Building D Science Lab
Fume Hoods Addition
For
Chipola College
Marianna, FL

Joel F. Paul, Jr	**Chair**
Danny Ryals	**Vice-Chair**
Sherry Young	**Board Member**
Thomas S. Lassmann	**Board Member**
Robert Reiff	**Board Member**
Melissa Cauley	**Board Member**
Dell Corbin	**Board Member**
Chris Campbell	**Board Member**
Joseph Shuler	**Board Member**
B. Shannon Saunders	**Board Attorney**
Dr. Sarah Clemmons	**President**

Statement of Compliance:

To the best of my knowledge, these drawings and the project manual are complete and comply with the Florida Building Code.

Date: May 21, 2026
Construction Documents

4452 Clinton Street
Marianna, FL 32446
FL Certificate of Authorization: 27825
Steven L Day, PE Florida License: 52607

WATFORD
ENGINEERING

TABLE OF CONTENTS

DIVISION 15 MECHANICAL

DIVISION 16 ELECTRICAL

END OF TABLE OF CONTENTS

INVITATION TO BID

Chipola College is extending an invitation to all qualified companies to submit a bid to perform all work associated with the Building D Science Lab Fume Hood Additions, Marianna, Florida.

Sealed bids will be received on June 11, 2026, until 10:00 AM, Central Time, in the Physical Plant at the Chipola College, 3094 Indian Circle, Marianna, Florida 32446. The bids shall be opened and read aloud at that time. The work shall consist of the addition of two pass through laboratory fume hoods and associated mechanical, electrical, and architectural work in accordance with the Plans and Specifications prepared by **WATFORD ENGINEERING,** 4452 Clinton Street, Marianna, Florida 32466.

Bids shall be a lump sum price; segregated bids will not be accepted.

Drawings and specifications may be examined at the office of the Engineer.

Contractors may obtain documents at the office of the Engineer, 4452 Clinton Street, Marianna, FL 32466. A deposit of $100 per set will be required, made payable to Watford Engineering. Plan and specification deposits by Contractors will be refunded if the Contractor submits a bonafide bid and documents are returned to the Engineer within five calendar days after the bid opening in usable condition. The Engineer's decision on usable condition shall be final.

A mandatory Pre-Bid Meeting shall be held for all concerned parties on May 28, 2026 at the Physical Plant at the Chipola College, 3094 Indian Circle, Marianna, Florida 32446 at 10:00 AM Central Time. Notification of any changes in meeting time/date will be made only to listed plan holders.

The Owner reserves the right to reject any or all Bids, accept Bids in any order or combination, accept or reject portions of Bids, make modifications to the work after bidding, and waive any informalities in the Bids if deemed in its best interest to do so. No bid may be withdrawn for sixty (60) days after the actual closing time for receipt of bids

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00100/INSTRUCTIONS TO BIDDERS

PART 1 - INSTRUCTIONS TO BIDDERS

A. The "Instructions to Bidders" of the American Institute of Architects, AIA Document A701, 1997 Edition are an integral part of the Specifications, as if written in full herein.

B. Copies of the "Instructions to Bidders" are on file and may be examined in the office of the Owner's Agent.

C. The Contractor is hereby specifically directed, as a condition of the contract, to obtain the necessary number of copies of Document A701 so as to acquaint himself with the Articles contained therein and to notify and appraise all Subcontractors, Suppliers and any other parties of the Contract or individuals or agencies engaged in the work as to its contents.

D. No contractual adjustments shall be due or become exigent as a result of, or failure on the part of the Contractor to fully acquaint himself and all other parties to the contract with the conditions of Document A701.

PART 2 - SUPPLEMENTARY CONDITIONS

A. Clarifications, modifications and additions to the Standard Instructions to Bidders are included in Section 00200 - Supplementary Instructions to Bidders of these Specifications.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00200/SUPPLEMENTARY INSTRUCTIONS

PART 1 - GENERAL

A. Supplements modify, change, delete from or add to the "Instructions to Bidders, AIA Document A701, 1997 Edition. Where any article of the Instructions to Bidders is modified or any Paragraph, Subparagraph or Clause is modified or deleted by these Supplements, the unaltered provisions of that Article, Paragraph, Subparagraph or clause shall remain in effect.

PART 2 - RECEIPT OF BIDS

A. Chipola College will receive lump sum bids to perform all work associated with Science Labs HVAC Renovations.

B. Bids shall be received until 10:00 a.m. local time, June 11, 2026.

C. Submit Bids To: Chipola College
Physical Plant Conference Room
4410 Longhouse Court
Marianna, FL 32446

D. Sealed bids shall be received until the above noted time and date for a "Lump Sum" Contract, based on the provisions of the Drawings and Project Manual as furnished by Watford Engineering, Inc., 4452 Clinton Street, Marianna, FL 32446.

PART 3 - COPIES OF BIDDING DOCUMENTS

3.1 SETS OF PLANS AND SPECS

A. General Contractors and Subcontractors may obtain two complete sets of plans and specifications from Watford Engineering, Inc., 4452 Clinton Street, Marianna, FL 32446. A deposit of $100.00 will be required made payable to Watford Engineering, Inc. Electronic plans in portable document format (PDF) can be obtained without deposit.

B. Plan and specification deposits by General Contractors and Subcontractors will be refunded if the documents are returned in usable condition to the Engineer within five calendar days after the bid opening. The Engineer's decision on usable condition shall be final.

3.2 SHIPPING AND HANDLING CHARGES

A. All shipping charges for delivery and return shall be borne by the party requesting documents.

3.3 REQUESTS FOR DRAWINGS AND SPECIFICATIONS

A. Requests for Specifications and Drawings at the above stated prices should be made to Watford Engineering, Inc.

3.4 EXAMINATION OF DOCUMENTS

A. Construction Documents may be examined at the Engineer's office.

PART 4 - INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

4.1 NOTIFICATION OF ERROR

A. Bidders and Subcontractors shall promptly notify the Engineer and Owner of any ambiguity, inconsistency or error which they may discover upon examination of the Bidding Documents or of the site and local conditions.

4.2 FAILURE TO BE FULLY INFORMED

A. No claim for additional compensation shall be entertained on behalf of or paid to General Contractor or any Subcontractor on account of his/her failure to be fully informed of all requirements of all parts of the Specifications, Addenda or Drawings. They are part of the Contract Documents and of the Contract and all Bidders should be thoroughly familiar with the content and requirements before submitting proposals.

PART 5 - PROPOSAL

5.1 GENERAL

A. SUBMIT PROPOSAL IN THE SAME FORM AS FOUND IN SECTION 00300, BID FORM.

B. The form may be removed from the specifications or typed as the Bidder so desires. Complete the form without interlineation, alteration or erasure. Amounts must be in both words and figures, with the Bidder's name fully stated; signature in longhand, executed by principal authorized to make contracts. When complete, proposal shall be placed in a sealed envelope, along with bid bond, sealed and labeled "BID DOCUMENTS".

C. Bids may be retained by the Owner for a period not to exceed sixty days from the time of opening of bids.

PART 6 - BID SECURITY

6.1 GENERAL

A. Each bid shall be accompanied by a Bid Security in the form of a Certified Check, Bid Bond, or Cashier’s Check made payable to the Owner in the amount of five percent (5%) of the total proposal, including all alternates if any, pledging that the Bidder shall enter into a contract with the Owner on the terms stated in his Bid and shall furnish bonds as described hereunder in Part 12 covering the faithful performance of the Contract and the payment of all obligations arising thereunder. If cash or check Bid Security is used, then the Bidder shall furnish with his Bid, a

commitment from Surety that a Performance and Payment Bond will be issued if the Contract is awarded to the Bidder. Should the bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Paragraph 5.3.1 of the Instructions to Bidders.

1. The Bond shall show that it is signed and sealed on the date of the bid.
2. Surety Bond shall be written on a standard Bid Bond Form and the Attorney-in-Fact who executes the bond on behalf of the surety shall affix to the bond a certified current copy of his Power of Attorney to execute obligations on behalf of the surety company.
3. The Owner shall have the right to retain the bid security of the Bidders to whom an award is being considered until either (1) the contract has been executed and bonds, if required, have been furnished, or (2) the specified time has elapsed so that Bids may be withdrawn, or (3) all Bids have been rejected.

PART 7 - WITHDRAWAL OF BID

7.1 GENERAL

A. All bids shall be held valid for a period of sixty days after receipt of bids.

PART 8 - SUBCONTRACTOR LISTING

8.1 GENERAL

A. Subcontractor to be employed for parts of the Work, as requested in the Bid Form, Section 00300, shall be listed. This requirement is mandatory. The competency and responsibility of listed subcontractors shall be considered in making the award of the Contract.

B. Prior to the award of the Contract, the Owner shall notify the Bidder in writing if either the Owner or the Owner's Agent, after due investigation, has reasonable objection to any such proposed Subcontractor. If the Owner or Owner's Agent has reasonable objection to any such proposed Subcontractor, the Bidder may, at his option, (1) withdraw his bid, or (2) submit an acceptable substitute Subcontractor.

C. Subcontractors proposed by the Bidder and to whom the Owner and the Owner's Agent have made no reasonable objection under the provisions of Paragraph 8.01-B. shall be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and the Owner's Agent.

PART 9 - OPENING OF BIDS

9.1 GENERAL

A. The properly identified Bids received on time shall be opened publicly and shall be read aloud in the Director of Facilities Office at the Chipola College, 4410 Longhouse Court, Marianna, Florida.

PART 10 - CONTRACTOR'S QUALIFICATION STATEMENT

10.1 GENERAL

A. In lieu of AIA Document A305, Contractor's Qualification Statement, the Contractor's Resume Statement which is part of the Bid Form shall be submitted (see Section 00300).

PART 11 - FAMILIARITY WITH LAWS

11.1 GENERAL

A. The Bidder is required to be familiar with all Federal, State and Local laws, ordinances, rules and regulations that in any manner affect the work. Ignorance on the part of the Bidder shall in no way relieve him from responsibility.

PART 12 - BOND REQUIREMENTS

12.1 GENERAL

A. Prior to execution of the Contract, the Bidder shall furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder in such form and amount as stated hereafter. Bonds may be secured through the Bidder's usual sources.

B. To be acceptable to the Chipola College as Surety for Bid Bonds and Performance and Payment Bonds a Surety Company shall comply with the following provisions:

1. The Surety Company must be admitted to do business in the State of Florida.
2. The Surety Company shall have been in business and have record of successful continuous operations for at least five (5) years.
3. The Surety Company shall have a least the following minimum ratings:

CONTRACT AMOUNT	POLICYHOLDER'S FINANCIAL REQUIRED RATING	RATING CLASS
Performance Bond equal to 100% of Contract Price	A- or better	III

4. Best's Policyholder's Rating of "A-" and "B" (which signifies A- = Excellent, and B = Good, based upon good underwriting, economic management, adequate reserves for undisclosed liabilities, net resources for unusual stock and sound investment) or an equivalent rating from the Insurance commissioner if not rated by Best's.

5. The Surety Company shall not expose itself to any loss on any one risk in an amount exceeding ten percent (10%) of its surplus policyholders, provided:
   a. Any risk or portion of any risk shall have been reinsured (in which case these minimum requirements contained herein also apply to the reinsuring carrier) in assuming insurer authorized or approved by the Insurance Commissioner to do business in this State shall be deducted in determining the limitation of risk prescribed in this section.
   b. In the case of a surety insurance company, there shall be deducted in addition to the deduction for reinsurance, the amount assumed by any co-surety.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00300/BID FORM

DATE: _____

BIDDERS NAME:_____

STREET AND CITY:_____

TELEPHONE NO:_____

TO: Chipola College
4410 Longhouse Court
Marianna, FL 32446

Gentlemen:

The bidder, in compliance with your Invitation to Bid for the Building D Science Lab Fume Hood Additions for Chipola College and having carefully examined the Project Drawings, the Project Manual and the site of the proposed work, and being familiar with conditions existing including availability of materials, proposes to furnish all labor, materials and equipment to construct the project in accordance with the Contract Documents, and the time indicated, at the price stated below. These prices shall cover all expenses incurred in performing the work required by the Contract Documents.

Drawings dated May 21, 2026 are as listed in the Index of Drawings on Sheet No. 1 of the Drawings.

Specifications dated May 21, 2026 are as listed in the Index of Specifications at the front of the Project Manual.

Also examined were the Contract provisions, the Site Work and the conditions affecting the Work and Addenda including,

Addendum No.:_____; Dated:_____; Pages ___ of ___.

Addendum No.:_____; Dated:_____; Pages ___ of ___.

Addendum No.:_____; Dated:_____; Pages ___ of ___.

Addendum No.:_____; Dated:_____; Pages ___ of ___.

Addendum No.:_____; Dated:_____; Pages ___ of ___.

In submitting this bid I agree:

1. To hold my bid open for 60 days after the bid date.

2. To accept the provisions of the Standard Contract documents of the Owner regarding disposition of bid security.

3. To enter into and execute a contract, if awarded, on the basis of this bid and to furnish Bonds in accordance with Specification Section 00500, and the General Conditions of the Contract for Construction.

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

5. TIME OF COMPLETION: The Undersigned hereby affirms and states that, if awarded the Contract for said Work, he shall commence Work as described herein. The construction documents allow 180 calendar days to achieve substantial completion.

6. LIQUIDATED DAMAGES: The Contractor shall pay as liquidated damages (not as a penalty) the sum of $1,000.00 for each consecutive calendar day elapsing between date fixed by Contract for Substantial Completion and date such Substantial Completion has been fully accomplished. Liquidated damages shall also be incurred at $1,000.00 each day upon Contractors failure to obtain Final Completion certification within 30 days of Substantial Completion date.

   I, the Undersigned, hereby submit the following proposal:

7. BASE BID

   I shall furnish all labor, materials, services and incidentals, and perform all Work necessary for the completion of work as shown and specified in strict accordance with the above-named Contract Documents for the sums and prices as listed below:

   $ _____

   (_____DOLLARS)
   (Amount shall be shown in both numerals and words. Amount in words shall govern.)

8. UNIT PRICES:

   Not Used

9. ALTERNATES: not used

10. CONSTRUCTION PROGRESS SCHEDULE: The Undersigned hereby agrees that if awarded the Contract he shall submit a Daily Progress Schedule within fifteen (15) consecutive calendar days following notification of Contract award. (See Section 01160, Progress Schedule.)

11. CONTRACT PROVISIONS: I understand that the Owner reserves the right to reject any or all bids and to waive any irregularities in the bidding.

12. Upon receipt of written notice of the acceptance of this bid, Bidder shall execute the formal contract within ten (10) days and deliver a Surety Bond or Bonds as required by Invitation to Bid.

13. I have executed and attached the following:

    a. Sworn Statement Under Section 287.133(3)(A), Florida Statutes, on Public Entity Crimes.
    b. Sworn Statement on Drug-Free Workplace Program.
    c. Sworn statement on Material Safety Data Form (MSDF).
    d. List of Subcontractors
    e. Contractor's Resume' Statements for Subcontractors.

_____
COMPANY

_____ _____
DATE ..... BY (SIGNATURE)

_____
TITLE

(SEAL - IF BID IS BY CORPORATION)

STATE OF _____

COUNTY OF _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____
[name of individual signing]

who, after first being sworn by me, affixed his/her signature in the space provided above on

this _____ day of _____, 20____.

_____ ..... SEAL
NOTARY PUBLIC

My commission expires: _____

SWORN STATEMENT PURSUANT TO SECTION 287.133(3)(a), FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted to..... _____
[print name of the public entity]

by _____.
[print individual's name and title]

for _____
[print name of entity submitting sworn statement]

whose business address is

_____

_____

and (if applicable) its Federal Employer Identification Number (FEIN) is

_____

(If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement: _____.)

2. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

3. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, means:
    1. A predecessor or successor of a person convicted of a public entity crime; or

2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a "person" as defined in Paragraph 287.133(1)(e), Florida Statutes means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

6. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. [Indicate which statement applies.]

_____ Neither the entity submitting this sworn statement, nor any of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, nor any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. [attach a copy of the final order]

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES FOR CATEGORY TWO OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

_____
[signature]

STATE OF _____

COUNTY OF _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____
[name of individual signing]

who, after first being sworn by me, affixed his/her signature in the space provided above on

this _____ day of _____, 20____.

_____ ..... SEAL
NOTARY PUBLIC

My commission expires:

END OF SWORN STATEMENT ON PUBLIC ENTITY CRIMES

SWORN STATEMENT PURSUANT TO SECTION 287.087 AND 440.102, FLORIDA STATUTES, DRUG-FREE WORK PLACE PROGRAM

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted to _____

   by _____
   (print individual's name and title)

   for _____
   (print name of entity submitting sworn statement)

   whose business address is:_____

   _____

   and (if applicable) its Federal Employer Identification Number (FEIN) is

   _____.

2. It is my understanding that the Owner, Chipola College is encouraged by State Law to give preference to entities with DRUG-FREE WORK PLACE PROGRAMS authorized by Florida Statutes, Section 287.087 and that the entity is eligible for discounts to its Worker's Compensation Insurance Premiums under Florida Statute Section 440.102.

   _____
   (signature)

STATE OF _____

COUNTY OF _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____
[name of individual signing]

who, after first being sworn by me, affixed his/her signature in the space provided above on this _____ day of _____, 20____.

_____ SEAL
NOTARY PUBLIC

My commission expires:

END OF DRUG-FREE WORK PLACE PROGRAM STATEMENT

SWORN STATEMENT PURSUANT TO FLORIDA STATUTES, MATERIAL SAFETY DATA FORM (MSDF)

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted to _____

   by_____
   (print individual's name and title)

   for_____
   (print name of entity submitting sworn statement)

   whose business address is

   _____

   _____

   and (if applicable) its Federal Employer Identification Number (FEIN) is

   _____.

2 It is my understanding that the Owner, Chipola College, requires the Bidder to submit to the Owner within five (5) business days from Bid Date the following items:

   a. List of all chemicals and/or products that may emit, leak, evaporate, be dissolved from, or produced by the services that the Contractor is proposing;

   b. List shall include a clear deliberation of chemical content of product, containing all information required by Federal OSHA Hazard Construction Law and Florida's Right-to-Know Law; list shall have Bid number and Bid Item Number stated on Data Sheets.

   c. For building or construction materials, or building furnishings, the Contractor shall submit in writing any chemical emission or exposure data that the product contains.

   d. Safety and Health Precautions to be employed to protect Workers who will be doing the work;

   e. Safety and Health Precautions to be employed to protect the building occupants, general public and other nearby tradesmen;

f. Safety and Health precautions to ensure that the work space, building, or Chipola College's properties are not contaminated as it may relate in any way to the services that are provided;

g. Precautions to be employed to ensure that harmful exposures shall not occur after the services have been provided, and a detailed description of the steps to be used to ensure this condition is achieved;

h. Procedures for the disposal of wastes or by-products, and a statement that the Contractor shall dispose of all wastes in compliance with applicable regulatory agencies.

3. Contractor is projecting himself as an expert in these services, and as such should be very familiar with listed items (a) through (h); As a knowledgeable entity about these services and products, the Contractor shall also be held fully and solely responsible for any problems that result in injury, illness, property damage or loss, or contamination of the air, soil, or water, or fines imposed by any regulatory agency for failure to comply with the regulations or prudent actions, that result from his services and/or the products used in supplying these services.

4. Submission of the Bid acknowledges and accepts the agreement to provide these services or materials and the Contractor agrees with all of the provisions listed above, and agrees to fully indemnify the Chipola College for any and all costs to the Chipola College that are the result of contamination, people exposures, damage to Chipola College, Engineer, and all personal property, or regulatory actions.

5. Contractor understands and agrees, if any of these provisions are not agreed to or provided as required in the Bid Application, the Contractor may be disqualified on the basis of being unresponsive to the Bid Requirements.

6. If after the contract has been secured, the Contractor fails to comply with any of these provisions, the work may be stopped immediately by the Chipola College, and the contract may be terminated at no penalty to the Chipola College. Should this occur, then the difference between this bid price and that of the next highest bidder shall be withheld as punitive damages for failing to comply with this agreement. The intent of this provision is for the Contractor to provide services and materials that shall not cause any harm to the students, staff, faculty, other tradesmen, school visitors or business invites, the indoor or outdoor environments, Chipola College property, or neighboring properties, and to ensure that the Bidder complies fully with all applicable regulatory agency requirements.

7. The Chipola College reserves the right to request additional information from the Contractor and Supplier concerning the contents of the products submitted by the Contractor for the corresponding bid item.

8. All questions concerning the requirements shall be submitted in writing to be forwarded to Chipola College.

_____
(signature)

STATE OF _____

COUNTY OF _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____
[name of individual signing]

who, after first being sworn by me, affixed his/her signature in the space provided above on this _____ day of _____, 20____.

_____ SEAL
NOTARY PUBLIC

My commission expires:

END OF MATERIAL SAFETY DATA FORM (MSDF) STATEMENT

END OF BID FORM

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00400/LIST OF SUBCONTRACTORS

NOTICE:

Each bidder shall submit with his Proposal, a list of his subcontractors as shown below and attach same to his bid package. No change may be made in the subcontractor list submitted except upon written approval of the Owner. Only a single copy of this list need be submitted.

The contractor shall submit a resume statement for all subcontractors listed below that are not prequalified to bid Chipola College Projects.

This list is attached to, and is an integral part of the proposal submitted by:

NAME:_____

ADDRESS:_____

FOR: **Building D Science Lab Fume Hood Additions**
FOR CHIPOLA COLLEGE
MARIANNA, FLORIDA

The undersigned hereinafter called the bidder, lists below the names of the subcontractors who will perform the phase of the work indicated.

Concrete:	Name:_____
	Address:_____
Electrical:	Name:_____
	Address:_____
Plumbing:	Name:_____
	Address:_____
Other:	Name:_____
	Address:_____

The undersigned declares that he has fully investigated each subcontractor listed and has received, and has in his files, evidence that the subcontractor is properly and currently licensed in the place where

required by local or state laws, has been engaged successfully in his line of work and his organization is capable, technically and financially, of performing the pertinent work, and that he has made similar installations in a satisfactory manner.

IN WITNESS WHEREOF, the bidder has hereunto set his signature and affixed his seal this

_____ day of _____, AD, 20__

By: _____ (SEAL)

Print Name:_____

SUBCONTRACTOR'S RESUME STATEMENT

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICE AUTHORIZED TO ADMINISTER OATHS.

ALL ITEMS AND BLANKS SHALL BE ADDRESSED AND COMPLETED. FAILURE TO DO SO MAY RESULT IN REJECTION OF THE BID.

THE UNDERSIGNED CERTIFIES UNDER OATH THAT THE INFORMATION PROVIDED HEREIN IS TRUE AND SUFFICIENTLY COMPLETE SO AS NOT TO BE MISLEADING.

1. This Sworn Statement is submitted with Bid Proposal for

   (Name of Project): _____

2. This Sworn Statement is submitted by:

   _____

3. Whose Principal Business Address is: _____

   _____

4. Social Security Number is (individual signing this statement):

   _____

5. SUBMITTED TO: _____

   ADDRESS: _____

   _____

6. TYPE OF BUSINESS:

   CORPORATION ____ ..... PARTNERSHIP ____

   INDIVIDUAL ____ ..... JOINT VENTURE ____

   OTHER ____

7. TYPE OF WORK (file separate form for each Classification of Work):

   ____ GENERAL CONSTRUCTION ..... ____ HVAC

____ PLUMBING ..... ____ ELECTRICAL

____ OTHER _____
(Please specify)

8. ORGANIZATION:

A. Years organization has been in business as a Contractor: _____

B. Years organization has been in business under its present business name:_____

C. Under what other or former names has your organization operated?
_____

D. If your organization is a corporation, answer the following:

1. Date of Incorporation: _____

2. State of Incorporation: _____

3. President's Name: _____

Officer's Names and Positions:

_____

_____

_____

E. If your organization is a partnership, answer the following:

1. Date of Organization: _____

2. Type of partnership (if applicable): _____

3. Name(s) of General Partner(s):

_____

_____

_____

_____

F. If your organization is individually owned, answer the following:

1. Date of Organization: _____

2. Name of Owner: _____

G. If the form of your organization is other than those listed above, describe it and name the principals:

_____

_____

_____

_____

9. LICENSING:

A. List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers if applicable. General Contractors must be state certified or registered and must attach a copy of their license.

_____

_____

_____

B. List jurisdictions in which your organization's partnership or trade name is filed.

_____

_____

_____

10. EXPERIENCE:

A. List the categories of work that your organization normally performs with its own forces.

_____

_____

B. Claims and suits. (If the answer to any of the questions below is yes, please attach details.)

1. Has your organization ever failed to complete any work awarded to it? _____

2. Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers? _____

3. Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years? _____

C. Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.) _____

D. On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

1. State total worth of work to be completed under existing contracts:

_____

E. On a separate sheet, list the major projects your organization has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

1. State average annual amount of construction work performed during the past five years:

_____

F. On a separate sheet, list the construction experience and present commitments of the key individuals of your organization.

11. REFERENCES:

A. Trade References:

_____

_____

_____

_____

B. Bank References:

_____

_____

_____

C. Surety:

1. Name of bonding company: _____

2. Name and address of agent:_____

_____

_____

3. Total maximum amount of bonding capabilities still remaining unbonded:

_____

12. FINANCING: I shall provide all Financing information upon demand of the Owner.

13. SIGNATURE:

A. Dated at _____ this _____ day of _____ 20 __.

Name of Organization:

_____

By: _____

Title: _____

M _____ being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading and does grant permission to verify any of the Sworn Statements made herein.

_____ SEAL
NOTARY PUBLIC

My commission expires:

END OF CONTRACTORS RESUME STATEMENT

SECTION 00500/AGREEMENT FORM AND BOND REQUIREMENTS

AGREEMENT FORM

The form of Contract shall be the Agreement Between Owner and Construction Manager provided herein.

BOND REQUIREMENTS

Unless otherwise specified or instructed, all bonds shall be paid for by Contractor and made payable to the Owner. AIA Document A312, 1984 Edition, shall be used.

BID BOND

See Project Manual Section 00200, Supplementary Instructions to Bidders, Part 6, Bid Security, for requirements of Bid Bond.

PERFORMANCE BOND

Performance Bond equal to one hundred percent (100%) of Contract price shall be required, plus any alternates. AIA Document A312, 1984 Edition, shall be used.

