: White
5. Noise Reduction Coefficient (NRC): 0.85, measured in accordance with ASTM C 423 with the equal to or better than absorption coefficient reading at the following specified frequencies:

Frequency:	125	250	500	1000	2000	5000
Absorp Co-ef	0.64	0.98	0.71	0.82	0.95	0.98

6. Sound Absorption Average: (SAA) 0.89, measured in accordance with ASTM C 423.
7. Surface Burning Characteristics: Flame spread less than 25 and smoke developed less than 50, Class A (1), per ASTM E 84 and ASTM E 1264.
8. Light Reflectance (white only): LR-1 (75%), measured in accordance with ASTM E 1477.
9. Moisture Resistance: Resistant to relative humidity up to 95 percent at 105 degrees F (40.5 degrees C) for 30 days.
10. Mold and Mildew Resistant: In accordance with requirements of ASTM C 665.
11. Fungi Resistant: Inc accordance with requirements of ASTM C 1338.
12. Accessibility: Panels shall be downward accessible by disengaging hinge support rail on one side of panel from the T-bar flange without the use of tools. Panel shall swing hinge downward to provide complete access without removal of the panel from the ceiling.

C. Suspension System for Acoustical Panel Ceiling, provide acoustical panel ceiling suspension system complying with the following

1 Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G01 (Z001) coating designation, with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges; other characteristics as follows:

a. Structural Classification Heavy-duty system
b. End Condition of Cross Runners: Override (stepped) or butt-edge type, as standard with manufacturer
c. Face Design: Flush face.
d. Cap Material: Steel sheet for General areas
e. Cap Finish: Painted white.
f. Mounting method: With compression struts as indicated for seismic loading.
g. Edge moldings: Standard size edge angle
Provde Armstrong BERC Clips, Chicago Metallic Seismic Retention Clip or USG retention Clip concealed in framing members if acceptable to, manufacturer and Building Authority.

END OF SECTION 095113

SECTION 096402 - WOOD STAGE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the 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. Solid-wood strip flooring over resilient mounted plywood substrate for the Stage area

B. Related Sections include the following:

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation details including location and layout of each type of wood flooring and accessory.

C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors and finishes available for wood flooring.

D. Samples for Verification: For each type of wood flooring and accessory, with stain color and finish required, approximately 12 inches (300 mm) long and of same thickness and material indicated for the Work. Include sample sets showing the full range of normal color and texture variations expected.

1.4 QUALITY ASSURANCE

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

B. Source Limitations: Obtain each type of material and product from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver wood flooring materials in unopened cartons or bundles.

B. Protect wood flooring from exposure to moisture. Do not deliver wood flooring until after concrete, masonry, plaster, ceramic tile, and similar wet-work is complete and dry.

C. Store wood flooring materials in a dry, warm, well-ventilated, weathertight location.

D. Move wood flooring into spaces where it will be installed, at least seven days before installation.

1.6 PROJECT CONDITIONS

A. Conditioning: Maintain relative humidity planned for building occupants and an ambient temperature between 65 and 75 deg F (18 and 24 deg C) in spaces to receive wood flooring for at least seven days before installation, during installation, and for at least seven days after installation. After post-installation period, maintain relative humidity and ambient temperature planned for building occupants.

1. For unfinished products, open sealed packages to allow wood flooring to acclimatize.
2. Do not install flooring until it adjusts to the relative humidity of and is at the same temperature as the space where it is to be installed.
3. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by flooring and finish manufacturers.

B. Install factory-finished wood flooring after other finishing operations, including painting, have been completed.

1.7 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Wood Flooring Warranty: Written warranty, signed by manufacturer agreeing to repair or replace wood flooring that fails in materials or workmanship. Failures include, but are not limited to, buckling, cupping and warping.

1. Warranty period: 5 years from Substantial Completion.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wood Flooring: Equal to 5 percent of amount installed for each type and finish indicated.

PART 2 - PRODUCTS

2.1 SOLID-WOOD STRIP FLOORING

A. Strip Flooring: Provide kiln-dried wood flooring as follows:

1. Species: Fir
2. Grade: Clear.
3. Cut: Plain sawn.
4. Thickness: 35/32 inch .
5. Face Width: 2-1/4 inches (57 mm).
6. Matching: Tongue and groove, and end matched.
7. Backs: Channeled (kerfed) for stress relief.
8. Random Lengths: Provide standard random-length strips complying with applicable grading rules.

2.2 SUBFLOOR SYSTEM

A. Plywood Underlayment: Two layers APA rated, C-D Plugged, exterior glue, tongue and groove, **15/32 inch (12 mm)** thick.

2.3 FINISHING MATERIALS

A. Wood Filler: Formulated to fill and repair seams, defects, and open-grain hardwood floors; compatible with finish system components and recommended by filler and finish manufacturers for use indicated. If required to match approved samples, provide pigmented filler.

B. Floor-Finish System: MFMA-listed system of compatible components recommended by flooring and finish manufacturers for application indicated.

1. Type: Group 3, Gymnasium Type (Surface) Finishes; urethane-oil type – non-fading.
2. Floor Sealer: Pliable, penetrating type.
3. Finish Coats: Formulated for gloss finish and multicoat application.

a. Floor Sealers and Finish Coats: VOC content of not more than 350 g/L.

2.4 MATERIALS

A. Vapor Retarder: ASTM D 4397, polyethylene sheet not less than 6.0 mils (0.15 mm) thick.

B. Wood Flooring Adhesive: Mastic recommended by flooring and adhesive manufacturers for application indicated.

C. Resilient Underlayment: **Flexible, multicellular, closed-cell, expanded polyethylene-foam sheet; 1/2 inch (13 mm) thick; nominal 2-lb/cu. ft. (32-kg/cu. m) density**. Or resilient pads of same thickness to be located at 12 inches o.c. in both directions.

2.5 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:

1. Stainless-Steel Items: Type **304** stainless-steel fasteners.
2. Uncoated Steel Items: Plated steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of wood flooring. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Concrete Slabs: Verify that concrete slabs comply with requirements specified Division 3 Section "Cast-in-Place Concrete."

1. Verify that slabs are dry according to test methods recommended by flooring manufacturer or, if none, by test methods in NOFMA's "Installing Hardwood Flooring."
2. Where wood flooring is installed directly over concrete slabs, grind high spots and fill low spots to provide a maximum 1/4-inch (6-mm) deviation in any direction when checked with a 10-foot (3-m) straight edge.

3.2 INSTALLATION

A. General: Comply with flooring manufacturer's written instructions, but not less than recommendations in NOFMA's "Installing Hardwood Flooring," as applicable to flooring type.

B. Pattern: Lay wood flooring in pattern indicated on Drawings or, if not indicated, as directed by Architect.

C. Expansion Space: Provide expansion space at walls and other obstructions and terminations of flooring of not less than 3/4 inch (19 mm), unless otherwise indicated on Drawings.

1. Unless fully concealed by trim, fill expansion space with flush cork expansion strip.

D. Vapor Retarder: install flooring over a layer of polyethylene sheet with edges overlapped over sleepers and turned up behind baseboards.

E. Underlayment: Install perpendicular to direction of flooring, staggering end joints in adjacent rows.

F. Solid-Wood Strip and Plank Flooring: Blind nail or staple flooring to substrate according to NOFMA's written recommendations.

3.3 SANDING AND FINISHING

A. Machine-sand flooring to remove offsets, ridges, cups, and sanding-machine marks that would be noticeable after finishing. Vacuum and tack with a clean cloth immediately before applying finish.

B. Apply filler according to manufacturer's written instructions.

1. Fill open-grained wood.
2. Fill and repair seams and defects.

C. Apply floor sealer according to finish manufacturer's written instructions.

3.4 PROTECTION

A. Cover complete installed wood flooring to protect it from damage or deterioration, before and after finishing, during remainder of construction period. Use heavy kraft-paper or other suitable covering. Do not use plastic sheet or film that could cause condensation.

1. Do not cover site-finished floors with kraft paper, or any other material, until finish reaches full cure, but not less than seven days after applying last coat.

END OF SECTION 096402

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient molding accessories for carpet tile edges and nosings (Alternate)

B. Related Sections:

1. Division 01 Section “Alternates”
2. Division 09 Section “Carpet Tile” for carpet tile floor coverings.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Product Data for adhesives, including printed statement of VOC content.

B. Samples for Initial Selection: For each type of product indicated.

C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.

D. Product Schedule: For resilient products.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Mockups: Provide resilient products with mockups specified in other Sections.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

A. Resilient Base:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.
b. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
c. Flexco, Inc.
d. Johnsonite.
e. Mondo Rubber International, Inc.
f. Musson, R. C. Rubber Co.
g. Roppe Corporation, USA.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
2. Manufacturing Method: Group I (solid, homogeneous).
3. Style: Cove (base with toe). To match existing that remains

C. Minimum Thickness: 0.125 inch (3.2 mm).

D. Height: 4 inches (102 mm).

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Preformed.

G. Inside Corners: Preformed.

H. Finish: Satin.

I. Colors and Patterns: As selected by Architect from full range of industry colors.

2.2 RESILIENT MOLDING ACCESSORY

A. Resilient Molding Accessory:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
b. Flexco, Inc.
c. Johnsonite.
d. R.C.A. Rubber Company (The).
e. Roppe Corporation, USA.

B. Description: Carpet edge for glue-down applications, Nosing for carpet.

C. Material: Rubber.

D. Profile and Dimensions: As indicated.

E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

   a. Cove Base Adhesives: Not more than 50 g/L.
   b. Rubber Floor Adhesives: Not more than 60 g/L.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Accessories: Prepare according to ASTM F 710.

   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. 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.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until they are same temperature as the space where they are to be installed.

   1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

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

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 096813 - CARPET TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes carpet tile and installation, purchased under State Contract.

B. Related Sections include the following:

1. Division 1 Section “Alternates”
2. Division 9 Section "Resilient accessories" for resilient wall base and accessories installed with carpet tile.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation methods.

1. For installation adhesive, including printed statement of VOC content.

B. Certification that products provided comply with published manufacturers standards.

C. Shop Drawings: Show the following:
1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

D. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet Tile: Full-size Sample.
2. Exposed Edge Stripping and Accessory: 12-inch- (300-mm-) long Samples.

E. Product Schedule: Use same room and product designations indicated on Drawings and in schedules.

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

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

B. Certification of Specified Products: Certification signed by Manufacturer’s representative that products provided comply with published product specifications.

C. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

D. Product Options: Products and manufacturers named in Part 2 establish requirements for product quality in terms of appearance, construction, and performance. Other manufacturers' products comparable in quality to named products and complying with requirements may be considered. Refer to Division 1 Section "Substitutions."

E. Mockups: For each type of carpet tile installation.

1.5 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with CRI 104, Section 5, "Storage and Handling."

1.6 PROJECT CONDITIONS

A. General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."

B. Environmental Limitations: Do not install carpet tile until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

C. Do not install carpet tile over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tile, install carpet tile before installing these items.

1.7 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Carpet Tile Warranty: Written warranty, signed by carpet tile manufacturer agreeing to replace carpet tile that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

1. Warranty Period: 10 years from date of Substantial Completion.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Carpet Tile: Full-size units, not less than 10 sq. yd. (8.3 sq. m).

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Carpet is to be procured through state carpet contract.No. MA1865

B. Available Carpet Tile:

Interface FLOR GlasBac RE Tile

C. Face Construction: tufted Textured-loop.

D. Pile height: .14 inch.

E. Face Yarn: Nylon.

F. Dye System: Yarn dyed.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided by or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and that is recommended by carpet tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Verify that substrates and conditions are satisfactory for carpet tile installation and comply with requirements specified.

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

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 13, "Carpet Modules (Tiles)."

B. Installation Method: As recommended in writing by carpet tile manufacturer for Glue-down; install every tile with releasable adhesive

C. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

D. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

F. Install pattern parallel to walls and borders unless otherwise indicated.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:
   1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
   2. Remove yarns that protrude from carpet tile surface.
   3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect carpet tile to comply with CRI 104, Section 15, "Protection of Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 098413 - FIXED SOUND ABSORPTIVE WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the 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. Back-mounted acoustical wall panels.

B. Related Sections include the following:

1. Gypsum Drywall Assemblies for substrates and reveals.

1.3 SUBMITTALS

A. Product Data: For each type of panel edge, core material, and mounting indicated.

B. Shop Drawings: Show fabrication and installation details for acoustical wall panels, including plans, elevations, sections, mounting devices, details, and attachments to other Work.

1. Show orientation of fabric application, pattern matching, and seams.

C. Samples for Initial Selection: For each type of fabric facing material from acoustical wall panel manufacturer's full range. Include samples of installation devices and accessories.

D. Samples for Verification: 8-by-11-inch (200-by-280-mm) units of each type of acoustical wall panel indicated; in sets for each color, texture, and pattern specified for facing materials, showing the full range of variations expected in these characteristics. Include samples of installation devices and accessories.

E. Product Certificates: Signed by manufacturers of acoustical wall panels certifying that products furnished comply with requirements.

F. Maintenance Data: For acoustical wall panels and facings to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing acoustical wall panels similar to those indicated for this Project and with a record of successful in-service performance.

B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

C. Source Limitations for Acoustical Wall Panels: Obtain acoustical wall panels from one source with resources to provide products of consistent quality in appearance and physical properties.

D. Fire-Test-Response Characteristics: Provide acoustical wall panels with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify acoustical wall panels with appropriate markings of applicable testing and inspecting agency.

1. Flame Spread: 25 or less.
2. Smoke Developed: 450 or less.

E. Mockups: Before installing acoustical wall panels, build mockups for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Demonstrate the proposed range of aesthetic effects and workmanship.
3. Obtain Architect's approval of mockups before starting acoustical wall panel fabrication.
4. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
5. Demolish and remove mockups when directed.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical wall panels from excessive moisture when shipping, storing, and handling. Deliver in unopened bundles and store in a dry place with adequate air circulation. Do not deliver material to building until wet-work, such as concrete and plaster, has been completed and cured to a condition of equilibrium. Protect panel edges from crushing and impact.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical wall panels until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Air-Quality Limitations: Protect acoustical wall panels from exposure to airborne odors, such as tobacco smoke, and install panels under conditions free from odor contamination of ambient air.

C. Field Measurements: Verify wall surface dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish surface dimensions and proceed with fabricating acoustical wall

panels without field measurements. Coordinate wall construction to ensure that actual surface dimensions correspond to established dimensions.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fabric: For each fabric, color, and pattern installed, provide length equal to 10 percent of amount installed, but no fewer than 10 yards (9 m).
2. Acoustical Wall Panel Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than 5 attachment devices.

PART 2 - PRODUCTS

2.1 CORE MATERIALS

A. Glass-Fiber Board: ASTM C 612, Type IA or Types IA and IB; density as specified, unfaced, dimensionally stable, molded rigid board, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 BACK-MOUNTED, EDGE-REINFORCED ACOUSTICAL WALL PANELS WITH GLASS-FIBER BOARD CORE

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. Conwed Designscape Respond Panel by Owens Corning.
2. Wall Technology by Owens Corning.
3. AlphaSorb Fabric-Wrapped Wall Panels by Acoustical Solutions, Inc.

B. Panel Construction: Manufacturer's standard panel construction consisting of facing material laminated to front face, edges, and back border of dimensionally stable, rigid glass-fiber board core; with edges chemically hardened to reinforce panel perimeter against warpage and damage.

C. Nominal Core Density: 4 to 7 lb/cu. ft. (64 to 112 kg/cu. m).

D. Core-Face Layer: Tackable, impact-resistant, high-density board or impact-resistant, acoustically transparent, copolymer face-sheet as standard with manufacturer.

E. Facing Material: COM Fabric , as selected by Architect
1. Width: 66 inches (1676 mm).

F. Nominal Core Thickness and Overall System NRC: 1 inch (25 mm) minimum and not less than NRC 0.80, for Type A mounting per ASTM E 795.

G. Panel Width: As indicated on Drawings.

H. Panel Height: Fabricated height as indicated on Drawings; mounting height as indicated on Drawings.

I. Panel Edge Detail: Square.

J. Corner Detail: Square to form continuous profile to match edge detail.

2.3 FABRICATION

A. Sound-Absorption Performance: Provide acoustical wall panels with minimum NRCs indicated, as determined by testing per ASTM C 423 for mounting type specified.

B. Acoustical Wall Panels: Panel construction consisting of facing material adhered to face, edges and back border of dimensionally stable core; with rigid edges to reinforce panel perimeter against warpage and damage.

1. Glass-Fiber Board: Resin harden areas of core for attachment of mounting devices.

C. Fabric Facing: Stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other foreign matter. Applied with visible surfaces fully covered.

1. Where square corners are indicated, tailor corners.
2. Where fabrics with directional or repeating patterns or directional weave are indicated, mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent panels.

D. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, sags.

E. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch (1.6 mm) for the following:

1. Thickness.
2. Edge straightness.
3. Overall length and width.
4. Squareness from corner to corner.
5. Chords, radii, and diameters.

F. Back-Mounting Devices: Concealed on backside of panel, recommended to support weight of panel, and as follows:

1. Metal "Z" Clips: Two-part panel clips, with one part of each clip mechanically attached to back of panel and the other part to wall substrate, designed to allow for panel removal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, blocking, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting acoustical wall panel performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install acoustical wall panels in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, and scribed to fit adjoining work accurately at borders and at penetrations. Comply with panel manufacturer's written instructions for installation of panels using type of concealed mounting accessories indicated or, if not indicated, as recommended by manufacturer. Anchor panels securely to supporting substrate.

B. Match and level fabric pattern and grain among adjacent panels.

C. Construction Tolerances: As follows:

1. Variation from Plumb and Level: Plus or minus 1/16 inch (1.6 mm).
2. Variation of Joints from Hairline: Not more than 1/16 inch (1.6 mm).

3.3 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels with fabric facing, on completion of installation, to remove dust and other foreign materials according to manufacturer's written instructions.

C. Remove surplus materials, rubbish, and debris resulting from acoustical wall panel installation, on completion of the Work, and leave areas of installation in a neat and clean condition.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure acoustical wall panels are without damage or deterioration at time of Substantial Completion.

B. Replace panels that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 098413

SECTION 099123 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes surface preparation and field painting of the following:

1. Doors and frames.
2. Interior gypsum board assemblies.
3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Related Sections include the following:

1. Division 8 Section "Steel Doors and Frames" for shop priming steel doors and frames.
2. Division 9 Section "Gypsum Board Assemblies" for surface preparation for gypsum board.
3. Divisions 23 and 26: Painting of mechanical and electrical work other than exposed duct, piping and conduit as specified herein, is specified in Divisions 23 and 26, respectively.

C. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.