PAYMENT BOND

Payment Bond equal to one hundred percent (100%) of Contract price shall be required, plus any alternates. AIA Document A312, 1984 Edition, shall be used.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00800/GENERAL CONDITIONS

PART 1 - SUPPLEMENTARY CONDITIONS

A. Clarifications, modifications and additions to the Agreement Between Owner and Construction Manager are included in Section 00900 - Supplementary Conditions of these Specifications.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00850/AGREEMENT BETWEEN OWNER AND CONSTRUCTION MANAGER

THIS AGREEMENT made this ___ day of _____, 20___, between CHIPOLA COLLEGE (the "Owner") and _____, Federal I.D. No. _____, (the "CONTRACTOR"), for services in connection with the following described Project:
_____ (the "Project").
The Owner and the CONTRACTOR agree as set forth below:

SECTION 1: The Construction Team and Extent of Agreement

1.1 The CONTRACTOR agrees to furnish its best skill and judgment and to cooperate with any Owner appointed Architect/Engineer in furthering the interest of the Owner. The CONTRACTOR agrees to furnish efficient business administration and superintendence to complete the Project in an expeditious and economical manner consistent with the interest of the Owner, and in accordance with the Contract Documents and the original baseline project schedule.

1.2 The Construction Team: The CONTRACTOR, the Owner, and any Owner appointed Architect/Engineer (the "Construction Team") will work as a team through construction completion. The CONTRACTOR shall provide leadership to the Construction Team on all matters relating to construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the Contract. The Architect/Engineer will provide leadership to the Construction Team on all matters relating to design. The CONTRACTOR shall only work for the Owner's interest and acknowledges that while it is a member of the Construction Team, its fiduciary duty is toward the best interest of the Owner and no other party.

1.3 Extent of Agreement: The Contract Documents consist of this Agreement, the Drawings and Specifications, plus the following (if any) the Conditions of the Contract, all amendments and/or change orders issued subsequent to execution of this Agreement, the Bid (#_____), Instructions to Bidders, an Executed Bid Form, Special Provisions, Technical Specifications, Payment and Performance Bond(s),and together with them, represents the entire agreement between the Owner and the CONTRACTOR and supersedes all prior negotiations, representations or agreements, whether verbal or written. These documents form the Contract, and all are as fully a part of the Contract as if specifically attached to this Agreement and are incorporated herein by reference. Where this Agreement is expressly in conflict with any Conditions of the Contract, this Agreement will prevail. This Agreement may be amended only by written instrument signed by the Owner and CONTRACTOR. Further, the Owner may request to CONTRACTOR to construct other minor projects, as requested by the Owner and any other work that is agreed upon shall be memorialized by a written amendment to this Agreement, and such amendment shall adequately describe the scope of work and fee for such services, if any. Notwithstanding the foregoing, no deviations in the CONTRACTOR's Executed Bid form from the Invitation to Bid, Construction Plans and/or other Contract documents prepared by the Owner shall be incorporated herein unless expressly provided in this Agreement. Any conflict with the CONTRACTOR's Executed Bid Form

and related Invitation to Bid, Construction Plans or other contract documents prepared by the Owner shall be construed in favor of the contract documents prepared by the Owner.

SECTION 2: Representations Of The CONTRACTOR

2.1 In order to induce the Owner to execute this Agreement and recognizing that the Owner is relying thereon, the CONTRACTOR, by executing this Agreement, makes the following express representations to the Owner:

(A) The CONTRACTOR is fully qualified to act in said capacity for the Project and has, and shall maintain, any and all licenses, permits or other authorizations necessary to act as the CONTRACTOR for, and to construct, the Project;

(B) The CONTRACTOR has become familiar with the Project and related Project site and the local conditions under with the Project is to be constructed and operated;

(C) The CONTRACTOR has received, reviewed and carefully examined all of the documents which make up this Contract, including, but not limited to, the plans and specifications, and has found them in all respects to be complete, accurate, adequate, consistent, coordinated and sufficient for construction;

(D) CONTRACTOR warrants good, right and proper title to all materials, supplies, and equipment installed or incorporated in the work and agrees upon completion of all work to deliver to Owner all materials, supplies, and equipment installed or incorporated in the work constructed free of any claims, liens, or charges.

(E) CONTRACTOR warrants to the Owner that all materials and equipment furnished under this Agreement will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects and in conformity with the Agreement and the related Contract Documents. All work not so conforming to these standards at the time of acceptance or at the time of inspections, tests or approvals, shall be considered defective. If required by the Owner, the CONTRACTOR shall furnish satisfactory evidence as to the kind and quality of material and equipment.

(F) Unless otherwise specifically noted herein, the CONTRACTOR shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, transportation, and other facilities and services necessary for the proper execution and completion of the Project.

SECTION 3: Intent And Interpretation

3.1 With respect to the intent and interpretation of this Contract, the Owner and the CONTRACTOR agree as follows:

(A) This Agreement, together with the associated documents set forth in 1.3 constitute the entire and

exclusive agreements between the parties with reference to the Project, and said Contract supersedes any and all prior discussions, communications, representations, understandings, negotiations, or agreements. This Agreement also supersedes any bid documents where said Agreement is in direct conflict therewith;

(B) Anything that may be required, implied or inferred by the documents which make up this Contract, or any one or more of them, shall be provided by the CONTRACTOR for the Contract Price;

(C) Nothing contained in this Contract shall create, nor be interpreted to create, privity or any other relationship whatsoever between the Owner and any person except the CONTRACTOR;

(D) When a word, term, or phrase is used in this Contract, it shall be interpreted or construed first, as defined herein; second, if not defined, according to its generally accepted meaning in the construction industry; and third, if there is no generally accepted meaning in the construction industry, according to its common and customary usage;

(E) The words "include", "includes", or "including", as used in this Contract, shall be deemed to be followed by the phrase, "without limitation";

(F) The specification herein of any act, failure, refusal, omission, event, occurrence or condition as constituting a material breach of this Contract shall not imply that any other, non-specified act, failure, refusal, omission, event, occurrence or condition shall be deemed not to constitute a material breach of this Contract;

(G) The CONTRACTOR shall have a continuing duty to read, examine, review, compare and contrast each of the documents which make up this Contract, shop drawings, and other submittals and shall give written notice to the Owner of any conflict, ambiguity, error or omission which the CONTRACTOR may find with respect to these documents before proceeding with the affected work. The express or implied approval by the Owner of any shop drawings or other submittals shall not relieve the CONTRACTOR of the continuing duties imposed hereby, nor shall any such approval be evidence of the CONTRACTOR's compliance with this Contract. The Owner has prepared, or had someone prepare, documents for the Project, including the plans and specifications for the Project, which are accurate, adequate, consistent, coordinated and sufficient for construction. HOWEVER, THE OWNER MAKES NO REPRESENTATION OR WARRANTY OF ANY NATURE WHATSOEVER TO THE CONTRACTOR CONCERNING SUCH DOCUMENTS. The CONTRACTOR again hereby acknowledges and represents that it has received, reviewed and carefully examined such documents, has found them to be complete, accurate, adequate, consistent, coordinated and sufficient for construction, and that the CONTRACTOR has not, does not, and will not rely upon any representations or warranties by the Owner or Owner’s Agent concerning such documents, as no such representations or warranties have been or are hereby made;

(H) In the event of any conflict, discrepancy, or inconsistency among any of the documents which make up this Contract, the following shall control:

(1) As between figures given on plans and scaled measurements, the figures shall govern;

(2) As between large scale plans and small scale plans, the large scale plans shall govern;

(3) As between plans and specifications, the requirements of the specifications shall govern;

(4) As between this document and the plans or specifications, this document shall govern.

(I) The Owner's appointed representative, which shall in this Project be _____, shall be the Director of Facilities.

SECTION 4: Ownership of the Contract Documents

4.1 The documents which make up this Contract, and each of them, as well as any other documents furnished by the Owner, shall remain the property of the Owner. The CONTRACTOR shall have the right to keep one (1) copy of the Contract upon completion of the Project; provided, however, that in no event shall the CONTRACTOR use, or permit to be used, any portion or all of such Contract on other projects without the Owner's prior written authorization.

SECTION 5: CONTRACTOR's Performance

5.1 The CONTRACTOR shall perform all of the work required, implied or reasonably inferable from this Contract including, but not limited to, the following:

(A) Construction of the Project;

(B) The furnishing of any required surety bonds and insurance;

(C) The provision or furnishing, and prompt payment therefor, of labor, supervision, services, materials, supplies, equipment, fixtures, appliances, facilities, tools, transportation, storage, power, fuel, heat, light, cooling, or other utilities, required for construction and all necessary building permits and other permits required for the construction of the Project; and

(D) The creation and submission to the Owner of detailed and comprehensive as-built drawings depicting all as-built construction. Said as-built drawings shall be submitted to the Owner upon final completion of the Project and receipt and approval of same by the Owner shall be a condition precedent to final payment to the CONTRACTOR.

SECTION 6: Time For CONTRACTOR'S Performance

6.1 The CONTRACTOR shall commence the performance of this Contract on _____ and shall diligently continue its performance to and until final completion of the Project. The CONTRACTOR shall accomplish Substantial Completion of the Project on or before 180 days from notice to proceed;

6.2 The CONTRACTOR shall pay the Owner the sum of One Thousand and No/100 Dollars ($1,000.00) per day for each and every calendar day of unexcused delay in achieving Substantial Completion beyond the date set forth herein for Substantial Completion. Any sums due and payable

hereunder by the CONTRACTOR shall be payable, not as a penalty, but as liquidated damages representing an estimate of delay damages likely to be sustained by the Owner, estimated at the time of executing this Contract. When the Owner reasonably believes that Substantial Completion will be unexcusably delayed, the Owner shall be entitled, but not required, to withhold from any amounts otherwise due the CONTRACTOR in an amount then reasonably believed by the Owner to be adequate to recover liquidated damages applicable to such delays. If and when the CONTRACTOR overcomes the delay in achieving Substantial Completion, or any part thereof, for which the Owner has withheld payment, the Owner shall promptly release to the Contractor those funds withheld, but no longer applicable, as liquidated damages;

6.3 The term "Substantial Completion", as used herein, shall mean that point at which the Project is at a level of completion in strict compliance with this Contract such that the Owner or its designee can enjoy beneficial use or occupancy and can use or operate it in all respects, for its intended purpose. Partial use or occupancy of the Project shall not result in the Project being deemed substantially complete, and such partial use or occupancy shall not be evidence of Substantial Completion;

6.4 All limitations of time set forth herein are material and are of the essence of this Contract and have been negotiated at arm's length and in good faith between the Parties hereto.

Section 7: Fixed Price And Contract Payments

7.1 The Owner shall pay, and the CONTRACTOR shall accept, as full and complete payment for the Contractor's timely performance of its obligations hereunder the fixed price of _____ Dollars ($_____). The price set forth in this Subparagraph 7.1 shall constitute the Contract Price, which shall not be modified except by Change Order as provided in this Contract.

7.2 The above referenced fixed price in 7.1 is based on the quantities indicated based on the actual scope of the project as shown on the construction plans. Should the quantities of any of the items of the work as listed in the executed Proposal and Bid Form be increased, the CONTRACTOR shall perform the additional work at the unit bid prices submitted.

7.3 Should the quantities of any of the items of the work as listed in the executed Proposal and Bid Form be decreased, the Fixed Price shall be reduced accordingly based on the above unit bid prices and the CONTRACTOR shall make no claim for anticipated profits or lost overhead for any decrease in quantities. Payments will be made on actual quantifies installed, as measured in place.

7.4 Within ten (10) calendar days of the effective date hereof, the CONTRACTOR shall prepare and present to the Owner the CONTRACTOR's Schedule of Values apportioning the Contract Price among the different elements of the Project for purposes of periodic and final payment. The CONTRACTOR's Schedule of Values shall be presented in whatever format, with such detail, and backed up with whatever supporting information the Owner requests. The CONTRACTOR shall not imbalance its Schedule of Values nor artificially inflate any element thereof. The violation of this provision by the CONTRACTOR shall constitute a material breach of this Contract. The CONTRACTOR's Schedule of Values will be utilized for the Contractor's Payment Requests but shall only be so utilized after it has been acknowledged in writing by the Owner;

7.5 The Owner shall pay the Contract Price to the CONTRACTOR in accordance with Section 218.70, Florida Statutes ("Local Government Prompt Payment Act) and the procedures set forth in this Section 7. On or before the 1st day of each month after commencement of performance, but no more frequently than once monthly, the CONTRACTOR may submit a Payment Request for the period ending the 15th day of the month to the follow:

Director of Facilities and Capital Projects
Chipola College
3094 Indian Circle
Marianna, FL 32446

With a copy to:

David N. Watford, PE
Watford Engineering, Inc.
4452 Clinton Street
Marianna, FL 32446

7.6 Payment Request shall be in such format and include whatever supporting information as may be required by the Owner. Therein, the CONTRACTOR may request payment for ninety percent (90%) of that part of the Contract Price allocable to Contract requirements properly provided, labor, materials and equipment properly incorporated in the Project, and materials or equipment necessary for the Project and properly stored at the Project site (or elsewhere if offsite storage is approved in writing by the Owner), less the total amount of previous payments received from the Owner.

7.7 Notwithstanding anything herein to the contrary, CONTRACTOR shall not be paid for equipment and materials until after installation.

7.8 Each Payment Request shall be signed by the CONTRACTOR and shall constitute the CONTRACTOR's representation that the quantity of work has reached the level for which payment is requested, that the work has been properly installed or performed in strict compliance with this Contract, and that the CONTRACTOR knows of no reason why payment should not be made as requested. Thereafter, the Owner shall review the Payment Request and may also review the work at the Project site or elsewhere to determine whether the quantity and quality of the work is as represented in the Payment Request and is as required by this Contract. The Owner shall approve in writing the amount which, in the opinion of the Owner, is properly owing to the CONTRACTOR. The Owner shall make payment to the CONTRACTOR in accordance within twenty-five (25) business days after the date of which the Payment Request is stamped as received as provided in Section 218.74(1), Florida Statutes. The amount of each such payment shall be the amount approved for payment by the Owner less such amounts, if any, otherwise owing by the CONTRACTOR to the Owner or which the Owner shall have the right to withhold as authorized by this Contract. The submission by the CONTRACTOR of a Payment Request also constitutes an affirmative representation and warranty that all work for which the Owner has previously paid is free and clear of any lien, claim, or other encumbrance of any person whatsoever. As a condition precedent to payment, the Contractor shall, if required by the Owner, also furnish to the Owner properly executed

Waiver of Right of Claim Against the Payment Bond in the form as provided in Section 255.05, Florida Statutes, from all subcontractors, materialmen, suppliers and other person or entity who has, or might have a claim against the Owner for the work done on the Owner's property. Furthermore, the Contractor warrants and represents that, upon payment of the Payment Request submitted, title to all work included in such payment shall be vested in the Owner;

(A) When payment is received from the Owner, the CONTRACTOR shall immediately pay all subcontractors, materialmen, laborers and suppliers the amounts they are due for the work covered by such payment. In the event the Owner becomes informed that the CONTRACTOR has not paid a subcontractor, materialman, laborer, or supplier within 10 days after the CONTRACTOR's receipt of payment, the Owner shall have the right, but not the duty, to issue future checks and payment to the CONTRACTOR of amounts otherwise due hereunder naming the CONTRACTOR and any such subcontractor, materialman, laborer, or supplier as joint payees. Such joint check procedure, if employed by the Owner, shall create no rights in favor of any person or entity beyond the right of the named payees to payment of the check and shall not be deemed to commit the Owner to repeat the procedure in the future;

(B) Neither payment to the CONTRACTOR, utilization of the Project for any purpose by the Owner, nor any other act or omission by the Owner shall be interpreted or construed as an acceptance of any work of the CONTRACTOR not strictly in compliance with this Contract;

(C) The Owner shall have the right to refuse to make payment and, if necessary, may demand the return of a portion or all of the amount previously paid to the CONTRACTOR due to:

(1) The quality of a portion, or all, of the CONTRACTOR's work not being in accordance with the requirements of this Contract;

(2) The quantity of the CONTRACTOR's work not being as represented in the CONTRACTOR's Payment Request, or otherwise;

(3) The CONTRACTOR's rate of progress being such that, in the Owner's opinion, Substantial Completion or final completion, or both, may be unexcusably delayed;

(4) The CONTRACTOR's failure to use Contract funds, previously paid the CONTRACTOR by the Owner, to pay CONTRACTOR's Project-related obligations including, but not limited to, subcontractors, laborers and material and equipment suppliers;

(5) Claims made, or likely to be made, against the Owner or its property;

(6) Loss caused by the CONTRACTOR;

(7) The CONTRACTOR's failure or refusal to perform any of its obligations to the Owner.

In the event that the Owner makes written demand upon the CONTRACTOR for amounts previously paid by the Owner as contemplated in this Section 7(F), the Contractor shall promptly comply with such demand;

(D) If within thirty (30) days from the date payment to the CONTRACTOR is due, the Owner, without cause or basis hereunder, fails to pay the CONTRACTOR any amounts then due and payable to the CONTRACTOR, the CONTRACTOR shall have the right to cease work until receipt of proper payment after first providing ten (10) days' written notice of its intent to cease work to the Owner. Any payment not made within thirty (30) days after the date due shall bear interest at the rate of twelve percent (12%) per annum;

(E) When Substantial Completion has been achieved, the CONTRACTOR shall notify the Owner in writing and shall furnish to the Owner a proposed punch list listing of those matters yet to be finished. The Owner will thereupon conduct an inspection to confirm that the work is in fact substantially complete and shall upon determining that the work is substantially complete, shall review and revise, if necessary, the proposed punch list. Upon its confirmation that the CONTRACTOR's work is substantially complete, the Owner will so notify the CONTRACTOR in writing and will therein set forth the date of Substantial Completion and furnish the final punch list of items that need to be completed for final completion. If the Owner, through its inspection, fails to find that the CONTRACTOR's work is substantially complete, and is required to repeat all, or any portion, of its Substantial Completion inspection, the CONTRACTOR shall bear the cost of such repeat inspection(s) which cost may be deducted by the Owner from any payment then or thereafter due to the CONTRACTOR. Guarantees and equipment warranties required by this Contract shall commence on the date of Substantial Completion. Upon Substantial Completion, the Owner shall pay the CONTRACTOR an amount sufficient to increase total payments to the Contractor to ninety percent (90%) of the Contract Price less any amounts attributable to liquidated damages, and less the reasonable costs as determined by the Owner for completing all incomplete work, correcting and bringing into conformance all defective and nonconforming work, and handling any outstanding or threatened claims;

(F) When the Project is finally complete and the Contractor is ready for a final inspection, it shall notify the Owner thereof in writing. Thereupon, the Owner will perform a final inspection of the Project. If the Owner confirms that the Project is complete in full accordance with this Contract and that the CONTRACTOR has performed all of its obligations to the Owner hereunder, the Owner will furnish a final Approval for Payment and the CONTRACTOR is entitled to the remainder of the unpaid Contract Price, less any amount withheld pursuant to this Contract. If the Owner is unable to issue its final Approval for Payment and is required to repeat its final inspection of the Project, the CONTRACTOR shall bear the cost of such repeat inspection(s), which cots may be deducted by the Owner from the Contractor's final payment;

(G) If the CONTRACTOR fails to achieve final completion within 30 days of (i) Substantial Completion, or (ii) the Owner's delivery to the Contractor of the punch list described in Section 7(H) herein, whichever is later, the CONTRACTOR shall pay the Owner the sum of <u>One Thousand and No/100 Dollars ($1,000.00)</u> per day for each and every calendar day of unexcused delay in achieving final completion beyond the date set forth herein for final completion of the work. Any sums due and payable hereunder by the CONTRACTOR shall be payable, not as a penalty, but as liquidated damages representing an estimate of delay damages likely to be sustained by the Owner, estimated at or before the time of executing this Contract. When the Owner reasonably believes that final completion will be unexcusably delayed, the Owner shall be entitled, but not required, to

withhold from any amounts otherwise due the CONTRACTOR an amount then believed by the Owner to be adequate to recover liquidated damages applicable to such delays. If and when the CONTRACTOR overcomes the delay in achieving final completion, or any part thereof, for which the Owner has withheld payment, the Owner shall promptly release to the CONTRACTOR those funds withheld, but no longer applicable, as liquidated damages;

.

(H) Prior to being entitled to receive final payment, and as a condition precedent thereto, the CONTRACTOR shall furnish the Owner, in the form and manner required by Owner, if any:

(1) An affidavit that all of the CONTRACTOR's obligations to subcontractors, laborers, equipment or material suppliers, or other third parties in connection with the Project, have been paid or otherwise satisfied;

(2) Separate Waiver of Right of Claim Against the Payment Bond in the form as provided in Section 255.05, Florida Statutes from each subcontractor, lower tier subcontractor, laborer, supplier or other person or entity who has, or might have a claim against the Owner;

(3) If applicable, consent(s) of surety to final payment;

(4) All product warranties, operating manuals, instruction manuals and other record documents, drawings (including as-built drawings), satisfactory test results and things customarily required of the CONTRACTOR, or expressly required herein or set forth in the bid documents, as a part of or prior to Project closeout.

(I) The Owner shall, subject to its rights set forth in Section 7(F) above, make final payment of all sums due the CONTRACTOR within ten (10) days of the Owner's execution of a final Approval for Payment.

(J) In accordance with Section 218.76, Florida Statutes, if a dispute arises between the CONTRACTOR and the Owner concerning payment of a Payment Request which is not resolved within 30 days of the Payment Request, the dispute shall be determined by the Director of Facilities pursuant to the following. Proceedings before the Director of Facilities shall commenced within 45 days and concluded within 60 days after the date of the Payment Request was received by the Owner’s representative listed in Section 7(B) herein. The proceedings are not subject to Chapter 120, Florida Statutes and do not constitute an administrative proceeding that prohibits a court from deciding de novo any action arising out of the dispute. If the dispute is resolved in favor of the Owner, interest charges begin to accrue 15 days after the Director of Facilities’ final determination. If the dispute is resolved in favor of the CONTRACTOR, then interest begins to accrue as of the original date the payment became due. Notwithstanding, nothing herein shall prevent the CONTRACTOR and College from resolving the matter prior to final determination of the Director of Facilities.

SECTION 8: Information And Material Supplied By The Owner

8.1 The Owner shall furnish to the CONTRACTOR, prior to the execution of this Contract, any and all written and tangible material in its possession concerning conditions below ground at the site of the Project.

Such written and tangible material is furnished to the CONTRACTOR only in order to make complete disclosure of such material as being in the possession of the Owner and for no other purpose. By furnishing such material, the Owner does not represent, warrant, or guarantee its accuracy either in whole, in part, implicitly or explicitly, or at all, and shall have no liability therefore. The Owner shall also furnish, if appropriate, the legal description of the Project site, and any required survey;

8.2 The Owner shall obtain all required authorizations, approvals, easements, and the like excluding the building permit and other permits or fees required of the CONTRACTOR by this Contract, or permits and fees customarily the responsibility of the CONTRACTOR;

8.3 The Owner will provide the CONTRACTOR two (2) copies of the complete Contract. The CONTRACTOR will be charged, and shall pay the Owner, the actual cost of duplication for any additional copy of the Contract which it may require.

SECTION 9: Cease And Desist Order

9.1 In the event the CONTRACTOR fails or refuses to perform the work as required herein, the Owner may instruct the CONTRACTOR to cease and desist from performing further work in whole or in part. Upon receipt of such instruction, the Contractor shall immediately cease and desist as instructed by the Owner and shall not proceed further until the cause for the Owner's instructions has been corrected, no longer exists, or the Owner instructs that the work may resume. In the event the Owner issues such instructions to cease and desist, and in the further event that the CONTRACTOR fails and refuses within seven (7) days of receipt of same to provide adequate assurance to the Owner that the cause of such instructions will be eliminated or corrected, then the Owner shall have the right, but not the obligation, to carry out the work with its own forces, or with the forces of another contractor, and the CONTRACTOR shall be fully responsible and liable for the costs of performing such work by the Owner. The rights set forth herein are in addition to, and without prejudice to, any other rights or remedies the Owner may have against the CONTRACTOR.

SECTION 10: Duties, Obligations And Responsibilities Of The Contractor

10.1 In addition to any and all other duties, obligations and responsibilities of the CONTRACTOR set forth in this Contract, the CONTRACTOR shall have and perform the following duties, obligations and responsibilities to the Owner:

(A) The CONTRACTOR is again reminded of its continuing duties set forth in Section 3(G), which are by reference hereby incorporated in this Section 10(A). The CONTRACTOR shall not perform work without adequate plans and specifications, or, as appropriate, approved shop drawings, or other submittals. If the CONTRACTOR performs work knowing or believing it involves an error, inconsistency or omission in the Contract without first providing written notice to the Owner, the CONTRACTOR shall be responsible for such work and pay the cost of correcting same;

(B) All work shall strictly conform to the requirements of this Contract;

(C) The work shall be strictly supervised, the CONTRACTOR bearing full responsibility for any and all acts or omissions of those engaged in the work on behalf of the CONTRACTOR;

(D) The CONTRACTOR hereby warrants that all labor furnished under this Contract shall be competent to perform the tasks undertaken, that the product of such labor shall yield only first-class results, that all materials and equipment provided shall be new and of high quality, that the completed work will be complete, of high quality, without defects, and that all work strictly complies with the requirements of this Contract. Any work not strictly complying with the requirements of this Subparagraph shall constitute a breach of the CONTRACTOR's warranty;

(E) The CONTRACTOR shall obtain and pay for all required permits, fees and licenses customarily obtained by the CONTRACTOR. The CONTRACTOR shall comply with all legal requirements applicable to the work;

(F) The CONTRACTOR shall employ and maintain at the Project site only competent supervisory personnel. Key supervisory personnel assigned by the CONTRACTOR to this Project are as follows:

NAME	FUNCTION
_____	_____
_____	_____
_____	_____

So long as the individuals named above remain actively employed or retained by the CONTRACTOR, they shall perform the functions indicated next to their names unless the Owner agrees to the contrary in writing. In the event one or more individuals not listed above subsequently assumes one or more of those functions listed above, the CONTRACTOR shall be bound by the provisions of this Section 10(F) as though such individuals had been listed above;

(G) The CONTRACTOR, within fifteen (15) days of commencing the work, shall provide to the Owner, and comply with, the CONTRACTOR's schedule for completing the work. Such schedule shall be in a form acceptable to the Owner. The CONTRACTOR's schedule shall be updated no less frequently than monthly (unless the parties otherwise agree in writing) and shall be updated to reflect conditions encountered from time to time and shall apply to the total Project. Each such revision shall be furnished to the Owner. Strict compliance with the requirements of this Section 10(G) shall be a condition precedent to payment to the CONTRACTOR, and failure by the CONTRACTOR to strictly comply with said requirements shall constitute a material breach of this Contract;

(H) The CONTRACTOR shall keep an updated copy of this Contract at the site. Additionally, the CONTRACTOR shall keep a copy of approved shop drawings and other submittals. All of these items shall be available to the Owner at all regular business hours. Upon final completion of the work, all of these items shall be finally updated and provided to the Owner and shall become the

property of the Owner;

(I) Shop drawings and other submittals from the CONTRACTOR do not constitute a part of the Contract. The CONTRACTOR shall not do any work requiring shop drawings or other submittals unless such shall have been approved in writing by the Owner. All work requiring approved shop drawings or other submittals shall be done in strict compliance with such approved documents. However, approval by the Owner shall not be evidence that work installed pursuant thereto conforms to the requirements of this Contract. The Owner shall have no duty to review partial submittals or incomplete submittals. The CONTRACTOR shall maintain a submittal log which shall include, at a minimum, the date of each submittal, the date of any resubmittal, the date of any approval or rejection, and the reason for any approval or rejection. The CONTRACTOR shall have the duty to carefully review, inspect and examine any and all submittals before submission of same to the Owner;

(J) The CONTRACTOR shall maintain the Project site in a reasonably clean condition during performance of the work. Upon final completion, the CONTRACTOR shall thoroughly clean the Project site of all debris, trash and excess materials or equipment;

(K) At all times relevant to this Contract, the CONTRACTOR shall permit the Owner to enter upon the Project site and to review or inspect the work without formality or other procedure.