1 Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment. Include painting of exposed radial duct. ‘

2. VOC compliance for products used in the work is a requirement of the work of this section.

D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include the following factory-finished components:

a. Architectural woodwork and casework.
b. Finished mechanical and electrical equipment.
c. Light fixtures.
d. Distribution cabinets.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

a. Furred areas.

b. Ceiling plenums.
c. Pipe spaces.
d. Duct shafts.

3. Finished metal surfaces include the following:

a. Anodized aluminum.
b. Stainless steel.
c. Chromium plate.

4. Operating parts include moving parts of operating equipment and the following:

a. Valve and damper operators.
b. Linkages.
c. Sensing devices.
d. Motor and fan shafts.

5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.3 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.4 SUBMITTALS

A. Product Data: For each paint system specified. Include block fillers and primers.

1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

4. Product Data For paints, including printed statement of VOC content and chemical components.

B. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.

a. Submit Samples for Architect's review of color and texture only

C. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. Source Limitations: Obtain primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

C. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
b. Other Items: Architect will designate items or areas required.

2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
3. Final approval of color selections will be based on benchmark samples.

a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.

7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.7 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F (10 and 32 deg C).

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F (7.2 and 35 deg C).

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.8 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to the Owner.

1. Quantity: Furnish the Owner with extra paint materials in the quantities indicated below:

a. Interior, Low-Luster Acrylic Finish: 1 gals of each color applied.
b. Interior Epoxy coatings: 1 gal of each color applied
c. Interior, Semigloss Acrylic Enamel: 2 gal. (7.57 L) of each color applied.
d. Interior Clear Coat: 5 gals.
e. Exterior, Semigloss Alkyd: 1 gal. of each color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the paint schedules as a standard of quality for the work

B. Manufacturers Names: The following manufacturers provide products that may be incorporated into the Work:

1. Benjamin Moore.
2. Columbia Paint
3. ICI Paints.
4. Kwal-Paints.
5. PPG.
6. Sherwin-Williams.

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
4. Floor Coatings: VOC not more than 100 g/L.
5. Flat Topcoat Paints: VOC content of not more than 50 g/L.
6. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
7. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
8. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
9. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.

C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
2. Restricted Components: Paints and coatings shall not contain any of the following:

   a. Acrolein.
   b. Acrylonitrile.
   c. Antimony.
   d. Benzene.
   e. Butyl benzyl phthalate.
   f. Cadmium.
   g. Di (2-ethylhexyl) phthalate.
   h. Di-n-butyl phthalate.
   i. Di-n-octyl phthalate.
   j. 1,2-dichlorobenzene.
   k. Diethyl phthalate.
   l. Dimethyl phthalate.
   m. Ethylbenzene.
   n. Formaldehyde.
   o. Hexavalent chromium.

p. Isophorone.
q. Lead.
r. Mercury.
s. Methyl ethyl ketone.
t. Methyl isobutyl ketone.
u. Methylene chloride.
v. Naphthalene.
w. Toluene (methylbenzene).
x. 1,1,1-trichloroethane.
y. Vinyl chloride.

D. Material Quality: Provide manufacturer's best-quality premium paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

E. Colors: Provide color selections made by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Verify that all sealants have been applied in locations that abut areas to be painted.
3. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.
2. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.

   a. Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of SSPC-SP 10.
   b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.

7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer on metal surfaces that have been shop primed and touchup painted.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.

F. Mechanical items to be painted include, but are not limited to, the following:

1. Piping, pipe hangers, and supports.
2. Heat exchangers.
3. Tanks.
4. Ductwork.
5. Insulation.
6. Motors and mechanical equipment.
7. Accessory items.

G. Electrical items to be painted include, but are not limited to, the following:

1. Conduit and fittings.
2. Switchgear.
3. Panelboards.

H. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

I. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

J. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:

1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
2. The testing agency will perform appropriate tests for the following characteristics as required by the Owner:

   a. Quantitative material analysis.
   b. Abrasion resistance.
   c. Apparent reflectivity.
   d. Flexibility.
   e. Washability.
   f. Absorption.
   g. Accelerated weathering.
   h. Dry opacity.
   i. Accelerated yellowness.
   j. Recoating.
   k. Skinning.
   l. Color retention.
   m. Alkali and mildew resistance.

3. The Owner may direct the Contractor to stop painting if test results show material being used does not comply with specified requirements. The Contractor shall remove non-complying paint from the site, pay for testing, and repaint surfaces previously coated with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces if, on repainting with specified paint, the 2 coatings are incompatible.

3.5 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.6 PROTECTION

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

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 INTERIOR PAINT SCHEDULE

A. Gypsum Board (Walls and Ceilings):

1. High-Performance Acrylic Latex System: MPI INT 9.2B.

a. Prime Coat: MPI #50, Interior Latex Primer Sealer.
1) Provide product with max VOC content of 200 g/L

b. Intermediate Coat: Interior W.B. Light Industrial Coating matching topcoat.
c. Topcoat: MPI #151, Interior W.B. Light Industrial Coating, MPI Gloss Level 3.
1) Provide product with max VOC content of 150 g/L

B. Ferrous Metal – door Frames

1. Alkyd System: MPI INT 5.1E.

a. Prime Coat: MPI #79, Alkyd Anti-Corrosive Metal Primer.
1) Provide product with max VOC content of 200 g/L

a. Intermediate Coat: Alkyd matching topcoat.
b. Topcoat: MPI #47, Interior alkyd, Semi-Gloss, MPI Gloss Level 5.
1) Provide product with max VOC content of 150 g/L

C. Galvanized-Metal Substrates (exposed structural framing and deck, radial ducts

Provide surface prep of solvent cleaning and testing for chromate passivation, and/or recommended primer for galvanized surfaces as recommended by manufacturer.

1. Waterborne Dry Fall: INT 5.3H.

a. Prime Coat: As recommended by manufacturer – test for oiled surfaces
b. Topcoat: MPI #133, Dry-Fall for Galvanized Steel (water based), applied at 1.5 mil dry film thickness.
1) Provide product with max VOC content of 150 g/L

D Natural-Finish Woodwork: Provide the following natural finishes over new, interior woodwork that is not factory finished – if indicated:

Alkyd-Based, Satin-Varnish Finish: 2 finish coats of an alkyd-based, clear-satin varnish over a sanding sealer.

1. Sealer Coat: Clear sanding sealer applied at spreading rate recommended by the manufacturer.

Dulux Paint; 1902-0000 WoodPride Interior Satin Polyurethane Varnish.
Kwal Paint; 4048 Woodkraft Sealer/Finish Satin.
Sherwin-Williams; Wood Classics Fast Dry Sanding Sealer B26V43.

2. First and Second Finish Coats: Alkyd-based or polyurethane varnish, as recommended by the manufacturer, applied at spreading rate recommended by the manufacturer.

Dulux Paint; 1902-0000 WoodPride Interior Satin Polyurethane Varnish.
Kwal Paint; 4039 Woodkraft Satin Varnish.
Sherwin-Williams; Wood Classics Fast Dry Oil Varnish, Satin A66-300 Series

END OF SECTION 099123

SECTION 115213 - PROJECTION SCREEN

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the 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. Front-projection screen – Electrically operated

B. Related Sections include the following:

1. Division 6 Section "Rough Carpentry" for wood blocking for screen installations.
2. Division 26 Sections for electrical wiring, connections, and installation of remote-control switches for electrically operated projection screen.

1.3 DEFINITIONS

A. Gain: Ratio of light reflected from or refracted by screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per FS GG-S-00172D(1).

B. Half-Gain Angle: The angle, measured from the axis of the screen surface, to the most central position on perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

1.4 SUBMITTALS

A. Product Data: For type of screen specified.

B. Shop Drawings: Show layout of projection screen. Include the following:

1. Location of screen centerline relative to ends of screen case.
2. Location of wiring connections.
3. Location of seams in drop surface.
4. Anchorage details.
5. Details of juncture of exposed surfaces with adjacent finishes.
6. Accessories.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain screen as a complete unit, including necessary mounting hardware and accessories.

B. Coordination of Work: Coordinate layout and installation of projection screen with other construction supported by, or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system, and partitions.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver projection screen until building is enclosed, other construction within spaces where screens will be installed is substantially complete, and installation of screens is ready to begin.

PART 2 - PRODUCTS

2.1 FRONT-PROJECTION SCREEN

A. Material and Viewing Surface of Front-Projection Screen: Provide screen manufactured from mildew- and flame-resistant fabric of type indicated for each type of screen specified and complying with the following requirements:

1. Matte-white viewing surface with gain characteristics complying with FS GG-S-00172D(1) for Type A screen surface.

2. Material: Vinyl-coated glass-fiber fabric.
3. Mildew Resistance: Provide mildew-resistant screen fabrics as determined by FS 191A/5760.
4. Fire-Test-Response Characteristics: Provide projection-screen fabrics identical to materials that have been tested for flame resistance according to both small- and large-scale tests of NFPA 701.
5. Seams: Where length of screen indicated exceeds maximum length produced without seams in fabric specified, provide screen with horizontal seam placed as follows:

   a. At top of screen at juncture between extra drop length and viewing surface. Provide 3 foot drop of black material.
6. Edge Treatment: Black masking borders.

7. Size of Viewing Surface: 10 x 10 minimum unless otherwise shown on drawings – Elect operated

B. Electrically Operated Screen, General: Provide manufacturer's standard UL-labeled units consisting of case, screen, motor, controls, mounting accessories, and other components necessary for a complete installation. Remotely control operation of each screen to comply with the following:

1. Single-Station Control: 3-position control switch key operated with metal device box and cover plate for flush wall mounting and for connection to 120-V, ac power supply.

2. Motor: Provide end-mounted motor.
3. End-Mounted Motor: Instant-reversing, gear-drive motor of size and capacity recommended by screen manufacturer with permanently lubricated ball bearings, automatic thermal-overload protection, preset limit switches to automatically stop screen in up and down positions, and positive-stop action to prevent coasting. Locate motor in its own compartment as follows:

4. Screen Mounting: Top edge securely anchored to rigid metal roller and bottom edge formed into a pocket holding a 3/8-inch- (9.5-mm-) diameter, metal rod with ends of rod protected by plastic caps.

   a. Roller for end-mounted motor supported by self-aligning bearings in brackets.

C. Electrically Operated Screen without Ceiling Closure: Units designed and fabricated for recessed, surface, or suspended installation with bottom of case entirely or partially open under screen compartment, to allow lowering and raising of screen, but closed under motor compartment, and as follows:

1. Screen Case: Wood sides and top with metal-lined motor compartment, factory primed and constructed as follows:

   a. Provide single or double top as standard with manufacturer.

D. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. Matte-White Viewing Surfaces:

   a. Matte White; Bretford Manufacturing, Inc.
   b. Matte White; Da-Lite Screen Co., Inc.
   c. Fiberglass Matte White; Draper Shade & Screen Co., Inc.

2. Electrically Operated Screens without Ceiling Closure, End-Mounted Motor:
   a. Series 950; Bretford Manufacturing, Inc.
   b. Senior Electrol; Da-Lite Screen Co., Inc.
   c. Rolleramic; Draper Shade & Screen Co., Inc.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install projection screens at locations indicated to comply with screen manufacturer's written instructions.

B. Install front-projection screen with screen case in position and relationship to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.

1. Test electrically operated units to verify that screen, controls, limit switches, closure, and other operating components are in optimum functioning condition.

3.2 PROTECTING AND CLEANING

A. Protect projection screen after installation from damage during construction. If damage occurs despite such protection, remove and replace damaged components or entire unit as required to provide unit in its original, undamaged condition.

END OF SECTION 115213

SECTION 126100 - FIXED AUDIENCE SEATING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes:

1. Auditorium Seating: Fixed audience seating with the following:

   a. Self-rising seat mechanism.
   b. Pedestal mounting.
   c. Upholstered chairs

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fixed audience seating.

B. Shop Drawings: Plans, elevations, and sections through rows showing seating layout; row-lettering and chair-numbering scheme; chair widths; accessories, including locations of left and right tablet arms; accessibility provisions; aisle widths; and attachments to other Work.

C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of finishes, colors, textures, and patterns available for each exposed material.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below and of same thickness and material indicated for the Work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. Upholstery Fabric: Full-width Sample, not less than 36 inches (900 mm) long, with fabric treatments applied. Show complete pattern repeat. Mark top and right side.
2. Molded Plastic: Manufacturer's standard-size unit, not less than 3 inches (75 mm) square.
3. Baked-on Coating Finishes: Manufacturer's standard-size unit, not less than 3 inches (75 mm) square.
4. Plastic Laminate: Manufacturer's standard-size unit, not less than 3 inches (75 mm) square.
5. Wood and Plywood Materials and Finishes: Manufacturer's standard-size unit, not less than 3 inches (75 mm) square.
6. Row-Letter and Chair-Number Plates: Full-size units with letters and numbers marked.

E. Maintenance Data: For fixed audience seating to include in maintenance manuals specified in Division 1. Include the following:

1. Methods for maintaining upholstery fabric.
2. Precautions for cleaning materials and methods that could be detrimental to seating finishes and performance.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

B. Fire-Test-Response Characteristics of Upholstered Chairs:

1. Padding: Comply with California Technical Bulletin 117 or similar requirements

C. Source Limitations: Obtain each type of seating required, including accessories and mounting components, through one source from a single manufacturer.

1. Upholstery Fabric: Obtain fabric of a single dye lot for each color and pattern of fabric required.

D. Mockups: Before installing seating, install mockups for each type of seating required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Install mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Install mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Obtain Architect's approval of mockups before starting installation.
4. Maintain mockups during installation in an undisturbed condition as a standard for judging the completed Work.
5. Mockups will be installed to judge row spacing and seating alignment.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not install seating until space is enclosed and weatherproof; wet work in space is complete and dry; finishes, including painting, are complete; and work above ceilings is complete. Do not install seating until ambient temperature and humidity conditions are continuously maintained at the levels anticipated for final occupancy.

B. Field Measurements: Verify seating layout by field measurements before seating fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating seating without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.6 EXTRA MATERIALS

A. Furnish extra materials from the same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Chair Seats and Backs: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type and size of chair seat and back.
2. Upholstered, Slip-on Cushions: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type and size of cushion.
3. Armrests: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type of armrest.

PART 2 - PRODUCTS

2.1 MATERIALS AND FINISHES

A. Steel: ASTM A 36/A 36M plates, shapes, and bars; ASTM A 570/A 570M hot-rolled sheet and strip; or ASTM A 620/A 620M cold-rolled sheet, finished with manufacturer's standard baked-on coating.

1. Color: As selected by Architect.

B. Cast Iron: ASTM A 48/A 48M, Class 25 (Class 175), gray iron castings free of blow holes and hot checks with parting lines ground smooth.

C. Medium-Density Fiberboard: ANSI A208.2, Grade MD.

D. Fabric: Olefin or solution dyed nylon of premium line in COM.

1. Weight: 18 oz./linear yd.
2. Color and Pattern: As selected by Architect.

E. Upholstery Padding: Flexible, cellular, molded or slab polyurethane foam.

F. Molded Plastic: High-density polyethylene, blow or injection molded.

1. Color: As selected by Architect from manufacturer’s full range.

2.2 FIXED AUDIENCE SEATING (AUDITORIUM)

A. Subject to compliance with requirements, provide products Available under state contract by the following:

1. American Seating Co. - Spirit Chair.

B. Design: 16 degree back angle, 33.5 inch high backs.

C. Chair Mounting:

1. Pedestal: Floor attached .
2. End Panels: Steel or cast iron, as standard with manufacturer.

D. Fabric Upholstered Chairs:

1. Backs:

a. Molded plastic back with upholstered 3 inch foam padding.

2. Seats: Two part and as follows:

a. Padding Thickness: Minimum 3 inches (76 mm) at front and rear edge.
b. Seat Underside: Molded plastic.

E. Back Pitch: Fixed.

F. Self-Rising Seat Mechanism: Gravity actuated, three-quarter fold minimum.

G. Armrests: Plastic.

H. Row-Letter and Chair-Number Plates: Manufacturer's standard.

2.3 FABRICATION

A. Floor Attachments: Fabricate to conform to floor slope, if any, while maintaining chairs at same angular relationship to vertical throughout Project.

B. Upholstery: Fabricate fabric-covered items with molded padding beneath fabric and with fabric covering free of welts, creases, stretch lines, and wrinkles. For each upholstered component, install pile and pattern run in a consistent direction.

C. Upholstered Chairs:

1. Two-Part Seats: Upper upholstered cushion with 3 inch thick formed padding over a steel inner frame and lower pan with fabric cover conforming to shape of cushion to conceal inner seat structure and hinge mechanism

D. Chair Seat Hinges: Self-lubricating, compensating type with noiseless self-rising seat mechanism passing ASTM F 851 and with positive internal stops cushioned with rubber or neoprene.

E. Armrests: Fabricated for concealed mounting and with rounded edges.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements, and other conditions affecting fixed audience seating. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install seating in locations indicated and fastened securely to substrates according to manufacturer's written installation instructions.

1. Use installation methods and fasteners that produce fixed audience seating assemblies with individual chairs capable of supporting an evenly distributed 600-lb (272-kg) static load without failure or other conditions that might impair the chair's usefulness.

B. Install seating with chair ends aligned from first to last row as shown on drawings. Modify backs and seats in varied width to optimize sightlines.

C. Install chairs in curved rows at a smooth radius.

D. Install seating so moving components operate smoothly and quietly.

3.3 ADJUSTING

A. Adjust self-rising seat mechanisms so seats in each row are aligned when in upright position.

B. Repair minor abrasions and imperfections in finishes with coating that matches factory-applied finish.

C. Replace upholstery fabric damaged during installation.

END OF SECTION 126100

SECTION 144200 - WHEELCHAIR LIFTS

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. Vertical platform screwdrive lift for wheelchair access.

B. Related Sections:
1. Division 26 Sections for electrical service to lifts, including fused disconnect switches and emergency or auxiliary power supply.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, dimensions, electrical characteristics, safety features, controls, and finishes.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.

C. Samples for Initial Selection: For surfaces and components with factory-applied color finishes.

1. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Metal Finish: Manufacturer's standard-size unit, not less than 3 inches (75 mm) square.
2. Tubular Products and Running Trim: Manufacturer's standard-size unit, 6 inches (150 mm) long.
3. Hardware: Manufacturer's standard, exposed, door-operating device.

E. Qualification Data: For qualified Installer.

F. Manufacturer Certificates: Signed by lift manufacturer certifying that runway, ramp or pit, and dimensions as shown on Drawings and that electrical service as shown and specified are adequate for lift being provided.

G. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted use of lifts.

H. Operation and Maintenance Data: To include in operation and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Parts list with sources indicated.
2. Recommended parts inventory list.

I. Warranty: Sample of special warranty.

J. Continuing maintenance proposal.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

B. Regulatory Requirements: In addition to requirements of authorities having jurisdiction, comply with ASME A18.1, "Safety Standard for Platform Lifts and Stairway Chairlifts."

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of lifts that fail in materials or workmanship within specified warranty period.

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

1.6 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of lift Installer. Include quarterly preventive maintenance and repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper lift operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.

B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard five-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500.

C. Steel Pipe: ASTM A 53/A 53M; standard weight (Schedule 40) unless otherwise indicated or required by structural loads.

D. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, commercial steel (CS), Type B, exposed, matte finish.

E. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, commercial steel (CS), Type B, pickled.

F. Galvanized-Steel Sheet: ASTM A 653/A 653M, G90 (Z275) zinc coating,

G. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123/A 123M, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

H. Inserts: Furnish required anchorage devices for installing structural members, guide rails, machines, and other lift components.

I. Expansion Anchors: Anchor-bolt-and-sleeve assembly of material indicated below with capability to sustain a load equal to 10 times the load imposed as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

J. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

2.2 VERTICAL PLATFORM LIFTS

A. Vertical Platform Lifts: Manufacturer's standard preengineered lift systems as indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Concord Elevator Inc.
b. AmeriGlide Atlas
c. Flinchbaugh Company, Inc. (The).
d. Florlift of New Jersey, Inc.
e. Garaventa Accessibility.
f. Giant Lift Equipment Mfg. Co. Inc.
g. Inclinator Company of America.
h. Liftavator, Inc.

i. Lift-U; Division of Hogan Mfg., Inc.
j. National Wheel-O-Vator Co., Inc. (The).
k. Savaria Corporation.
l. ThyssenKrupp Access;

B. Basis of Design " Thyssen Porch Lift

C. Platform Size: 36 W by 56 L inches.

D. Rated Speed: 9-12 fpm

E. Power Supply: 115 V, 60 Hz, 20 amp.

F. Emergency Operation: Provide emergency manual operation and emergency battery power system to raise or lower units in case of malfunction or power loss.

G. Provide keyless operation at all times insuring availability of use to anyone at any time.

H. Self-Supporting Units: Support vertical loads of units only at base, with lateral support only at landing levels.

I. Platform: Expanded metal with non-skid surface flooring.

J. Ramp: Provide ramp matching platform to provide transition from lower floor to lift platform. .

1. Ramp Size: End ramps; length as required for slope.
2. Ramp Slope: Maximum 1:12.
3. Ramp Finish: Manufacturer's standard.

2.3 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.4 FINISHES

A. Steel and Galvanized-Steel Factory Finish:

1. Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard, thermosetting polyester or acrylic urethane powder coating with a cured film thickness not less than 1.5 mils (0.04 mm).
2. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, critical dimensions, and other conditions affecting performance.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Wiring Method: Conceal conductors and cables within housings of units or building construction. Do not install conduit exposed to view in finished spaces. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

B. Position sills accurately and fill space under sills solidly with nonshrink, nonmetallic grout.

C. Adjust stops for accurate stopping and leveling at each landing, within required tolerances.

D. Adjust retractable ramps to meet maximum allowable slope and change-in-elevation requirements, and to lie fully against landing surfaces.

E. Lubricate operating parts of lift, including drive mechanism, guide rails, hinges, safety devices, and hardware.

F. Test safety devices and verify smoothness of required protective enclosures and fascias

3.3 FIELD QUALITY CONTROL

A. Acceptance Testing: On completion of lift installation and before permitting use of lifts, perform acceptance tests as required and recommended by ASME A18.1 and authorities having jurisdiction.

B. Operating Test: In addition to above testing, load lifts to rated capacity and operate continuously for 30 minutes between lowest and highest landings served. Readjust stops, signal equipment, and other devices for accurate stopping and operation of system.

C. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on lifts.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lifts. Include a review of emergency systems and emergency procedures to be followed at time of operational failure and other building emergencies.

B. Check operation of lifts with Owner's personnel present and before date of Substantial Completion. Determine that operating systems and devices are functioning properly.

C. Check operation of lifts with Owner's personnel present not more than one month before end of warranty period. Determine that operating systems and devices are functioning properly.

END OF SECTION 144200

SECTION 21 1313

WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install complete wet-pipe fire sprinkler system as specified in Contract Documents.

B. Products Installed But Not Supplied Under This Section:
   1. Firestopping

1.2 REFERENCES

A. American Society For Testing And Materials:
   1. ASTM A 53-02, 'Standard Specification for Pipe, Steel and Hot-Dipped, Zinc-Coated, Welded and Seamless.'
   2. ASTM A 234-05, 'Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperature Service.'
   3. ASTM A 395-99 (2004), 'Standard Specification for Ferritic Ductile Iron Pressure-Retaining Casting for Use at Elevated Temperatures.'
   4. ASTM A 536-84 (2004), 'Standard Specification for Ductile Iron Castings.'
   5. ASTM A 795-04, 'Standard Specification for Black and Hot-Dipped -Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.'

B. American Society of Mechanical Engineers / American National Standards Institute:
   1. ASME / ANSI B 16.3-1998, 'Malleable-Iron Threaded Fittings.'
   2. ASME / ANSI B 16.4-1998, 'Gray Iron Threaded Fittings.'
   3. ASME / ANSI B 16.5-2003, ' Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24.'

C. American Water Works Association:
   1. AWWA C-606-2004, 'Joints, Grooved and Shoulder Type.'

D. National Fire Protection Association / American National Standards Institute:
   1. NFPA / ANSI 13-2002, 'Installation of Sprinkler Systems.'

1.3 SUBMITTALS

A. Shop Drawings:
   1. Size sprinkler system by one of following methods:
      a. Pipe schedule method in accordance with NFPA/ANSI 13.
      b. Hydraulic calculation design method based on water supply evaluation performed at building site.
      c. On submittals, refer to sprinkler heads by sprinkler identification or model number published in appropriate agency listing or approval. Trade names and other abbreviated designations are not acceptable
   2. Submittal Procedure:
      a. After award of Contract and before purchase of equipment, submit seven sets of shop drawings with specifications and hydraulic calculations, if pipe schedule method is not used, to Architect and two sets to local jurisdiction having authority for fire prevention for review.

b. After integrating Architect's and AHJ's comments into drawings, licensed certified fire protection engineer of record submitting fire sprinkler system design construction documents shall stamp, sign, and date each sheet of shop drawings and first page of specifications and calculations.
c. Submit stamped documents to Owner and to AHJ for fire prevention for final approval.
d. After final approval, submit four copies of approved stamped documents to Architect.
e. Failure of system to meet requirements of authority having jurisdiction shall be corrected at no additional cost to Owner.

B. Closeout:
1. Operation And Maintenance Manual Data:
a. Modify and add to requirements as follows:
1) Provide master index showing items included.
2) Provide name, address, and phone number of Architect, Architect's Fire Sprinkler Consultant, General Contractor, and Fire Protection subcontractor.
3) Provide operating instructions to include:
a) General description of fire protection system.
b) Step by step procedure to follow in putting system into operation.
4) Maintenance instructions shall include:
a) List of system components used indicating name and model of each item.
b) Manufacturer's maintenance instructions for each component installed in Project. Instructions shall include installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.
5) Include copies of approved shop drawings and copies of required warranties.
b. If system has both wet and dry segments, provide single Operations And Maintenance Manual for total Fire Suppression System.
2. Inspection Checklist:
a. Provide Owner with checklist and brief explanation of following inspections:
1) Weekly Inspection.
2) Monthly Inspection.
3) Quarterly Inspection.
4) Semi-Annual Inspection.
5) Annual Inspection.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Designer:
a. Licensed fire protection engineer or fire protection system designer certified by NICET to level three minimum and engaged in design of fire protection systems. Engineer / designer shall:
1) Design system so it can be completely drained.
2) Be responsible for overseeing preparation of shop drawings, hydraulic calculations where applicable, and system installation.
3) Make complete inspection of installation including capability of being completely drained.
4) Provide corrected record drawings to Owner with letter of acceptance.
5) Certify that installation is in accordance with Contract Documents.
2. Installer: Licensed by jurisdiction having authority over installed fire protection systems for location of Project. Furnish verified list of similar projects installed during past 5 years minimum.

B. Requirements of Regulatory Agencies:
1. Unless noted otherwise, system shall conform to:
a. NFPA / ANSI 13-2002 'Light & Ordinary Hazard Occupancies.'
b. NFPA / ANSI 24-2002 'Service Mains and Their Appurtenances, Private.'
c. NFPA / ANSI 101-2000 'Life Safety Code.'
d. Requirements of local water department and local authority having jurisdiction for fire protection.

e. Applicable rules, regulations, laws, and ordinances.
f. Underwriter's Laboratories Publication, 'Fire Protection Equipment Directory', current edition at time of Pre-Bid Meeting.
g. Comply with backflow prevention requirements and, if required, include device in hydraulic calculations.

1.5 OWNER'S INSTRUCTIONS

A. Instruction Sessions:
1. Instruct Owner's personnel in operation and maintenance of system utilizing Operation And Maintenance Manual when so doing. Minimum instruction period shall be four hours.
2. Instruction sessions shall occur after Substantial Completion inspection when system is properly working and before final payment is made.

B. Posted System Diagram:
1. Provide single, color-coded floor plan diagram showing total system. Color dry pipe system elements BLUE and wet pipe system elements RED. Indicate locations of dry pipe system drains and inspector test valve station.
2. Include following information on diagram sheet:
   a. Explanation of principles behind operation of dry pipe system alarm valve.
   b. Step by step shut down procedure.
   c. Step by step system drainage procedure.
   d. Step by step start-up procedure.
   e. Step by step procedure for protection of system from freezing.
3. Laminate diagram with plastic and mat or frame suitable for hanging near riser.

1.6 MAINTENANCE

A. Extra Materials: Furnish twelve spare heads of each type and temperature rating used, properly boxed with sprinkler head wrench.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. General: Use only domestically manufactured pipe, pipe fittings, valves, sprinkler heads, and other components.

B. Pipe
1. Schedule 40 Welded Steel
   a. Exterior, Above Ground: Schedule 40 hot-dip galvanized welded steel meeting requirements of ASTM A 53 or ASTM A 795.
   b. Interior, Above Ground: Schedule 40 black welded steel meeting requirements of ASTM A 53 or ASTM A 795.
2. Schedule 40 Mechanical Grooved Pipe And Fittings: Mechanical grooved pipe, couplings, and fittings by Victaulic.
3. Grooved Coupling Gaskets:
   a. Quality Standard:
      1) Victaulic ‘E’ EPDM-Type A, Grade, temperature rated minus 30 deg F to 150 deg F.

C. Fittings:
1. Usage:
   a. 2 inches And Smaller: Welded, screwed, flanged, or roll grooved coupling system. At Contractor’s option, piping 1-1/4 inches and smaller, may be Victaulic FIT® locking lug fittings with pressure responsive gasket. For use with schedule 40 carbon steel pipe.

b. 2-1/2 inches And Larger: Welded, flanged, or roll grooved coupling system.

2. Types And Quality:
   a. Screwed:
      1) Cast iron meeting requirements of ANSI B 16.4 or ductile iron meeting requirements of ANSI B 16.3 and ASTM A 536, Grade 65-45-12.
      2) Threaded fittings and pipe shall have threads cut to ANSI B1.20.1.
         a) Do not extend pipe into fittings to reduce waterway.
         b) Ream pipe after cutting to remove burrs and fins.
   b. Flanged: Steel meeting requirements of ANSI B16.5.
   c. Welded:
      1) Carbon steel meeting requirements of ASTM A 234.
      2) Weld pipe using methods complying with AWS D10.9, level AR-3. Welding procedures and performance of welders shall comply with ASW D10.9, level AR3.
   d. Roll Grooved Pipe Coupling System:
      1) Ductile iron meeting requirements of ASTM A 395 and ASTM A 536, and UL listed and FM approved.
      2) Couplings:
         a) UL listed and approved.
         b) Rigid:
            (1) Cast to provide rigidity for support and hanging in accordance with NFPA-13.
            (2) Approved Products.
               (a) Gruvlok 7401.
               (b) Tyco (Grinnell) 772
               (c) Victaulic Style 005.
         c) Flexible:
            (1) Use in locations where vibration attenuation and stress relief are required.
            (2) Approved Products.
               (a) Gruvlok 7000.
               (b) Tyco (Grinnell) 705
               (a) Victaulic Style 75.
         d) Flange Adapters:
            (1) Class 125 or 150.
            (2) Approved Products.
               (a) Gruvlok 70R.
               (b) Tyco (Grinnell) 71
               (a) Victaulic Style 744.
      3) Grooved products used on Project shall be from same manufacturer. Grooving tools shall be as recommended by manufacturer of grooved products.

D. Hangers, Rods, And Inserts
   1. Galvanized, unless specified otherwise, and UL approved for service intended.
   2. Standard:
      a. Hangers and accessories shall be Anvil numbers specified or equals by B-Line.
      b. Clevis Hangers: Equal to Anvil Fig 65.
      c. Roller Assembly: Equal to Anvil Fig 181.
      d. Riser Clamps: Equal to Anvil Fig. 40.
   3. Concrete Inserts:
      a. Equal to Anvil Fig 282. Suitable for special nuts size 3/8 inch through 7/8 inch, with yoke to receive concrete reinforcing rods, and with malleable iron lugs for attaching to forms.
      b. Continuous Inserts:
         1) Quality Standard.
            (1) Unistrut P-3246 through P-3270.
   4. Steel Deck Bracket:
      a. Quality Standard.
         1) Unistrut P1000 with clamp nut, minimum 6 inch length.

E. Valves:
   1. Butterfly Valves:
      a. UL / FM approved.
      b. Indicating type.

c. Approved Products.
    1) Milwaukee:
        a) Model BB-SC502 threaded ends with tamper switch One to 2 inches.
        b) Model BBVSC502 Grooved ends with tamper switch 2 to 2-1/2 inches.
    2) Nibco:
        a) Model WD3510-8 Wafer type with valve tamper switch.
        b) Model GD4765-8N Grooved type with valve tamper switch, 2-1/2 to 8 inches.
    3) Tyco (Grinnell):
        a) Model TFP1515 wafer.
        b) Model TFP1510 Grooved.
    4) Victaulic: Series 705W Grooved end type with internal supv. switches.

2. Gate Valves:
    a. UL / FM approved.
    b. Outside Screw and Yoke Type (O.S.&Y).
    c. Class 150 psi.
    d. Approved Products.
        1) Nibco:
            a) T-1040 with Threaded Ends 1/2 to 2 inches.
            b) F-637-31 Flanged Ends.
        2) Mueller: R-2360-6 Flanged Ends.
        3) Victaulic: Series 771 Grooved Ends

3. Ball Valves:
    a. UL / FM approved.
    b. Valve tamper switch.
    c. Approved Products.
        1) Milwaukee: BB-SC502 with threaded ends.
        2) Nibco: KT-505 with threaded ends.
        3) Nibco: KG-505 with grooved ends.
        4) Victaulic: Series 728 with grooved or threaded ends.

4. Swing Check Valves:
    a. 1/2 to 3 inch horizontal check.
        1) Regrinding type.
        2) Renewable disk.
        3) Bronze Class 125 with threaded ends.
        4) Approved Products.
            a) Nibco: KT-403-W.
            b) Victaulic: Series 712.
    b. 2 to 4 inch Horizontal check:
        1) Grooved ends..
        2) Ductile iron body.
        3) Rated 300 psi.
        4) Approved Products.
            a) Tyco (Grinnell): CV-1F Grooved ends.
            b) Victaulic: Series 712.
            c) Viking: D-1 Grooved ends.
    c. 2-1/2 to 12 inch Horizontal check:
        1) Bolted bonnet.
        2) Raised face flanges.
        3) Bronze mounted with ductile iron body.
        4) 125 lb Class A.
        5) Approved Products.
            a) Nibco: F-938-31.
            b) Mueller: A-2120-6.
            c) Tyco (Grinnell) CV-2 grooved and flanged.
            d) Viking: G-1 grooved and flanged

5. Wafer Type Check Valves:
    a. 4 to 8 inch cast iron body.
    b. 175 psi minimum working pressure.
    c. Rubber Seat.
    d. Approved Products.

1) Nibco: KW-900-W.
2) Mueller: A-2102.

6. Grooved-End Check Valves:
   a. UL listed and FM approved to 250 psi maximum operating pressure.
   b. 2-1/2 to 12 inch ductile iron body.
   c. Disc And Seat:
      1) 2-1/2 And 3 Inch : Aluminum bronze disc with mounted elastomer seal and PPS (polyphenylene sulfide) coated seat.
      2) 4 Inch And Larger: Elastomer encapsulated ductile iron disc with welded in nickel seat.
   d. Approved Products.
      1) Nibco: KG-900-W grooved ends
      2) Victaulic Series 717.
7. Alarm Check Valves:
   a. Approved Products.
      1) Reliable: E with gauges and drain.
      2) Tyco (Grinnell): Model AV-1-300.
      3) Victaulic: Series 751 with gauges and drain.
      4) Viking: J-1 with gauges and drain.
8. Backflow Preventer: Make and model shown on Drawings or as required by local codes.
9. Retard Chamber:
   a. Self-draining.
   b. Approved Products.
      1) Reliable: E-1.
      2) Victaulic: Series 752.
      3) Viking: C-1.
10. Inspector's Test Valve:
   a. Bronze body with threaded or grooved ends.
   b. Combination sight glass / orifice.
   c. Approved Products.
      1) Tyco (Grinnell): Model F350.
      2) Victaulic: Testmaster Alarm Test Module Style 720.

F. Sprinkler Heads:
1. Concealed Pendant:
   a. Adjustable cover.
   b. Coordinate concealed cover finish with Architect.
   c. Acceptable Products:
      1) Wet Pendant, Flat Profile:
         a) Reliable: F4FR.
         b) Victaulic: Model 3810.
         c) Viking: Model VK462.
         d) Tyco (Grinnell): Model RF11.
         e) Equal as approved by Architect before bidding.
2. Horizontal Sidewall Sprinkler:
   a. UL listed and approved.
   b. Recess adjustable.
   c. Where guards are required, use chrome plated sprinkler guards that are listed, that are approved by Sprinkler Manufacturer for use with head, and that are supplied by Sprinkler Manufacturer.
   d. Acceptable Products:
      1) Wet System:
         a) Reliable: F1FR.
         b) Tyco (Grinnell): Model TY3331.
         c) Victualic: Model V2710.
         d) Viking: VK305.
         e) Equal as approved by Architect before bidding. See Section 01 6200.
3. Attic Sprinklers, Upright:
   a. UL listed and approved.
   b. Approved for use in roof structures, combustible and non-combustible, with ceiling below.
   c. Approved Products.

1) Tyco: BB, SD, or HIP.