SECTION 11: Indemnity

11.1 To the fullest extent permitted by law, the CONTRACTOR shall indemnify and hold harmless the Owner and the Owner's agents, employees, and volunteers from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from the performance of the work defined in the Invitation to Bid, any related addenda, this Agreement, and all specifications or plans without exception, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of personal property including the loss of use resulting there from, and (2) is caused in whole or in any part by a negligent act or omission of the CONTRACTOR, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by the negligence of a party indemnified hereunder. Such obligations shall not be construed to negate, abridge, or otherwise reduce any right or obligation of indemnity which would otherwise exist as to any party or person described in this Section 11.

11.2 In any and all claims against the Owner or any of its agents, employees or volunteers by any employee of the CONTRACTOR, any subcontractor, anyone directly or indirectly employed by any of them or anyone whose acts any of them may be liable, the indemnification obligation under this Section 11 shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

SECTION 12: Design Professional

12.1 There is an architect or consulting engineer acting as Owner's agent including inspection of work or

progress of CONTRACTOR in this contract. Accordingly, the Owner' Agent shall have the following duties and responsibilities:

(A) The Owner' Agent shall draft proposed Change Orders;

(B) The Owner' Agent shall approve, or respond otherwise as necessary concerning shop drawings or other submittals received from the CONTRACTOR;

(C) The Owner' Agent shall be authorized to refuse to accept work which is defective or otherwise fails to comply with the requirements of this Contract. If the Owner' Agent deems it appropriate, the Owner shall be authorized to call for extra inspection or testing of the work for compliance with requirements of this Contract;

(D) The Owner' Agent shall review the CONTRACTOR's Payment Requests and shall make a recommendation in writing those amounts which, in the opinion of the Owner, are properly owing to the CONTRACTOR as provided in this Contract;

(E) The Owner' Agent shall, upon written request from the CONTRACTOR, perform those inspections required in Section 7 hereinabove.

SECTION 13: Claims By The CONTRACTOR

Claims by the CONTRACTOR against the Owner are subject to the following terms and conditions:

(A) All Contractor claims against the Owner shall be initiated by a written claim submitted to the Owner. Such claim shall be received by the Owner no later than seven (7) calendar days after the event, or the first appearance of the circumstances, causing the claim, and same shall set forth in detail all known facts and circumstances supporting the claim;

(B) The CONTRACTOR and the Owner shall continue their performance hereunder regardless of the existence of any claims submitted by the CONTRACTOR;

(C) In the event the CONTRACTOR discovers previously concealed and unknown site conditions which are materially at variance from those typically and ordinarily encountered in the general construction or within the geographical location of the Project, the Contract Price shall be modified, either upward or downward, upon the written claim made by either party within seven (7) calendar days after the first appearance to such party of the circumstances. As a condition precedent to the Owner having any liability to the CONTRACTOR due to concealed and unknown conditions, the CONTRACTOR must give the Owner written notice of, and an opportunity to observe, such condition prior to disturbing it. The failure by the CONTRACTOR to give the written notice and make the claim as provided by this Section 13(C) shall constitute a waiver by the CONTRACTOR of any rights arising out of or relating to such concealed and unknown condition;

(D) In the event the CONTRACTOR seeks to make a claim for an increase in the Contract Price, as a condition precedent to any liability of the Owner therefor, the CONTRACTOR shall strictly comply with the requirements of Section 13(A) and such claim shall be made by the CONTRACTOR

before proceeding to execute any additional or changed work. Failure of the condition precedent to occur shall constitute a waiver by the CONTRACTOR of any claim for additional compensation;

(E) In connection with any claim by the CONTRACTOR against the Owner for compensation in excess of the Contract Price, any liability of the Owner for the CONTRACTOR's cost shall be strictly limited to direct cost incurred by the CONTRACTOR and shall in no event include indirect cost or consequential damages of the CONTRACTOR. The Owner shall not be liable to the CONTRACTOR for claims of third-parties including subcontractors, unless and until liability of the CONTRACTOR has been established therefor in a court of competent jurisdiction;

(F) In the event the CONTRACTOR should be delayed in performing any task which at the time of the delay is then critical, or which during the delay becomes critical, as the sole result of any act or omission by the Owner or someone acting in the Owner's behalf, or by Owner-authorized Change Orders, unusually bad weather not reasonably anticipatable, fire or other Acts of God, the date for achieving Substantial Completion, or, as applicable, final completion, shall be appropriately adjusted by the Owner upon the written claim of the CONTRACTOR to the Owner. A task is critical within the meaning of this Section 13(F) if, and only if, said task is on the critical path of the Project schedule so that a delay in performing such task will delay the ultimate completion of the Project. Any claim for an extension of time by the CONTRACTOR shall strictly comply with the requirements of Section 13(A) above. If the CONTRACTOR fails to make such claim as required in this Section 13(F), any claim for an extension of time shall be waived.

SECTION 14: Subcontractors

14.1 Upon execution of this Contract, the CONTRACTOR shall identify to the Owner, in writing, those parties intended as subcontractors on the Project. The Owner shall, in writing, state any objections the Owner may have to one or more of such subcontractors. The CONTRACTOR shall not enter into a subcontract with an intended subcontractor with reference to whom the Owner objects. All subcontracts shall afford the CONTRACTOR rights against the subcontractor which correspond to those rights afforded to the Owner against the CONTRACTOR herein, including those rights of Contract termination as set forth herein below.

SECTION 15: Change Orders

15.1 One or more changes to the work within the general scope of this Contract may be ordered by Change Order. The CONTRACTOR shall proceed with any such changes, and same shall be accomplished in strict accordance with the following terms and conditions:

(A) Change Order shall mean a written order to the CONTRACTOR executed by the Owner after execution of this Contract, directing a change in the work and may include a change in the Contract Price or the time for the CONTRACTOR's performance, or any combination thereof;

(B) Any change in the Contract Price resulting from a Change Order shall be determined as follows:

(1) By mutual agreement between the Owner and the CONTRACTOR as evidenced by (a) the

change in the Contract Price being set forth in the Change Order, (b) such change in the Contract Price, together with any conditions or requirements relating thereto, being initialed by both parties and (c) the CONTRACTOR's execution of the Change Order; or

(2) If no mutual agreement occurs between the Owner and the CONTRACTOR, the change in the Contract Price, if any, shall be derived by determining the reasonable actual costs incurred or savings achieved, resulting from revisions in the work. Such reasonable actual costs or savings shall include a component for direct jobsite overhead and profit but shall not include home-office overhead or other indirect costs or components. Any such costs or savings shall be documented in the format and with such content and detail as the Owner requires.

(C) The execution of a Change Order by the CONTRACTOR shall constitute conclusive evidence of the CONTRACTOR's agreement to the ordered changes in the work, this Contract as thus amended, the Contract Price and the time for performance by the CONTRACTOR. The CONTRACTOR, by executing the Change Order, waives and forever releases any claim against the Owner for additional time or compensation for matters relating to or arising out of or resulting from the work included within or affected by the executed Change Order;

(D) The CONTRACTOR shall notify and obtain the consent and approval of the CONTRACTOR's surety with reference to all Change Orders if such notice, consent or approval is required by the Owner, the CONTRACTOR's surety or by law. The CONTRACTOR's execution of the Change Order shall constitute the CONTRACTOR's warranty to the Owner that the surety has been notified of, and consents to, such Change Order and the surety shall be conclusively deemed to have been notified of such Change Order and to have expressly consented thereto.

(E) The Owner’s representative in this agreement is the Director of Facilities. No change orders or other modifications to this agreement shall be effective unless in writing and signed by the Director of Facilities.

15.2 The Owner, without invalidating this Agreement, may order changes in the work consisting of additions, deletions, or other revisions. All changes in the work shall be authorized as described herein. Except in cases of emergency endangering life or property, the CONTRACTOR shall allow no changes in the work without the prior written consent of the Owner.

SECTION 16: Contract Time and Time Extensions

16.1 CONTRACTOR shall diligently pursue the completion of the Work and coordinate the Work being done on the Project by its subcontractors and material men, as well as coordinating its Work with all work of others at the Project Site, so that its Work or the work of others shall not be delayed or impaired by any act or omission of CONTRACTOR. CONTRACTOR shall be solely responsible for all construction means, methods, techniques, sequences, and procedures, as well as coordination of all portions of the Work under the Contract Documents.

16.2 Should CONTRACTOR be obstructed or delayed in the prosecution of or completion of the Work as a result of unforeseeable causes beyond the control of CONTRACTOR, and not due to its fault or

neglect, including but not restricted to acts of God or of the public enemy, acts of government, fires, floods, epidemics, quarantine regulations, strikes or lockouts, CONTRACTOR shall notify the Owner in writing within forty-eight (48) hours after the commencement of such delay. Written supporting data with specific details of CONTRACTOR operations, which were delayed, shall be submitted to the Owner within fifteen (15) calendar days after the occurrence of the delay, unless the Owner grants additional time in writing for such submittals, or else the CONTRACTOR shall be deemed to have waived any right which CONTRACTOR may have had to request a time extension.

16.3 No interruption, interference, inefficiency, suspension or delay in the commencement or progress of the Work from any cause whatever, including those for which Owner may be responsible, in whole or in part, shall relieve CONTRACTOR of his duty to perform or give rise to any right to damages or additional compensation from Owner. CONTRACTOR expressly acknowledges and agrees that it shall receive no damages for delay. CONTRACTOR's sole remedy, if any, against Owner will be the right to seek an extension to the Contract Time; provided, however, the granting of any such time extension shall not be a condition precedent to the aforementioned "No Damages For Delay" provision. This paragraph shall expressly apply to claims for early completion, as well as to claims based on late completion.

16.4 Requests for delays due to adverse weather conditions shall meet all of the following conditions:

(A) CONTRACTOR notified the Owner in writing within forty-eight (48) hours of the delay.

(B) The weather was unusual as documented by supporting data.

(C) The weather did have an adverse impact on the CONTRACTOR’s schedule (critical path only).

(D) The CONTRACTOR and inspector’s daily logs corroborate the adverse impact. Where a conflict exists between the weather data and the daily reports, the daily reports will take precedence.

SECTION 17: Discovering and Correcting Defective or Incomplete Work

17.1 In the event that the CONTRACTOR covers, conceals or obscures its work in violation of this Contract or in violation of a directive from the Owner, such work shall be uncovered and displayed for the Owner's inspection upon request, and shall be reworked at no cost in time or money to the Owner.

17.2 If any of the work is covered, concealed or obscured in a manner not covered by Section 17.1 above, it shall, if directed by the Owner be uncovered and displayed for the Owner's inspection. If the uncovered work conforms strictly with this Contract, the costs incurred by the CONTRACTOR to uncover and subsequently, replace such work shall be borne by the Owner. Otherwise, such costs shall be borne by the CONTRACTOR.

17.3 The CONTRACTOR shall, at no cost in time or money to the Owner, correct work rejected by the Owner as defective or failing to conform to this Contract. Additionally, the CONTRACTOR shall reimburse the Owner for all testing, inspections and other expenses incurred as a result thereof.

17.4 In addition to its warranty obligations set forth elsewhere herein, the CONTRACTOR shall be specifically obligated to correct any and all defective or nonconforming work for a period of twelve (12) months following final completion upon written direction from the Owner.

17.5 The Owner may, but shall in no event be required to, choose to accept defective or nonconforming work. In such event, the Contract Price shall be reduced by the greater of (1) the reasonable costs of removing and correcting the defective or nonconforming work, and (2) the difference between the fair market value of the Project as constructed and the fair market value of the Project had it not been constructed in such a manner as to include defective or nonconforming work. If the remaining portion of the unpaid Contract Price, if any, is insufficient to compensate the Owner for the acceptance of defective or nonconforming work, the CONTRACTOR shall, upon written demand from the Owner, pay the Owner such remaining compensation for accepting defective or nonconforming work.

SECTION 18: Termination By The Contractor

18.1 If the Owner repeatedly fails to perform its material obligations to the Contractor for a period of thirty (30) days after receiving written notice from the CONTRACTOR of its intent to terminate hereunder, the CONTRACTOR may terminate performance under this Contract by written notice to the Owner. In such event, the CONTRACTOR shall be entitled to recover from the Owner as though the Owner had terminated the CONTRACTOR's performance under this Contract for convenience pursuant to Section 20 hereunder.

SECTION 19: Owner’s Right To Suspend Contractor’s Performance

19.1 The Owner shall have the right at any time to direct the CONTRACTOR to suspend its performance, or any designated part thereof, for any reason whatsoever, or without reason, for a cumulative period of up to ten (10) calendar days. If any such suspension is directed by the Owner, the CONTRACTOR shall immediately comply with same.

19.2 In the event the Owner directs a suspension of performance under this Section 19, through no fault of the CONTRACTOR, the Owner shall pay the CONTRACTOR as full compensation for such suspension the CONTRACTOR's reasonable costs, actually incurred and paid, of:

(A) Demobilization and remobilization, including such costs paid to subcontractors;

(B) Preserving and protecting work in place;

(C) Storage of materials or equipment purchased for the Project, including insurance thereon;

(D) Performing in a later, or during a longer, time frame than that contemplated by this Contract.

SECTION 20: Termination By The Owner

20.1 The Owner may terminate this Contract in accordance with the following terms and conditions:

(A) The Owner may, for any reason whatsoever, terminate performance under this Contract by the CONTRACTOR for convenience. The Owner shall give written notice of such termination to the CONTRACTOR specifying when termination becomes effective. The CONTRACTOR shall incur no further obligations in connection with the work and the CONTRACTOR shall stop work when such termination becomes effective. The CONTRACTOR shall also terminate outstanding orders and subcontracts. The CONTRACTOR shall settle the liabilities and claims arising out of the termination of subcontracts and orders. The Owner may direct the CONTRACTOR to assign the CONTRACTOR's right, title and interest under termination orders or subcontracts to the Owner or its designee. The CONTRACTOR shall transfer title and deliver to the Owner such completed or partially completed work and materials, equipment, parts, fixtures, information and Contract rights as the CONTRACTOR has. When terminated for convenience, the Contractor shall be compensated as follows:

(1) The CONTRACTOR shall submit a termination claim to the Owner specifying the amounts due because of the termination for convenience together with costs, pricing or other data required by the Owner. If the CONTRACTOR fails to file a termination claim within one (1) year from the effective date of termination, the Owner shall pay the Contractor, an amount derived in accordance with Subparagraph (3) below;

(2) The Owner and the CONTRACTOR may agree to the compensation, if any, due to the Contractor hereunder;

(3) Absent agreement to the amount due to the CONTRACTOR, the Owner shall pay the Contractor the following amounts:

(a) Contract prices for labor, materials, equipment and other services accepted under this Contract;

(b) Reasonable costs incurred in preparing to perform and in performing the terminated portion of the work, and in terminating the Contractor's performance, plus a fair and reasonable allowance for direct jobsite overhead and profit thereon (such profit shall not include anticipated profit or consequential damages); provided however, that if it appears that the CONTRACTOR would have not profited or would have sustained a loss if the entire Contract would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss, if any;

(c) Reasonable costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to Section 20.1(A) of this Paragraph. These costs shall not include amounts paid in accordance with other provisions hereof.

The total sum to be paid the Contractor under this Section 20.1(A) shall not exceed the total Contract Price, as properly adjusted, reduced by the amount of payments otherwise made, and shall in no event include duplication of payment.

(B) If the CONTRACTOR does not perform the work, or any part thereof, in a timely manner, supply adequate labor, supervisory personnel or proper equipment or materials, or if it fails to timely

discharge its obligations for labor, equipment and materials, or proceeds to disobey applicable law, or otherwise commits a violation of a material provision of this Contract, then the Owner, in addition to any other rights it may have against the CONTRACTOR or others, may terminate the performance of the CONTRACTOR and assume possession of the Project site and of all materials and equipment at the site and may complete the work. In such case, the CONTRACTOR shall not be paid further until the work is complete. After final completion has been achieved, if any portion of the Contract Price, as it may be modified hereunder, remains after the cost to the Owner of completing the work, including all costs and expenses of every nature incurred, has been deducted by the Owner, such remainder shall belong to the CONTRACTOR. Otherwise, the CONTRACTOR shall pay and make whole the Owner for such cost. This obligation for payment shall survive the termination of the Contract. In the event the employment of the CONTRACTOR is terminated by the Owner for cause pursuant to this Section 20.1(B) and it is subsequently determined by a Court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a Termination for Convenience under Section 20.1(A) and the provisions of Section 20.1(A) shall apply.

SECTION 21: Insurance

21.1 The CONTRACTOR shall have and maintain insurance in accordance with the requirements of Exhibit "A" attached hereto and incorporated herein by reference.

SECTION 22: Surety & Performance Bonds

22.1 The CONTRACTOR shall furnish separate performance and payment bonds to the Owner. Each bond shall set forth a penal sum in an amount not less than the Contract Price. Each bond furnished by the CONTRACTOR shall incorporate by reference the terms of this Contract as fully as though they were set forth verbatim in such bonds and shall specifically reference Section 17.4 of this Agreement. In the event the Contract Price is adjusted by Change Order executed by the Contractor, the penal sum of both the performance bond and the payment bond shall be deemed increased by like amount. The performance and payment bonds furnished by the CONTRACTOR shall be in form suitable to the Owner and shall be executed by a surety, or sureties, reasonably acceptable to the Owner. The Bond, along with the appropriate power of attorney, shall be delivered to the Owner simultaneously with the execution of this Agreement. The Bond shall extend as a Guarantee Bond for a minimum of one (1) year after acceptance of the Project.

22.2 In the event that the Surety becomes bankrupt, insolvent or unsatisfactory for any reason to the Owner, the CONTRACTOR shall substitute additional or new Bonds in the same or lesser penal sum, satisfactory to the Owner and to be conditioned as above required. Upon the CONTRACTOR's failure to furnish such additional or new Bonds within ten (10) days from the date of written notice to do so, all payments under this Agreement shall be withheld until such additional Bonds are furnished.

SECTION 23: Project Records

23.1 All documents relating in any manner whatsoever to the Project, or any designated portion thereof, or any communication with any participant in the Project, which are in the possession of the

CONTRACTOR, or any subcontractor of the CONTRACTOR, shall be made available to the Owner for inspection and copying upon written request by the Owner. Furthermore, said documents shall be made available, upon request by the Owner, to any state, federal or other regulatory authority and any such authority may review, inspect and copy such records. Said records include, but are not limited to, all drawings, plans, specifications, submittals, correspondence, minutes, memoranda, tape recordings, videos, or other writings or things which document the Project, its design, and its construction. Said records expressly include those documents reflecting the cost of construction to the CONTRACTOR. The CONTRACTOR shall maintain and protect these documents for no less than four (4) years after final completion of the Project, or for any longer period of time as may be required by law or good construction practice.

SECTION 24: Applicable Law

24.1 The law applicable to this Contract is hereby agreed to be the law of the State of Florida, with venue for any litigation arising hereunder being in Jackson County, Florida.

SECTION 25: Successors And Assigns

25.1 Each party binds itself, its successors, assigns, executors, administrators or other representatives to the other party hereto and to successors, assigns, executors, administrators or other representatives of such other party in connection with all terms and conditions of this Contract. The CONTRACTOR shall not assign this Contract without prior written consent of the Owner.

SECTION 26: Notice

26.1 All notices required or permitted hereunder shall be in writing and shall be deemed to have been duly delivered hereunder if mailed by first class certified mail, postage prepaid, to the respective parties at the respective addresses:

Owner:

Nolan V. Baker, P.E.
Director of Facilities
Chipola College
3094 Indian Circle
Marianna, FL 32446

With a copy to:

Owner's Agent
David N. Watford, PE
Watford Engineering, Inc.
4471 Clinton Street
Marianna, FL 32446

Contractor:

_____
_____
_____
_____

Any party may at any time change its address for such notices by delivering or mailing to the other parties hereto, in the manner provided above, a notice of
such change.

SECTION 27: Protections of Persons and Property

27.1 The CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Project.

27.2 The CONTRACTOR shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

(A) All employees on the Project and all other persons who may be affected thereby;

(B) All the work related to the Project and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the CONTRACTOR or any of his subcontractors; and

(C) Other property at the site or adjacent thereto including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

27.3 The CONTRACTOR shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

27.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Project, the CONTRACTOR shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

27.5 All damage or loss to any property referred to in Section 27 caused in whole or in part by the CONTRACTOR, any subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by the CONTRACTOR.

27.6 The CONTRACTOR shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the CONTRACTOR's superintendent unless otherwise designated in writing the CONTRACTOR to the Owner.

27.7 The CONTRACTOR shall not load or permit any part of the work related to the Project to be loaded as to endanger its, or any persons, safety.

27.8 In any emergency affecting the safety of persons or property, the CONTRACTOR shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the CONTRACTOR on account of emergency work shall be determined as provided Section 16.2.

27.9 The CONTRACTOR at all times shall keep the premises free from accumulation of waste materials or rubbish caused by its operations. At the completion of the work the CONTRACTOR shall remove all its waste materials and rubbish from and about the Project as well as tools, construction equipment, machinery and surplus materials, and shall clean all glass surfaces and leave the work “broom clean” or its equivalent, except as otherwise specified. If the CONTRACTOR fails to clean up, the Owner may do so and the cost thereof shall be charged to the CONTRACTOR and/or may be withheld from any remaining obligated payments. If a dispute arises between separate CONTRACTOR’s as to their responsibility for the cleaning up as required herein, the Owner may clean up and charge the cost thereof to the several CONTRACTOR’s as the Owner determines to be just.

27.10 The CONTRACTOR shall be responsible for any encroachments on rights or property of the public or adjoining property owners and shall hold the Owner harmless because of any encroachments which may be a result of his lack of proper layout. In this regard he shall, without extra cost to the Owner, remove any work or that portion of any work that encroaches on the property of others, or that Is built beyond legal building or setback limits, and he shall rebuild the affected work or portion of work at the proper location in full compliance with this Agreement and related documents.

SECTION 28: Miscellaneous Provisions

28.1 The Owner and CONTRACTOR respectively, bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement and to the partners, successors, assigns and legal representatives of such other Party with respect to all covenants of this Agreement.

28.2 The CONTRACTOR warrants that it has not employed or retained any company or person (other than a bona fide employee working solely for the CONTRACTOR) to solicit or secure this Agreement, and that it has not paid or agreed to pay any person, company, corporation, individual or firm (other than a bona fide employee working solely for the CONTRACTOR) any fee, commission, percentage, gift, or any other consideration contingent upon or resulting from the award of making of this Agreement.

28.3 As required by Section 287.058, Florida Statutes, this Agreement may be unilaterally canceled by the Owner for refusal of the CONTRACTOR to allow public access to all documents, papers, letters, or other material subject to the provisions of Chapter 119 and made or received by the CONTRACTOR in conjunction with the Agreement or related Project.

28.4 As may be applicable and as provided by Section 287.0582, Florida Statutes, the State of Florida’s performance and obligation to pay under this Agreement may be contingent upon an annual appropriation by the Florida Legislature.

28.5 As required by Section 287.133, Florida Statutes, the CONTRACTOR warrants that it is not on the

convicted vendor list for a public entity crime committed within the past 36 months. The CONTRACTOR further warrants that it will neither utilize the services of, nor contract with, any supplier, subcontractor, or consultant in excess of $15,000.00 in connection with this Project for a period of 36 months from the date of their being placed on the convicted vendor list.

28.6 The CONTRACTOR agrees that it, and all subcontractors, suppliers and consultants, used by the CONTRACTOR will comply with any and all applicable laws, rules and regulations relating to equal employment opportunity, and any Federal, State and Local Laws, rules and regulations pertaining thereto.

28.7 The CONTRACTOR agrees that it is in compliance with Section 112.313(7) in as much as the CONTRACTOR acknowledges that it does not have any employee or their spouse that owns a greater than 5% interest in your company and is also an employee of the Owner.

28.8 The duties and obligations imposed by the Contract and related documents and the rights and remedies thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available at law.

28.9 Prior to and during the progress of the work, the Owner reserves the right to award other contracts relating to the Project or in connection with other work within the boundaries of the Project.

OWNER	**CONTRACTOR**
Chipola College	
_____ [Seal]	_____[Seal]
(*TYPED NAME)*	*(TYPED NAME)*
By:_____	By:_____
(*SIGNATURE)*	*(SIGNATURE)*
President 3094 Indian Circle Marianna, FL 32446	
_____	_____
(PRINTED NAME, TITLE & ADDRESS)	*(PRINTED NAME, TITLE & ADDRESS)*
_____	_____
(DATE OF EXECUTION)	*(DATE OF EXECUTION)*

EXHIBIT "A"

Contractor's and Subcontractor's Insurance:

1. Compensation Insurance: The Contractor shall procure and maintain during the life of this contract Workmen's Compensation Insurance for all of his employees to be engaged in work on the project under this contract, and in case any such work is sublet, the Contractor shall require the Subcontractor similarly to provide Workmen's Compensation Insurance for all the labor's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Insurance. In case any class of employees engaged in hazardous work on the project under this contract is not protected under the Workmen's Compensation statute, the Contractor shall provide and shall cause each Subcontractor to provide adequate insurance for the protection of such of his employees not otherwise protected. The Contractor shall indemnify and hold the City harmless for any claim made by the Subcontractor for workmen's compensation.

2. Contractor's Comprehensive Liability and Property Damage Insurance: The Contractor shall procure and shall maintain during the life of this contract Contractor's Comprehensive Liability Insurance in an amount satisfactory to the Owner, but not less than $300,000.00 for injuries, including accidental death, to any one person, and subject to the same limit for each person, in an amount not less than $1,000,000.00, on account of one accident, and the Contractor's Property Damage Insurance in an amount not less than $1,000,000.00. This insurance shall be maintained with an insurance company or companies licensed to do business in the state in which the Contractor shall perform his contractual services. Owner shall be named as additional insured on the policy.