4. Pendant Sprinklers:
   a. UL listed and approved.
   b. Where guards or escutcheons are required, use chrome plated sprinkler guards and escutcheons that are listed, that are approved by Sprinkler Manufacturer for use with head, and that are supplied by Sprinkler Manufacturer.
   c. Acceptable Products:
      1) Reliable: F1FR.
      2) Tyco: TY3231.
      3) Victaulic: Model V2726.
      4) Viking: VK302.
      5) Equal as approved by Architect before bidding.
5. Upright Sprinklers:
   a. UL listed and approved.
   b. Acceptable Products:
      1) Reliable: F1FR.
      2) Tyco: TY3331.
      3) Victaulic: Models V2704.
      4) Viking: VK300.
      5) Equal as approved by Architect before bidding.

G. Water Flow Alarm:
1. Mechanical Flow Alarm: Water Gong.
   a. UL listed and approved.
   b. Approved Products.
      1) Reliable: C.
      2) System Sensor: SSV 120 or SSM 24 Series.
      3) Tyco: WMA-1.
      4) Victaulic: Series 760.
      5) Viking: F-2.

H. Pressure Gauges:
1. Mechanical Water Pressure Gauges:
   a. UL listed and approved.
   b. 3-1/2 inch diameter dial.
   c. 0 to 300 psi in 5 psi increments.
   d. Approved Products.
      1) Reliable: UA.
      2) HO Trerice: 500.
      3) Viking: 01124A.

I. Waterflow Detectors:
1. Electrical Water Flow Switch:
   a. UL / FM approved.
   b. Switch activates with flow of 10 gpm or more.
   c. Two single pole double throw switches.
   d. Automatic reset.
   e. Approved Products.
      1) Potter-Roemer: Model 6201-6208.
      2) System Sensor: WFD.
      3) Viking: VSR-F and VS-SP.

J. Tamper Switch
1. Weather and Tamper Resistant Switch.
   a. UL listed and FM approved.
   b. Two Single Pole Double Throw Switches, contact rating 5 amps at 120 VAC.
   c. Removal of switch or cover shall activate trouble signal.
   d. Alarm shall activate between first and second revolution of valve wheel.
   e. Mount to monitor valve and not interfere with operation.

f. Shall operate in horizontal and vertical position.
g. Approved Products.
1) Control Valves, Butterfly Valves, Post Indicator Valves:
a) Federal: Model PIV
b) Potter-Roemer: Model 6223
c) Notifier: Model PIBV2
d) System Sensor: Model PIBV2.
2) O.S. & Y Valves:
a) Federal: Model OSY
b) Notifier: Model OSY2
c) Potter-Roemer: Model 6220
d) System Sensor: Model OSY2

K. Automatic Drain Device:
1. Straight Design, 3/4 inch.
2. Approved Products.
a. Nibco: Ball-Drip.
b. Potter-Roemer: Figure 5982.
c. Viking: B-1

L. Fire Department Connection:
1. Two-way Inlet with single clapper.
2. Polished Brass.
3. Quality Standards.
a. Round 'AUTO SPKR' identification plate, polished brass by Potter-Roemer Fig. 5962.
4. Approved Products.
a. Croker: 6405-PB.
b. Potter-Roemer: Fig. 5710.

M. Post Indicating Valve:
1. Polished brass.
2. Supervisory switch.
3. Approved Products.
a. As required by Authority Having Jurisdiction (AHJ).

N. Propylene Glycol:
1. Approved Product.
a. Dow Frost by Dow Chemical.

2.2 MANUFACTURERS

A. Contact Information:
1. Anvil International, Portsmouth, NH www.anvilintl.com.
2. Croker Corp, Elmsford, NY www.croker.com.
3. Dow Chemical, Midland, MI www.dow.com.
4. Gruvlock by Anvil International, Portsmouth, NH www.anvilintl.com.
5. HO Trerice Company, Oak Park, MI www.hotco.com
6. Milwaukee Valve Co, Milwaukee, WI www.milwaukeevalve.com.
7. Mueller Company, Decatur, IL www.muellerflo.com.
8. Nibco Inc, Elkhart, IN www.nibco.com.
9. Potter-Roemer, Cerritos, CA www.potterroemer.com.
10. Reliable Automatic Sprinkler Co, Mount Vernon, NY www.reliablesprinkler.com.
11. System Sensor, St Charles, IL www.systemsensor.com.
12. TYCO Fire & Building Products, Oak Creek, WI www.tyco-fire.com.
13. Victualic Company of America, Easton, PA or Victualic Company of Canada, Rexdale, ON www.victaulic.com.
14. Viking Corp, Hastings, MI www.vikingcorp.com.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Drawings:
   1. Fire Protection Drawings show general arrangement of piping. Follow as closely as actual building construction and work of other trades will permit. Install system so it can be completely drained as designed.
   2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These Drawings take precedence over Fire Protection Drawings.
   3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions and to enable system to be completely drained.

3.2 INSTALLATION

A. Interface With Other Work: Provide inserts for attaching hangers in concrete floor construction at time floors are placed.

B. Connect system to flange provided under other sections.

C. Install sprinkler systems in accordance with requirements of latest editions of NFPA 13, FM Global, and as specified below:
   1. Install to enable complete drainage of system. Drain trapped piping in accordance with NFPA 13, Paragraph 8.15.2.5 and 8.16.4.1.
      a. Install main drain from riser.
      b. Install auxiliary drains in low points of piping system and inspector's test valve drain to mechanical pad located outside building unless otherwise directed by Architect.
   2. Install piping system so it will not be exposed to freezing temperatures.
   3. Do not use dropped, damaged, or used sprinkler heads.
   4. Install sprinkler lines concealed.
   5. Install tamper switches and flow detectors where located by Architect.
   6. Install automatic ball drip device in lowest point of piping to fire department connection and drain to floor drain or to exterior of building.
   7. Brace and support system to meet seismic zone requirements for building site.

D. Flush system at full design flow rate for minimum five minutes. Route water to outside of building. Protect landscaping and other exterior elements from damage during flow tests.

3.3 FIELD QUALITY CONTROL

A. Site Tests:
   1. Test system according to 'Contractor's Material And Testing certificate for Above Ground Piping' NFPA-13, figure 16.1.
   2. Tests shall be witnessed by Architect and representative of local jurisdiction over fire prevention.
   3. Test blanks shall have red painted lugs protruding beyond flange to clearly indicate their presence and be numbered to assure their removal when testing is completed.

END OF SECTION

DIVISION 23: HEATING, VENTILATING, AND AIR-CONDITIONING

23 0000 HEATING, VENTILATING, AND AIR-CONDITIONING

23 0501 COMMON HVAC REQUIREMENTS
23 0529 HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
23 0553 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
23 0713 DUCT INSULATION
23 0719 HVAC PIPING INSULATION
23 0933 ELECTRIC AND ELECTRONIC CONTROL SYSTEM FOR HVAC
23 0955 DUCT TESTING, ADJUSTING, AND BALANCING
23 0957 PIPE TESTING, ADJUSTING, AND BALANCING

23 2000 HVAC PIPING AND PUMPS

23 2113 HYDRONIC PIPING
23 2114 HYDRONIC PIPING SYSTEM SPECIALTIES
23 2600 CONDENSATE DRAIN PIPING

23 3000 HVAC AIR DISTRIBUTION

23 3001 COMMON DUCT REQUIREMENTS
23 3114 LOW-PRESSURE METAL DUCTS
23 3300 AIR DUCT ACCESSORIES
23 3316 FIRE AND SMOKE DAMPERS
23 3346 FLEXIBLE DUCTS
23 3713 DIFFUSERS, REGISTERS, AND GRILLES
23 3714 LOUVERS AND VENTS

23 7000 CENTRAL HVAC EQUIPMENT

23 7313 AIR HANDLING UNITS

END OF TABLE OF CONTENTS

SECTION 23 0501

COMMON HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common requirements and procedures for HVAC systems.
   2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
   3. Interface with Testing And Balancing Agency.
   4. Furnish and install sealants relating to installation of systems installed under this Division.
   5. Furnish and install Firestop Penetration Systems for HVAC system penetrations as described in Contract Documents.
   6. Furnish and install sound, vibration, and seismic control elements.

B. Products Supplied But Not Installed Under This Section:
   1. Sleeves, inserts, and equipment for mechanical systems installed under other Sections.

C. Related Sections:

1.2 SUBMITTALS

A. Product Data:
   1. Manufacturer's catalog data for each manufactured item.
      a. Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
      b. Include name, address, and phone number of each supplier.

B. Shop Drawings:
   1. Schematic control diagrams for each separate fan system, heating system, control panel, etc. Each diagram shall show locations of all control and operational components and devices. Mark correct operating settings for each control device on these diagrams.
   2. Diagram for electrical control system showing wiring of related electrical control items such as firestats, fuses, interlocks, electrical switches, and relays. Include drawings showing electrical power requirements and connection locations.
   3. Drawing of each temperature control panel identifying components in panels and their function.
   4. Other shop drawings required by Division 23 trade Sections.

C. Closeout:
   1. Operation And Maintenance Manual Data:
      a. Modify and add to requirements as follows:
         1) At beginning of HVAC section of Operations And Maintenance Manual, provide master index showing items included.
         2) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and HVAC, Sheet Metal, Refrigeration, and Temperature Control subcontractors.
         3) Provide operating instructions to include:
            a) General description of each HVAC system.

b) Step by step procedure to follow in putting each piece of HVAC equipment into operation.
c) Provide diagrams for electrical control system showing wiring of items such as smoke detectors, fuses, interlocks, electrical switches, and relays.

4) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
a) List of HVAC equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
b) Manufacturer's maintenance instructions for each piece of HVAC equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.
c) Summary list of mechanical equipment requiring lubrication showing name of equipment, location, and type and frequency of lubrication.

5) Include copies of approved shop drawings and copies of warranties required in individual Sections of Division 23.

1.3 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
1. Perform work in accordance with applicable provisions of Gas Ordinances applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.

B. Identification:
1. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.
2. Materials shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Accept valves on site in shipping containers with labeling in place.

B. Storage:
1. In addition to requirements specified:
a. Stored material shall be readily accessible for inspection by Architect until installed.
b. Store items subject to moisture damage, such as controls, in dry, heated spaces.
c. Provide temporary protective coating on cast iron and steel valves.
d. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Handling: Protect bearings during installation. Thoroughly grease steel shafts to prevent corrosion.

1.5 WARRANTY

A. Guarantee HVAC systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

B. Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record 'start-up' date of each piece of equipment on certificate.

C. If HVAC sub-contractor with offices located more than 150 miles from Project site is used, provide service / warranty work agreement for warranty period with local HVAC sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

1.6 SYSTEM START-UP

A. Off-Season Start-up:
   1. If Substantial Completion inspection occurs during heating season, schedule spring start-up of cooling systems. If inspection occurs during cooling season, schedule autumn start-up for heating systems.
   2. Notify Owner seven days minimum before scheduled start-up.
   3. Time will be allowed to completely service, test, check, and off-season start systems. During allowed time, train Owner's representatives in operation and maintenance of system.
   4. At end of off-season start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.

B. Preparations that are to be completed before start up and operation include, but are not limited to, following:
   1. Dry out electric motors and other equipment to develop and properly maintain constant insulation resistance.
   2. Make adjustments to insure that:
      a. Equipment alignments and clearances are adjusted to allowable tolerances.
      b. Nuts and bolts and other types of anchors and fasteners are properly and securely fastened.
      c. Packed, gasketed, and other types of joints are properly made up and are tight and free from leakage.
      d. Miscellaneous alignings, tightenings, and adjustings are completed so systems are tight and free from leakage and equipment performs as intended.
   3. Motors and accessories are completely operable.
   4. Inspect and test electrical circuitry, connections, and voltages to be properly connected and free from shorts.
   5. Adjust drives for proper alignment and tension.
   6. Make certain filters in equipment for moving air are new and of specified type.
   7. Properly lubricate and run-in bearings in accordance with Manufacturer's directions and recommendations.

1.7 OWNER'S INSTRUCTIONS

A. Instruct building maintenance personnel in operation and maintenance of mechanical systems utilizing Operation And Maintenance Manual when so doing.
   1. Minimum Instruction Periods:
      a. HVAC: Four hours.
      b. Temperature Control: Two hours.
   2. Conduct instruction periods after Substantial Completion inspection when systems are properly working and before final payment is made. None of these instructional periods shall overlap another.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Pipe And Pipe Fittings: Use domestic made pipe and pipe fittings on Project. Weld-O-Let and Screw-O-Let fittings are acceptable.

B. Sleeves:

1. In Framing: Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga galvanized sheet metal two sizes larger than bare pipe or insulation on insulated pipe.
2. In Concrete And Masonry: Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.

2.2 MANUFACTURED UNITS

A. Valves: Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Inspection:
1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which mechanical work is dependent for efficiency and report work that requires correction.
2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

B. Drawings:
1. HVAC Drawings show general arrangement of piping, ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over HVAC Drawings.
3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

C. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

3.2 PREPARATION

A. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.

B. Changes Due To Equipment Selection:
1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings, if requested by Architect, showing proposed installations.
2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
3. Provide any additional motors, valves, controllers, fittings, and other additional equipment required for proper operation of system resulting from selection of equipment.
4. Be responsible for the proper location of roughing-in and connections provided under other Divisions.

3.3 INSTALLATION

A. Interface With Other Work:
   1. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and see they are properly installed.
   2. Electrical: Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
   3. Testing And Balancing:
      a. Put HVAC systems into full operation and continue their operation during each working day of testing and balancing.
      b. Make changes in pulleys, belts, fan speeds, and dampers or add dampers as required for correct balance as recommended by Testing And Balancing Agency and at no additional cost to Owner.

B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.

C. Locating Equipment:
   1. Arrange pipes, ducts, and equipment to permit ready access to valves, cocks, unions, traps, filters, starters, motors, control components, and to clear openings of doors and access panels.
   2. Adjust locations of pipes, ducts, switches, panels, and equipment to accommodate work to interferences anticipated and encountered.
   3. Install HVAC work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
   4. Determine exact route and location of each pipe and duct before fabrication.
      a. Right-Of-Way:
         1) Lines that pitch shall have right-of-way over those that do not pitch. For example, steam, steam condensate, and drains shall normally have right-of-way.
         2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
      b. Offsets, Transitions, and Changes in Direction:
         1) Make offsets, transitions, and changes in direction in pipes and ducts as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
         2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.

D. Piping:
   1. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus.
      a. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper erection of systems of piping in every respect.
      b. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings.
         1) Arrange so as to facilitate removal of tube bundles.
         2) Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
            a) Make connections of dissimilar metals with di-electric unions.
            b) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
         3) Do not use reducing bushings, street elbows, bull head tees, close nipples, or running couplings.
         4) Install piping systems so they may be easily drained. Provide drain valves at low points and manual air vents at high points in hot water heating and cooling water piping.
         5) Install piping to insure noiseless circulation.

6) Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.

c. Do not install piping in shear walls.

2. Properly make adequate provisions for expansion, contraction, slope, and anchorage.
   a. Cut piping accurately for fabrication to measurements established at site. Remove burr and cutting slag from pipes.
   b. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
   c. Make changes in direction with proper fittings.
   d. Expansion of Thermoplastic Pipe:
      1) Provide for expansion in every 30 feet of straight run.
      2) Provide 12 inch offset below roof line in each vent line penetrating roof.
3. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete floors on grade. Seal sleeves with specified sealants.
   a. Sleeves through floors shall extend 1/4 inch above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
   b. Sleeves through floors and foundation walls shall be watertight.
4. Provide spring clamp plates (escutcheons) where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.
5. Remove dirt, grease, and other foreign matter from each length of piping before installation.
   a. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
   b. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
   c. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.

E. Penetration Firestops: Install Penetration Firestop System appropriate for penetration at HVAC system penetrations through walls, ceilings, roofs, and top plates of walls.

F. Sealants:
   1. Seal openings through building exterior caused by penetrations of elements of HVAC systems.
   2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.

3.4 REPAIR / RESTORATION

A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
   1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
   2. Surface finishes shall exactly match existing finishes of same materials.

3.5 FIELD QUALITY CONTROL

A. Site Tests:
   1. Perform tests on HVAC piping systems. Furnish devices required for testing purposes.
   2. Replace material or workmanship proven defective with sound material at no additional cost to Owner. Repeat tests on new material, if requested.

3.6 CLEANING

A. Clean exposed piping, ductwork, and equipment.

B. No more than one week before Final Inspection, flush out bearings and clean other lubricated surfaces with flushing oil. Provide best quality and grade of lubricant specified by Equipment Manufacturer.

C. Replace filters in equipment for moving air with new filters of specified type no more than one week before Final Inspection.

3.7 PROTECTION

A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

B. Do not operate pieces of equipment used for moving supply air without proper air filters installed properly in system.

C. After start-up, continue necessary lubrication and be responsible for damage to bearings while equipment is being operated up to Substantial Completion.

END OF SECTION

SECTION 23 0529

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common hanger and support requirements and procedures for HVAC systems.

B. Related Sections:
   1. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.

1.2 SUBMITTALS

A. Product Data:
   1. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Hangers, Rods, And Inserts
   1. Galvanized and UL approved for service intended.
   2. Hangers and accessories shall be Anvil numbers specified or equals approved by Architect before installation.
      a. Support horizontal piping from clevis hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
      b. Support insulated pipes with clevis hanger equal to Anvil Fig 260 or roller assembly equal to Anvil Fig 171 with an insulation protection shield equal to Anvil Fig 167. Gauge and length of shield shall be according to Anvil design data.
      c. Except uninsulated copper pipes, support uninsulated pipes from clevis hanger equal to Anvil Fig 260. Support uninsulated copper pipe from hanger equal to Anvil Fig CT-65 copper plated hangers and otherwise fully suitable for use with copper tubing.
   3. Support rods for single pipe shall be in accordance with following table:

Rod Diameter	Pipe Size
3/8 inch	2 inches and smaller
1/2 inch	2-1/2 to 3-1/2 inches
5/8 inch	4 to 5 inches
3/4 inch	6 inches
7/8 inch	8 to 12 inches

   4. Support rods for multiple pipe supported on steel angle trapeze hangers shall be in accordance with following table:

Rods		Number of Pipes per Hanger for Each Pipe Size						
Number	Diameter	2 Inch	2.5 Inch	3 Inch	4 Inch	5 Inch	6 Inch	8 Inch
2	3/8 Inch	Two	0	0	0	0	0	0
2	1/2 Inch	Three	Three	Two	0	0	0	0
2	5/8 Inch	Six	Four	Three	Two	0	0	0
2	5/8 Inch	Nine	Seven	Five	Three	Two	Two	0

2	5/8 Inch	Twelve	Nine	Seven	Five	Three	Two	Two

a. Size trapeze angles so bending stress is less than 10,000 psi .

5. Riser Clamps For Vertical Piping: Equal to Anvil Figure 261.
6. Concrete Inserts:
   a. Equal to Anvil Figure 282.
   b. Suitable for special nuts size 3/8 inch through 7/8 inch with yoke to receive concrete reinforcing rods, and with malleable iron lugs for attaching to forms.
   c. Continuous inserts shall be Equal to Unistrut P-3200 series.
7. Steel Deck Bracket: Equal to Unistrut P1000 with clamp nut, minimum 6 inch length.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work:
   1. Furnish inserts for attaching hangers that are to be cast in concrete floor construction to Division 03 at time floors are poured.

B. Piping:
   1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
      a. Except for underground pipe, suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.
      b. Supports For Horizontal Piping:
         1) Support metal piping at 96 inches mm on center maximum for pipe 1-1/4 inches or larger and 72 inches on center maximum for pipe 1-1/8 inch or less.
         2) Support thermoplastic pipe at 48 inches on center maximum.
         3) Provide support at each elbow. Install additional support as required.
      c. Supports for Vertical Piping:
         1) Place riser clamps at each floor or ceiling level.
         2) Securely support clamps by structural members, which in turn are supported directly from building structure.
         3) Provide clamps as necessary to brace pipe to wall.
      d. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.
      e. Expansion of Thermoplastic Pipe:
         1) Provide for expansion in every 30 feet of straight run.
         2) Provide 12 inch offset below roof line in each vent line penetrating roof.

END OF SECTION

SECTION 23 0553

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install identification of HVAC equipment and piping as described in Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Paint:
   1. Paints specified are from Pittsburgh Paint & Glass (PPG), Pittsburgh, PA www.ppgaf.com.
   2. One Coat Primer:
      a. 6-2 Quick Drying Latex Primer Sealer over fabric covers.
      b. 6-205 Metal Primer under dark color paint.
      c. 6-6 Metal Primer under light color paint.
   3. Finish Coats: Two coats 53 Line Acrylic Enamel.
   4. Quality Standard. See Section 01 6200.
      a. Paint of equal quality from other Manufacturers may be used. Maintain specified colors, shades, and contrasts.

2.2 MANUFACTURED UNITS

A. Labels:
   1. Equipment Identification: Black formica, with white reveal when engraved. Lettering to be 3/16 inch high minimum.

PART 3 - EXECUTION

3.1 APPLICATION

A. Labels:
   1. Identify following items with specified labels fastened to equipment with screws:
      a. Thermostats and control panels in mechanical spaces.
      b. Air handling units.
      c. Hydronic system components.
   2. Engrave following data from Equipment Schedules on Drawings onto labels:
      a. Equipment mark.
      b. Area served.
      c. Thermostat zone number, when different from equipment mark.
      d. Panel and breaker from which unit is powered.

B. Painting:
   1. Leave equipment in like-new appearance.

2. Only painted legends, directional arrows, and color bands are acceptable.
3. Locate identifying legends, directional arrows, and color bands at following points on exposed piping of each piping system:
   a. Adjacent to each item of equipment.
   b. At point of entry and exit where piping goes through wall.
   c. On each riser and junction.
   d. Every 25 feet on long continuous lines.
   e. Stenciled symbols shall be one inch high and black.

3.2 SCHEDULES

A. Schedule of Abbreviations for Pipe Stencils and Equipment Identification and Band Colors for Pipe Identification:
   1. Apply stenciled symbols and continuous painting as follows:

Pipe Type	Pipe/Stencil Color	Symbol
Heating Supply Water	Red	HWS
Heating Return Water	Red	HWR
Chilled Supply Water	Blue	CWS
Chilled Return Water	Blue	CWR

END OF SECTION

SECTION 23 0713

DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install thermal wrap duct insulation as described in Contract Documents.

B. Related Work:
   1. Section 23 3114: Low-Pressure Metal Ducts.
   2. Section 23 3300: Acoustic duct liner.

1.2 REFERENCES

A. American Society for Testing and Materials:
   1. ASTM B 209-01, 'Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.'

PART 2 - PRODUCTS

2.1 MATERIALS

A. Thermal Wrap Duct Insulation:
   1. 1-1/2 inch thick fiberglass with factory-laminated, reinforced aluminum foil scrim kraft facing and density of one lb/ per cu ft.
   2. Thermal Conductivity: 0.27 BTU in/HR SF deg F at 75 deg F maximum.
   3. Acceptable Products:
      a. Type 100 standard duct insulation by Certainteed St Gobain, Valley Forge, PA www.certainteed.com.
      b. Microlite FSK by Johns-Manville, Denver, CO www.jm.com.
      c. Duct Wrap FSK by Knauf Fiber Glass, Shelbyville, IN www.knauffiberglass.com.
      d. Alley Wrap FSK by Manson Insulation Inc, Brossard, QB www.isolationmanson.com.
      e. FRK by Owens-Corning, Toledo, OH www.owenscorning.com.
      f. Equal as approved by Architect before bidding.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Thermal Wrap Duct Insulation:
   1. Install insulation as follows:
      a. On outside air ducts within building insulation envelope.
      b. On other air ducts where indicated on Drawings.
   2. Wrap insulation tightly on ductwork with circumferential joints butted and longitudinal joints overlapped minimum 2 inches.
      a. Do not compress insulation except in areas of structural interference. Minimum thickness at corners shall be one inch thick.
      b. Remove insulation from lap before stapling.

c. Staple seams at approximately 16 inches on center with outward clenching staples.
d. Seal seams with foil vapor barrier tape or vapor barrier mastic. Seal penetrations of facing to provide vapor tight system.

B. Insulate outside of ceiling diffusers, diffuser drops, and duct silencers same as ductwork.

END OF SECTION

SECTION 23 0719

HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install insulation on above ground refrigerant and hot water heating piping and fittings as described in Contract Documents.

B. Related Sections:
   1. Section 23 0501: General Mechanical Requirements

1.2 DELIVERY, STORAGE, AND HANDLING

A. Keep materials and work dry and free from damage.

B. Replace wet or damaged materials at no additional cost to Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hydronic Piping System:
   1. Thickness:

Pipe Size, Outside Diameter	Insulation Thickness
One inch and smaller	1 inch
1-1/4 to 2 inch	1 Inch
2-1/2 to 4 inch	1-1/2 Inch

   a. Approved Products:
      1) Micro LOK AP-T plus by Johns Manville.
      2) Knauf pipe insulation with ASJ-SSL jacket by Knauf.
      3) SSL II pipe insulation with ASJ-SSL jacket by Owen's Corning.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before application of insulating materials, brush clean surfaces to be insulated and make free from rust, scale, grease, dirt, moisture, and any other deleterious materials.

B. Use drop cloths over equipment and structure to prevent adhesives and other materials spotting the work.

3.2 INSTALLATION

A. Hydronic Piping System:
   1. General:
      a. Fit insulation tightly against surfaces to be insulated and provide with tight joints.
      b. Install insulation in manner to facilitate removal for repairs. Place sections or blocks so least possible damage to insulation will result from inspection or repairs of piping or equipment.
      c. Use broken-joint construction in application of two-layer covering.
      d. Fill cracks and depressions with insulating cement mixed to thick plastic paste. Apply by hand in several layers to make up total specified thickness. Final layer shall have smooth uniform finish before application of covering.
      e. Apply one heavy brush coat of sizing such as Foster Sealfast 30-36 or Arabol lagging adhesive to canvas prior to painting.
      f. Piping:
         1) Apply to clean dry pipe with joints butted firmly together.
         2) Seal longitudinal laps with vapor barrier adhesive.
         3) Wrap butt joints with 4 inchstrip of vapor barrier jacket cemented with vapor barrier adhesive.
         4) Wrap end joints where they butt together with factory furnished vapor barrier strips applied with vapor barrier adhesive.
      g. Valves, Fittings, and Flanges:
         1) Do not apply insulation over flanged joints until piping has been brought up to operating temperature and flange bolts have been fully tightened.
         2) Insulate flanges, valves, and special accessories with covering equal in temperature resistance and thickness to that of the connecting piping.
         3) Fittings for pipe sizes 2 inchesand smaller may be insulated with hydraulic setting insulating cement or equal, to thickness equal to adjoining pipe insulation. Apply final coat of fitting mastic over insulating cement.
         4) Insulate fittings for pipe sizes 2-1/2 inchesand larger with segments of molded insulation securely wired in place and coated with skim coat of insulating cement. Apply fitting mastic, fitting tape and finish with final coat of fitting mastic.
         5) Finish fittings regardless of pipe size with 4 oz canvas and coated with vapor barrier adhesive.
         6) Insulate valves so wheel, stem, and packing nut are exposed.
         7) Finish with Zeston covers in lieu of mastic and canvas. Seal edges.
   2. Provide metal protection saddles where pipe hangers occur.

3.3 FIELD QUALITY CONTROL

A. Method of installing insulation shall be subject to approval of Architect. Sloppy or unworkmanlike installations are not acceptable.

3.4 CLEANING

A. Leave premises thoroughly clean and free from insulating debris.

3.5 PROTECTION

A. Protect insulation wherever leak from valve stem or other source might drip on insulated surface, with aluminum cover or shield rolled up at edges and sufficiently large in area and of shape that dripping will not splash on surrounding insulation.

END OF SECTION

SECTION 23 0933

ELECTRIC AND ELECTRONIC CONTROL SYSTEM FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install automatic temperature control system as described in Contract Documents.
   2. Furnish and install conductors and make connections to control devices, motors, and associated equipment.
   3. Assist in test and balance procedure.

B. Related Sections:
   1. Section 23 0501: Common HVAC Requirements.
   2. Section 23 3300: Furnishing and installing of temperature control dampers.

1.2 SYSTEM DESCRIPTION

A. Design Criteria:
   1. Automatic Temperature Control System design concept utilizes communicating thermostats located in mechanical closet, with electronic sensors and electric / electronic actuation of dampers.
   2. Network communications and control devices will be LonWorks compliant. System shall include HVAC control, interface, and maintenance management functions related to normal building operations.

B. Performance Criteria: Install low voltage electrical wiring in accordance with Division 26 of these Specifications.

1.3 SUBMITTALS

A. Closeout:
   1. Project Record Documents:
      a. Provide one hardcopy and one CD of record ATC diagrams and drawings. CD information shall be AutoCAD or Visio compatible files.
      b. Provide two CD copies with fully commissioned LonSpec database.
      c. Leave with O&M Manual specified in Section 23 0501.

1.4 OWNER'S INSTRUCTIONS

A. In addition to training required in Section 23 0501, provide following training:
   1. Training shall be by personnel of installing company and utilize operator's manuals and as-built documentation.
   2. Provide training in two sessions for up to eight hours total. First session will occur between system completion and Substantial Completion. Second session will occur within 45 days of Substantial Completion when agreed upon by Owner.
   3. Training shall include sequence of operation review, selection of displays, modification of schedules and setpoints, troubleshooting of sensors, etc.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Sensors:
   1. Remote Room Sensor:
      a. Honeywell T7770
         1) Sensor shall be integrated with the existing ATC system.

B. Duct Smoke Detectors:
   1. Photoelectric duct mounted smoke detector in systems with airflow greater than 2000 CFM. Detectors to operate on 120 VAC.
   2. Approved Products:
      a. Model DS290 by Detection Systems.
      b. Model DH100 ACDCP duct mounted smoke detector by System Sensor.
      c. Model FL-D350RP by Fire-Lite.
      d. Model SL-2000P by Air Products And Controls Inc.
      e. Model 2650-761 by Maplechase / Firex.

C. Damper Actuators:
   1. Electric type equipped for Class I wiring.
   2. Shall not consume power during UNOCCUPIED cycle or use chemicals or expandable media.
   3. Have built in spring return.
   4. Quality Standard:
      a. Honeywell S0524-2POS. Also shown as MS8105 1008
      b. Honeywell S0524-2POS-SW2 w/ Auxiliary switches.

D. Control Valve And Motor:
   1. Quality Standard:
      a. Honeywell: V5013N three-way modulating type.
      b. Honeywell: ML7420A3063 valve motor.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work:
   1. Calibrate room thermostats as required during and balance.
   2. Instruct test and balance personnel in proper use and setting of control system components.

B. Safety Controls: Interlock duct smoke detectors to keep heating, cooling, and system fan from operating when detector is energized.

C. Mount damper actuators and actuator linkages external of airflow. Make certain dampers operate freely without binding or with actuator housing moving.

D. Program ATC system using standard LonSpec database CD provided by Approved Distributor.

E. Sequence of Control:
   1. New equipment shall interface with owner's existing equipment. Provide all necessary interface equipment and software controllers.
   2. Fan shall run continuously in occupied mode and cycle in unoccupied mode.
   3. Adjustable heating and cooling set points shall control space temperature by activating either heating or cooling equipment including central plan equipment, circulator pumps, and control valves.

4. Minimum outside air damper, spring return type, shall open in occupied mode and remain closed in unoccupied mode in zones using outside air.
5. System shall control operation of pumps, heating hot water, and chilled water circulation equipment. Provide all necessary pump controllers to integrate with ATC system.

3.2 FIELD QUALITY CONTROL

A. Manufacturer's Field Service:
   1. Calibrate, adjust, and set controls for proper operation, operate systems, and be prepared to prove operation of any part of control system. This work is to be completed before pre-substantial completion inspection.
   2. Test each individual heating, cooling, and damper control for proper operation using control system.

3.3 ADJUSTING

A. Program minimum of one day's operation into thermostat memory function.

END OF SECTION

SECTION 23 0955

DUCT TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Test, balance, and adjust air duct systems as described in Contract Documents.

B. Related Sections:
   1. Division 23:
      a. Completing installation and start-up of mechanical systems, and changing sheaves, belts, and dampers as required for correct balance.
      b. Assisting Balancing Agency in testing and balancing of mechanical system.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements:
   1. Perform testing and balancing in complete accordance with Associated Air Balance Council Standards for Field Measurement & Instructions, Form P1266, Volume I. Record test data on AABC standard forms or facsimile.

1.3 SUBMITTALS

A. Quality Assurance / Control:
   1. Four copies of complete test data for evaluation and approval.
   2. Test And Balance Report:
      a. Complete with logs, data, and records as required herein. Print logs, data, and records on white bond paper bound together in report form.
      b. Certified accurate and complete by Balancing Agency's certified test and balance engineer.
      c. Contain following general data in format selected by Balancing Agency.
         1) Project Number.
         2) Project Title.
         3) Project Location.
         4) Project Architect and Mechanical Engineer.
         5) Test and Balance Agency and Certified Engineer.
         6) Contractor and mechanical sub-contractor.
         7) Dates tests were performed.
         8) Certification Document.
         9) Report Forms similar to AABC Standard format.
      d. Report shall include following:
         1) Preface suggesting abnormalities and problems encountered.
         2) Instrumentation List including type, model, manufacturer, serial number, and calibration dates.
         3) System Identification reporting location of zones, supply, return, and exhaust openings.
         4) Record following for each piece of air handling equipment:
            a) Manufacturer, model number, and serial number.
            b) Design and manufacturer rated data.
            c) Actual CFM.
            d) Suction and discharge static pressure of each fan.
            e) Outside-air and return-air total CFM.

f) Actual operating current, voltage, and brake horsepower of each fan motor.
g) Final RPM of each motor.
h) Fan and motor sheave manufacturer, model, size, number of grooves and center distance.
i) Belt size and quantity.
j) Static-pressure controls final operating set points.

3. Bind approved copy of report in Operations And Maintenance Manual for Division 23.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Work of this Section shall be performed by independent Air Testing And Balance Agency specializing in testing and balancing of heating, ventilating, and cooling systems to balance, adjust, and test air moving equipment, air distribution, and exhaust systems.
2. Agency shall provide proof of having successfully completed at least five years of specialized experience in air and hydronic system balancing. Work by this Agency shall be done under direct supervision of qualified heating and ventilating engineer employed by Agency.
3. Agency shall be approved in writing by Architect.
4. Neither Architect's engineering consultant or anyone performing work on this Project under other Sections of Division 23 shall be permitted to do this work.

1.5 SCHEDULING

A. Award test and balance subcontract to Agency upon receipt of Notice To Proceed to allow Agency to schedule this work in cooperation with other Sections involved and to comply with completion date.

B. During construction, Agency shall inspect installation of pipe systems, sheet metal work, temperature controls, and other component parts of mechanical systems. Perform inspections as follows.
1. One inspection when 60 percent of ductwork is installed.
2. One inspection when 90 percent of equipment is installed.

C. Do not begin air testing and balancing until:
1. After completion of air cooling, heating, and exhaust systems including installation of specialties, devices, and new filters.
2. Proper function of control system components including electrical interlocks, damper sequences, air and water reset, and fire and freeze stats has been verified.
3. Automatic temperature controls have been calibrated and set for design operating conditions.
4. Verification of proper thermostat calibration and setting of control components such as static pressure controllers and other devices that may need set points changed during process of balancing system.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 PREPARATION

A. Heating, ventilating, and cooling systems and equipment shall be in full operation and continue in operation during each working day of testing and balancing.

3.2 FIELD QUALITY CONTROL

A. Site Tests:

1. If requested, conduct tests in presence of Architect.
2. Instruments used by Agency shall be accurately calibrated and maintained in good working order.
3. Air Testing And Balancing Procedure:
   a. Perform tests at high and low speeds of multi-speed systems and single speed systems. Perform following testing and balancing functions in accordance with Associated Air Balance Council National Standards:
      1) Fan Speeds:
         a) Air Handling Units (with variable pitch pulleys and sheaves): Test and adjust fan RPM to achieve design CFM requirements.
      2) Current And Voltage: Measure and record motor current and voltage.
      3) Pitot-Tube Traverse:
         a) Make measurements in duct where velocity is uniform, 7-1/2 duct diameters downstream 2 duct diameters minimum upstream from any turbulence, I.E. elbow, damper, take-off, etc.
         b) Perform pitot-tube traverse of main supply and return ducts to obtain total CFM.
         c) Perform pitot-tube traverse of outside air duct serving each piece of air moving equipment.
            (1) Where single trunk serves multiple pieces of equipment, perform, pitot-tube traverse of duct branch serving each piece of equipment as well as pitot-tube traverse of total air flow in trunk with all pieces of equipment operating.
            (2) Where pitot-tube traverse is not possible or if pitot-tube traverse is unreliable, flow hood measurement over exterior intake louver or grille is acceptable.
      4) Static Pressure: Test and record system static pressures, including suction and discharge static pressure of each fan.
      5) Air Temperature: Take wet and dry bulb air temperatures on entering and leaving side of each cooling coil. Dry bulb temperatures shall be taken on entering and leaving side of each heating unit.
      6) Zone Ducts: Adjust zone ducts to within design CFM requirements. At least one zone balancing damper shall be completely open.
      7) Main Ducts: Adjust main ducts to within design CFM requirements and traverse for total CFM quantities.
      8) Branch Ducts: Adjust branch ducts to within design CFM requirements. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.
      9) Tolerances: Test and balance each diffuser, grille, and register to within 10 percent of design requirements.
      10) Identification: Identify the location and area of each grille, diffuser, register, and terminal box. Record on air outlet data sheets.
      11) Description: Record size, type, and manufacturer of each diffuser, grille, and register on air outlet data sheets.
      12) Terminal Boxes: Set volume regulators on terminal boxes to meet design maximum and minimum CFM requirements. Check temperature controls for proper operation and calibration. Read out diffusers connected to terminal boxes shall be read out in heating and cooling modes and record their readings on air outlet data sheets.
      13) Drafts: Adjust diffusers, grilles, and registers to minimize drafts.
   b. Permanently mark all outside air, supply air, and return air damper positions after balancing has been completed.
4. Smoke testing, or some other approved means, may be required to determine leak locations if air balance report indicates that any system's CFM total is less than 10 percent of design CFM. Prior to test, verify that system's duct joints have been sealed as specified and that air moving device in question is supplying required design system air flow. Architect will approve test method required. If smoke test is selected, use following procedure. Provide necessary precautions to protect those performing or observing test from being exposed to smoke.
   a. Use zinc chloride smoke candles, titanium tetrachloride ampules or sticks, or other devices acceptable to Architect to generate smoke.
   b. Close openings in duct except for one opening at farthest end of duct run.
   c. Circulate smoke at pressurized condition of 1/2 inch minimum water gauge static pressure.
   d. Report findings to Architect in writing.