3. Subcontractor's Comprehensive Liability and Property Damage Insurance: The Contractor shall require each of his Subcontractor's to procure and maintain during the life of his contract Subcontractor's Comprehensive Liability and Property Damage Insurance coverage in amounts satisfactory to the Contractor for his own protection, with an insurance company or companies licensed to do business in the state in which the Subcontractor shall perform his contractual services.

4. Scope of Insurance and Special Hazards: The insurance required shall provide adequate protection for Contractor and his Subcontractors, respectively, against damage claims which may arise from operations under this contract, whether such operations be by the insured or by anyone directly or indirectly employed by the insured, and also against any of special hazards which may be encountered in the performance of this contract.

5. Proof of Carriage of Insurance: The Contractor shall furnish the Owner with satisfactory proof of carriage of the insurance required, but the failure to provide adequate insurance shall not relieve the Contractor's responsibility to protect the Owner wholly from all such claims and damages.

The certificate of insurance shall include as a certificate holder:
Chipola College
3094 Indian Circle
Marianna, FL 32446

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00900/SUPPLEMENTARY GENERAL CONDITIONS

PART 1 – NOT USED

PART 2 – NOT USED

PART 3 - CONTRACTOR

3.1 CONTRACT ADJUSTMENTS

A. No contractual adjustments shall be due or become exigent as a result of, or failure on the part of the Contractor to fully acquaint himself and all other parties to the contract with the General Conditions, Section 00800.

3.2 FIELD CONDITIONS

A. Prior to commencing any excavation or grading, the Contractor shall satisfy himself as to the accuracy of all survey data as indicated in these drawings and specifications and/or as provided by Owner. Should the Contractor discover any inaccuracies, errors or omissions in the survey data, the Contractor shall immediately notify the Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the contractor of any excavation or grading shall be held as an acceptance of the survey data by the Contractor, after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said survey data.

3.3 SCHEDULE OF MATERIAL AND SUBDIVISION OF THE WORK

A. Contractor shall, within fifteen (15) days after signing of Contract, file with the Owner and Engineer, a correct, complete itemized schedule of materials and subdivisions of work, giving quantities and unit prices of complete labor and materials.

3.4 CONTRACT DOCUMENTS

A. If, in Contractor's opinion, any work is indicated on Drawings, or is specified in such a manner as will make it impossible to produce a generally acceptable piece of work, or should discrepancies appear between drawings and specifications, he shall refer same to the Owner and Engineer for decision before proceeding with Work.

B. If Contractor fails to make such reference, no excuse will thereafter be entertained for failure to carry out work in satisfactory manner. Should a conflict occur in or between Drawings or Specifications, Contractor shall be deemed to have estimated on a more expensive way of doing work unless he shall have asked for and obtained a decision, in writing, from the Owner and Engineer before submission of proposal as to which method or materials will be required.

C. Figures govern scale dimensions and large scale drawings govern those of smaller scale. If drawings and specifications conflict or require any clarification which was not obtained prior to

bidding, the Contractor shall estimate and include in his bid the more expensive method or material. No deviation shall be made from plans and specifications except upon written order of the Owner or Engineer.

3.5 SUPERVISION AND CONSTRUCTION PROCEDURES

A. Contractor shall be responsible for notifying the Owner's Uniform Building Code Inspector (UBCI) for the College. The Contractor shall notify the UBCI when the following areas or segments of work are ready for inspection by the UBCI. The Contractor shall not conceal or cover up these areas until the UBCI has completed their inspection of same:

- Pre-Construction Meeting
- Soil Compaction Tests
- Concrete Slabs and Forms with reinforcing Steel in place (Prior to Concrete Pour)
- Underground and Subsurface Piping Prior to Burial
- Installation of HVAC Equipment and Duct Work (Smoke Detectors, Fire Dampers, HVAC Controls and Test and Balance Procedures)
- Electrical Conduit, Wiring and Equipment
- Installation of Pipe Fittings, Valves, Piping and Plumbing Equipment
- Piping Pressure Tests
- Substantial Completion Inspection of Project
- Final Completion Inspection of Project

B. The Contractor shall supervise and direct the Work, using his best skill and attention. The Contractor shall be solely responsible for and have control over all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

C. The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Owner.

D. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Engineer in the Engineer's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

E. The Contractor shall be responsible for inspection of portions of Work already performed under his Contract to determine that such portions are in proper condition to receive subsequent Work.

3.6 WARRANTY

A. The warranty provided in this paragraph shall be in addition to and not in limitation of any other warranty or remedy required by law or by the Contract Documents.

B. The Contractor shall provide the Owner with written warranties covering the work for the periods of time specified in the Contract Documents. As a minimum the work will be guaranteed against defects in materials and workmanship for one year from the date of final acceptance of the project by the Owner with all mechanical equipment compressors guaranteed for five years from the date of final acceptance. The date of final acceptance shall be the beginning date of all warranties.

3.7 PERMITS, FEES AND NOTICES

A. All construction work shall comply with the Florida Department of Education Office of Educational Facilities State Requirements for Educational Facilities, latest edition. All educational facilities constructed by the Chipola College shall be exempt from all county, district, municipal, or local building codes and ordinances, and the College may not use local building codes and ordinances, even on a volunteer basis. No College funds may be expended for obtaining building permits. The Uniform Building Code for Educational Facilities Construction required by Chapter 74-374, Florida Laws, governs in this instance. All educational facilities in the State of Florida constructed by a Board shall incorporate the State Uniform Code for Public Educational Facilities Construction and are exempt from all other State, County, District, Municipal or Local Building Codes, interpretations, building permits and assessments of fees for Building Permits, Ordinances and impact fees or service availability fees. (State Requirements for Educational Facilities - 5.1 Codes and Regulatory Agencies).

B. Although the Owner is not subject to the Florida Sales and Use Tax, any Contractor who purchases materials which will be used in the construction of a public-owned building will not be exempt from the sales tax on these materials. Florida Sales and Use Tax shall be applied to all materials included in this bid—NO EXCEPTIONS. Reference the following excerpt from the Florida Statutes:

1. The State, any county, municipality or political subdivision of this state is exempt from the sales tax, except this exemption shall not include sales or tangible personal property made to Contractors employed either directly or as agents of such government or political subdivision thereof when such tangible personal property going into or becomes a part of public works owned by such government or political subdivision thereof.

C. The Contractor shall meet the latest requirements of the United States Department of Labor Occupational Safety and Health Standards and comply with The Manual of Accident Prevention in Construction, all applicable safety and sanitary laws, regulations, and ordinances and any safety rules or procedures.

D. The National Emission Standards for Hazardous Air Pollutants (NESHAPS), 40 CFR part 61, Subpart M and other guidance materials relating to asbestos regulations and as follows shall be the responsibility of the Contractor:

1. Demolition and Renovation Projects: In accordance with asbestos regulations, subpart M, a notification must be sent to the Department of Environmental Regulation before the

project starts. A notice must be sent for a DEMOLITION project even if NO asbestos containing material is present in the facility.

2. Upon approval of Contract by the Owner and ten (10) days before the issuance of Notice-to-Proceed of demolition project, the notice must be postmarked or delivered to BOTH of the following addresses as well as the Owner and Engineer:

1) State of Florida Department of Environmental Protection
160 Governmental Center
Second Floor
Pensacola, FL 32501
(850) 436-8364

2) State of Florida Department of Environmental Protection Bureau of Air Quality Management
2600 Blairstone Road
Tallahassee, FL 32399-2400

Any questions concerning the asbestos regulations shall be addressed to DEP.

3.8 ASBESTOS CONTAINING MATERIALS

A. Asbestos-Containing Materials (ACM) are known to be present in this project and actual locations are summarized in the Asbestos Survey, located and retained in the Chipola College.

B. The summary may or may not be all inclusive.

C. Contractor shall be responsible for being knowledgeable of the reported locations and be watchful for materials that may contain asbestos and avoid any disturbance of known or suspected ACM.

D. Contractor shall maintain safe conditions by:

1. Becoming familiar with locations of ACM at the project.
2. Avoiding disturbance of ACM, accidental or intentional.
3. Reporting all suspicious hazardous conditions to the Engineer.

3.9 SUPERINTENDENT

A. The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

B. The Contractor shall employ and keep at the site of the work during its progress a competent and thoroughly experienced superintendent capable of handling all phases of the project. The Superintendent shall have any necessary assistants, foremen and timekeepers required by the scope of this project. If the Contractor must replace the Superintendent for any reason between "Notice-to-Proceed" and final Owner's and Engineer's certification of completion of the work, (punch list) the Contractor shall notify the Owner and Engineer of the date that the existing Superintendent shall be leaving. All work shall cease after said date until the Owner and Engineer accepts the reason for replacement and approves of a satisfactory replacement

Superintendent and the Owner and Engineer are satisfied the new Superintendent is properly authorized and briefed on the status of the project.

C. The Contractor shall submit to the Owner and Engineer the name of the proposed superintendent for the Contractor at the Pre-Construction Conference. The superintendent shall attend the Pre-Construction Conference and all Progress Meetings.

D. The Superintendent will remain on the job until punch list items are corrected.

E. The Contractor shall give efficient supervision to the work, using the best skill and attention. The Contractor shall carefully study and compare all drawings, specifications and other instructions and shall report at once to the Owner and Engineer any error, inconsistency or omission which is discovered but shall not be held responsible for their existence or discovery. The Superintendent shall be in attendance on the job a minimum of six (6) hours per working day from "Notice-to-Proceed" continuously through final approval of the work by the Owner and Engineer. No work shall be allowed to transpire on the site unless the Superintendent is in attendance at the site.

3.10 WORK FORCE

A. The Contractor shall furnish sufficient forces, construction plant and equipment, and shall work such hours, including night shifts and overtime operations, as may be necessary to insure the prosecution of the Work in accordance with the approved progress schedule. If the Contractor falls behind the progress schedule, the Contractor shall take such steps as may be necessary to improve the progress by increasing the number of shifts, overtime operations, days of work and the amount of construction plant, all without additional cost to the Owner.

B. Failure of the Contractor to comply with the requirements under this provision shall be grounds for determination by the Owner and Engineer that the Contractor is not prosecuting the work with such diligence as will insure completion within the time specified and such failure constitutes a substantial violation of the conditions of the Agreement.

C. Upon such determination, the Owner may terminate the Contractor's right to proceed with the work, or any separable part thereof, in accordance with the Agreement, or may withhold further payments as indicated in the Agreement.

3.11 SPECIAL JOB CONDITIONS

A. Chipola College Policy states that there shall be no smoking or use of tobacco products allowed in any facility or on any real or personal property owned by or under the control of Chipola College. Contractor and Subcontractor employees are required to leave the school campus for tobacco use.

B. The General Contractor and/or subcontractor and their employees shall refrain from use of vulgarities around students, staff and faculty.

C. Clothing shall have no vulgarities or sexually suggestive graphics.

D. Direct contact with students, faculty or staff is strictly prohibited.

E. Violation of Special Conditions may result in immediate termination of that employee, Contractor or Subcontractor.

3.12 SHOP DRAWINGS, PROJECT DATA AND SAMPLES

A. The Contractor shall review, stamp with his approval and submit, with reasonable promptness and in orderly sequence so as to cause no delay in the Work or in the Work of any other Contract, all Shop Drawings, Product Data, and Samples required by the Contract Documents or subsequently by the Engineer as covered by Modifications. Shop Drawings and Samples shall be properly identified as specified, or as the Owner or Engineer may require. At the time of submission the Contractor shall inform the Owner and Engineer in writing of any deviation in the Shop Drawings from the requirements of the Contract Documents.

B. The Owner and Engineer will review and approve Shop Drawings and Samples with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the Project and with the information given in the Contract Documents. The Engineer's or Owner's approval of a separate item shall not indicate approval of an assembly in which the item functions.

C. The Contractor shall make any corrections required by the Engineer or Owner and shall resubmit the required number of corrected copies of Shop Drawings or new Samples until approved. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Engineer on previous submissions.

D. When professional certification of performance criteria of materials, systems or equipment is required by the contract Documents, the Engineer shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.

3.13 USE OF SITE

A. The Contractor shall present a plan, for approval by the Engineer and Owner, showing all areas for safety fencing staging, storage, job office, ingress and egress to the site. No work shall be done until this is approved.

3.14 CLEANING UP

A. The Contractor shall clean all glass surfaces and leave the Work "clean" to include, where applicable, properly finished and polished floors.

B. If the contractor fails to clean up, the Owner may do so and the cost thereof shall be charged to the Contract.

3.15 INDEMNIFICATION

A. Contractor hereby acknowledges the receipt of ten dollars ($10.00) and other good and valuable consideration from the Owner and the Engineer which has been paid to him as specific consideration for the indemnification provided herein.

PART 4 - ADMINISTRATION OF CONTRACT

4.1 ENGINEER

A. Nothing contained in the Contract Documents shall create any contractual relationship between the Engineer and the Contractor.

B. The Engineer will not be responsible for the acts or omissions of the Contractor, and Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

PART 5 - SUBCONTRACTORS

5.1 CONTRACTUAL RELATIONS

A. Nothing contained in the Contract Documents shall create any contractual relation between the Owner or the Engineer and any Subcontractor or Sub-subcontractor.

B. All work performed for the Contractor by a Subcontractor shall be pursuant to an appropriate agreement between the Contractor and the subcontractor (and where appropriate between Subcontractors and Sub-subcontractors) which shall contain provisions that:

1. Preserve and protect the rights of the Owner and the Engineer under the Contract with respect to the Work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;
2. Require that such Work be performed in accordance with the requirements of the Contract Documents;
3. Require submission to the Contractor of applications for payment under each subcontract to which the Contractor is a party, in reasonable time to enable the Contractor to apply for payment in accordance with Part 8;
4. Require that all claims for additional costs, extensions of time, damages for delays or otherwise with respect to subcontracted portions of the Work shall be submitted to the Contractor (via any Subcontractor or Sub-subcontractor where appropriate) in the manner provided in the Contract Documents for like claims by the Contractor upon the Owner;
5. Waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance described in Exhibit A of the Agreement Between Owner and Construction Manager, except such rights as they may have to the proceeds of such insurance held by the Owner as trustee; and,
6. Obligate each Subcontractor specifically to consent to the provisions of this Paragraph 5.1.

PART 6 - CHANGES IN THE WORK

6.1 CHANGE ORDERS

A. When any one change increases or decreases the scope of the original contract, the proposal to change shall be supported by accurate cost data establishing the fair and current market value of the labor, materials, equipment, and incidentals required to accomplish the change, plus a margin to represent the contractor's profit and overhead. Cost data shall be in sufficient detail to enable any qualified architect or engineer to confirm the accuracy of such proposal. Profit and overhead shall be added to additive change orders and shall be deducted on deductive change orders. No deduction shall be made for profit and overhead on deductive change orders in connection with Direct Material Purchases - see Section 01028.

B. The allowance for overhead and profit combined, included in the total cost to the Owner, shall be based upon the following schedule:

1. For the Contractor, for any work performed by his own forces, 15% of the cost.
2. For each Subcontractor involved, work performed by his own forces, 15% of the Cost.
3. For the Contractor, for work performed by his Subcontractor, 5% of the amount due the Subcontractor.

C. Cost shall be limited to the following: Cost of materials, including sales tax and cost of delivery, cost of labor, including Social Security, Old Age and Unemployment Insurance; Worker's Compensation Insurance; rental value of power tools and equipment. Overhead shall include the following: Bond premiums, supervision, superintendence, wages of timekeepers, watchmen and clerks, small tools, incidentals, general office expense and all other expenses not included in "cost". If the net value of a change results in a credit from the Contractor or Subcontractor, the credit given shall be the net cost plus overhead and profit except for Direct Material Purchase items. The cost as used herein shall include all items of labor, materials and equipment.

PART 7 - TIME

7.1 NOT USED

7.2 NOT USED

7.3 DELAYS AND EXTENSIONS OF TIME

A. No extension of time beyond the date of completion fixed by terms of the Contract shall be effective unless in writing, submitted to the Engineer, and approved by Owner. The determination made by the Owner on an application for an extension of time shall be binding and conclusive on the Contractor.

PART 8 - PAYMENTS AND COMPLETION

8.1 SCHEDULE OF VALUES

A. Within ten days after signing the Contract and before the first application for payment, the Contractor shall submit to the Engineer a schedule of values of the various portions of the Work, including quantities if required by the Engineer, aggregating the total Construction Sum, divided so as to facilitate payments to Subcontractors in accordance with Paragraph 9.6, prepared in such form as specified or as the Engineer and the Contractor may agree upon, and supported by such data to substantiate its correctness as the Engineer may require. Each item in the schedule of values shall include its proper share of overhead and profit. This schedule, when approved by the Engineer, shall be used only as a basis for the Contractor's Applications for Payment.

8.2 APPLICATION FOR PAYMENT (go to next page)

PAYMENT CERTIFICATION:

Project:

Contractor:

Address:

Pay Request #_____

Date:_____

The estimated percentage of the construction completed based upon the plans and specifications is _____ _____%.

All claims for labor and materials been paid or will be paid with the proceeds of this requisition.

There are no liens other than permitted encumbrances outstanding against such portion of the project.

All construction completed to date has been done in accordance with the plans and specifications relating thereto.

All required surety bonds and insurances are in full force and effect.

The building can be completed in accordance with the plans and specifications and the project budget relating thereto on or before the estimated completion date as modified pursuant to the construction contract between the Contractor and the Board of Trustees.

I certify that the above information is correct.

_____

_____

_____

_____
Contractor's Signature

_____
Witness

8.3 NOT USED

8.4 PAYMENTS TO SUBCONTRACTORS

A. If the Owner fails to issue a Certificate for Payment for any cause which is the fault of the Contractor and not the fault of a particular Subcontractor, the Contractor shall pay that Subcontractor on demand, made at any time after the Certificate for Payment should otherwise have been issued for his work to the extent completed, less the retained percentage.

B. The Contractor shall pay each Subcontractor a just share of any insurance moneys received by the Contractor under the Exhibit A of the Agreement Between Owner and Construction Manager, and he shall require each Subcontractor to make payments to his subcontractors.

C. The Owner will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Engineer and Owner on account of portions of the Work done by such Subcontractor.

8.5 NOT USED

8.6 NOT USED

8.7 EMERGENCIES

A. The Contractor shall provide at the site, and make available to all workers, medical supplies and equipment necessary to supply first aid service to all persons injured in connection with the work. The Contractor shall report any and all accidents in writing to Insurance Company, Owner and Engineer within twenty-four (24) hours of the occurrence. The report shall contain the following information and it shall be the responsibility of the Contractor to have an accident report filled out in triplicate and submitted as required above with (1) Name of Person or Persons and Home Address, (2) Location of Occurrence, (3) Time of Day and Date, (4) Description of Occurrence, (5) Statements of Witnesses and (6) Signature of Contractor's Superintendent. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger. If any claim is made by anyone against the Contractor or any Subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Owner, giving full details of the Claims.

PART 9 - INSURANCE

9.1 Refer to Exhibit A of the Agreement Between Owner and Construction Manager.

PART 10 – NOT USED

PART 11 - MISCELLANEOUS PROVISIONS

11.1 NOT USED

11.2 TEST AND INSPECTIONS

A. Neither the observations of the Owner or Engineer in his administration of the Construction Contract, nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from his obligations to perform the Work in accordance with the Contract Documents.

B. Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

C. All testing of materials, products, equipment, etc. shall be the responsibility of the Contractor and the Contractor shall pay for all tests.

11.3 EQUAL OPPORTUNITY

A. The Contractor and all subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin or age. The Contractor shall take affirmative actions to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, national origin or age. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertisement; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous place, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

B. The Contractor and all subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, national origin or age.

END OF SECTION

SECTION 01010/SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project consists of the following:

Building D Science Labs Fume Hood Additions

1. Project Location: Marianna, FL
2. Owner: Chipola College

B. The Project Scope consists of the following:

1. Addition of two pass through fume hoods between each lab.
2. Add new duct heater to serve the room containing the fume hoods; relocate existing duct heater.
3. Associated architectural and electrical work.

1.3 CONTRACTOR USE OF PREMISES

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

1. Owner Occupancy: Allow for Owner occupancy and use by the public. Provide construction and dust barriers to separate work areas and phase work around the owner’s occupancy schedule.

2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Use of the Existing Building: Not applicable.

1.4 OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: The Owner will occupy the site during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate owner usage. Perform the Work so as not to interfere with the Owner's operations.

PART 2 - PRODUCTS (Not Applicable)
PART 3 – EXECUTION (Not Applicable)

END OF SECTION

SECTION 01015/OCCUPANCY DURING CONSTRUCTION

PART 1 - GENERAL

1.01 GENERAL:

A. The premises shall be used during periods of the construction.

B. The Owner reserves the right to utilize completed sections of work prior to Substantial Completion, provided that such use does not inordinately interfere with the Contractor's completion of the work. Such partial use shall not constitute acceptance of the work or any part of the work.

C. The Contractor shall erect dust screens, barricades, fences, etc., and exclude unauthorized personnel from the construction site. Contractor shall be responsible for coordinating designated parking areas, for protecting building surfaces and shrubbery or any other items or surfaces subject to construction.

D. The Contractor shall confer with the Owner and shall schedule work, store materials, and restrict access to site in a manner that shall cause the least interference with normal activities of the facility.

E. It is intended that the work shall be started with a Notice to Proceed.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01028/DIRECT MATERIAL PURCHASE PROCEDURE

PART 1 - MAJOR MATERIAL PURCHASE

1.01 GENERAL:

A. As a service to Contractors and as a cost savings measure for owner, Chipola College may purchase major materials for construction project.

1.02 PROCEDURE

A. The College may issue purchase orders and process payment for invoices approved by the General Contractor. The General Contractor (G.C.) is responsible for all ordering of materials, delivery, installation and warrantee. This purchase process does not alter, modify or relieve the G.C. of any obligations specified in the Contract Documents.

1.03 COST OF MATERIALS AND EQUIPMENT

A. G.C. will include the cost of construction materials and equipment in the Lump Sum Price for the Section. The Lump Sum Price will also include all Florida State sales and other taxes normally applicable to such material and equipment. The Owner may, at its own discretion, purchase such materials and equipment directly from the supplier. The Owner may consider purchasing any item but does not expect to purchase items less than $1,000.

1.04 SALES TAX

A. In the event the owner elects to make direct purchases, G.C. will not be responsible for paying sales tax on such items. Such items are referred to in this Section as "Direct Purchase Material". The responsibilities of the Owner, Engineer and G.C. relative to the Direct Material Purchase shall be governed by the terms and conditions of this Section. This Section shall take precedence over any conflicting conditions and terms of other Contract Documents. All clerical, administrative, management, supervisory, inspection, handling, storage and other costs necessary for G.C. to comply with this Section are included in the G.C.'s Lump Sum Price.

1.05 COST OF BONDS

A. Cost of the bonds shall be included in the G.C.'s Lump Sum Price. G.C. may select the supplier or suppliers from whom it wishes to purchase materials or equipment as long as the material or equipment meets the specification which relates to that material or equipment.

1.06 SUBCONTRACTORS COMPLIANCE

A. G.C. shall furnish the Owner, through the Owner’s Agent, with a Direct Material Purchase Form identifying each item or material or equipment to be purchased by the Contractor for the Project. The Direct Material Purchase Form shall include:

1. The name, address, telephone number and contact person for the supplier and the name and address of the project.

2. Manufacturer or brand, model or specification number of the item.

3. Quantity needed as estimated by G.C. or subcontractor.

4. The price quoted by the supplier for the material or equipment in questions.

5. Any sales tax associated with such quote.

6. Shipping, handling and insurance costs.

7. Delivery dates as established by G.C. or subcontractor.

8. Special terms and conditions which have been negotiated with the supplier relative to payment terms, discounts, rebates, warranty, credits or other terms and conditions which will revert to the Owner.

9. Statement with the submittal control number that material/equipment have been reviewed and approved by Owner or Owner's Agent during the shop drawing submittal process.

1.08 OWNER'S PURCHASE ORDER

A. Promptly upon receipt of a Direct Material Purchase Form, the Owner will initiate a purchase order for the material/equipment which the Owner chooses to purchase. The purchase order shall require that the supplier provide required shipping and handling insurance. The purchase order shall also require the delivery of the Direct Material Purchase items on the delivery dates provided by the G.C. in the Request Form. A copy of each purchase order will be furnished to the G.C. The G.C. shall promptly review the copy of the purchase order and verify that items ordered are in accordance with the Direct Materials Purchase Request Form, the terms of this contract, and with the G.C.'s requirements.

B. The invoice for the Direct Material Purchase items will be sent directly to the Owner with a courtesy copy sent to the G.C.

1.09 DEDUCTIVE CHANGE ORDERS

A. The Owner's Agent shall prepare and the G.C. shall execute, on a monthly basis, deductive Change Orders to reflect purchases made by the Owner. The amount of the deduction shall be based on the requisition amount plus sales tax. These Change Orders must be executed before the related purchase order will be paid.

B. Contractor's overhead and profit shall not be deducted on change orders for Direct Material Purchase items.

1.10 SHOP DRAWINGS

A. Nothing in this Section shall alter or modify the procedures for submission of shop drawings and other submittals by the G.C.

1.11 DELIVERY TO JOB SITE

A. When the Direct Material Purchase Items are delivered to the project, either by common carrier or manufacturer's/supplier's vehicle, the title to these items shall pass to the Owner. The Owner's Representative and G.C. shall jointly inspect each deliver for manufacturer/brand, quantity and condition. The G.C. and Owner's Representative shall both sign the invoice after the inspection; by this process the ownership will transfer from the Owner to the G.C.

B. There upon; the G.C. shall be fully responsible for all matters relating to the receipt, protection and risk loss of Direct Material Purchase Items the same as if such items were purchased by the G.C. or subcontractor until such items are incorporated and accepted by the Owner as a finished product.

C. At a minimum, the G.C. shall verify correct quantities, verify documentation, coordinate and expedite delivery, obtain and verify warranties required by contract documents, inspect and accept each item at the time of delivery, unload, handle and store the item.

D. Direct purchase of materials by the Owner in no way relieves the G.C. of any responsibilities regarding the compliance with specification requirements, coordination, protection, scheduling or warranty.

E. As Direct Material Purchase Items are delivered to the job-site, Contractor shall visually inspect all shipments, and approve the supplier's shipping documents and the courtesy invoice. G.C. and Owner's Representative shall assure that each delivery is accomplished by documentation adequate to identify the purchase order against which the purchase is made.

F. After **courtesy** invoices have been signed by both G.C. and Owner's Representative, the completed invoices will be processed for payment.

G. G.C. shall inspect to determine that Direct Material Purchase Items conform to the purchase requisition form, and determine prior to the incorporation into the project is such materials are defective. If G.C. discovers defective or non-conforming items it shall not utilize such items in the project and shall promptly notify Owner of the defect or non-conformity and assist Owner in obtaining repair or replacement of item.

H. G.C. shall be fully responsible and liable to the Owner if they fail to perform such inspection or otherwise permit defective or non-conforming material or equipment to be incorporated into the project. This requirement does not relieve the G.C. of its obligation to ensure that materials requested for purchase have been reviewed and approved by the Owner or Owner's Agent through shop drawing and submittal procedures.

1.12 WARRANTY

A. Contractor warrants Direct Material Purchase Items the same as all other materials and equipment furnished by G.C. and nothing in this Section shall alter or modify G.C.'s obligations under the Contract relative to warranties.

1.13 INSURANCE

A. The G.C. shall purchase the insurance for the benefit and protection of the Owner, the Owner's Agent, and G.C. sufficient to protect against any loss of or damage to Direct Materials Purchase Items. The Owner is paying for this insurance as part of the Contract Price.

B. Such insurance shall cover the full value of any Owner-Furnished Materials not yet incorporated into the project starting from the time of material acceptance. The G.C. shall be solely responsible for any loss or damage attributed to the G.C. to the extent that the Owner is not compensated by the insurance stated above.

1.14 DELAY OR INTERRUPTION

A. Owner shall not be liable for any interruption or delay damages in connection with Direct Material Purchase Items except where Owner fails within (30) days of receipt or a Purchasing Requisition Form to either cause the Owner to award a Purchase Order or notify the G.C. that the Owner elects not to purchase an item.

1.15 REPORTS

A. G.C. shall on a bi-weekly basis provide Owner with documentation establishing the amount and nature of the material and equipment delivered by suppliers and accepted by the G.C. during the reporting period.

B. The G.C. shall correspond all material and equipment to purchase orders, **courtesy** invoices, delivery tickets, and inspection and acceptance reports.

C. The G.C. shall also obtain lien waivers and other releases from suppliers. Upon receipt of appropriate documentation from the G.C., payment will be made by Owner directly to the appropriate supplier.

END OF SECTION 01028

SECTION 01045/CUTTING PATCHING CLEAN UP

PART 1 - GENERAL

1.01 DESCRIPTION OF THE WORK:

A. Definition: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.

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

1.02 CUTTING AND PATCHING:

A. Cutting and patching is the responsibility of the Contractor including attendant excavation and backfill required to complete the work or to:

1. Make its several parts fit together properly.

2. Uncover portions of the work to provide for installation of ill- timed work.

3. Remove and replace defective work.

4. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

5. Provide shoring as specified herein.

1.03 STRUCTURAL WORK:

A. Do not cut-and-patch structural work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio without the Owner Agent's approval of shoring plans. Submit proposal and request and obtain Owner and Owner Agent's approval before proceeding with cut-and-patch of structural work.

1.04 VISUAL/QUALITY LIMITATIONS:

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

1.05 LIMITATIONS ON APPROVALS:

A. The Owner or Owner Agent's approval to proceed with cutting and patching does not waive right to later require removal/replacement of work found to be cut-and-patched in an unsatisfactory manner, as judged by the Owner or Owner's Agent.

PART 2 - PRODUCTS

2.01 MATERIALS:

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

PART 3 - EXECUTION

3.01 PREPARATION:

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

3.02 TEMPORARY SUPPORTS:

A. Provide adequate temporary supports as necessary to assure the structural integrity of the affected portion of the work.

B. Temporary Support: To prevent failure, provide temporary support of work to be cut.

C. Shoring: Contractor shall provide shoring plans and details signed, sealed and dated by a Florida Registered Structural Engineer.

3.03 PROTECTION:

A. Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.

3.04 INTERFERENCE:

A. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.05 PRECAUTIONS:

A. Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

3.06 CUTTING:

A. Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible, review proposed procedures with the original installer; comply with original installer's recommendations.

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

PART 4 - PERFORMANCE

4.01 GENERAL:

A. Execute cutting and demolition by methods which shall prevent damage to other work, and shall provide the proper surfaces to receive repairs.

B. Execute excavating and backfilling by methods which shall prevent settlement or damage to other work or the building.

C. Restore work which has been cut or removed; install new products to provide completed work in accord with requirements of Contract Documents.

D. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes.

PART 5 - PATCHING

5.01 GENERAL:

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

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

PART 6 - CLEAN UP

6.01 GENERAL:

A. Prior to final acceptance the Contractor shall thoroughly clean the entire project of all debris, excess material, trash or any other loose or foreign matter which is on the site at the completion of the project as a result of the work on the project. This shall include, but is not limited to, floors, finishes and site. Remove all debris associated with construction. Burning shall not be allowed on site.

B. The Contractor for the general work shall keep the site of operations free from accumulations of rubbish and waste materials at all times, and shall require Subcontractors to remove and dispose of their debris. Removal and disposition of debris shall be made by Contractor at no cost to the Owner.

C. Should any Contractor or Subcontractor allow rubbish or waste material to accumulate on any portion of the site or in any portion of the building to such extent that the accumulation constitutes a hazard or obstructs the prosecution of the work in any way, the Architect or Owner may, if Contractor/Subcontractor at fault fails to remove such debris or waste material after written notice to clear up the accumulation, engage proper labor or services of another Contractor to make necessary removal and disposition and to charge cost against monies due the Contractor.

D. Flammable and combustible materials shall be kept in metal cans with tight covers, and removed from building at end of each working day.

END OF SECTION

SECTION 01090/DEFINITIONS AND STANDARDS

PART 1 - DEFINITIONS

1.1 GENERAL

A. Except as specifically defined otherwise, the following definitions supplement definitions of the Contract, Supplementary Conditions and other general contract documents, and apply generally to the work.

B. The provisions of Division 0 sections, General Requirements, apply to the entire work of the Contract.

C. Indicated: Shown on drawings by notes, graphics or schedules, or written into other have same meaning as "indicated", and are used to assist the reader in locating particular information.

D. Directed, Requested, Reviewed, etc.: These terms imply "by the Owner or Owner's Agent", unless otherwise indicated.

E. "Reviewed by Owner or Owner's Agent" in no case releases Contractor from responsibility to fulfill requirements of Contract Documents.

F. Space available to Contractor at location of project, either exclusively or to be shared with separate contractors, for performance of the work.

G. Furnish: Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar subsequent requirements.

H. Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working dimension, finishing, curing, protecting, cleaning, and similar requirements.

I. Provide: Furnish and install, complete and ready for intended use.

J. Installer: Entity (firm or person) engaged to install work, by Contractor, Subcontractor or Sub-subcontractor. Installers are required to be skilled in work they are engaged to install.

K. Specification Text Format: Underscoring facilitates scan reading, no other meaning. Imperative language is directed at Contractor, unless otherwise noted.

L. Overlapping/Conflicting Requirements: Most stringent requirement written directly into the Contract Documents is intended and shall be enforced. Refer uncertainties to the Owner and Engineer for a decision before proceeding.

1. Where optional requirements are specified in parallel manner, option is intended to be Contractor's unless otherwise indicated.

M. Minimum Requirements: Indicated requirements are for a specific minimum acceptable level of quality/quantity, as recognized in the industry. Actual work must comply (within specified tolerances), or may exceed minimums within reasonable limits. Refer uncertainties to Owner and Engineer before proceeding.

N. Abbreviations, Plural Words: Abbreviations, where not defined in Contract Documents, shall be interpreted to mean the normal construction industry terminology, determined by recognized grammatical rules, by the Architect/Engineer. Plural words shall be interpreted as singular and singular words shall be interpreted as plural where applicable for context of Contract Documents.

O. Testing Laboratory: An independent entity engaged for the project to provide inspections, tests, interpretations, reports and similar services.

PART 2 - STANDARDS AND REGULATIONS

2.1 GENERAL:

A. Industry Standards: Applicable standards of construction industry have same force and effect on performance of the work as if copied directly into the Contract Documents or bound and published therewith. Standards referenced in Contract Documents or in governing regulations have precedence over non-referenced standards, insofar as different standards may contain overlapping or conflicting requirements. Comply with standards in effect as of date of Contract Documents, unless otherwise indicated.

1. Abbreviations: Where abbreviations or acronyms are used in Contract Documents, they mean the well recognized name of entity in building construction industry; refer uncertainties to the Owner and Owner's Agent before proceeding, or consult "Encyclopedia of Associations" by Gale Research Company.

END OF SECTION

SECTION 01150/SCHEDULE OF VALUES AND REQUEST FOR PAYMENT

PART 1 - GENERAL

1.1 SCHEDULE OF VALUES

A. As required by the Supplementary Conditions, Part 8, the Contractor shall submit a schedule of values allocated to the various portions of the project.

B. Schedule shall be submitted within fifteen (15) days of signing contract.

C. Upon request of the Owner or Engineer, support the values with data which shall substantiate their correctness.

D. The schedule of values, unless objected to by the Owner or Engineer, shall be used only as the basis for the Contractor's Applications for Payment.

E. Related requirements specified in other sections apply.

PART 2 - FORM AND CONTENT OF SCHEDULE OF VALUES

2.1 GENERAL

A. Type schedule on 8-1/2 x 11" white paper: Contractor's standard forms and automated printout shall be considered for approval by Owner and Engineer upon Contractor's request. Identify schedule with:

1. Title of project and locations.
2. Architect/Engineer and project number.
3. Name and address of Contractor.
4. Contract designation.
5. Date of submission.

B. Schedule shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Follow the table of contents of the Project Manual as the format for listing component items.

1. Identify each line item with the number and title of the respective major section of the specifications.

PART 3 - PROJECTED VALUES

3.1 PROJECTED DRAW AMOUNTS

A. A schedule showing the projected (estimated) amount of each Application and Certificate to the end of the project shall be submitted within ten days of signing the Contract. This schedule will be non binding.

B. A revised schedule of projected amounted for each of the remaining Applications and Certificates of Payment shall be submitted with each request for payment. This shall be updated to reflect the history and current status of the draws plus projecting future amounts.

PART 4 - REQUEST FOR PAYMENT

4.1 GENERAL

A. Submit itemized applications typed on AIA Document G702, Application and Certification for Payment, and continuation sheet(s) G702A.

B. Attach executed Payment Certification Form per Section 00800 Article 9, Paragraph 9.3.5.

PART 5 - SUBMITTAL PROCEDURE

5.1 GENERAL

A. Submit Applications for Payment to the Engineer at the times stipulated in the Agreement.

B. Number: Three (3) copies of each Application.

C. When Engineer finds the application properly completed and correct, he shall transmit a certificate for payment to Owner, with a copy to Contractor.

D. Prior to the initial payment request, submit:

1. List of principal subcontractors and suppliers.
2. Schedule of values.
3. Progress schedule and first progress report.
4. Copies of building permits and similar start-up authorization or certifications.
5. Performance/payment bonds (if required).
6. Evidence of insurance coverage.

E. Following issuance by Owner and Engineer of Certificate of Substantial Completion, Contractor may submit special payment request, provided the following have been completed:

1. Obtain permits, certificates of inspection and other approval and releases by governing authorities, required for Owner's occupancy and use of project.
2. Submit warranties and similar documentation.
3. Submit maintenance manuals and provide instruction of Owner's operation/ maintenance personnel.
4. Complete final cleaning of the work.

5. Submit record documents.
6. Submit listing of work to be completed before final acceptance.

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

1. Complete work listed as incomplete at time of substantial completion, or otherwise assure Owner of subsequent completion of individual incomplete items.
2. Settle liens and other claims, or assure Owner of subsequent settlement.
3. Submit proof of payment on fees, taxes and similar obligations.
4. Transfer operational, access, security and similar provisions to Owner; and remove temporary facilities, tools and similar items.
5. Completion of requirements specified in "Project Close-out" - Section 01700, and "Close-out Special Instructions, Section 01712.
6. Obtain Consent of Surety for final payment.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01160/PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Contractor shall develop a Progress Schedule demonstrating fulfillment of the contract requirements, shall keep the schedule up to date in accordance with the requirements of this section.

1.2 CONTRACTOR'S REPRESENTATIVE

A. The Contractor shall designate an authorized representative in the firm who shall be responsible for the preparation of the schedule, review and report progress of the project with and to the Owner or Engineer. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the requirements of this specification section and such authority shall not be interrupted throughout the duration of the project.

PART 2 - PAYMENT AND PROGRESS REPORTING

2.1 MEETINGS AND REPORTS

A. Job site progress meetings shall be held on dates mutually agreed to by the Owner (or Representative), the Engineer and the Contractor. Contractor shall be required to attend all monthly progress meetings. Presence of Subcontractors during progress meetings is optional unless required by the Owner or Engineer. The Contractor shall complete their copy of the "look-ahead report" and all other data required by this section shall be accurately filled in and completed prior to the monthly progress meeting. The Contractor shall provide this information to the Owner and Engineer.

PART 3 - RESPONSIBILITY FOR COMPLETION

3.1 MEETING COMPLETION DATES

A. Whenever it becomes apparent from the current monthly progress review meeting that the contract completion dates shall not be met, the Contractor shall execute some or all of the following remedial actions:

1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.
2. Increase the number of working hours per shift, shifts per working day, working day per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
3. Reschedule the work in conformance with the specification requirements.

B. Prior to proceeding with any of the above actions, the Contractor shall notify and obtain approval from the Owner and Engineer for the proposed schedule changes.

PART 4 - ADJUSTMENT OF CONTRACT COMPLETION

4.1 REQUESTS FOR EXTENSION

A. The contract completion time shall be adjusted only for causes specified in this contract. Request for an extension of the contract completion date by the Contractor shall be supported with a justification and supporting evidence as the Engineer and Owner may deem necessary for determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. The Owner shall, within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Owner's decision. (See Supplemental Conditions, Section 00900)

B. Request for extension of time shall be submitted to Engineer for review prior to recommendations to Owner.

C. The Contractor shall submit each request for a change in the contract completion date to the Engineer. The Contractor shall include, as a part of each change order proposal, a sketch showing revisions, for the work in question and its relationship to other activities on the approved schedule.

D. The original schedules shall be in reproducible form, with two (2) copies each. The original reproducible form, after approval, must be used each month with the up-date information added to the reproducible schedules and three (3) copies of the schedules submitted with request for payment.

END OF SECTION

SECTION 01200/PROJECT MEETINGS

PART 1 - GENERAL

1.1 PRECONSTRUCTION CONFERENCE:

A. After all required documents are in order and before actually starting work at the site, the Owner and Engineer shall schedule a Preconstruction Conference with all interested parties in attendance.

B. It shall be the aim of this conference to discuss and resolve any last-minute details and/or questions which any of the interested parties to the work may have and which have not been previously addressed.

C. The time and place of the meeting shall be announced to all parties involved by the Architect.

PART 2 - PROJECT MEETINGS

2.1 GENERAL

A. Conduct general progress and coordination meetings weekly, attended by a representative of each primary entity engaged for performance of work. Contractor shall record discussions and decisions, and distribute copies to those attending and others affected including Engineer and Owner.

B. Contractor shall prepare and present a three (3) month Daily Progress Schedule at each mid-month meeting. This schedule shall be updated and attached to each monthly Request for Payment. (See Progress Schedules - Section 01160).

C. In the event the Daily Progress Schedule indicates failure to comply with the actual scheduled daily completion dates, the Contractor shall be required to work additional time to bring the project into compliance with the Schedule. This additional time shall be performed on request of the Engineer or Owner without additional cost to Owner.

D. Schedule meetings to coordinate with preparation of payment requests.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01205/ PROCEDURES AND CONTROLS

PART 1 - ADMINISTRATION AND SUPERVISION

1.1 COORDINATION

A. Coordinate various elements of the work and entities engaged to perform work; and coordinate the work with existing facilities/conditions, and with work by separate Contractors (if any) and by Owner.

PART 2 - SURVEYING/RECORDING

2.1 GENERAL

A. Working from established lines and levels at or near project site, establish and maintain dependable markers for lines and levels of the work. Calculate dimensions and measure for layout of work; do not scale the drawings. Maintain surveyor's log of layout work. Record deviations (if any) from drawing information on existing conditions and review with the Owner and Engineer at time of discovery.

PART 3 - INSPECTIONS AND TESTING

3.1 GENERAL

A. Provide required inspection and testing services specified to be by independent agencies, where not indicated specifically as Owner's responsibility. Neither inspection and test results nor failure thereof to disclose deficiencies relieves General Services Contractor of responsibility to comply with requirements of Contract Documents. Provide services to inspection and testing agencies (Owner's and Contractor's), including taking and delivery of samples, patching work and similar assistance. Require engaged agencies to perform indicated testing and submit reports promptly; and to report significant observations having an important bearing on the work, to the Owner and Engineer by the most expeditious means possible.

B. Installer Inspections: Require Installer of each major unit of work to inspect substrate and conditions for installation, and to report (in writing) unsatisfactory conditions. Correct unsatisfactory conditions before proceeding. Inspect each product immediately before installation, and do not install damaged or defective products, materials or equipment.

PART 4 - PREPARATION FOR INSTALLATION

4.1 PRE-INSTALLATION CONFERENCE

A. Prior to starting installation of each major component of the work, hold a pre-installation conference, attended by each entity involved or affected by planned installation. Include technical representatives of product manufacturers and others recognized as expert or otherwise capable of

influencing success of the installation. Review significant aspects of requirements for the work. Record discussion and distribute as plan of action.

PART 5 - INSTALLATION, GENERAL

5.1 GENERAL

A. Comply with manufacturer's instructions and recommendations to extent printed information is more detailed or stringent than requirements contained directly in Contract Documents.

B. Timing: Install work during time and under conditions which shall ensure best possible results, coordinated with required inspection and testing.

C. Anchor work securely in place, properly located by measured line and level, organized for best possible uniformity, visual effect, operational efficiency, durability, and similar benefit to Owner's use. Isolate non-compatible materials from contact sufficiently to prevent deterioration.

D. Mount individual units of work at industry-recognized mounting heights, if not otherwise indicated; refer uncertainties to Owner and Engineer before proceeding.

PART 6 - CLEANING AND PROTECTION

6.01 GENERAL

A. Clean each element of work at time of installation. Provide sufficient maintenance and protection during construction to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION

SECTION 01300/SUBMITTALS AND SHOP DRAWINGS

PART 1 - GENERAL

1.1 SHOP DRAWINGS

A. Submit shop drawings, Product Data and Samples required by the Contract Documents.

B. Related requirements specified in other sections:

1. Warranties: Section 01350
2. Mechanical: Division 15
3. Electrical: Division 16

C. "EQUIVALENT SUBSTITUTIONS" - See Section 01631 - Products and Substitutes. Whenever a material, article or piece of equipment is identified on the plans or in the specifications by reference to manufacturer's or vendor's names, catalog numbers, etc., it is intended merely to establish a standard; and, any material, article, or equipment of other manufacturers and vendors which shall perform adequately the duties imposed by the general design shall be considered equally acceptable provided the material, article or equipment so proposed, is, in the opinion of the Engineer, of equal substance and function. It shall not be purchased or installed by the Contractor without the Engineer's written review.

D. Definitions of Shop Drawings, Product Data and Samples are as follows:

1. Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
2. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.
3. Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work shall be judged.

PART 2 - PROCEDURES

2.1 GENERAL

A. General Contractor shall submit all Shop Drawings, Product Data and Samples. The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate Contractor, all Shop Drawings, Product Data and Samples required by Contract Documents.

B. The General Contractor shall stamp each submittal or portion of submittal to be forwarded to the architect with a uniform, self explanatory action stamp, appropriately marked and executed including date and signature to indicate the status of the submittal, or portion of submittal. The

General Contractor by approving and submitting Shop Drawings, Product Data and Samples, represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or shall do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

C. General Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Owner or Engineer's review of Shop Drawings, Product Data or Samples unless the Contractor has specifically informed the Owner and Engineer in writing of such deviation at the time of submission and the Architect has given written acknowledgment of the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Owner and Engineer's review thereof.

D. General Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, product Data or Samples, to revisions other than those requested by the Architect on previous submittals.

E. No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been reviewed by the Owner and Engineer as provided. All such portions of the Work shall be in accordance with reviewed submittals.

F. The Owner and Engineer shall review or take other appropriate action upon Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Owner and Engineer's review of a specific item shall not indicate approval of an assembly of which the item is a component.

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

H. Submit all Structural, Mechanical and Electrical items at one (1) time.

I. Submit material selections promptly and together with respective Shop Drawings.

PART 3 - DISCONTINUED ITEMS

3.1 GENERAL

A. Every effort is made to select and use products and colors that are currently in production. Statements that a color or product is out of production shall not be accepted unless accompanied by written proof from the manufacturer of the product.

PART 4 – NOT USED

PART 5 - SUBMITTAL CONTENTS

5.1 GENERAL

A. The date of submission and the dates of any previous submissions.

B. The project title and number. Submittals not clearly marked to identify the material, equipment and accessories on which approval is requested shall be returned without action, for identification and resubmittal.

C. Contract identification.

D. The names of: Contractor, Supplier, Manufacturer.

E. Identification of the product, with the specification section number.

F. Field dimensions, clearly identified as such.

G. Relation to adjacent or critical features of the work or materials.

H. Applicable standards, such as ASTM or Federal Specification numbers.

I. Identification of deviations from Contract Documents.

J. Identification of revisions on resubmittal.

K. Package each submittal appropriately for transmittal and handling.

L. General Contractor's Review Stamp indicating that the Contractor has reviewed and approved the submittal as being in compliance with the Contract Documents on each copy of submittal, signed and dated.

PART 6 - REVIEWING TIME

6.1 GENERAL

A. Shop Drawings shall be submitted in adequate time as not to delay progress of the work. Allow minimum of three (3) weeks for processing of each submittal. No extension of time shall be allowed because of failure to transmit submittals to the Owner and Engineer sufficiently in advance of the Work.

PART 7 - SPECIFIC REQUIREMENTS

7.1 SHOP DRAWINGS (OTHER THAN SAMPLES AND PRODUCT DATA)

A. All submittals 11" X 17" or smaller submit one (1) copy of each item for review. (except as noted below).

1. All submittals larger than 11" X 17" shall be submitted as follows:

a. Initial submittal: Submit two opaque blue/black line prints and one correctable, reproducible transparency. The transparency shall be processed and returned.
b. After approval Contractor shall print and process all copies necessary for job use and distribution.
c. Where it is necessary to provide intermediate submittals between the initial and final submittals, provide and process intermediate submittals in the same manner as for initial submittals. See Mechanical and Electrical Sections for their specific Shop Drawing Requirements.

2. All submittals requiring signatures and/or raised seals - submit (4) four originals.
3. Review of Submittals:

a. Submittals reviewed by the Owner and Engineer shall be returned to the Contractor stamped or marked as follows:

"REVIEWED" - Means that fabrication, manufacture and/or construction may proceed providing the work is in compliance with the Contract Documents.

"REJECTED" - Means no work shall be fabricated, manufactured, and/or constructed and that the Contractor shall make a new submittal to the Owner and Engineer. Any submissions marked "Rejected" shall not be permitted on the site.

"REVISE AND RESUBMIT" - Means that the submittal shall be revised and resubmitted due to inadequacies beyond minor corrective action on the submittal.

"FURNISH AS CORRECTED" - Means that fabrication, manufacture, and/or construction may proceed providing the work is in compliance with the Owner and Engineer's corrections and the Contract Documents.

7.2 SAMPLES

A. Submit three (3) samples when required. Submit with Shop Drawing if Shop Drawing is required. Submit three (3) color samples at same time.

1. Tag or mark each sample for identification.
2. Products and materials requiring submittals are noted in the individual sections of the specifications.
3. Submit two (2) sets of samples; one set shall be returned. Provide three (3) or more samples in each set where variations in color, pattern or texture are observable; show average condition and extreme range of variations. Submit full documentation with each set. Sample submittals are for Owner and Engineer's observations of color, texture,

pattern and "kind". Maintain one (1) returned set at project site for purposes of quality control comparisons.

7.3 PRODUCT DATA

A. Mark each copy to indicate the actual product to be provided; show selections from among options in the manufacturer's printed Product Data. Submit six (6) copies to Owner and Engineer; submittal is for information and record purposes only. Where the Product Data is required for maintenance manuals, submit two (2) additional copies which shall be returned. Maintain one (1) additional copy at the project site for reference purposes.

B. Preparation: Clearly mark each copy to identify pertinent products or models.

1. Show performance characteristics and capacities, complete with all required test data.
2. Show dimensions and clearances required.

C. Manufacturer's schematic drawings and diagrams:

1. Modify drawings and diagrams to delete information which is not applicable to the work.
2. Supplement standard information to provide information specifically applicable to the work.
3. Show wiring or piping diagrams and controls.

PART 8 - DISTRIBUTION

8.1 GENERAL

A. Distribute reproductions of Shop Drawings and copies of Product Data which carry the Owner and Engineer's stamp of approval to:

- Job Site file
- Other affected Contractors
- Subcontractors
- Supplier of Fabricator
- Owner

B. Documents and Samples at the Site: The Contractor shall maintain at the site for the Owner one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction and approved Shop Drawings, Product Data and Samples. These shall be available to the Engineer and shall be delivered to him for the Owner upon completion of the Work.

PART 9 - MISCELLANEOUS SUBMITTALS

9.1 GENERAL

A. Provide copies of miscellaneous submittals as follows:

1. Warranties: Submit two (2) executed copies, plus additional copies as required for maintenance manuals.
2. Inspection and Test Reports: Where not processed as Shop Drawings or Product Data, provide two (2) copies plus additional copies as required for maintenance manuals.
3. Field Records: Four (4) copies, including one copy which shall be returned for inclusion in the submittal of record documents.
4. Maintenance Manuals: Submit two (2) bound copies.
5. Record Drawings: See Section 01700 - Project Close-out, As-Built Drawings.
6. Miscellaneous Record Documentation: Provide the original maintained marked-up copy.

PART 10 - ARCHITECT'S/ENGINEER'S ACTION

10.1 GENERAL

A. Stamp: The Owner and Engineer shall stamp each submittal to be returned with a uniform, self explanatory action stamp, appropriately marked and executed to indicate the status of the submittal. (See Part 7.)

PART 11 - REQUIRED SUBMITTALS

11.1 LIST OF SUBMITTALS

A. The following list of required submittals is for the General Contractor's convenience only. The General Contractor shall carefully review the specifications for additional requirements and submit those as required. The following list does not relieve the General Contractor from complying with all specifications requirements. Any item required here shall be submitted. Additional items which may be required for the proper execution of the work shall be submitted as directed by the Owner and Engineer.

B. Submit number of copies of shop drawings, project data and samples which General Contractor requires for distribution plus four (4) copies which shall be retained by the Owner and Engineer.

END OF SECTION

SECTION 01331/TIME EXTENSION WEATHER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, and Division-1 Specifications, apply to work of this section.

1. See General and Special Conditions

PART 2 - TIME EXTENSIONS

2.1 EXTENSIONS

A. Extensions for weather may be granted for weather in excess of normal that adversely impacts ongoing activities on the site that have successive following activities that must be completed in a required sequence for completion of the project within the specified performance period. These would be generally labeled as Critical Path Activities when that type of schedule is used.