B. Final Inspection And Adjustments:
   1. System shall be balanced and reports submitted to Architect before final inspection.

2. Balancing Agency shall be represented at final inspection meeting by qualified testing personnel with balancing equipment and two copies of air balancing test report.
   a. Architect will choose and direct spot balancing of one zone. Differences between the spot balance and test report will be justification for requiring repeat of testing and balancing for entire building. If recheck testing demonstrates measured flow deviation of 10 percent or more from recorded information on report, report will be rejected and new inspection and report will be made and resubmitted.
   b. Perform re-balancing in presence of Architect and subject to its approval.
   c. If re-balancing is required, submit revised air test and balance reports to Architect before Substantial Completion.
   d. Spot balance and rebalance shall be performed at no additional cost to Owner.
3. Where furnace supplied to job site provides over 5 percent more air than schedule requirements, rooms supplied by that furnace shall have their supply air quantities increased by ratio of actual total air quantity supplied to minimum air quantity required by furnace schedule.

END OF SECTION

SECTION 23 0957

PIPE TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Test, balance, and adjust hydronic heating systems as described in Contract Documents.

1.2 SUBMITTALS

A. Quality Assurance / Control - Agency will submit four copies of complete test data for evaluation and approval including neatly typed listing of items required by Contract Documents.

B. Closeout - Agency will submit approved copy of water test and balance report for inclusion in Operations And Maintenance Manual.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Work by Agency will be performed under direct supervision of qualified Heating and Ventilating Engineer employed by Agency.

1.4 SEQUENCING

A. Test and balance subcontract will be awarded to Agency upon confirmation of receipt of Notice To Proceed to allow Agency to schedule this work in cooperation with work of other Sections involved and to comply with completion date.

B. Schedule testing and balancing to begin upon completion of cooling and heating systems including installation of all specialties and devices. Begin work of this Section after heating, ventilating, and cooling systems and equipment are in full operation and continue their operation during each working day of testing and balancing.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 PREPARATION

A. Heating, ventilating, and cooling systems and equipment shall be in full operation and continue in operation during each working day of testing and balancing.

3.2 FIELD QUALITY CONTROL

A. Site Tests:

1. Instruments used by Agency will be accurately calibrated and maintained in good working order.
2. Testing And Balancing Agency will provide technicians with following instruments for field use:
   a. One set of pressure gauges and fittings.
   b. Dry bulb thermometer.
   c. Wet bulb thermometer.
   d. Thermocouple unit and thermocouples.
   e. Set of balancing cock adjustment wrenches.
   f. Portable field flowmeter.
3. If requested, conduct tests in presence of Architect.
4. Preparation of System:
   a. Phase I:
      1) Open valves to full position including coil stop valves, close bypass valves, and return line balancing cocks.
      2) Remove and clean strainers.
      3) Examine water in system to determine if it has been treated and is clean.
      4) Check pump rotation.
      5) Check expansion tanks to make sure they are not air bound and system is full of water.
      6) Check air vents at high points of water systems to make sure they are installed properly and are operating freely. Make certain air is removed from circulating system.
      7) Set temperature controls so coils are calling for full cooling and for full heating respectively. This should close automatic bypass valves at coil.
      8) Check operation of automatic bypass valve.
      9) Check and set operating temperature of boilers to design requirements.
      10) Perform air balance before beginning water balance.
   b. Phase II:
      1) Set hot water pumps to proper gpm delivery.
      2) Adjust flow of hot water through boiler.
      3) Check leaving water temperatures, return water temperatures, and pressure drop through boilers. Reset to correct design temperatures.
      4) Check water temperature at inlet side of heating and cooling coils. Note rise or drop of temperatures from source.
      5) Balance each hot water and chilled water coil.
      6) Upon completion of flow readings and coil adjustments, mark settings and record data.
   c. Phase III:
      1) After making adjustments to coils, recheck settings at pumps and boilers. Readjust if required.
      2) Install pressure gauges on each coil, then read pressure drop through coil at set flow rate on call for full heating. Set pressure drop across bypass valve to match coil full blow pressure drop. This prevents unbalanced flow conditions when coils are on full bypass.
      3) Check and record following items at each heating element:
         a) Inlet water and air temperatures.
         b) Leaving water and air temperatures.
         c) Pressure drop of each coil.
         d) Pressure drop across bypass valve.
         e) Pump operating suction and discharge pressures and final TDH.
         f) Mechanical specifications of pumps.
         g) Rated and actual running amperage of pump motor.

END OF SECTION

SECTION 23 2600

CONDENSATE DRAIN PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install condensate drain piping as described in Contract Documents.

B. Related Sections:
   1. Section 23 0501: Common HVAC Requirements

1.2 REFERENCES

A. American Society For Testing And Materials:
   1. ASTM B 88-03, 'Standard Specification for Seamless Copper Water Tube.'

PART 2 - PRODUCTS

2.1 MATERIALS

A. Condensate Drains:
   1. Schedule 40 PVC for condensate drains from cooling coils.
   2. 3 inch deep seal, vented water trap adjacent to cooling coil connection.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Condensate Drains:
   1. Support piping and protect from damage.
   2. Do not combine PVC condensate drain piping from furnace combustion chamber with copper condensate drain piping from cooling coil.

END OF SECTION

SECTION 23 3001

COMMON DUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General procedures and requirements for ductwork.
   2. Repair leaks in ductwork, as identified by duct testing, at no additional cost to Owner.

B. Related Sections:
   1. Section 23 0501: Common HVAC Requirements.

1.2 SUBMITTALS

A. Samples: Sealer and gauze proposed for sealing ductwork.

B. Quality Assurance / Control:
   1. Manufacturer's installation manuals providing detailed instructions on assembly, joint sealing, and system pressure testing for leaks.
   2. Specification data on sealer and gauze proposed for sealing ductwork.

1.3 QUALITY ASSURANCE

A. Requirements: Construction details not specifically called out in Contract Documents shall conform to applicable requirements of SMACNA HVAC Duct Construction Standards.

PART 2 - PRODUCTS

A. Finishes, Where Applicable: Colors as selected by Architect.

B. Duct Hangers:
   1. One inch by 20 ga galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 96 inches apart. Do not use wire hangers.
   2. Attaching screws at trusses shall be 2 inch No. 10 round head wood screws. Nails not allowed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. During installation, protect open ends of ducts by covering with plastic sheet tied in place to prevent entrance of debris and dirt.

B. Make necessary allowances and provisions in installation of sheet metal ducts for structural conditions of building. Revisions in layout and configuration may be allowed, with prior written approval of Architect. Maintain required airflows in suggesting revisions.

C. Hangers And Supports:

1. Install pair of hangers close to each transverse joint and elsewhere as required by spacing indicated in table on Drawings.
2. Install upper ends of hanger securely to floor or roof construction above by method shown on Drawings.
3. Attach strap hangers to ducts with cadmium-plated screws. Use of pop rivets or other means will not be accepted.
4. Where hangers are secured to forms before concrete slabs are poured, cut off flush all nails, strap ends, and other projections after forms are removed.
5. Secure vertical ducts passing through floors by extending bracing angles to rest firmly on floors without loose blocking or shimming. Support vertical ducts, which do not pass through floors, by using bands bolted to walls, columns, etc. Size, spacing, and method of attachment to vertical ducts shall be same as specified for hanger bands on horizontal ducts.

3.2 CLEANING

A. Clean interior of duct systems before final completion.

END OF SECTION

SECTION 23 3114

LOW-PRESSURE METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install above-grade low-pressure steel ducts and related items as described in Contract Documents.

B. Products Installed But Not Furnished Under This Section:
   1. Duct smoke detectors.

C. Related Sections:
   1. Section 23 0713: Thermal Insulation for ducts, plenum chambers, and casings.
   2. Section 23 3001: Common Duct Requirements.
   3. Section 23 0933: Temperature control damper actuators and actuator linkages.
   4. Section 23 0933: Furnishing of duct smoke detectors.

1.2 REFERENCES

A. American Society For Testing And Materials:
   1. ASTM A 653-02a, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.'

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Sheet Metal:
   1. Fabricate ducts, plenum chambers and casings of zinc-coated, lock-forming quality steel sheets meeting requirements of ASTM A 653, with G 60 coating.

B. Duct Sealer For Interior Ducts:
   1. Approved Products:
      a. Duct Butter or Butter Tak by Cain Manufacturing Co Inc, Pelham, AL www.cainmfg.com.
      b. DP 1010 by Design Polymerics, Fountain Valley, CA www.designpoly.com.
      c. S2 by Duro Dyne, Farmingdale, NY www.durodyne.com.
      d. Versa Grip 102 by Hardcast Inc, Wylie, TX www.hardcast.com.
      e. 15-325 by Kingco, Div ITW TACC, Rockland, MA www.taccint.com.
      f. 44-41 by Mon-Eco Industries Inc, East Brunswick, NJ (800) 899-6326 or (908) 257-7942.
      g. Airseal #11 by Polymer Adhesive Sealant Systems Inc, Weatherford, TX www.polymeradhesives.com.
      h. Water Base Duct Sealer by United McGill Corp, Columbus, OH www.unitedmcgill.com.

C. Duct Sealer For Exterior Ducts:
   1. Approved Products:
      a. Hardcast Tape and RTA-50 adhesive by Hardcast Inc, Wylie, TX www.hardcast.com.

2.2 FABRICATION

A. Ducts:
   1. Straight and smooth on inside with joints neatly finished.
   2. Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.
   3. Duct panels through 48 inch dimension having acoustic duct liner need not be cross-broken or beaded. Cross-break unlined ducts, duct panels larger than 48 inch vertical and horizontal sheet metal barriers, duct offsets, and elbows, bead 12 inches on center.
      a. Apply cross-breaking to sheet metal between standing seams or reinforcing angles.
      b. Center of cross-break shall be of required height to assure surfaces being rigid.
   4. Duct drops to diffusers shall be round, square, or rectangular to accommodate diffuser neck. Drops shall be same gauge as branch duct.
      a. Seal joints air tight.
      b. Externally insulate round drops.
      c. Internally line square and rectangular drops.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work: Reseal transverse joint duct leaks and seal longitudinal duct joint leaks discovered during air test and balance procedures at no additional cost to Owner.

B. Install internal ends of slip joints in direction of flow. Seal transverse and longitudinal joints air tight using specified duct sealer. Cover horizontal and longitudinal joints on exterior ducts with two layers of specified tape installed with specified adhesive.

C. Securely anchor ducts and plenums to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger. Brace and install ducts so they shall be free of vibration under all conditions of operation.

D. Ducts shall not bear on top of structural members.

E. Paint ductwork visible through registers, grilles, and diffusers flat black.

F. Properly flash where ducts protrude above roof.

G. Under no conditions will pipes, rods, or wires be allowed to penetrate ducts.

END OF SECTION

SECTION 23 3300

AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install duct accessories in specified ductwork as described in Contract Documents.

B. Related Sections:
   1. Section 23 0933: Temperature control damper actuators and actuator linkages.
   2. Section 23 3001: Common Duct Requirements.

1.2 REFERENCES

A. American Society for Testing and Materials:
   1. ASTM A 653-02a, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.'
   2. ASTM C 665-01, 'Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.'
   3. ASTM C 1071-00, 'Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Acoustical Material).'

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Acoustical Liner System:
   1. Duct Liner:
      a. One inch thick, 1-1/2 lb density fiberglass conforming to requirements of ASTM C 1071. Liner will not support microbial growth when tested in accordance with ASTM C 665.
      b. Approved Products:
         1) Ultralite or ToughGard by CertainTeed.
         2) Duct Liner E-M by Knauf Fiber Glass.
         3) Akousti-Liner by Manson Insulation.
         4) Aeroflex Plus by Owens Corning.
         5) Linacoustic by Johns-Manville.
   2. Adhesive:
      a. Approved Water-Based Products:
         1) Cain: Hydrotak.
         2) Design Polymerics: DP2501 or DP2502 (CMCL-2501).
         3) Duro Dyne: WSA.
         4) Hardcast: Coil-Tack.
         5) Kingco: 10-568.
         6) Miracle: PF-101.
         7) Mon-Eco: 22-67 or 22-76.
         8) Polymer Adhesive: Glasstack #35.
         9) Techno Adhesive: 133.
         10) United McGill: Uni-tack.
      b. Approved Solvent-Based (non-flammable) Products:

1) Cain: Safetak.
2) Duro Dyne: FPG.
3) Hardcast: Glas-Grip 648-NFSE.
4) Kingco: 15-137.
5) Miracle: PF-91.
6) Mon-Eco: 22-24.
7) Polymer Adhesive: Q-Tack.
8) Techno Adhesive: 'Non-Flam' 106.

c. Approved Solvent-Based (flammable) Products:
1) Cain: HV200.
2) Duro Dyne: MPG.
3) Hardcast: Glas-Grip 636-SE.
4) Kingco: 15-146.
5) Miracle: PF-96.
6) Mon-Eco: 22-22.
7) Polymer Adhesive: R-Tack.
8) Techno Adhesive: 'Flammable' 106.

3. Fasteners:
a. Adhesively secured fasteners not allowed.
b. Approved Products:
1) AGM Industries Inc: 'DynaPoint' Series RP-9 pin.
2) Cain.
3) Duro Dyne.
4) Dyn Air: DWT or FWT
5) Omark dished head 'Insul-Pins.'
6) Gripnails may be used if each nail is installed by 'Grip Nail Air Hammer' or by 'Automatic Fastener Equipment' in accordance with Manufacturer's recommendations.

B. Flexible Equipment Connections:
1. 30 oz closely woven UL approved glass fabric, double coated with neoprene.
2. Fire retardant, waterproof, air-tight, resistant to acids and grease, and withstand constant temperatures of 250 deg F.
3. Approved Products:
a. Cain: N-100.
b. Duro Dyne: MFN.
c. Dyn Air: CPN with G-90 galvanized off-set seam
d. Elgen: ZLN.
e. Ventfabrics: Ventglas.
f. Ductmate: ProFlex.

C. Duct Access Doors:
1. General:
a. Factory built insulated access door with hinges and sash locks, as necessary. Construction shall be galvanized sheet metal, 24 ga minimum.
b. Fire and smoke damper access doors shall have minimum clear opening of 12 inches square or larger as shown on Drawings.
2. Rectangular Ducts:
a. Approved Products:
1) Air Balance: Fire/Seal FSA 100.
2) Air-Rite: Model HAD-2.
3) Cesco: HDD.
4) Flexmaster: Spin Door.
5) Kees Inc: ADH-D.
6) Nailor: 085H-01.
7) Pottorff: 60-HAD.
8) Ruskin: ADH-24.

D. Dampers And Damper Accessories:
1. Locking Quadrant Damper Regulators:

a. Approved Products:
    1) Duro Dyne: KS-38.
    2) Dyn Air: QPS-385
    3) Ventfabrics: Ventline 555.
    4) Young: No. 1.
2. Concealed Ceiling Damper Regulators:
    a. Approved Products:
        1) Cain.
        2) Duro Dyne.
        3) Metco Inc.
        4) Ventfabrics: 666 Ventlok.
        5) Young: 301.
3. Volume Dampers:
    a. Rectangular Duct:
        1) Factory-manufactured 16 ga galvanized steel, single blade and opposed blade type with 3/8 inch axles and end bearings. Blade width 8 inches maximum. Blades shall have 1/8 inch clearance all around.
            a) Damper shall operate within acoustical duct liner.
            b) Provide channel spacer equal to thickness of duct liner.
        2) Dampers above removable ceiling and in Mechanical Rooms shall have locking quadrant on bottom or side of duct. Otherwise, furnish with concealed ceiling damper regulator and cover plate.
        3) Approved Products:
            a) Air-Rite: Model CD-2.
            b) American Warming: VC-2-AA.
            c) Arrow: OBDAF-207.
            d) C & S: AC40.
            e) Cesco: AGO.
            f) Daniel: CD-OB.
            g) Greenheck: VCD-20.
            h) Pottorff: CD-42.
            i) Ruskin: MD-35.
            j) UTEMP: CD-OB.
4. Motorized Outside Air Dampers:
    a. General:
        1) Low leakage type. AMCA certified.
        2) Make provision for damper actuators and actuator linkages to be mounted external of air flow.
    b. Rectangular Ducts:
        1) Damper Blades:
            a) Steel or aluminum airfoil type with mechanically locked blade seals, 8 inch blade width maximum measured perpendicular to axis of damper.
            b) Jamb seals shall be flexible metal compression type.
            c) Opposed or single blade type.
        2) Approved Products:
            a) Air Balance: AC 526.
            b) American Warming: AC526.
            c) Arrow: AFD-20.
            d) C & S: AC50.
            e) Cesco: AGO3.
            f) Honeywell: D-643.
            g) Pottorff: CD-52.
            h) Ruskin: CD-60.
5. Backdraft Dampers:
    a. Backdraft blades shall be nonmetallic neoprene coated fiberglass type.
    b. Stop shall be galvanized steel screen or expanded metal, 1/2 inch mesh.
    c. Frame shall be galvanized steel or extruded aluminum alloy.
    d. Approved Products:
        1) Air-Rite: Model BDD-3.
        2) American Warming: BD-15.

3) C & S: BD30.
4) Cesco: FBD 101.
5) Daniel: FBD-H/V.
6) Pottorff: 50FBD.
7) Ruskin: NMS2.
8) UTEMP: BFEA.

E. Air Turns:
1. Single thickness vanes. Double thickness vanes not acceptable.
2. 4-1/2 inch wide vane rail. Junior vane rail not acceptable.

F. Branch Tap for Flexible Ductwork:
1. Factory-manufactured rectangular-to-round 45 degree leading tap fabricated of 24 ga zinc-coated lock-forming quality steel sheets meeting requirements of ASTM A 653, with G-90 coating.
2. One inch wide mounting flange with die formed corner clips, pre-punched mounting holes, and adhesive coated gasket.
3. Manual Volume Damper:
   a. Single blade, 22 ga minimum
   b. 3/8 inch minimum square rod with brass damper bearings at each end.
   c. Heavy-duty locking quadrant on 1-1/2 inch high stand-off mounting bracket attached to side of round duct.
4. Approved Products:
   a. ST-1HD by Air-Rite.
   b. STO by Flexmaster.
   c. HET by Sheet Metal Connectors.

2.2 FABRICATION

A. Duct Liner:
1. Install mat finish surface on airstream side. Secure insulation to cleaned sheet metal duct with continuous 100 percent coat of adhesive and with 3/4 inch long mechanical fasteners 12 inches on center maximum unless detailed otherwise on Drawings. Pin all duct liner.
2. Accurately cut liner and thoroughly coat ends with adhesive. Butt joints tightly. Top and bottom sections of insulation shall overlap sides. If liner is all one piece, folded corners shall be tight against metal. Ends shall butt tightly together.
3. Coat longitudinal and transverse edges of liner with adhesive.

B. Air Turns:
1. Permanently install vanes arranged to permit air to make abrupt turn without appreciable turbulence, in 90 degree elbows of above ground supply and return ductwork.
2. Quiet and free from vibration when system is in operation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Duct Liner:
1. Furnish and install acoustic lining in following types of ducts:
   a. Supply air.
   b. Return air.
   c. Mixed air.
   d. Transfer air.
   e. Relief air.
   f. Exhaust air.
   g. Elbows, fittings, and diffuser drops greater than 12 inches in length.

B. Flexible Connections: Install flexible inlet and outlet duct connections to each air handler.

C. Access Doors In Ducts:
   1. Install at each manual outside air damper and at each motorized damper. Locate doors within 6 inches of installed dampers.
   2. Install within 6 inches of fire dampers and in Mechanical Room if possible. Install on side of duct that allows easiest access to damper.

D. Dampers And Damper Accessories:
   1. Install concealed ceiling damper regulators.
      a. Paint cover plates to match ceiling tile.
      b. Do not install damper regulators for dampers located directly above removable ceilings or in Mechanical Rooms.
   2. Provide each take-off with an adjustable volume damper to balance that branch.
      a. Anchor dampers securely to duct.
      b. Install dampers in main ducts within insulation.
      c. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
      d. Where concealed ceiling damper regulators are installed, provide cover plate.
   3. Install motorized dampers.

END OF SECTION

SECTION 23 3316

FIRE AND SMOKE DAMPERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install fire and smoke dampers described in Contract Documents.

B. Related Sections:
   1. Section 23 3001: Common Duct Requirements.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. Dampers shall conform to NFPA and SMACNA requirements and bear UL label.
   2. Dampers shall be approved by fire authorities having jurisdiction where so required.
   3. Wall and floor fire dampers shall conform to UL 555 'Fire Damper Test Standard.'
   4. Ceiling fire dampers shall conform to UL 555C 'Ceiling Damper Test Standard.'
   5. Smoke Dampers shall conform to UL 555S 'Leakage Rated Damper Test Standard.'
   6. Combination fire / smoke dampers shall conform to UL 555 'Fire Damper Test Standard' and to UL 555S 'Leakage Rated Damper Test Standard.'

1.3 MAINTENANCE

A. Extra Materials: Leave six fusible links of each rating type used on Project with Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Fire Dampers:
   1. Walls And Floors (Type 1):
      a. Type 'B.'
      b. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
         1) Air Balance: Model 119B.
         2) Cesco: Model 15SB.
         3) Greenheck: Model FD150XB.
         4) Pottorff: Model VFD-10.
         5) Ruskin: Model DIBD20.
         6) Safe-Air: Model 150B Sleeved.
   2. Ceilings (Type 2):
      a. Radiation type ceiling fire damper.
      b. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
         1) Air Balance: Model 289.
         2) Cesco: Model RCI.
         3) Greenheck: Model CRD-60B.
         4) Pottorff: Model CFD-20.
         5) Ruskin: Model CFD-LDS Series.

6) Safe-Air: Model 410A.

2.2 MANUFACTURERS

A. Contact Information:
   1. Air Balance Inc, Holland, OH www.air-balance.com.
   2. Cesco Products, Minneapolis, MN www.cescoproducts.com.
   3. Greenheck Corp, Schofield, WI www.greenheck.com or Greenheck Corp/ E H Price Ltd, Winnipeg, MB (204) 669-4220.
   4. Pottorff, Montebello, CA www.pottorff-hvac.com.
   5. Prefco Products Inc, Buckingham, PA www.prefco-hvac.com.
   6. Ruskin Manufacturing, Kansas City, MO www.ruskin.com.
   7. Safe-Air / Dowco, Cicero, IL www.safeair-dowco.com.

2.3 FABRICATION

A. General:
   1. 16 ga frames.
   2. Integral sleeves, except for Type 2 Fire Dampers.

B. Type 1 Dampers: Fabricate with blades out of airstream.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Placement:
   1. Fire Dampers (Types 1 and 2): Install in ducts where ducts penetrate fire-rated walls and floors and at registers, grilles, and diffusers penetrating fire rated assemblies.

B. Sequences of Operation:
   1. Types 1 And 2: Dampers shall close when temperatures at damper exceed 165 deg F link unless indicated otherwise on Drawings.

END OF SECTION

SECTION 23 3346

FLEXIBLE DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install supply air branch duct runouts to diffusers as described in Contract Documents.

B. Related Sections:
   1. Section 23 3001: Common Duct Requirements.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Ducts:
   1. Formable, flexible, circular duct which shall retain its cross-section, shape, rigidity, and shall not restrict airflow after bending.
   2. Insulation: Nominal 1-1/2 inches, 3/4 lb/cu ft density fiberglass insulation with air-tight, polyethylene or polyester core, sheathed in seamless vapor barrier jacket factory installed over flexible assembly.
   3. Assembly, including insulation and vapor barrier, shall meet Class I requirement of NFPA 90A-1989 and be UL 181 rated, with flame spread of 25 or less and smoke developed rating of 50 or under.
   4. Approved Products:
      a. ANCO-FLEX 4625 by Anco Products Inc, Elkhart, IN www.ancoproductsinc.com.
      b. PF/UPC #090 by Flex-Aire
      c. RJ-30 by Flexible Air Movers Inc, (800) 456-1326
      d. M-KC by Thermaflex by Flexible Technologies, Abbeville, SC www.thermaflex.net.
      e. Type 4m Insulated by Flexmaster USA Inc, Houston, TX www.flexmasterusa.com or Flexmaster Canada, Ltd, Richmond Hill, ON (905) 731-9411.

B. Cinch Bands: Nylon, 3/8 inch removable and reusable type.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct in fully extended condition free of sags and kinks, using 72 inch maximum lengths.

B. Make duct connections by coating exterior of duct collar for 3 inches with duct sealer and securing duct in place over sheet metal collar with specified cinch bands.

END OF SECTION

SECTION 23 3713

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install diffusers, registers, and grilles connected to ductwork as described in Contract Documents.

B. Related Sections:
   1. Section 23 3001: General Duct Requirements.

1.2 MAINTENANCE

A. Extra Materials: Leave tool for removing core of each different type of grille for building custodian.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Supply Grilles And Registers:
   1. Finish: As directed by Architect.
   2. Removable core.
   3. Quality Standard:
      a. Titus: Model 1700L.

B. Low Sidewall Return Grilles:
   1. Finish: Off-white baked enamel.
   2. Quality Standard:
      a. Titus: 33RL.

C. Floor Return Grilles:
   1. Finish: As directed by Architect.
   2. Quality Standard:
      a. Titus: CT-580.

D. Ceiling Diffusers:
   1. Finish: Off-white baked enamel.
   2. Quality Standard:
      a. Titus: TDC-6.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Anchor securely into openings. Secure frames to ductwork by using four sheet metal screws, one per side.

END OF SECTION

SECTION 23 3714

LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install louvers connected to ductwork as described in Contract Documents.

B. Related Requirements:
   1. Section 23 3001: General Duct Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer List:
   1. Airolite Co, Marietta, OH www.airolite.com.
   2. Air-Rite Manufacturing, Bountiful, UT (801) 295-2529.
   3. American Warming & Ventilating, Holland, OH www.awv.com.
   4. Arrow United Industries, Wyalusing, PA www.arrowunited.com.
   5. Carnes Co, Verona, WI www.carnes.com.
   6. Industrial Louvers Inc, Delano, MN www.industriallouvers.com.
   7. Ruskin Manufacturing, Kansas City. MO www.ruskin.com.
   8. Vent Products Co Inc, Chicago, IL www.ventprod.com.
   9. Wonder Metals Corp, Redding, CA www.wondermetals.com.

2.2 MANUFACTURED UNITS

A. Louvers:
   1. General:
      a. Extruded aluminum, with blades welded or screwed into frames.
      b. Frames shall have mitered corners.
      c. Louvers shall be recessed, flanged, stationary, or removable as noted on Drawings.
      d. Finish:
         1) Polyvinyledene Fluoride (PVF_2) Resin-base finish (Kynar 500 or Hylar 5000) containing 70 percent minimum PVF_2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
         2) Color as selected by Architect from Manufacturer's standard colors.
   2. Louvers Connected To Ductwork:
      a. 1/2 inch mesh 16 ga aluminum bird screen.
      b. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
         1) K638 by Airolite.
         2) LE-1 by Air-Rite Manufacturing.
         3) LE48 by American Warming & Ventilating.
         4) EA-405 by Arrow United Industries.
         5) FKDA by Carnes.
         6) 455-XP by Industrial Louvers.
         7) ELF81S30 by Ruskin.
         8) 2740-31 by Vent Products.
         9) EX by Wonder Metals.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Anchor securely into openings.

B. Where louvers touch masonry or dissimilar metals, protect with heavy coat of asphaltum paint.

END OF SECTION

SECTION 23 7313

AIR HANDLING UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install air handling units as described in Contract Documents.

B. Related Sections:
   1. Section 23 0501: Common HVAC Requirements.

1.2 SUBMITTALS

A. Product Data:
   1. Indicate dimensions, weights, capacities, fan capacities, fan performance, motor electrical characteristics, casing construction details, wiring interconnections, gauges, and finishes of materials.
   2. Indicate filter sizes and quantities, and filter frames.
   3. Provide coil selection work sheets showing proper consideration for altitude, air density, glycol correction, and fouling factor.
   4. Manufacturer installation instructions.
   5. Fan curves with specified operating point clearly plotted.
   6. Sound power levels for air handling unit(s) at scheduled conditions.
   7. Include instructions for lubrication, filter replacement, motor and drive replacement, spare parts list, and wiring diagrams.

B. Record Documents:
   1. Show unit configuration in direction of air flow.
   2. Indicate assembly and unit dimensions.

1.3 QUALITY ASSURANCE

A. Qualification Requirements:
   1. Certify air handling unit capacity, static pressure, fan speed, brake horse power, and selection procedures in accordance with ARI 430-89.
   2. Certify air coils capacities, pressure drops and selection procedures in accordance with ARI 410-87.
   3. Certify sound power levels for air handling unit(s) at scheduled conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Casing:
   1. Construct non-load exterior panels of minimum 16 gage galvanized steel.
      a. Removal of exterior panels shall not affect structural integrity of unit.
      b. Apply final shop coat zinc rich protective paint to units with welds on exterior surfaces or welds that have burned through from interior welds. Manufacturer's standard color.

c. Walls constructed of 2 inches thick double wall acoustical thermal panels.
d. Interior walls - Minimum 18 gage perforated (solid) galvanized steel.

2. Insulate sections handling conditioned air with 2 inches thick 3 lb / cu ft double density matt faced fiberglass covered with inner panel of 18 gauge minimum perforated galvanized steel. Install insulation using adhesive. Insulation edges protected with metal lagging.
3. For routine service access, supply unit with full height, galvanized, double wall, hinged, access doors.
   a. 16 gage steel exterior and 22 gage solid metal interior liner.
   b. Continuously welded corners on doors.
   c. Insulation as specified above.
   d. Provide two 'Ventlock - 310' latches operable from either side of door.
   e. Doors shall be fully gasketed with continuous 1/2 inch closed cell hollow, round, black gasket with metal encapsulated reinforced backing mechanically fastened to door frame.
   f. Door frames shall be 12 gage galvanized steel.
4. Base shall be constructed from structural steel 4 inch minimum channel iron around perimeter of unit with intermediate channel and angle iron supports.
   a. 16 gage plate shall be installed on base.
   b. Floor shall be flat, reinforced from below with seams continuously welded.
   c. Provide base with lifting lugs.
   d. Insulate base with one inch thick insulation sheeted with 22 gage galvanized steel liner.
   e. Provide auxiliary drains in fan sections downstream of cooling coils and in mixing sections.
   f. Drain connections shall terminate at side of unit.
5. On units provided with cooling coils, extend drain pan under complete coil section.
   a. Provide drain connections on both sides of each drain pan.
   b. Drain pans shall be of sealed double wall galvanized construction with Manufacturer's standard insulation sandwiched between pan layers.

B. Fans:
1. Supply fan types as scheduled on Drawings, minimum Class II construction.
   a. Properly sized fan shaft and protectively coated with lubricating oil.
   b. Solid fan shafts properly designed so fan shaft does not pass through first critical speed as unit comes up to rated RPM.
   c. Statically and dynamically tested as assembly at required RPM to meet design specifications.
   d. Fan wheel properly secured to shaft to prevent slippage.
   e. Outlet of fan shall be separated from unit casing by means of factory installed flexible fabric connection.
2. Provide self-aligning, grease lubricated pillow-block ball bearings with lubrication fittings.
   a. Provide extended grease lines to drive side of unit casing, for new fan bearings, rigidly attached for easy service access.
   b. Bearings shall perform to L-50 400,000 hour average life.
3. Provide integral all welded vibration isolation base for fan and motor.
   a. Provide free standing isolators with sound deadening pads and leveling bolts.
   b. Spring diameter to compressed operating ratio shall be one to one.
   c. Spring deflection shall be one inch.
   d. Isolators shall have earth quake restraints.

C. Motors and Drives:
1. Drive sheaves shall be machined cast iron.
2. Sheave selections and belt lengths shall be in accordance with drive manufacturer for specific motor loads being encountered.
3. Provide metal belt guard with openings for tachometer readings. Size belt guard to allow either sheave to be increased by two sizes.

D. Coils:
1. Provided by same company as supplier of air handling units and designed with aluminum plate fins and copper tubes.
2. Fins shall have collars drawn, belled, and firmly bonded to tubes with mechanical expansion of tubes.

a. Soldering or tinning shall not be used in bonding process.
b. Mount coils in unit casing to be accessible for service and can be removed from unit through side or top.
c. Capacities, pressure drops, and selection procedure shall be certified in accordance with ARI Standard 410.

3. Provide factory installed extended drain and vent connections for water coils. Drain pans shall be continuously welded and coated with asphalt.
4. Hydronic Coils:
   a. Enclosed in coil section.
   b. Coil headers and U-bends shall not be exposed.
   c. Water flow counter to air flow.
   d. Provide supply header to ensure distribution of water to each tube of coil.
   e. Proof tested to 300 psig and leak tested to 200 psig air pressure under water.
   f. 5/8 inch outside dimension tubes, with minimum 0.024 inch wall thickness.
   g. Coordinate coil connections with Drawings for access.
   h. Coils shall be drainable.

E. Filter:
1. Provide factory fabricated flat filter section of same construction and finish as unit casing with filter guides and hinged, double wall access doors with automotive style gasket for minimum leakage for filter removal.
   a. Provide filter rack for 2 inch thick medium efficiency filters. Rack shall be of galvanized steel and equipped with gaskets to limit leakage to less than 3 percent.
   b. Fabricate filter boxes to flange to other unit components.
   c. Provide blockouts as required to prevent air bypass around filters.
2. 2 inch thick medium efficiency pleated media, disposable type pre-formed pleated design, with filtering media area being at least 4.6 times face area with at least 16 pleats per linear foot.
   a. Media:
      1) Reinforced non-woven cotton fabric, treated with adhesive similar to Vyclad B, and continuously laminated to supporting steel wire grid conforming to configuration of pleats.
         a) Rated average efficiency of at least 36.5 percent when tested by ASHRAE Type test (atmospheric) and be capable of operating with variable face velocities up to 500 FPM (2.54 m per second) without impairing efficiency.
         b) Initial resistance shall not exceed 0.30 inch WG at 500 FPM, or 0.12 inches WG at 300 FPM.
   b. UL Class II.
   c. Approved Manufacturers And Models:
      1) DP2-40 by Airguard Industries Inc.
      2) HC Type 40 by Environmental Filter Corporation.
      3) 30/30 by Farr Compnay.
3. Filter Gauges:
   a. Magnahelic gauges accurate to plus or minus 2 percent of full scale.
   b. Provide probes and shut off valves with each gauge.
   c. Pipe so gage can read drop across filters.
   d. Approved Manufacturer And Model:
      1) Series 2000 by Drywer.

F. Quality Standard:
1. Carrier Model 39MN.
2. Approved Manufacturers:
   a. Carrier.
   b. Bryant.
   c. York.
   d. Lennox.
   e. Trane.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Furnish and install vibration isolation pads under mounting rail at load points indicated by unit manufacturer. Size shall be as recommended by unit manufacturer.

B. Level unit including spring isolators.

C. Provide each drain connection with deep seal trap and pipe all connections to drain.

D. Provide drain valve on each coil drain fitting and vent valve on each coil vent.

E. Thoroughly seal and calk pipe and conduit penetrations to casing.

F. Seal floor penetrations.

3.2 ADJUSTING

A. Check and align access doors to ensure smooth operation.

B. At start-up, check each fan motor for rotation and amp draw for each phase. Mark reading on fan scroll.

C. Adjust belt drives for tension and alignment.

3.3 PROTECTION

A. Do not operate units until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION

SECTION 26 0501

MINOR ELECTRICAL DEMOLITION

PART 3 EXECUTION

1.01 EXAMINATION

A. Verify that abandoned wiring and equipment serve only abandoned facilities.

B. Beginning of demolition means installer accepts existing conditions.

1.02 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.

E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Notify Southern Utah University before partially or completely disabling system.

1.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new construction.

B. Remove abandoned wiring to source of supply.

C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

E. Repair adjacent construction and finishes damaged during demolition and extension work.

F. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

END OF SECTION

SECTION 26 0519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wire and cable for 600 volts and less.

B. Wiring connectors and connections.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 WIRING REQUIREMENTS

A. Concealed Dry Interior Locations: Use only building wire in raceway or metal clad cable.

B. Exposed Dry Interior Locations: Use only building wire in raceway or metal clad cable.

2.02 BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: NFPA 70, Type THHN/THWN.

2.03 METAL CLAD CABLE

A. Description: NFPA 70, Type MC.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation Temperature Rating: 60 degrees C.