2.2 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

A. In order for an award of a time extension under this clause, the following conditions must be satisfied:

1. The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.
2. The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

B. The following is a schedule of monthly anticipated adverse weather days. This will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DAYS

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
5	4	5	3	3	5	7	7	5	3	4	4

C. Upon acknowledgment of the Notice to Proceed and continuing throughout the contract, the Contractor will record on the daily report the occurrence of adverse weather and resultant impact to normally schedule work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day.

The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph B above, the Owner and Engineer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification.

2.3 REQUEST FOR WEATHER EXTENSION

A. Any request for a time extension for weather must include:

1. Weather data from Military Installation or National Weather Services for the time period in question.
2. Impact on ongoing activities.
3. Relation of those activities to completion of the project.
4. Other information and documentation as requested by the Owner and Engineer.
5. Requests for time extensions as indicated above must be made in writing to the Owner and Engineer no more than two days after the of the period of excessive weather. No time extensions will be granted for weather if not requested within two days as indicated above.

2.4 HURRICANE PREPAREDNESS PLAN

A. GC is required to take special care and precautions in the event of all severe inclement weather.

B. A normal condition of alertness shall be maintained in the Work area during the hurricane season unless a higher condition of hurricane readiness is prescribed. GC shall develop a Hurricane Readiness Plan for Work areas and insure that the plan provides all necessary precautionary measures and procedures to be employed by their forces prior to the occurrence of a hurricane or destructive wind storm in the area. The plan shall be placed into effect for the hurricane season, designated as beginning on 1 June of each year and ending on 30 November.

CONDITIONS OF READINESS

Seasonal/Hurricane Condition:Hurricane Season Readiness:
Condition IV:Storm may hit this area in 72 hours.
Condition III:Storm may hit this area in 48 hours.
Condition II:Storm may hit this area in 24 hours.
Condition I:Storm will hit this area.

C. Condition III and II - In the event U.S. Weather Bureau sets special weather conditions, GC shall take precautions established when Condition III or Condition II has been set.

GC shall inspect and adequately secure the Work depending on weekday or weekend time period.

D. Condition I - GC shall inspect the site and Work at an appropriate time to insure the area is secure and consistent with the current Condition of Readiness in effect or expected to be placed in effect.

If it is likely Condition I will be set during the weekend or after regular working hours, the GC shall secure the Work area in accordance with the expected condition prior to close of regular working hours.

E. Preparations - All loose materials shall be secured. Of utmost concern is the amount of material, equipment, vehicles, storage sheds, state of site drainage, openings/glass areas, roof conditions that can become missiles in heavy winds and cause damage to buildings, personnel and other property.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01350/WARRANTIES

PART 1 - GENERAL

1.1 WARRANTIES

A. Per the Contract conditions, the Contractor shall warrant all materials and work for one (1) year from date of Final Completion

B. Refer to Divisions 2 through 16 sections for specific content requirements and particular requirements for all warranties.

PART 2 - OPERATION MANUALS

2.1 GENERAL

A. Contractor shall file in one place all operation, maintenance or other manuals received with finishes and equipment and upon completion of project, present these to the Owner. The contractor shall provide electronic copies of all data in PDF format, grouped in folders and file names as indicated in hard copy of manuals.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01400/QUALITY CONTROL SERVICES

PART 1 - DESCRIPTION

1.1 GENERAL

A. Quality control services include inspections and tests performed by independent agencies and governing authorities, as well as by the Contractor. Inspection and testing services are intended to determine compliance of the work with requirements specified. Specific quality control requirements are specified in individual specification sections.

PART 2 - RESPONSIBILITIES

2.1 GENERAL

A. Contractor Responsibilities: Except where indicated as being the Owner's responsibility, quality control services are the Contractor's responsibility, including those specified to be performed by an independent agency and not by Contractor. The Contractor shall employ and pay an independent agency, testing laboratory or other qualified firm to perform quality control services specified.

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

B. Retest Responsibilities: Where results of inspections or tests do not indicate compliance with Contract Documents, retests are the Contractor's responsibility.

C. Responsibility for Associates Services: The Contractor shall cooperate with independent agencies performing inspections or tests. Provide auxiliary services as are reasonable. Auxiliary services include:

Provide access to the work.

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

E. Qualifications for Service Agencies: Engage inspection and test service agencies which are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories.

F. Submittals: Submit a certified written report of each inspection, test or similar service, in duplicate to the Owner and Engineer. Submit additional copies of each report to governing authority, when the authority so directs.

G. Report Data: Written inspection or test reports shall include:

- Names of testing agency or test laboratory.
- Dates and locations of samples, tests or inspections.
- Names of individuals present.
- Complete inspection or test data.
- Test Results.
- Interpretations.
- Recommendations.

H. Repair and Protection: Upon completion of inspection or testing repair damaged work and restore substrates and finishes.

END OF SECTION

SECTION 01500/TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 TEMPORARY STORAGE AND OFFICE:

A. Contractors shall provide for his own use at the site, such storage and office space as deemed necessary.

B. Provide a temporary fence around the area. Location shall be approved by Authorities on the site before installation.

C. Trailers and sheds and fenced areas as necessary shall be located only with the Owners approval.

1.2 USE CHARGES

A. Usage charges for temporary services of facilities are not chargeable to the Owner or Engineer.

1.3 REGULATIONS

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

1.4 STANDARDS

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

1.5 INSPECTIONS

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

1.6 SUBMITTALS

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

1.7 MATERIALS AND EQUIPMENT

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

1.8 INSTALLATION

A. Use qualified tradesmen for installation. Locate temporary services and facilities where they shall serve the project adequately and result in minimum interference with the work.

PART 2 - TOILET FACILITIES

2.1 GENERAL

A. General Contractor shall provide his toilet facilities. Units shall be of the chemical type, sanitary, ventilated and clean. Location shall be within the construction office/storage area.

B. General Contractor shall comply with governing regulations including Safety and Health Codes for type, number, location, operation and maintenance of fixtures and facilities.

PART 3 - UTILITIES, GENERAL

3.1 GENERAL

A. Temporary Utility Installation: General Services Contractor shall provide all temporary utilities as required to perform the work under this contract and pay all expenses attributed to this requirement. Engage local utility company to install temporary service or to make connections to existing service. Arrange with the companies and existing users for an acceptable time when service can be interrupted to make connections.

1. Establish a service implementation and termination schedule. As early as possible change to use of permanent service, to enable removal of the temporary utility and eliminate possible interference with completion of the work.
2. Provide adequate capacity at each stage of construction. Prior to availability at the site, provide trucked-in services for start-up construction operations.
3. Obtain and pay for easements required to bring temporary utilities.

B. Water: As required for use, shall be obtained by attaching a hose or hoses to the lines authorized by the Owner, if available. The General Contractor shall bear all cost and provide water if not available.

C. Power: General Contractor shall provide all extension lines as required for his use. Power shall be obtained from locations authorized by Owner. Owner shall bear all cost.

1. Electric Power Supply: Provide weather tight, grounded temporary electrical distribution system, with ground fault circuit interrupters and ground-fault interrupter features of proper types, sizes, electrical ratings and characteristics to fulfill project requirements. Comply with applicable requirements of NEMA, NECA and UL standards and governing regulations. Install temporary lighting of adequate illumination levels to perform the work specified.

a. Service: Comply with NECA pertaining to installation of temporary wiring service and grounding. Provide transformers, and over current protective devices at main distribution panel for power and light circuitry. Provide disconnects for equipment circuits.

(1) Exercise control over power usage to conserve energy.

D. Power Distribution System: Provide circuits of proper sizes, characteristics, and ratings for each use indicated. Install wiring overhead, and risers vertically where least exposed to damage. Provide rigid steel conduit to protect wiring on grade, floors, decks or other areas exposed to possible damage.

1. Provide 20 amp, 4-gang receptacle outlets, equipped with ground- fault circuit interrupters, reset button and pilot light, spaced that a 100 foot extension cord can reach each area of work. Use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic.
2. Provide warning signs at power outlets that are other than 110/120 volt. Provide outlets of proper NEMA configuration to prevent insertion of 110/120 volt plugs into higher voltage outlets.

E. Temporary Lighting: Provide general service incandescent lamps of wattage required for adequate illumination. Protect lamps with guard cages or tempered glass enclosures where exposed to breakage. Provide exterior type fixtures where exposed to weather or moisture. Provide local switching to allow lights to be turned off in patterns to conserve energy.

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

F. Telephone: Contractor’s superintendent shall maintain a phone (fixed or portable) where he can be reached during normal business hours. Additionally, the Owner shall be given an after hours number for emergency use only.

PART 4 - PROTECTION OF OCCUPANTS

4.1 GENERAL

A. Provide temporary fencing, barricades, supports, partitions, etc. as required to provide protection to occupants, and to exclude unauthorized persons from work areas. Temporary fencing shall be double knuckle chain link- 6’ high. Orange contractors fencing is not allowed.

B. Protection of Facilities: Provide protection from damage, dust, etc. to all items in vicinity of contract work including, but not limited to, adjacent building surfaces, finishes, items of equipment, utilities, etc. Repair any damage to Owner's satisfaction at no additional cost to Owner.

PART 5 - LIFTING DEVICES AND HOISTING FACILITIES

5.1 GENERAL

A. Provide cranes, hoists, towers and other lifting devices necessary for the proper and efficient movement of materials; provide operating personnel for equipment as required. Equipment shall be provided with proper guys, bracing and other safety devices as required by Local or State codes.

B. Remove towers and hoisting equipment when they are no longer needed.

PART 6 - TEMPORARY HEAT not required

PART 7 - FIRST AID SUPPLIES

7.1 GENERAL

A. Comply with governing regulations and recognized recommendations within the construction industry.

PART 8 - DEWATERING FACILITIES AND DRAINS

8.1 GENERAL

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

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

PART 9 - TEMPORARY ENCLOSURE

9.1 GENERAL

A. Provide temporary enclosure of materials, equipment, work in progress and completed portions of the Work to provide protection from exposure, foul weather, other construction operations, and similar activities. Provide enclosures where temporary heat is needed and the permanent building enclosure is not complete, and there is no other provision for containment of heat. Coordinate with ventilating and material drying or curing requirements to avoid dangerous conditions.

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

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

PART 10 - COLLECTION AND DISPOSAL OF WASTES

10.1 GENERAL

A. Establish a system for collection and disposal of waste materials. Enforce requirements strictly. Do not hold collected materials longer than seven (7) days during normal weather or three (3) days when the daily temperature is expected to rise above 80 degrees F. (27 degrees C). Handle waste materials that are hazardous, dangerous, or unsanitary separately from other waste by containerizing. Dispose of waste material in a lawful manner.

PART 11 - RODENT AND PEST CONTROL

11.1 GENERAL

A. Retain a local exterminator or insect-and-pest control company to perform extermination and control procedures at regular intervals so that the project shall be relatively free of pests and their residues at Substantial Completion. Perform control operations in a lawful manner using environmentally safe materials.

PART 12 - MISCELLANEOUS SERVICES AND FACILITIES

12.1 GENERAL

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

PART 13 - SECURITY AND PROTECTION FACILITIES INSTALLATION

13.1 GENERAL

A. Provide a neat and uniform appearance in security and protection facilities acceptable to the Architect/Engineer and the Owner. Maintain site in a safe, lawful and publicly acceptable manner. Take necessary measures to prevent erosion.

PART 14 - TEMPORARY FIRE PROTECTION

14.1 GENERAL

A. Until fire protection needs may be fulfilled by permanent facilities, install and maintain temporary fire protection of the types needed to protect against losses. Comply with recommendations of NFPA Standard 10.

B. Locate fire extinguishers where most effective. Provide type "A" fire extinguishers for temporary offices and spaces where there is minimal danger of electrical or flammable liquid fires, and type "ABC" dry chemical extinguishers elsewhere. Store combustible materials in containers in fire-safe locations.

C. Review fire prevention and protection needs with local Fire Department officials and establish procedures to be followed in the event of fire. Instruct personnel in procedures and post warnings and information. Maintain unobstructed access to fire extinguishers, temporary fire protection facilities, and other access routes. Prohibit smoking in hazardous areas. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of ignition.

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

PART 15 - BARRICADES, WARNING SIGNS AND LIGHTS

15.1 GENERAL

A. Comply with recognized standards and code requirements for erection of substantial barricades a minimum of 6' high where needed to prevent accidents. Paint with appropriate colors and warning signs to inform personnel at the site and the public of the hazard being protected against. Provide lighting where needed, including flashing red lights where appropriate.

PART 16 - SECURITY ENCLOSURES AND LOCKUP

16.1 GENERAL

A. Install substantial temporary enclosures of partially completed areas of construction. Provide locking entrances adequate to prevent unauthorized entrance, vandalism, theft and similar violations of project security.

B. Where materials and equipment must be temporarily stored, and are of substantial value or attractive for possible theft, provide a secure lockup. Enforce strict discipline in connection with the timing of installation and release of materials, to minimize the opportunity for theft and vandalism.

PART 17 - ENVIRONMENTAL PROTECTION

17.1 GENERAL

A. Conduct construction activities by methods that comply with environmental regulations, minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result from the performance of work at the site. Avoid the use of tools and equipment which produce harmful noise. Restrict the use of noise making tools and equipment to hours of use that shall minimize complaints.

PART 18 - OPERATION, TERMINATION AND REMOVAL

18.1 GENERAL

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

B. Maintenance: Operate and maintain temporary services and facilities in good operating condition and in a safe and efficient manner until removal is authorized. Do not overload services or facilities. Protect from damage by freezing temperatures and similar elements. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.

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

PART 19 - PROTECTION

19.1 GENERAL

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

PART 20 - TERMINATION AND REMOVAL

20.1 GENERAL

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

B. Substantial Completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01631/PRODUCTS AND SUBSTITUTIONS

PART 1 - PROCEDURAL REQUIREMENTS

1.1 SOURCE LIMITATIONS

A. To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit of work. Where it is possible to do so, match separate procurements as closely as possible. To the extent that the product selection process is under the Contractor's control, provide products that are compatible with previously selected products. Where standard products are available that comply with specified requirements, provide those standard products that have been used successfully before in similar applications, and that are recommended by the manufacturers for the applications indicated.

PART 2 - PRODUCT SELECTION LIMITATIONS

2.01 PRODUCT SELECTIONS

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

1. Single Product Name: Where only a single product or manufacturer is named, provide the product, unless it is not available, is incompatible with existing work, or does not comply with specified requirements or governing regulations.
2. Two or More Products Named: Where two or more products or manufacturers are named, the selection is at the Contractor's option, provided the product selected complies with specified requirements.

    a. "Equivalent" Provisions: Where products or manufacturers are specified by name accompanied by the term "equivalent", provide either the product named, or comply with the requirements for gaining approval of "substitutions" for the use of an unnamed product.

3. Compliance with Standards: Where specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting any product that complies with specified requirements provided no product names are indicated.
4. Performance Requirements: Where the specifications require compliance with indicated performance requirements, the Contractor has option of selecting any product that complies with the specific performance requirements provided no product names are indicated.
5. Visual Requirements: Where specifications indicate that a product is to be selected from the manufacturer's standard options, without naming the manufacturer, the Architect/Engineer has the option of making the selection, after the Contractor has determined or selected the manufacturer.

2.2 NAMEPLATES

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

PART 3 - SUBSTITUTIONS

3.1 CONDITIONS

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

1. The proposed substitution is related to an "equivalent" or similar provision in the Contract Documents.
2. The required product cannot be supplied in time for compliance with Contract Time requirements.
3. The required product is not acceptable to the governing authorities.
4. The required product cannot be properly coordinated with other materials in the Work, or cannot be warranted or insured as specified.
5. The proposed substitution shall offer a substantial advantage to the Owner after deducting offsetting disadvantages including delays, additional compensation to the Architect/Engineer for redesign, evaluation and other necessary services, and similar considerations.

3.2 SUBMITTALS

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

1. Provide complete product documentation, including Product Data and Samples, where appropriate.
2. Provide detailed performance comparisons and evaluation, including testing laboratory reports where applicable.
3. Provide coordination information indicating the effect of the substitution on other work and the time schedule.
4. Provide cost information for the proposed Change Order.
5. Provide the Contractor's general certification of the recommended substitution.

3.3 CHANGE ORDER

A. Approval of substitutions is possible only by the Change Order or Supplemental Instructions procedure.

PART 4 - DELIVERY, STORAGE AND HANDLING

4.1 GENERAL

A. Receive, store and handle products, materials and equipment in a manner that shall prevent loss, deterioration and damage. Schedule deliveries so as to minimize long-term storage at the project site.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01700 /PROJECT CLOSE-OUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF REQUIREMENTS

A. Definitions: Close-out is hereby defined to include general requirements near end of Contract Time, in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in sections of Division 2 through 16. Time of close-out is directly related to "Substantial Completion", and therefore may be either a single time period for entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. That time variation (if any) shall be applicable to other provisions of this section.

1.3 PREREQUISITES TO SUBSTANTIAL COMPLETION

A. General: Prior to requesting Owner and Engineer's inspection for certification of Substantial Completion (for either entire work or portions thereof), complete the following and list known exceptions in request:

1. In progress payment request coincident with or first following date claimed, show either 100% completion for portion of work claimed as "Substantially Complete", or list incomplete items, value of incompletion, and reasons for being incomplete.
2. Include supporting documentation for completion as indicated in these Contract Documents.
3. Submit statement showing accounting of changes to the Contract Sum.
4. Contractor shall notify and advise Owner of pending insurance change-over requirements.
5. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
6. Obtain and submit releases enabling Owner's full and unrestricted use of the work and access to services and utilities, including (where required) Occupancy Permits, operating certificates, and similar releases.
7. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.
8. Make final change-over of locks and transmit keys to Owner, and advise Owner's personnel of change-over in security provisions.
9. Complete start-up testing of systems, and instructions of Owner's operating/maintenance personnel. Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.
10. Complete final cleaning up requirements, including touch-up of marred surfaces.

11. Touch-up and otherwise repair and restore marred exposed finishes.
12. Test and Balance of mechanical systems.

1.4 INSPECTION PROCEDURES

A. Upon receipt of Contractor's request, the Owner and Engineer shall either proceed with inspection or advise Contractor of prerequisites not fulfilled. Following initial inspection, the Owner and Engineer shall either prepare Certificate of Substantial Completion, or advise Contractor of work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that work has been substantially completed. Contractor shall prepare a type written "punch-list" of items to be completed and attached to the Substantial Completion Form. Results of completed inspection shall form initial "punch-list" for final acceptance.

1.5 PREREQUISITES TO FINAL ACCEPTANCE

A. General: Prior to requesting the Owner and Engineer's final construction review for certification of final acceptance and final payment, as required by the Contract, complete the following and list known exceptions (if any) in request:

1. Submit final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
2. Submit updated final statement, accounting for additional (final) changes to Contract Sum.
3. Submit certified copy of the Owner and Engineer's "final punch list" of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by the Owner and Engineer.
4. Submit final meter readings for utilities, measured record of stored fuel, and similar data as of time of Substantial Completion or when Owner took possession of and responsibility for corresponding elements of the work.
5. Submit Consent of Surety.
6. Submit final liquidated damages settlement statement, acceptable to Owner.
7. Revise and submit evidence of final, continuing insurance coverage complying with insurance requirements.
8. See Section 01712 Part 2 Close-Out Special Instructions complete and Notarized Statements on ACM/Hazardous Materials.
9. Submit all warranties/guarantees dated from Final Acceptance.

B. Review Procedure: Upon receipt of Contractor's notice that work has been completed, including punch-list items resulting from earlier construction reviews, and excepting incomplete items delayed because of acceptable circumstances, the Owner and Engineer shall reinspect work. Upon completion of review, the Owner and Engineer shall either prepare Certificate of Final Acceptance or advise Contractor of work not completed or obligations not fulfilled as required for final acceptance. If necessary, procedure shall be repeated.

1.6 AS-BUILT DRAWINGS

A. During the progress of the work, the Contractor shall require the Job Superintendent for the Project and the Job Superintendent for the, Air Conditioning, Heating, Ventilating, and Electrical Contractors to record on their field sets of drawings any approved alteration to Contract Drawings as installed and the exact locations, as installed, of all underground and otherwise concealed conduit, pipe and duct lines which were not installed exactly as shown on the Contract Drawings.

B. With reference to Electrical work, the exact conduit runs shall be shown on these drawings.

C. Upon completion of the work, this data shall be recorded to scale, by a competent draftsman on sepia line prints or transparent paper of the contract drawings. Sepias shall be furnished to the Contractor by the Owner and Engineer, and cost shall be borne by Contractor.

D. The reproducible line prints reflecting changed and unchanged sheets shall be submitted to the Owner and Engineer when completed, for certification and forwarding to the Owner, at the time of project close-out.

1.7 RECORD SPECIFICATIONS

A. Maintain one (1) copy of Specifications, including Addenda, Change Orders, Supplemental Instructions and similar modifications issued in printed form during construction, and mark-up variations (of substance) in actual work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable. Upon completion of mark-up, submit to Architect along with sepia line as-built plans referenced in Paragraph 1.06 of this specification section.

1.8 MAINTENANCE MANUALS

A. Organize maintenance-and-operating manual information into suitable sets of manageable size, and bind into individual binders properly identified and indexed (thumb-tabbed). Include emergency instructions, spare parts listing, warranties, wiring diagrams, recommended "turn-around" cycles, inspection procedures, shop drawings, product data, and similar applicable information. Bind each manual of each set in a heavy-duty 2", 3-ring vinyl-covered binder, and include pocket folders for folded sheet information. Mark identification on both front and spine of each binder. Provide three hard copies and one electronic copy in PDF format. Electronic copy shall be searchable and tabbed for convenience.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 CLOSE-OUT PROCEDURES

A. General Operating/Maintenance Instructions: Arrange for each installer of work requiring continuing maintenance or operation, to meet with Owner's personnel, at project site, to provide

basic instructions needed for proper operation and maintenance of entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and similar procedures and facilities. For operational equipment, demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy/efficiency adjustments, and similar operations. Review maintenance and operations in relation with applicable warranties, agreements to maintain, bonds, and similar continuing commitments.

3.2 FINAL CLEANING

A. General: All cleaning shall be responsibility of General Services Contractor with exception of Special cleaning for specific units of work is specified in sections of Divisions 2 through 16. General cleaning during progress of work is specified in General Conditions and as temporary services in "Temporary Facilities" section of this Division. Provide final cleaning of the work, at time indicated, consisting of cleaning each surface or unit of work to normal "clean" condition expected for a first-class building cleaning and maintenance program. Comply with manufacturer's instructions for cleaning operations. The following are examples, but not by way of limitation, of cleaning levels required:

1. Remove labels which are not required as permanent labels.
2. Clean transparent materials, including window/door glass, to a polished condition, removing substances which are noticeable as vision-obscuring materials. Replace broken glass and damaged transparent materials.
3. Clean exposed exterior finishes and interior (if applicable) to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
4. Wipe surfaces of mechanical and electrical equipment clean and remove excess lubrication and other substances.
5. Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, trenches, manholes, attics and similar spaces.
6. Clean floors in job storage spaces broom clean.
7. Vacuum clean carpeted surfaces and similar soft surfaces.
8. Clean plumbing fixtures to a sanitary condition free of stains including those resulting from water exposure.
9. Clean light fixtures and lamps so as to function with full efficiency.
10. Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petro-chemical spills and other foreign deposits. Rake grounds which are neither planted nor paved, to a smooth, even-textured surface.
11. Clean and finish resilient flooring per specifications.

B. Removal of Protection: Except as otherwise indicated or requested by Owner or Engineer, remove temporary protection devices and facilities which were installed during course of the work to protect previously completed work during remainder of construction period.

C. Compliance: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on Owner's property, or discharge volatile or other harmful or dangerous materials into drainage systems; remove waste materials from site and dispose of in a lawful manner.

1. Where extra materials of value are remaining after completion of associated work have become Owner's property, dispose of these to Owner's best advantage as directed.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 9B

RESILIENT TILE (LVP, LVT) AND RUBBER BASE

9B-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F, of these specifications shall apply to and form a part of this Section as if written in full herein.

9B-02. SCOPE:

Provide all labor, materials, and equipment necessary to install new floor covering and base where shown and scheduled on the drawings and as specified.

9B-03. RESILIENT TILE FLOORING

1) GENERAL
   (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.

   (2) SUMMARY
      (a) Section Includes:
         (i) Solid vinyl floor tile.

   (3) ACTION SUBMITTALS
      (a) Product Data: For each type of product.
      (b) Sustainable Design Submittals:
         (i) Product Data: For adhesives, indicating VOC content.
         (ii) Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
         (iii) Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.
      (c) Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

(i) Show details of special patterns.

(d) Samples: Full-size units of each color and pattern of floor tile required.

(e) Product Schedule: For floor tile. [Use same designations indicated on Drawings.]

(4) INFORMATIONAL SUBMITTALS

(a) Qualification Data: For Installer.

(5) CLOSEOUT SUBMITTALS

(a) Maintenance Data: For each type of floor tile to include in maintenance manuals.

(6) MAINTENANCE MATERIAL SUBMITTALS

(a) Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

(i) Floor Tile: Furnish one box for every 100 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

(7) QUALITY ASSURANCE

(a) Installer Qualifications: A qualified installer with a minimum of 5 years commercial resilient flooring installation experience, and who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

(i) Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

(b) Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

(i) Build mockups for floor tile including resilient base and accessories.

1. Size: Minimum 100 sq. ft. (9.3 sq. m) for each type, color, and pattern and locations as shown on drawings.

(ii) Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

(iii) Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

(8) DELIVERY, STORAGE, AND HANDLING

(a) Store floor tile 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). Store floor tiles on flat surfaces.

(9) FIELD CONDITIONS

(a) HVAC system should be operational and running for a minimum of 7 days prior to resilient tile installation and remain running after resilient tile installation.

(b) Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F (18 deg C) or more than 85 deg F (29 deg C), in spaces to receive floor tile during the following time periods:

(i) 48 hours before installation.
(ii) During installation.
(iii) Permanently after installation.

(c) Close spaces to traffic during floor tile installation.

(d) Close spaces to traffic, all heavy rolling loads, and point loads for 48 to 72 hours after floor tile installation.

(e) Install floor tile after other finishing operations, including painting, have been completed.

(10) WARRANTY

(a) Special Warranty for Resilient Tile; Manufacturer agrees to repair or replace defective material within specified warranty period.

(i) Warranty does not include installer's workmanship.
(ii) Resilient tile must be installed and maintained according to manufacturer's recommendations.
(iii) Warranty Period:
1. Manufacturing Defects Warranty: 10 years.
2. Limited Commercial Wear Warranty: 10 years.
3. Under bed Warranty: 10 years. (Requires Shaw 4100 or S150 adhesive.)