E. Insulation Material: Thermoplastic.

F. Armor Material: Steel.

G. Armor Design: Interlocked metal tape.

PART 3 EXECUTION

3.01 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.02 INSTALLATION

A. Install wire and cable securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Route wire and cable as required to meet project conditions.

C. Use wiring methods indicated.

D. Pull all conductors into raceway at same time.

E. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

F. Neatly train and lace wiring inside boxes, equipment, and panelboards.

G. Clean conductor surfaces before installing lugs and connectors.

H. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

I. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

J. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

K. Identify and color code wire and cable under provisions of Section 26 0553 (16075). Identify each conductor with its circuit number or other designation indicated.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding components.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide bonding to meet requirements described in Quality Assurance.

B. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

END OF SECTION

SECTION 26 0529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MATERIALS

A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.

B. Supports: Fabricated of structural steel or formed steel members; galvanized.

C. Anchors and Fasteners:
   1. Concrete Structural Elements: Use precast inserts, expansion anchors, powder-actuated anchors, or preset inserts.
   2. Steel Structural Elements: Use beam clamps, steel spring clips, steel ramset fasteners, or welded fasteners.
   3. Concrete Surfaces: Use self-drilling anchors or expansion anchors.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.
   1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

B. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

C. Install surface-mounted cabinets and panelboards with minimum of four anchors.

D. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch (25 mm) off wall.

E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 26 0534

CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Conduit, fittings and conduit bodies.

1.02 RELATED REQUIREMENTS

A. Section 07 8400 (07840) - Firestopping.

B. Section 26 0526 (16060) - Grounding and Bonding for Electrical Systems.

C. Section 26 0529 (16070) - Hangers and Supports for Electrical Systems.

D. Section 26 0553 (16075) - Identification for Electrical Systems.

E. Section 26 0537 (16138) - Boxes.

1.03 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2005.

B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.

C. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

D. NECA 101 - Standard for Installing Steel Conduit (Rigid, IMC, EMT); National Electrical Contractors Association; 2006.

E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2007.

F. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit; National Electrical Manufacturers Association; 2003.

G. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing; National Electrical Manufacturers Association; 2004.

H. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

PART 2 PRODUCTS

2.01 CONDUIT REQUIREMENTS

A. Conduit Size: Comply with NFPA 70.
   1. Minimum Size: 3/4 inch (19 mm) unless otherwise specified.

B. Dry Locations:
   1. Concealed: Use rigid steel conduit, intermediate metal conduit, electrical metallic tubing, or thickwall nonmetallic conduit.
   2. Exposed: Use rigid steel conduit, intermediate metal conduit, electrical metallic tubing, or thickwall nonmetallic conduit.

2.02 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Intermediate Metal Conduit (IMC): Rigid steel.

C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.03 ELECTRICAL METALLIC TUBING (EMT)

A. Description: ANSI C80.3; galvanized tubing.

B. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron compression type.

2.04 NONMETALLIC CONDUIT

A. Description: NEMA TC 2; Schedule 40 PVC.

B. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Install steel conduit as specified in NECA 101.

C. Install nonmetallic conduit in accordance with manufacturer's instructions.

D. Arrange supports to prevent misalignment during wiring installation.

E. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

F. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.

G. Fasten conduit supports to building structure and surfaces under provisions of Section 26 0529 (16070).

H. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

I. Do not attach conduit to ceiling support wires.

J. Arrange conduit to maintain headroom and present neat appearance.

K. Route exposed conduit parallel and perpendicular to walls.

L. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

M. Route conduit in and under slab from point-to-point.

N. Maintain adequate clearance between conduit and piping.

O. Cut conduit square using saw or pipecutter; de-burr cut ends.

P. Bring conduit to shoulder of fittings; fasten securely.

Q. Install no more than equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one shot bender to fabricate bends in metal conduit larger than 2 inch (50 mm) size.

R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

S. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic.

T. Provide suitable pull string in each empty conduit except sleeves and nipples.

U. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

V. Ground and bond conduit under provisions of Section 26 0526 (16060).

W. Identify conduit under provisions of Section 26 0553 (16075).

3.02 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400 (07840).

END OF SECTION

SECTION 26 0537

BOXES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall and ceiling outlet boxes.

B. Pull and junction boxes.

1.02 RELATED REQUIREMENTS

A. Section 07 8400 (07840) - Firestopping.

B. Section 26 2726 (16140) - Wiring Devices: Wall plates in finished areas.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

B. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2007.

C. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association; 2003.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2003.

E. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Provide products listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

B. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Provide gasketed cover by box manufacturer. Provide threaded hubs.

C. Wall Plates for Finished Areas: As specified in Section 26 2726 (16140).

2.02 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.

C. Set wall mounted boxes at elevations to accommodate mounting heights indicated.

D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.

1. Adjust box locations up to 10 feet (3 m) if required to accommodate intended purpose.

E. Orient boxes to accommodate wiring devices oriented as specified in Section 26 2726 (16140).

F. Maintain headroom and present neat mechanical appearance.

G. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

H. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches (150 mm) from ceiling access panel or from removable recessed luminaire.

I. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400 (07840).

J. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

K. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

L. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

M. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches (305 mm) of box.

N. Use gang box where more than one device is mounted together. Do not use sectional box.

3.02 ADJUSTING

A. Install knockout closures in unused box openings.

3.03 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates and labels.

B. Wire and cable markers.

1.02 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 NAMEPLATES AND LABELS

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

B. Letter Size:
   1. Use 1/8 inch (3 mm) letters for identifying individual equipment and loads.
   2. Use 1/4 inch (6 mm) letters for identifying grouped equipment and loads.

2.02 WIRE MARKERS

A. Legend:
   1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION

A. Install nameplates and labels parallel to equipment lines.

B. Secure nameplates to equipment front using screws.

C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.

END OF SECTION

SECTION 26 5100

INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior luminaires and accessories.

B. Emergency lighting units.

C. Exit signs.

D. Lamps.

1.02 REFERENCE STANDARDS

A. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association; 2006.

B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

C. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 2006.

1.03 SUBMITTALS

A. See Section 01 3000 (01300) - Administrative Requirements, for submittal procedures.

B. Product Data: Provide dimensions, ratings, and performance data.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70 and NFPA 101.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Substitutions: See Section 01 6000 (01600) - Product Requirements.

2.02 LUMINAIRES

A. Furnish products as indicated in Schedule included on the Drawings.

B. Substitutions: See Section 01 6000 (01600) - Product Requirements.

2.03 LAMPS

A. Manufacturers:
   1. GE Lighting: www.gelighting.com.
   2. Philips Lighting Co of NA: www.lighting.philips.com.
   3. Substitutions: See Section 01 6000 (01600) - Product Requirements.

B. Lamp Types: As specified for each luminaire.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting).

B. Install accessories furnished with each luminaire.

C. Connect luminaires and exit signs to branch circuit outlets provided under Section 26 0537 (16138) using flexible conduit.

D. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

E. Bond products and metal accessories to branch circuit equipment grounding conductor.

F. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

3.02 FIELD QUALITY CONTROL

A. Perform field inspection in accordance with Section 01 4000 (01400).

B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.03 ADJUSTING

A. Aim and adjust luminaires as directed.

B. Position exit sign directional arrows as indicated.

3.04 CLEANING

A. Clean electrical parts to remove conductive and deleterious materials.

B. Remove dirt and debris from enclosures.

C. Clean finishes and touch up damage.

3.05 PROTECTION

A. Relamp luminaires that have failed lamps at Substantial Completion.

3.06 SCHEDULE - See Drawings

END OF SECTION

SECTION 27 4116

INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Amplifier and control equipment.

B. Input equipment.

C. Sound system cable.

1.02 RELATED REQUIREMENTS

A. Section 01 7900 (01820) - Demonstration and Training.

B. Section 26 0526 (16060) - Grounding and Bonding for Electrical Systems.

C. Section 26 0537 (16138) - Boxes.

1.03 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

1.04 SYSTEM DESCRIPTION

A. Audio system for voice and music.

B. Video system in including video projector, conduit, standard boxes, cable, jacks, mounting hardware, etc.

C. Input components:
   1. Turntable.
   2. Compact disc player.
   3. Microphone.

1.05 SUBMITTALS

A. See Section 01 3000 (01300) - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate electrical characteristics and connection requirements. Indicate layout of equipment mounted in racks and cabinets, component interconnecting wiring, and wiring diagrams of field wiring to speakers and remote input devices.

C. Product Data: Provide data showing electrical characteristics and connection requirements for each component.

D. Operation Data: Include instructions for adjusting, operating, and extending the system.

E. Maintenance Data: Include repair procedures and spare parts documentation.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70 and Federal Communications Commission.

B. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Crown: www.crownaudio.com.

B. Marantz: www.d-mpro.com.

C. TOA: www.toaelectronics.com

D. DBX: www.dbxpro.com

E. Atlas: www.atlassound.com

F. Audio-Technica: www.audio-technica.com

G. Shure: www.shure.com

H. Denon: www.usa.denonm.com

I. Tascam: www.tascam.com

J. EMTech: www.emtechelectronics.com

K. InFocus: www.infocus.com

L. Substitutions: See Section 01 6000 (01600) - Product Requirements.

2.02 AMPLIFICATION AND CONTROL EQUIPMENT

A. Microphone Inputs: Two low impedance inputs with 600 microvolt sensitivity and noise level at least 55 dB below rated output.

B. System Frequency Response: 50 to 15,000 Hz, plus or minus 2 dB.

C. System Distortion: Less than 1.5 percent, 100 to 100,000 Hz at rated power.

D. System Cabinet: Rack mounted.

2.03 COMPONENTS

A. Compact Disc Player: Marantz PMD 351.
   1. Substitutions: See Section 01 6000 (01600) - Product Requirements.

B. Microphone: Desk type low impedance microphone with push-to-talk switch.

C. Speakers: 8 inch (200 mm) coaxial speaker with integral crossover circuit.
   1. Frequency Range: 45 to 18,000 Hz.
   2. Dispersion: Minus 3 dB at 90 degrees, minus 5 dB at 110 degrees.

D. Speaker Baffles and Enclosure: Square, painted steel, with uniform perforations.
   1. Finish: by ARCHITECT.
   2. Speaker Backbox: Insulated with sound-deadening material.

E. Equipment Rack: Floor mounted equipment rack.
   1. Equipment Mounting Width: 19 inch (483 mm).
   2. Finish: by ARCHITECT.

F. Video Projectors (ceiling mounted).
   1. Brightness: 3200 lumens min.
   2. Uniformity: 85% min.
   3. Contrast Ratio: 800:1
   4. Aspect Ratio: 16:9
   5. Projection: 5' to 32'
   6. Data signals: VGA, SVGA, XGA, SXGA, S-Video, RCA-Component
   7. Video: Full NTSC, PAL SECAM, HDTV, EDTV
   8. Full function remote control
   9. Substitutions: See Section 01 6000 (01600) - Product Requirements.

2.04 WIRE AND CABLE

A. Microphone Cord: 20 AWG stranded copper conductor, 600 volt insulation, rated 60 degrees C, two conductor shielded cable with rubber jacket.

B. Input Cable: 22 AWG copper conductor, 300 volt insulation, rated 60 degrees C, paired conductors twisted together, shielded, and covered with a PVC jacket.

2.05 Video Accessories

A. For purposes of this specification O dBmV shall be equal to 1,000 microvolt across 75 ohms.

B. All passive distribution equipment and cable shall pass frequencies from 5-500 MHZ and be back matched for future sub-channel room origination.

C. All splitters and couplers shall provide a shielding level of at least 80 Db.

D. All outlets shall be isolated from the cable by a minimum of 12 db and from any other outlet by a minimum of 28 db.

E. The contractor shall ascertain the requirements of the project and shall provide any taps, filters, outlets or cable required to achieve the specified performance and provide a picture at any outlet equal in quality to that of signals directly form the cable drop.

F. Equipment as specified is manufactured by Blonder Tongue and Belden. Equals of Jerrold, Scientific Atlanta, Pico Macom, West Penn or Times Fiber shall be acceptable.

G. Provide with all required ceiling-mount hardware
   1. Premier Mounts - PP-FCTA false ceiling mount
   2. Premier Mounts - Gyrolock PBC series with 1 2" AST-2446 suspension adapter
   3. Substitutions: See Section 01 6000 (01600) - Product Requirements.

PART 3 EXECUTION

3.01 INSTALLATION

A. Furnish and install a complete Audio-Video system in accordance with the specifications and drawings.

B. Install in accordance with manufacturer's instructions.

C. Mounting Heights: Coordinate locations of outlet boxes specified in Section 26 0537 (16138) to obtain mounting heights specified and indicated.

D. Splice cable only in accessible junction boxes or at terminal block units.

E. Make cable shields continuous at splices and connect speaker circuit shield to equipment ground only at amplifier.

F. Install input circuits in separate cables and raceways from output circuits.

G. Provide protection for exposed cables where subject to damage.

H. Support cables above accessible ceilings to keep them from resting on ceiling tiles. Use spring metal clips or plastic cable ties to support cables from structure for ceiling suspension system. Include bridle rings or drive rings.

I. Use suitable cable fittings and connectors.

J. Ground and bond equipment and circuits in accordance with Section 26 0526 (16060).

K. Provide and install signal cables from interface boxes to video projectors as shown on drawings.

3.02 ADJUSTING

A. Adjust transformer taps for appropriate sound level.

B. Adjust devices and wall plates to be flush and level.

3.03 CLOSEOUT ACTIVITIES

A. See Section 01 7900 (01820) - Demonstration and Training, for additional requirements.

B. Demonstration: Demonstrate operation of system to Southern Utah University's personnel.
   1. Use operation and maintenance data as reference during demonstration.
   2. Briefly describe function, operation, and maintenance of each component.

END OF SECTION

SECTION 28 3100

FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire alarm system design and installation, including all components, wiring, and conduit.

B. Circuits from protected premises to supervising station, including conduit.

C. Replacement and removal of existing fire alarm system components, wiring, and conduit indicated.

1.02 RELATED REQUIREMENTS

A. Section 07 8400 (07840) - Firestopping: Materials and methods for work to be performed by this installer.

B. Section 23 3300 (15820) - Air Duct Accessories: Smoke dampers monitored and controlled by fire alarm system.

1.03 REFERENCE STANDARDS

A. IEEE C62.41 - IEEE Recommended Practice on Surge Voltages in Low-Voltage Power Circuits; 1991 (R1995).

B. NFPA 70 - National Electrical Code; 2008.

C. NFPA 72 - National Fire Alarm Code; 2007.

1.04 SUBMITTALS

A. See Section 01 3000 (01300) - Administrative Requirements, for submittal procedures.

B. Drawings must be prepared as reproducible drawings.

C. Evidence of designer qualifications.

D. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:
   1. Copy (if any) of list of data required by authority having jurisdiction.
   2. NFPA 72 "Record of Completion", filled out to the extent known at the time.
   3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A-7-5-2.2(9), and complete listing of software required.
   4. System zone boundaries and interfaces to fire safety systems.
   5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
   6. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
   7. List of all devices on each signaling line circuit, with spare capacity indicated.
   8. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
   9. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
   10. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.

11. Certification by the manufacturer of the control unit that the system design complies with the contract documents.
12. Certification by Contractor that the system design complies with the contract documents.
13. Do not show existing components to be removed.

E. Inspection and Test Reports:
1. Submit inspection and test plan prior to closeout demonstration.
2. Submit documentation of satisfactory inspections and tests.
3. Submit NFPA 72 "Inspection and Test Form," filled out.

F. Project Record Documents: See Section 01 7800 (01780) for additional requirements; have one set available during closeout demonstration:
1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
2. "As installed" wiring and schematic diagrams, with final terminal identifications.
3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.

G. Closeout Documents:
1. Certification by manufacturer that the system has been installed in compliance with his installation requirements, is complete, and is in satisfactory operating condition.
2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.

1.05 QUALITY ASSURANCE

1.06 WARRANTY

A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.

B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 FIRE ALARM SYSTEM

A. Fire Alarm System: Provide modifications and extensions to the existing automatic fire detection and alarm system:
1. Provide all components necessary, regardless of whether shown in the contract documents or not.
2. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
   a. The Americans With Disabilities Act (ADA).
   b. The requirements of the State Fire Marshal.
   c. The requirements of the local authority having jurisdiction, which is _____.
   d. Applicable local codes.
   e. The contract documents (drawings and specifications).
   f. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
3. Fire Command Center: Location indicated on drawings.
4. Master Control Unit (Panel): Existing, located at fire command center.

B. Circuits:
1. Initiating Device Circuits (IDC): Class B, Style A.
2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
3. Notification Appliance Circuits (NAC): Class A, Style Z.

2.02 EXISTING COMPONENTS

A. Existing Fire Alarm System: Remove existing components indicated and incorporate remaining components into new system, under warranty as if they were new; do not take existing portions of system out of service until new portions are fully operational, tested, and connected to existing system.

B. Clearly label components that are "Not In Service."

C. Remove unused existing components and materials from site and dispose of properly.

2.03 FIRE SAFETY SYSTEMS INTERFACES

A. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:
   1. Duct smoke detectors.

B. HVAC:
   1. Duct Smoke Detectors: Close dampers indicated; shut down air handlers indicated.

2.04 COMPONENTS

A. General:
   1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
   2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.

B. Fire Alarm Control Units, Initiating Devices, and Notification Appliances: Analog, addressable type; listed by Underwriters Laboratories as suitable for the purpose intended.

C. Initiating Devices:

D. Notification Appliances:

E. Circuit Conductors: Copper or optical fiber; provide 200 feet (60 m) extra; color code and label.

F. Surge Protection: In accordance with IEEE C62.41 B3 combination waveform and NFPA 70; except for optical fiber conductors.

G. Locks and Keys: Deliver keys to Southern Utah University.

H. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
   1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.
   2. Provide one for each control unit where operations are to be performed.
   3. Obtain approval of Southern Utah University prior to mounting; mount in location acceptable to Southern Utah University.
   4. Provide extra copy with operation and maintenance data submittal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and the contract documents.

B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.

C. Obtain Southern Utah University's approval of locations of devices, before installation.

D. Install instruction cards and labels.

3.02 INSPECTION AND TESTING FOR COMPLETION

A. Notify Southern Utah University 7 days prior to beginning completion inspections and tests.

B. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.

C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.

D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.

E. Provide all tools, software, and supplies required to accomplish inspection and testing.

F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

G. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

3.03 CLOSEOUT

A. Closeout Demonstration: Demonstrate proper operation of all functions to Southern Utah University.
   1. Be prepared to conduct any of the required tests.
   2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
   3. Have authorized technical representative of control unit manufacturer present during demonstration.
   4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
   5. Repeat demonstration until successful.

END OF SECTION