2) PRODUCTS

(1) PERFORMANCE REQUIREMENTS

(a) Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

(i) Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

(b) Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

(2) SOLID VINYL FLOOR TILE

(a) Basis-of-Design Product: Subject to compliance with requirements, provide Patcraft Typeface I312V.

(b) Tile Standard: ASTM F 1700.

(i) Class: Class III, printed film vinyl tile.
(ii) Type: A Smooth.

(c) Overall Thickness: 0.098 inch (2.5 mm).

(d) Wear Layer: 20 mil (0.5 mm) ExoGuard™ Quatrz Enhanced Urethane.

(e) Wear Layer Thickness: 0.020 inch (0.5 mm).

(f) Size: 23-5/8 by 23-5/8 inches (600mm by 600 mm).

(g) Colors and Patterns: As selected by Architect from full range of manufacturer's designations.

(h) Test Data:

(i) Slip Resistance: ASTM D 2047, ADA Compliant.
(ii) Static Load, ASTM F 970: 2000 psi (lbs.sq.in) – 0.005 in.
(iii) Residual Indentation, ASTM 1914: Passes <8%
(iv) Flexibility, ASTM F 137: Passes.
(v) Dimensional Stability: Federal Standard #501A, Method 6211 >0.02”/ft.
(vi) Resistance to Heat, ASTM F 1514: Passes.
(vii) Resistance to Light, ASTM F 1515: Passes.
(viii) Resistance to Chemicals, ASTM 925: Passes.
(ix) Resistance to Fungi, ASTM G 21: Passes, Rate zero (Rate zero: Fungi Free).

(x) Antibacterial Activity, AATCC 147: Passes, resists the propagation of bacteria.
(xi) Radiant Flux, ASTM E 648: greater than 0.45 watts/cm, NFPA Class I.
(xii) Smoke Density, ASTM E 662: less than 450, Passes.

(3) INSTALLATION MATERIALS

(a) Trowel-able Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

(b) Adhesives: Water-resistant adhesive such as the Shaw 4100 or Shaw S150 to suit floor tile and substrate conditions indicated.

(i) Adhesives shall have a VOC content of 50 g/L or less.
(ii) Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

(c) Floor Polish: Floor Finish is optional. If floor finish is desired, provide protective, neutral pH liquid floor-polish products recommended by floor tile manufacturer.

3) EXECUTION

(1) EXAMINATION

(a) Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

(i) 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 floor tile.

(b) Proceed with installation only after unsatisfactory conditions have been corrected.

(2) PREPARATION

(a) Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

(b) Concrete Substrates: Prepare according to ASTM F 710.

(i) Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
(ii) Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
(iii) Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
(iv) Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
1. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates are below 90 percent relative humidity level.

(c) Fill cracks, holes, and depressions in substrates with trowel-able leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

(d) Do not install floor tiles until they are the same temperature as the space where they are to be installed.

(i) At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

(e) Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

(3) FLOOR TILE INSTALLATION

(a) Comply with manufacturer's written instructions for installing floor tile.

(b) Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

(i) Lay tiles square with room axis.

(c) Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

(i) Lay tiles in pattern of colors and sizes indicated.

(d) Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

(e) Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

(f) Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

(g) Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

(h) Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

(4) CLEANING AND PROTECTION

(a) Comply with manufacturer's written instructions for cleaning and protecting floor tile.

(b) Perform the following operations immediately after completing floor tile installation:

(i) Remove adhesive and other blemishes from exposed surfaces.
(ii) Sweep and vacuum surfaces thoroughly.
(iii) Damp-mop surfaces to remove marks and soil.

(c) Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

(d) Optional Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

(e) Cover floor tile until Substantial Completion.

9B-04. CARPET TILE **N.A.**

9B-05. RUBBER BASE:

Where noted, base shall be 4" high **rubber** base equal to Roppe or Johnsonite. **Internal and external corners shall be premolded**. Apply with full bed of mastic so base adheres uniformly to wall surface. Color to be selected by Architect.

9B-06. GUARANTEES:

This Contractor shall furnish a 2-Year Guarantee for workmanship and installation and defective materials for the installation of all the floor covering specified in this section, and in addition, shall furnish a 10-Year Warranty from the carpet manufacturer for delamination, edge ravel and excessive wear. Guarantees to be dated date of acceptance of building.

END OF SECTION.

SECTION 9D

ACOUSTICAL TREATMENT

9D-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

9D-02. SCOPE:

The work to be done under this heading includes the furnishing of all labor, equipment, services, and materials necessary for, or reasonably incidental to, making a complete installation of the suspended acoustical tile ceilings in strict accordance with these specifications and/or as indicated on the drawings. No deviation from these specifications shall be allowed unless approved by the Architect in writing prior to bid date. All acoustical materials and suspension systems shall be installed by a subcontractor thoroughly experienced in this type of work and approved by the manufacturer. **It shall be the responsibility of the acoustical contractor to provide adequate support for the light fixtures and it shall be this contractor's responsibility to coordinate his work with the electrical and mechanical contractors. This contractor is to arrange for adequate anchorage to the frame system.**

9D-03. NON-BEVELED EDGE SUSPENDED GRID LAY IN TILE CEILING SYSTEM: **N.A.**

9D-04. BEVELED EDGE SUSPENDED GRID LAY IN TILE CEILING SYSTEM: **N.A.**

9D-05. SUSPENDED GRID VINYL FACED GYP BOARD LAY IN TILE CEILING SYSTEM:

A. Grid System: Shall be Prelude XL 15/16" suspended exposed tee grid as manufactured by Armstrong World Industries, Inc.

1. Components: All main beams and cross tees shall be commercial - quality hot dipped galvanized steel. Exposed surfaces chemically cleansed, capping prefinished in baked polyester pain. Main beams and cross tees are double-web steel construction with 15/16" type exposed flange design column strength and staked-on end detail allowing easy cross tee removal and remounting. Main beams shall be 1 ½" spaced not more than 4'0" o.c. Cross tees shall be 1 ½". Wall molding shall be #7800 with ⅞" exposed flange. Hanger wire shall be 12-gauge galvanized carbon steel.

2. Finish: All steel roll-formed parts, including cap, shall be chemically cleansed. Capping shall be prefinished in a baked polyester paint finish. Color shall be

WHITE and match the actual color of the selected ceiling tile, unless other specified. Off white not acceptable.

B. Ceiling Lay-in Tile Units:

1 All areas where vinyl faced gyp board lay in panels are called for shall be sheetrock brand lay in ceiling tile Clima-Plus as manufactured by US Gypsum Company. Units shall be ½" thick, 2'0" x 2'0", vinyl faced, and square edged. Units shall have flame spread of less than 25 and smoke development of less than 5. Color shall be white.

9D-06. ACOUSTICAL CEILING TILE TRIM: N.A.

9D-07. INSTALLATION AND COORDINATION:

Main "T" runners shall be of not more than 48" centers and supported by 12-gauge wire to joist or structural system members (no hanging from ducts, piping, etc.); use unistrut members where required. Each corner of light fixture shall also be supported by hanger wires. "T" spline intersecting moldings shall be locked in place. All runners and splines shall be straight or in alignment and flush at intersections. **Edge molding shall be mitered at all corners, internal and external.**

Exterior doors shall be hung, and all doors and windows glazed and all wet work completely dry before starting this work. Areas shall be broom clean before proceeding with this work.

The contractor shall extend complete coordination to and with the mechanical and electrical contractors in coordination of the work. Tile shall be centered one room and lighting fixtures, and ceiling grilles shall be centered in tiles. A reflected ceiling plan is included in the architectural drawings, and it is the responsibility of the ceiling sub- contractor to verify their accuracy and to bring to the Architect's attention any areas that will create shifting of grid or mechanical or electrical items.

9D-08. EXTRA TILE: **N.A.**

9D-09. ACOUSTICAL WALL PANELS: **N.A.**

9D-10. ACOUSTICAL BARREL DIFFUSERS N.A.

9D-11. CLEAN-UP:

The Contractor shall remove all debris, scrap, etc., from the site upon completion of his work. Tile shall be free of fingerprints, smudges, and present a uniform color, clean and level. Any tile found to contain smudges, chips, etc., shall be removed and replaced with new tile.

9D-12. GUARANTEE:

This contractor shall guarantee in writing the materials and workmanship for a period of two (2) years after final acceptance of the building.

END OF SECTION.

SECTION 9E

PAINTING

9E-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

9E-02. SCOPE:

Furnish all labor, materials, equipment, and services necessary and/or incidental to do all painting and decorating under this Contract.

In general, but not limited to, this contractor will include:

A. Three (3) coats of paint on all new work exterior and interior, including plaster, stucco, sheetrock, block masonry walls, trim, and metal.

B. Finishing of all cabinet work and paneling except that which is covered by plastic laminate, or that which is finished at the mill.

C. Epoxy coating of all walls and ceilings where called for on the schedule.

D. Painting of concrete floors where called for on the drawings.

9E-03. GENERAL REQUIREMENTS:

Mix all paints at least seventy-two (72) hours before using, keeping the containers covered during this period. Mix well before using. All paint to come to the job in their original containers, and to be Sherwin- Williams, ICI Coatings, Pittsburgh, or Pratt and Lambert.

Painter to mix samples of stains and colors and have Architect's approval before applying. All surfaces to receive paint, varnish, etc., shall be clean, smooth, free from dust, scratches, and to be thoroughly dry before applying paint.

The edges including the top and bottom edges of all doors which paint at the job site shall be finished as called for, and shall be touched up after the carpenter has made the final adjustments.

No paint shall be applied to wet or damp surfaces, nor shall any paint be applied to any surface when the temperature is below 50 degrees F.

All painting and decorating to be done by experienced workmen, and the finished work shall be free from runs, sags, scratches, and brush marks, and shall be uniform in color.

Application of a paint by spray not allowed other than glaze or multicolor coats as called for. All wood and trim to be painted by brush only.

9E-04. APPLICATION:

A. No coat shall be applied until the preceding one is thoroughly dry, and no paint shall be applied when temperature is 50 degrees F., or below, or when surfaces are damp. All paint shall be evenly spread and well brushed or sprayed as noted, or so as to accomplish best results. All paints, stains, etc., shall be mixed and applied according to manufacturer's directions, and each coat shall be sanded as required before the succeeding coat is applied.

B. All raw spots of wood frames, interior millwork, to be primed at mill shall be touched up with similar material immediately after being placed. All knots, sap, and pitch streaks shall be brush coated with shellac before priming coat is applied. Prime all wood which is to be covered with metal unless same has been treated with wood preserver.

C. Concrete masonry walls where called for to be painted shall be first examined for excess mortar, pointing up of joints, etc.

D. All rust spots, scratches, blemishes, etc., on metal door frames and exposed metal work through the building, shall be worked to the base metal with steel wool, the spots primed, and when dry.

E. Natural finish wood doors surfaces to be sanded with #320 wet or dry paper and rubbed with 4/0 steel wool between each coat.

F. Epoxy Coating Finish: Where called for on the finish schedule, epoxy coating shall be as per Paragraph 16-11, this section.

9E-05. PUTTYING:

After the priming coat has been applied, all nail holes and voids of any kind are to be puttied flush with the surfaces. Excess putty shall be removed from the surfaces before succeeding coats of paint are applied.

9E-06. EXTERIOR PAINTING: N.A.

9E-07. INTERIOR PAINTING:

A. Exposed Iron and Steel Metals:

1. One Coat Primer: ICI Ultra-Hide 1120-1200 Oil / Alkyd Interior Enamel Undercoater or Sherwin Williams Kem Kromik Metal Primer.

2. Two Coats Finish: ICI Ultra-Hide 1416 Latex Semi-Gloss Interior Wall and Trim Enamel or two coats Sherwin Williams Promar 200 Latex Semi-Gloss Enamel.

B. Wood Trim (other than natural finish):

1. One Coat Primer: ICI Ultra-Hide 1120-1200 Oil / Alkyd Interior Enamel Undercoater or Sherwin Williams Classic Wall and Wood Primer B28-W101.

2. Two Coats Finish: ICI Ultra-Hide 1416 Latex Semi-Gloss Interior Wall and Trim Enamel or Sherwin Williams Promar B-31 200 Semi-Gloss.

C. Sheetrock Walls:

1. One Coat Primer: ICI Ultra-Hide 1030-1200 PVA Interior Primer Sealer or Sherwin Williams Promar 200 Series B-28.

2. Two Coats Finish: ICI Ultra-Hide 1412 Latex Eggshell Interior Wall and Trim or Sherwin Williams Promar 200 Latex Semi-Gloss Enamel B-31.

D. Exposed Masonry Block:

1. One Coat Primer: ICI Ultra-Hide 3010-1200 Interior / Exterior Vinyl Acrylic Blockfiller or Sherwin Williams Heavy Duty Acrylic Block Filler B42W46.

2. Two Coats Finish: ICI Ultra-Hide 1412 Latex Eggshell Interior Wall and Trim Enamel or Sherwin Williams Promar 200 Latex Semi-Gloss Enamel B-31.

E. Epoxy Coating Finish: Where called for on the finish schedule, epoxy coating shall be as per Paragraph 16-11, this section.

9E-08. NATURAL FINISH:

A. Where selected or called for on wood trim or doors or millwork items:

1. One coat of Lacquer Sealer and two coats of Gloss Lacquer or two coats of ICI Woodpride 1902 Interior Polyurethane High Gloss Varnish.

9E-09. STAINED FINISH:

A. Where selected or called for on wood trim or wood doors or millwork items:

1. One Coat: ICI Woodpride 1900 Interior Oil Wood Finishing Stain or one coat of Olympic Clear Interior Stain.

2. One Coat: Lacquer Sealer or Sanding Sealer Well Sanded.

3. Two Coats: ICI Woodpride 1902 Interior Polyurethane High Gloss Varnish or two coats of Gloss Lacquer.

9E-10. SEALED CONCRETE FLOORS: N.A.

9E-11. EPOXY COATING FINISH: N.A.

9E-12. SANDING AND FINISHING:

It will be the responsibility of the painting contractor to hand sand all surfaces to be painted and otherwise prepare them to provide a smooth finish paint job. All corners to be "eased", nail holes filled and painted surfaces prepared and approved after prime coat is applied. The second coat of paint must be completed and approved before final coat is started in any area. Repainting of any area required because of poor coverage, sags, voids, poorly prepared surfaces, etc., will require the repainting of the entire wall area. No patch painting will be accepted.

9E-13. APPLICATION OF COATS:

Work shall be limited to specific areas of construction to facilitate inspection and progress, and no succeeding coat will be applied in any area until the prime coat or first coat has been inspected and approved for the entire area.

Prime coat will be white. Second coat tinted toward color, and final coat from can in color selected.

9E-14. SUBMITTAL:

Painting contractor to submit technical information for the various types of paint used along with color sample box for color selection.

9E-15. GUARANTEE:

Painting contractor shall guarantee in writing his material and application for a period of one year from date of acceptance of building.

END OF SECTION.

SECTION 9F

METAL STUD AND DRYWALL SYSTEM

9F-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

9F-02. SCOPE:

Furnish all labor, materials and equipment and perform all operations necessary for the complete installation of all metal studs and drywall applications as noted in these Specifications and as shown on the Drawings.

9F-03. GENERAL:

Screw stud system shall be generally for single layer of ⅝" fireguard sheetrock, or ⅝" sheetrock in interior walls, ½" exterior plywood or exterior gypsum board for backing for E.I.F. system, or for thermoply and backing for face brick. Steel stud system shall be equal to 3 ⅝" and 6" screw stud system as manufactured by U.S. Gypsum Company. Note drawings for other special wall thicknesses. All studs shall be galvanized steel and spaced 16" o.c.

9F-04. MATERIALS:

1. Studs -3 ⅝", 6" or 8" where shown. 16 gauge at door jambs and head. 20 gauge where used for framing for interior walls or where drawings indicate. 18 gauge where framing at exterior walls. Walls above or below window and door openings and for any framing where connections are welded if not indicated heavier shall be 18 gauge.

2. Runners - Sized for studs 22 gauge.

3. Face Boards - ⅝" " fire guard where noted (see drawings for double layers), and ⅝" " regular for other partition walls. Where ceramic tile is called for on metal stud construction wall boards shall be ½" Durock Board as manufactured by U.S. Gypsum.

4. Fasteners - USG screws of required length.

5. Joint Treatment - tape regular and flex tape.

6. Z galvanized metal furring strips ¾" and 1".

7. ¾" E.P.S. insulation board.

8. Galvanized hat channels (see drawings for sizes).

9. Galvanized corner beads. Galvanized “J” molding at all face ends

10. Sheetrock equal to National Gypsum Co. Wallboards ⅝" " thick fire guard for all rated walls, ⅝" " thick for interior walls and for ceilings where called for.

11. See EIFS section for exterior EIFS sheathing.

9F-05. INSTALLATION:

A. Exterior Framing:

1. Studs and Runners:

a. Align runners accurately according to exterior wall layout and secure to base and head with power-driven fastener spaced 16" o.c.

b. Position studs vertically in runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c., or to suspended ceilings with toggle bolts or hollow wall anchors spaced 16" o.c.

c. Exterior block wall furring strips to be installed 2'0" o.c. with ¾" E.P.S. Board positioned tightly between the furring strips. Furring strips to be secured to block walls with power driven fasteners spaced no further than 16" o.c.

B. Interior Walls:

1. Stud System Erection: Attached steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c., or to suspended ceilings with toggle bolts or hollow wall anchors spaced 16" o.c.

Position studs vertically, with open side facing in same direction, engaging floor and ceiling runners, and spaced 16" o.c. When necessary, splice studs with 8" nested lap and two positive attachments per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partitions corners and existing construction elements. here studs are installed directly against exterior walls, and a possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surface.

Anchor all studs for shelf-walls and those adjacent to door and window frames, partition intersections, corners and free-standing furring to ceiling and floor runner flanges with USG Metal Lock Fastener tool or screws. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bold or screw attachment. Over metal door and borrowed-light frames, placed horizontally a cut-to length section of runner, with a web-flange bend at each end, and secure to strut-studs with two screws in each bent web. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over door frame header.

2. Gypsum Panel Erection: Apply gypsum panels perpendicular to studs. Position all edges over studs for parallel application; all ends over studs for perpendicular application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.

   For one hour rated walls between units, screw size and spacing shall be in accordance to requirement for a one-hour rating.

   For single-layer parallel application of gypsum panels, space screws 16" o.c. in field of panels and along vertical abutting edges. For perpendicular panel application, space screws 16" o.c. in field and along abutting end joints.
   For double-layer screw attachment, space screws 24" o.c. in base layer and 16" o.c. in face layer. Apply both layers of gypsum panels vertically with joints in face layer offset from base layer joints. For ½" and ⅝" " panels, use 1" screws for base layer and 1- ⅝" " screws for face layer.

   For stud walls where ceramic tile is called for ½" Durock Board shall be installed in accordance with ATC. All joints shall be properly taped and the contractor shall inspect application of wall board for proper secureness to see that all joints of the wall board occur at wall anchored studs. All joints to be taped full length of cement board.

3. Chase Wall Erection: Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stud nails or power-driven anchors 24" o.c. to suspended ceilings with toggle bolts 16" o.c., or to wood framing with suitable fasteners 24" o.c.

   Position steel studs vertically in runners, 16" o.c. with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Anchor all studs to floor and ceiling runner flanges with USG Metal Lock Fastener tool or screws.

   Cut cross bracing to be placed between rows of studs from gypsum panels, 12" high by chase wall width. Space braces 48" o.c. vertically and attach to stud webs with six (6) 1" Type S Screws per brace. If larger braces are used, space screws 8" o.c. max. On each side.

   Bracing of 2- ½” steel studs may be used in place of gypsum panels. Anchor web at each end of steel brace to stud web with two (2) ⅝" pan head screws. When chase wall studs are not opposite, install steel stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal 2- ½" runner screw-attached to chase wall studs within the cavity.

C. Finishing: Gypsum board shall be finished according to manufacturer’s recommendations with a complete system of taping, joint compound, sanding, etc. Use pre-fabricated outside and inside corner metal reinforcement. Joints, nails or other imperfections that are visible will be cause for rejection. Use “J” molding at all sheetrock panel ends.

END OF SECTION.

SECTION 15005/MECHANICAL GENERAL

1 GENERAL

1.1 The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the mechanical work as herein called for and shown on the drawings.

1.2 Related Documents:

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

1.2.2 This is a Basic Mechanical Requirements Section. Provisions of this section apply to work of all Division 15 sections.

1.2.3 Review all other contract documents to be aware of conditions affecting work herein.

1.2.4 Definitions:

1.2.4.1 Provide: Furnish and install, complete and ready for intended use.

1.2.4.2 Furnish: Supply and deliver to project site, ready for subsequent requirements.

1.2.4.3 Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar requirements.

1.3 Permits and Fees: Contractor shall obtain all necessary permits, meters, and inspections required for his work and pay all fees and charges incidental thereto.

1.4 Verification of Owner's Data: Prior to commencing any work the Contractor shall satisfy himself as to the accuracy of all data as indicated in these plans and specifications and/or as provided by the Owner. Should the Contractor discover any inaccuracies, errors, or omissions in the data, he shall immediately notify the Architect/Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the Contractor of any work shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said data.

1.5 Delivery and Storage of Materials: Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and accidental damage.

1.6 Extent of work is indicated by the drawings, schedules, and the requirements of the specifications. Singular references shall not be constructed as requiring only one device if multiple devices are shown on the drawings or are required for proper system operation.

1.7 Field Measurements and Coordination:

1.7.1 The intent of the drawings and specifications is to obtain a complete and satisfactory installation. Separate divisional drawings and specifications shall not relieve the Contractor or subcontractors from full compliance of work of his trade indicated on any of the drawings or in any section of the specifications.

1.7.2 Verify all field dimensions and locations of equipment to insure close, neat fit with other trades' work. Make use of all contract documents and approved shop drawings to verify exact dimension and locations.

1.7.3 Coordinate work in this division with all other trades in proper sequence to insure that the total work is completed within contract time schedule and with a minimum cutting and patching.

1.7.4 Locate all apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on mechanical drawings, be guided by architectural details and conditions existing at job and correlate this work with that of others.

1.7.5 Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval.

1.7.6 Carefully examine any existing conditions, piping, and premises. Compare drawings with existing conditions. Report any observed discrepancies. It shall be the Contractor's responsibility to properly coordinate the work and to identify problems in a timely manner. Written instructions will be issued to resolve discrepancies.

1.7.7 Because of the small scale of the drawings, it is not possible to indicate all offsets and fittings or to locate every accessory. Drawings are essentially diagrammatic. Study carefully the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job. Locate piping, ductwork, equipment and accessories with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and for coordination with all trades. Contractor shall not order materials or perform work without such verification. No extra compensation will be allowed because field measurements vary from the dimensions on the drawings. If field measurements show that equipment or piping cannot be fitted, the Architect/Engineer shall be consulted. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.

1.8 Guarantee:

1.8.1 The Contractor shall guarantee labor, materials and equipment for a period of one (1) year from Final Completion, or from Owner's occupancy, whichever is earlier. Contractor shall make good any defects and shall include all necessary adjustments to and replacement of defective items without expense to the Owner.

1.8.2 Owner reserves right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period.

1.9 Approval Submittals:

1.9.1 When approved, the submittal control log and submittals shall be an addition to the specifications herewith, and shall be of equal force in that no deviation will be permitted except with the approval of the Architect/Engineer.

1.9.1.1 Shop drawings, product literature, and other approval submittals will only be reviewed if they are submitted in full accordance with the General and Supplementary Conditions and Division 1 Specification sections and the following.

1.9.1.1.1 Submittals shall be properly organized in accordance with the approved submittal control log.

1.9.1.1.2 Submittals shall not include items from more than one specification section in the same submittal package unless approved in the submittal control log.

1.9.1.1.3 Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.

1.9.1.1.4 Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date on the cover sheet.

1.9.1.1.5 Submittals that include a series of fixtures or devices (such as plumbing fixtures or valves) shall be organized by the fixture number or valve type and be marked accordingly. Each fixture must include all items associated with that fixture regardless of whether or not those items are used on other fixtures.

1.9.1.1.6 The electrical design shown on the drawings supports the mechanical equipment basis of design specifications at the time of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the mechanical submittal with a written statement that this change will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

1.9.2 If the shop drawings show variation from the requirements of contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in writing

in his letter of transmittal and on the submittal cover sheet in order that, if acceptable, Contractor will not be relieved of the responsibility for executing the work in accordance with the contract.

1.9.3 Review of shop drawings, product literature, catalog data, or schedules shall not relieve the Contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer each such deviation in writing at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings, product literature, catalog data, or schedules. Any feature or function specified but not mentioned in the submittal shall be assumed to be included per the specification.

1.9.4 Submit shop drawings as called for in other sections after award of the contract and before any material is ordered or fabricated. Shop drawings shall consist of plans, sections, elevations and details to scale (not smaller than ¼" per foot), with dimensions clearly showing the installation. Direct copies of small scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment furnished under other sections and shall show space allotted for it. Include construction details and materials.

1.10 Test Reports and Verification Submittals: Submit test reports, certifications and verification letters as called for in other sections. Contractor shall coordinate the required testing and documentation of system performance such that sufficient time exists to prepare the reports, submit the reports, review the reports and take corrective action within the scheduled contract time.

1.11 O&M Data Submittals: Submit Operation and Maintenance data as called for in other sections. When a copy of approval submittals is included in the O&M Manual, only the final “Approved” or “Approved as Noted” copy shall be used. Contractor shall organize these data in the O&M Manuals tabbed by specification number. Prepare O&M Manuals as required by Division 1 and as described herein.. Submit manuals at the Substantial Completion inspection.

2 PRODUCTS

2.1 All materials shall be new or Owner-supplied reused as shown on the drawings, the best of their respective kinds, suitable for the conditions and duties imposed on them at the building and shall be of reputable manufacturers. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following sections.

2.2 Equipment and Materials:

2.2.1 Shall be new and the most suitable grade for the purpose intended. Equipment furnished under this division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar units or equipment.

2.2.2 Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.

2.2.3 The label of the approving agency, such as UL, IBR, ASME, ARI, AMCA, by which a standard has been established for the particular item shall be in full view.

2.2.4 The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be a product of the manufacturer's latest design.

2.2.5 A service organization with personnel and spare parts shall be available within two hours for each type of equipment furnished.

2.2.6 Install in accordance with manufacturer's recommendations. Place in service by a factory trained representative where required.

2.2.7 Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material and type of construction desired. Manufacturer's products shown on the drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products, or the particular products of named manufacturers, meet the detailed specifications and that size and arrangement of equipment are suitable for installation.

2.2.8 Model Numbers: Catalog numbers and model numbers indicated in the drawings and specifications are used as a guide in the selection of the equipment and are only listed for the contractor's convenience. The contractor shall determine the actual model numbers for ordering materials in accordance with the written description of each item and with the intent of the drawings and specifications.

2.2.9 All equipment and material shall be manufactured and assembled in the United States.

2.3 Requests for Substitution:

2.3.1 Where a particular system, product or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product or material specified.

2.3.2 Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances.

2.3.2.1 Required product cannot be supplied in time for compliance with Contract time requirements.

2.3.2.2 Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.

2.3.2.3 Substantial cost advantage is offered Owner after deducting offsetting disadvantages including delays, additional compensation for redesign, investigation, evaluation and other necessary services and similar considerations.

2.3.3 All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:

Principal of operation.
Materials of construction or finishes.
Thickness of gauge of materials.
Weight of item.
Deleted features or items.
Added features or items.
Changes in other work caused by the substitution.
Performance curves.

If the approved substitution contains differences or omissions not specifically called to the attention of the Architect/Engineer, the Owner reserves the right to require equal or similar features to be added to the substituted products (or to have the substituted products replaced) at the Contractor's expense.

3 EXECUTION

3.1 Workmanship: All materials and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any materials installed which do not present an orderly and reasonably neat and/or workmanlike appearance, or do not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.

3.2 Coordination:

3.2.1 The Contractor shall be responsible for full coordination of the mechanical systems with shop drawings of the building construction so the proper openings and sleeves or supports are provided for piping, ductwork, or other equipment passing through slabs or walls.

3.2.2 Any additional steel supports required for the installation of any mechanical equipment, piping, or ductwork shall be furnished and installed under the section of the specifications requiring the additional supports.

3.2.3 It shall be the Contractor's responsibility to see that all equipment such as valves, dampers, filters and such other apparatus or equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the drawings.

3.2.4 All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.

3.2.5 The contractor shall protect equipment, material, and fixtures at all times. He shall replace all equipment, material, and fixtures which are damaged as a result of inadequate protection.

3.2.6 Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.

3.2.7 Start of work will be construed as acceptance of suitability of work of others.

3.3 Interruption of Service: Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.

3.4 Phasing: Provide all required temporary valves, piping, ductwork, equipment and devices as required. Maintain temporary services to areas as required. Remove all temporary material and equipment on completion of work unless Engineer concurs that such material and equipment would be beneficial to the Owner on a permanent basis.

3.5 Cutting and Patching: Notify General Contractor to do all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. Utilize experienced trades for cutting and patching. Obtain permission from Architect/Engineer before cutting any structural items.

3.6 Equipment Setting: Bolt equipment directly to concrete pads or vibration isolators as required, using hot-dipped galvanized anchor bolts, nuts and washers. Level equipment.

3.7 Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Division 15. Obtain matched color coatings from the manufacturer and apply as directed. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.

3.8 Clean-up: Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition.

3.9 Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.

3.10 Climate Control: Operate heating and cooling systems as required after initial startup to maintain temperature and humidity conditions to avoid freeze damage and warping or sagging of ceilings and carpet.

3.11 Record Drawings:

3.11.1 During the progress of the work the Contractor shall record on their field set of drawings the exact location, as installed, of all piping, ductwork, equipment, and other systems which are not installed exactly as shown on the contract drawings.

3.11.2 Upon completion of the work, record drawings shall be prepared as described in the General Conditions, Supplementary Conditions, and Division 1 sections.

3.12 Acceptance:

3.12.1 Punch List: Submit written confirmation that all punch lists have been checked and the required work completed.

3.12.2 Instructions: At completion of the work, provide a competent and experienced person who is thoroughly familiar with project, for one day to instruct permanent operating personnel in operation of equipment and control systems. This is in addition to any specific equipment operation and maintenance training.

3.12.3 Operation and Maintenance Manuals: Furnish four complete manuals bound in ring binders with Table of Contents, organized, and tabbed by specification section. Manuals shall contain:

Detailed operating instructions and instructions for making minor adjustments.
Complete wiring and control diagrams.
Routine maintenance operations.
Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
Copies of approved submittals.
Copies of all manufacturer's warranties.
Copies of test reports and verification submittals.

3.12.4 Record Drawings: Submit record drawings.

3.12.5 Test and Balance Report: Submit four certified copies. The Report shall be submitted for review prior to the Substantial Completion Inspection unless otherwise required by Division 1.

3.12.6 Acceptance will be made on the basis of tests and inspections of job. A representative of firm that performed test and balance work shall be in attendance to assist. Contractor shall furnish necessary mechanics to operate system, make any necessary adjustments and assist with final inspection.

END OF SECTION

SECTION 15020 - CODES AND STANDARDS

1 GENERAL

1.1 The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the mechanical work as herein called for and shown on the drawings.

1.2 This is a Basic Mechanical Requirements section. Provisions of this section apply to work of all Division 15 sections.

2 CODES

2.1 All work under Division 15 shall be constructed in accordance with the codes listed herein. The design has been based on the requirements of these codes; and while it is not the responsibility of the Contractor to verify that all work called for complies with these codes, he shall be responsible for calling to the Architect/Engineer's attention any drawings or specifications that are not in conformance with these or other codes prior to ordering equipment or installing work.

2.2 Comply with regulations and codes of utility suppliers.

2.3 Where no specific method or form of construction is called for in the contract documents, the Contractor shall comply with code requirements when carrying out such work.

2.4 Where code conflict exists, generally the most restrictive requirement applies. Comply with current code edition, unless noted.

2.5 Additional codes or standards applying to a specific part of the work may be included in that section.

2.6 The following codes govern the work:

1) Florida Building Code 8th Edition, 2023 Building
2) Florida Building Code 8th Edition, 2023 Plumbing
3) Florida Building Code 8th Edition, 2023 Mechanical
4) Florida Building Code 8th Edition, 2023 Fuel Gas
5) Florida Fire Prevention Code 8th Edition
6) National Electric Code (NFPA 70-17).
7) Life Safety Code (NFPA 101-18).
8) Installation of Air Conditioning and Ventilation Systems (NFPA 90A-15)
9) Florida Building Code 8th Edition, 2023 Energy
10) Florida Building Code 8th Edition, 2023 Accessibility
11) Florida Americans with Disabilities Accessibility Implementation Act (October 1, 1993) as described in Accessibility Requirements Manual, Department of Community Affairs (January 1, 1997).
12) Americans with Disabilities Act Accessibility Guidelines (ADAAG), January, 1994.

13) State Requirements for Education Facilities, SREF

3 STANDARDS

All mechanical materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments, to the extent referenced:

1) Underwriters' Laboratories (UL)
2) American National Standards Institution (ANSI)
3) American Society of Testing Materials (ASTM)
4) National Fire Protection Association (NFPA)
5) National Electrical Manufacturers Association (NEMA)
6) Air Conditioning and Refrigeration Institute (ARI)
7) Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
8) American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
9) Air Movement and Control Association (AMCA)

END OF SECTION

SECTION 15030/MECHANICAL RELATED WORK

1 DIVISION 1 - GENERAL REQUIREMENTS

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

1.2 This is a Basic Mechanical Requirements section. Provisions of this section apply to work of all Division 15 sections.

1.3 Coordinate with the General Contractor for all cutting and patching. Contractors performing Division 15 work shall inform the General Contractor of all cutting and patching required prior to bidding and shall coordinate installation.

2 DIVISION 5 - METALS

2.1 Refer to Division 5, Metals for:

2.1.1 Supports for mechanical work.

3 DIVISION 7 - THERMAL AND MOISTURE PROTECTION

3.1 Refer to Division 7, Thermal and Moisture Protection for:

3.1.1 Installation of all roof curbs and roof supports for mechanical work.

3.1.2 Caulking and waterproofing of all wall and roof mounted mechanical work.

4 DIVISION 16 - ELECTRICAL

4.1 Mechanical contractor shall coordinate the exact electrical requirements of all mechanical equipment being provided with the electrical contractor. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the mechanical equipment basis of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the mechanical submittal with a written statement that this design will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

4.2 Mechanical contractor shall provide all HVAC control wiring including the Energy Management Control system sensors, alarms, and input/output signals and all relays, interlocks, warning lights, and control devices, in conduit and complying with the requirements of Division 16. The

intent is for the mechanical contractor to be responsible for the entire HVAC control system, including point-to-point wiring.

4.3 Electrical contractor shall provide disconnect switches, starters, and contactors for mechanical equipment unless specifically noted as being furnished as part of mechanical equipment.

4.4 Electrical contractor shall provide all power wiring, raceway and devices, and make final electrical connections to all mechanical equipment, switches, starters, contactors, controllers, and similar equipment.

END OF SECTION

SECTION 15105/PIPES AND PIPE FITTINGS

1 GENERAL

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

1.2 This section is a Division-15 Basic Mechanical Materials and Methods section, and is part of each Division-15 section making reference to pipes and pipe fittings specified herein.

1.3 Extent of pipes and pipe fittings required by this section is indicated on drawings and/or specified in other Division-15 sections.

1.4 Codes and Standards:

1.4.1 Welding: Qualify welding procedures, welders and operators in accordance with ASME B31.1, or ASME B31.9, as applicable, for shop and project site welding of piping work.

1.4.2 Brazing: Certify brazing procedures, brazers, and operators in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for shop and job-site brazing of piping work.

1.4.3 NSF Labels: Where plastic piping is indicated to transport potable water, provide pipes and pipe fittings bearing approval label by National Sanitation Foundations (NSF).

1.5 Test Report and Verification Submittals:

1.5.1 Submit welding certification for all welding installers.

1.5.2 Submit brazing certification for all brazing installers.

2 PRODUCTS

2.1 Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation requirements, and comply with governing regulations and industry standards.

2.2 Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.

2.3 Piping Materials/Products:

2.3.1 Soldering Materials:

2.3.1.1 Tin-Antimony (95-5) Solder: ASTM B-32, Grade 95TA.

2.3.1.2 Silver-Phosphorus Solder: ASTM B-32, Grade 96TS.

2.3.2 Pipe Thread Tape: Teflon tape.

2.3.3 Protective Coating: Koppers Bitumastic No. 505 or equal.

2.3.4 Gaskets for Flanged Joints: ANSI B16.21; full-faced for cast iron flanges; raised-face for steel flanges, unless otherwise noted.

2.3.5 Welding Materials: Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials. Materials shall be determined by installer to comply with installation requirements.

2.3.6 Brazing Materials: Silver content of not less than 15%. Materials shall be determined by installer to comply with installation requirements.

2.4 Copper Tube and Fittings:

2.4.1 Copper Tube:

2.4.1.1 Copper Tube: ASTM B88; Type K or L as indicated for each service; hard-drawn temper unless specifically noted as annealed.

2.4.1.2 ACR Copper Tube: ASTM B280.

2.4.1.3 DWV Copper Tube: ASTM B306.

2.4.2 Fittings:

2.4.2.1 Wrought-Copper Solder-Joint Fittings: ANSI B16.22.

2.4.2.2 Copper Tube Unions: Provide standard products recommended by manufacturer for use in service indicated.

2.4.2.3 Wrought-Copper Solder-Joint Drainage Fittings: ANSI B16.29.

2.4.2.4 Cast-Copper Flared Tube Fittings: ANSI B16.26.

2.5 Steel Pipes and Pipe Fittings

2.5.1 Pipes:

2.5.1.1 Black Steel Pipe: ASTM A-53 or A-120, seamless.

2.5.1.2 Galvanized Steel Pipe: ASTM A-53 or A-120, seamless.

2.5.2 Pipe Fittings:

2.5.2.1 Threaded Cast Iron: ANSI B16.4.

2.5.2.2 Threaded Malleable Iron: ANSI B16.3; plain or galvanized as indicated.

2.5.2.3 Malleable Iron Threaded Unions: ANSI B16.39; selected by installer for proper piping fabrication and service requirements including style, end connections, and metal-to-metal seats (iron, bronze or brass); plain or galvanized as indicated.

2.5.2.4 Threaded Pipe Plugs: ANSI B16.14.

2.5.2.5 Flanged Cast Iron: ANSI B16.1, including bolting.

2.5.2.6 Steel Flanges/Fittings: ANSI B16.5, including bolting and gasketing.

2.5.2.7 Wrought-Steel Buttwelding Fittings: ANSI B16.9, except ANSI B16.28 for short radius elbows and returns, rated to match connected pipe.

2.5.2.8 Pipe Nipples: Fabricated from same pipe as used for connected pipe; except do not use less than schedule 80 pipe where length remaining unthreaded is less than 1 ½ inches, and where pipe size is less than 1 ½ inches, and do not thread nipples full length (no close-nipples).

2.6 Plastic Pipes and Fittings:

2.6.1 Pipes:

2.6.1.1 PVC DWV Pipe: ASTM D-2665, Schedule 40.

2.6.1.2 PVC Sewer Pipe: ASTM D-3034.

2.6.1.3 PVC Pressure Pipe: ASTM D-1785, Schedule 40 or 80.

2.6.2 Fittings:

2.6.2.1 PVC Solvent Cement: ASTM D-2564.

2.6.2.2 PVC DWV Socket: ASTM D-2665.

2.6.2.3 PVC Sewer Socket: ASTM D-3034.

2.6.2.4 PVC Schedule 40 Socket: ASTM D-2466.

2.6.2.5 PVC Schedule 80 Socket: ASTM D-2467.

2.6.2.6 PVC Schedule 80 Threaded: ASTM D-2464.

2.7 Cast Iron Soil Pipes and Fittings:

2.7.1 Pipe:

2.7.1.1 Hubless Cast Iron Soil Pipe: FS WW-P-401, coated.

2.7.1.2 Cast Iron Hub-and-Spigot Soil Pipe: ASTM A74, coated.

2.7.2 Fittings:

2.7.2.1 Hubless Cast Iron Soil Pipe Fittings: Two pieces cast iron with stainless steel bolts and nuts, MG Coupling or equal.

2.7.2.2 Hubless Cast Iron Soil Pipe Fittings: Neoprene gasket complying with ASTM C564 and stainless steel holding band.

2.7.2.3 Cast Iron Hub-and-Spigot Soil Pipe Fittings: Match soil pipe units; complying with ASTM A74.

2.7.2.4 Compression Gasket: Neoprene ASTM C564.

2.7.2.5 Lead and Oakum Joint Materials: Products complying with governing regulations for use in service indicated.

2.8 Cast Iron Pressure Pipes and Fittings:

2.8.1 Ductile Iron Pipe: ANSI A21.51, AWWA C151, cement mortar lined, Class 51, unless noted otherwise, coated.

2.8.2 Pipe Joints: Ductile or Cast Iron Fittings-AWWA C110, Rubber Gasket Joints-AWWA C111.

2.9 Acid Resistant Pipe and Fittings:

2.9.1 Glass: Borosilicate glass drainage pipe and fittings with mechanical joint couplings. Couplings shall be fabricated with a stainless steel band and bolt, rubber compression liner and TFE or equal seal ring. All pipe, fittings, and couplings shall be by the same manufacturer and shall be O/I Schott "Kimax".

2.9.2 Cast Iron, Acid-Resistant: High-silicon content, cast-iron pipe and fittings complying with ASTM A-518; hub and spigot or mechanical joint. Couplings shall be mechanical joint fabricated with a stainless steel clamp, neoprene outer sleeve, and teflon inner sleeve. Duriron or approved equal.

2.9.3 Polypropylene: Flame retardant pipe and fittings shall be schedule 40 and manufactured from a polypropylene compound meeting the Type 1 requirements of ASTM D-2146. Flammability requirements are based on ASTM D-635. All joints shall be made by socket fusion welding or mechanical joints. R & G Sloan Fuseal II or Labline Enfield.

2.10 Concrete Pipes and Fittings:

2.10.1 Reinforced Concrete Pipe: ASTM C76, Class III or as indicated, with modified tongue-in-groove compression gasket joints complying with ASTM C443.

2.10.2 Fittings: Match concrete pipe; provide units by same manufacturer, complying with same standards.

2.11 Clay Pipes and Fittings:

2.11.1 Vitrified Clay Pipe: ASTM C700, Standard Strength (SS) with resilient gasket joints complying with ASTM C425.

2.11.2 Fittings: Match clay pipe; provide units by same manufacturer, complying with same standards.

3 EXECUTION

3.1 Installation

3.1.1 General: Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently-leak proof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible unions for disassembly and maintenance or replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings, not bushings. Align piping accurately at connections, within 1/16" misalignment tolerance.

3.1.2 Comply with ANSI B31 Code for Pressure Piping.

3.1.3 Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns and other structural and permanent-enclosure elements of building; limit clearance to ½" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1" clearance outside insulation.

3.1.4 Concealed Piping: Unless specifically noted as “Exposed” on the drawings, conceal piping from view in finished and occupied spaces, by locating in column enclosures, chases, in hollow wall

construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.

3.1.5 Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical, communications, or data equipment spaces and enclosures unless shown. Install drip pan under piping that must run through electrical spaces.

3.1.5.1 Cut pipe from measurements taken at the site, not from drawings. Keep pipes free of contact with building construction and installed work.

3.2 Piping System Joints: Provide joints of the type indicated in each piping system.

3.2.1 Solder copper tube-and-fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply non-acid type solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.

3.2.2 Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed. Paint exposed threads to retard rusting.

3.2.3 Flanged Joints: Match flanges within piping system, and at connection with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets. Bolts shall project 1/8" to 3/8" beyond nut face when tight.

3.2.4 Weld pipe joints in accordance with recognized industry practice and as follows. Be guided by ANSI B.31.

3.2.4.1 Weld pipe joints only when ambient temperature is above 0°F.

3.2.4.2 Bevel pipe ends at a 37.5° angle where possible, smooth rough cuts, and clean to remove slag, metal particles and dirt.

3.2.4.3 Use pipe clamps or tack-weld joints; 4 welds for pipe sizes to 10". All welds shall be open-butt.

3.2.4.4 Build up welds with root pass, followed by filler pass and then a cover pass. Eliminate valleys at center and edges of each weld. Weld by procedures which will ensure elimination of unsound or unfused metal, cracks, oxidation, blow-holes and non-metallic inclusions.

3.2.4.5 Do not weld-out piping system imperfections by tack-welding procedures; refabricate to comply with requirements.

3.2.4.6 At Installer's option, install forged branch-connection fittings wherever branch pipe is less than 3" and at least two pipe sizes smaller than main pipe indicated; or install regular "T" fitting. Weld-O-Let or equal.

3.2.4.7 All field welding and cutting using oxygen-acetylene methods within the building shall be performed in accordance with NFPA-51B (1994).

3.2.4.8 Limit the use of welded piping to shop-fabricated only. Neither welding nor cutting with oxygen-acetylene methods will be permitted within the envelope of the hospital building.

3.2.5 Plastic Pipe Joints: Comply with manufacturer's instructions and recommendations, and with applicable industry standards.

3.2.5.1 Solvent-cemented joints shall be made in accordance with ASTM D-2235 and ASTM F-402.

3.2.5.2 PVC sewer pipe bell/gasket joints shall be installed in accordance with ASTM D-2321.

3.2.6 Cast-Iron Joints: Tightly pack joint with joint packing material. Do not permit packing to enter bore of finished joint. Clean joint after packing. Fill remaining joint space with one pouring of lead to indicated minimum depth measured from face of bell. After lead has cooled, calk joint tightly by use of hammer and calking iron. If using compression joints, comply with manufacturer's installation instruction using gaskets and lubricant furnished specifically for this duty.

3.2.7 Hubless Cast-Iron Joints: Comply with coupling manufacturer's installation instructions.

3.2.8 Braze copper tube-and-fitting joints where indicated, in accordance with ANSI B.31.

3.2.9 Acid Resistant Pipe Joints: Comply with manufacturer's instructions and recommendations. Cut, trim, and join pipes and fittings to ensure a tight system without unduly stressing or damaging components.

3.2.10 Concrete Pipe Joints: Except as otherwise indicated, comply with applicable provisions of "Concrete Pipe Field Manual" by the American Concrete Pipe Association. Branch connections shall be made at the drainage structure wherever possible. If junctions are necessary in concrete pipes, cutting and joining shall be done complying with the manufacturer's recommendations and inspected prior to covering.

3.2.11 Clay Pipe Joints: Comply with ASTM C12. Use approved lubricant for all joints using gaskets or rings. Branch connections, changes in direction, and connections made to dissimilar piping materials shall be made with factory fabricated adaptors.

3.3 Piping Installation

3.3.1 Install piping to allow for expansion and contraction.

3.3.2 Isolate all copper tubing from steel and concrete by wrapping the pipe at the contact point, and for one inch on each side, with a continuous plastic sleeve. Isolate all copper tubing installed in block walls with a continuous plastic sleeve.

3.3.3 Underground Piping:

3.3.3.1 Provide plastic tape markers over all underground piping. Provide copper wire over all underground plastic piping. Locate markers 18" above piping.

3.3.3.2 Coat the following underground (uninsulated) pipes with a heavy coat of bitumastic or provide an 8 mil polyvinyl sleeve: black steel pipe, galvanized steel pipe, copper tubing.

3.3.3.3 Install underground glass pipes in a protective casing of expanded polystyrene. Underground glass fittings shall be wrapped with protective plastic sheets or bags. Use care to prevent scratching or chipping glass pipes and fittings.

3.3.4 Install ductile and cast-iron water mains and appurtenances in accordance with AWWA C600.

END OF SECTION

SECTION 15110/VALVES

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work of this section.

1.2 This section is a Division-15 Basic Materials and Methods section, and is part of each Division-15 section making reference to or requiring valves specified herein.

1.3 Extent of valves required by this section is indicated on drawings and/or specified in other Division-15 sections.

1.4 Quality Assurance:

1.4.1 Valve Dimensions: For face-to-face and end-to-end dimensions of flanged or welding-end valve bodies, comply with ANSI B16.10.

1.4.2 Valve Types: Provide valves of same type by same manufacturer.

1.4.3 Valve Listing: For valves on fire protection piping, provide UL listing. Provide approval by Factory Mutual Fire Insurance Companies.

1.4.4 Valves Installed in Boiler Rooms: Comply with ASME Boiler and Pressure Vessel Code.

1.5 Approval Submittals: When required by other Division-15 sections, submit product data, catalog cuts, specifications, and dimensioned drawings for each type of valve. Include pressure drop curve or chart for each type and size of valve. Submit valves with Division-15 section using the valves, not as a separate submittal. Submit valve comparison chart with applicable valves clearly marked if valves other than basis-of-design are to be used. For each valve, identify systems where the valve is intended for use.

1.5.1 Gate Valves. Type GA.

1.5.2 Globe Valves. Type GL.

1.5.3 Check Valves. Type CK.

1.5.4 Ball Valves. Type BA.

1.5.5 Butterfly Valves. Type BF.

1.6 O&M Data Submittals: Submit a copy of approval submittals. Submit installation instructions, maintenance data and spare parts lists for each type of valve. Include this data in the O&M Manual.

2 PRODUCTS

2.1 General: Provide factory-fabricated valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated; provide proper selection as determined by Installer to comply with specifications and installation requirements. Provide sizes as indicated, and connections which properly mate with pipe, tube, and equipment connections.

2.2 Acceptable Manufacturers: Subject to compliance with requirements, provide valves of one of the producers listed for each valve type. Other valve manufacturers list names are also acceptable. The model numbers are listed for contractor's convenience only. In the case of a model number discrepancy, the written description shall govern.

2.3 Gate Valves:

2.3.1 Packing: Select valves designed for repacking under pressure when fully opened, equipped with non-asbestos packing suitable for intended service. Select valves designed so back seating protects packing and stem threads from fluid when valve is fully opened, and equipped with gland follower.

2.3.2 Comply with the following standards:

Cast Iron Valves: MSS SP-70. Cast Iron Gate Valves, Flanged and Threaded Ends.
Bronze Valves: MSS SP-80. Bronze Gate, Globe, Angle and Check Valves.
Steel Valves: ANSI B16.34. Steel Standard Class Valve Ratings.

2.3.3 Types of gate (GA) valves:

1 Threaded Ends 2" and Smaller (GA1): Class 125, bronze body, screwed bonnet, rising stem, solid wedge. Stockham B-100. Nibco T-111. Crane 428. Milwaukee 148.

2 Soldered Ends 2" and Smaller (GA2): Class 125, bronze body, screwed bonnet, non-rising stem, solid wedge. Stockham B-108 or B-109. Nibco S-111. Crane 1334. Milwaukee 149.

3 Flanged Ends 2½" and Larger (GA3): Class 125, iron body, bronze mounted, bolted bonnet, rising stem, OS&Y, solid wedge. Stockham G-623. Nibco F617-0. Crane 465½. Milwaukee F2885.

4 Threaded Ends 2" and Smaller (GA4): Class 150, bronze body, screwed bonnet, rising stem, solid wedge. Stockham B-122. Nibco T-131. Crane 431. Milwaukee 1150.

5 Soldered Ends 2" and Smaller (GA5): Class 150, bronze body, screwed bonnet, rising stem, solid wedge. Stockham B-124. Nibco S-134. Milwaukee 1169.

6 Threaded Ends 2" and Smaller (GA6): 175 WWP, bronze body, screwed bonnet, rising stem, OS&Y, solid wedge, UL-listed. Stockham B-133. Nibco T-104-0.

7 Flanged Ends 2½" and Larger (GA7): 175 WWP, iron body, bolted bonnet, rising stem, OS&Y, solid wedge, UL listed. Stockham G-634. Nibco F-607-0TS

8 Threaded Ends 2" and Smaller (GA8): Class 200, bronze body, union bonnet, rising stem, solid wedge, renewable seat. Stockham B-132. Nibco T-154-SS. Milwaukee 1174.

9 Flanged Ends 2½" and Larger (GA9): Class 250, iron body bronze mounted, bolted bonnet, rising stem, OS&Y, solid wedge. Stockham F-667. Nibco F-667-0. Crane 7½E. Milwaukee F-2894.

10 Threaded Ends 2" and Smaller (GA10): Class 300, bronze body, union bonnet, rising stem, solid wedge, renewable seat. Stockham B-145. Nibco T-174-SS. Crane 634E. Milwaukee 1184.

11 Flanged Ends 2½" and Larger (GA11): Class 300, cast steel body, bolted bonnet, rising stem, solid wedge, seal-welded seat rings. Provide trim to match use. Stockham 30-0F. Crane 33.

12 Flanged Ends 2½" and Larger (GA12): 300 WWP, iron body, bolted bonnet, bronze mounted, rising stem, OS&Y, solid wedge, UL-listed. Stockham F-670. Nibco F-697-0.

2.4 Globe Valves:

2.4.1 Packing: Select valves designed for repacking under pressure when fully opened, equipped with packing suitable for intended service. Select valves designed so back seating protects packing and stem threads from fluid when valve is fully opened, and equipped with gland follower.

2.4.2 Composition Disc: Where required, provide suitable material for intended service. For steam throttling service, fit composition disc valve with throttling nut. For metal seated globe valves, provide hardened stainless steel disc and seat ring.

2.4.3 Comply with the following standards:

Cast-Iron Valves: MSS SP-85. Cast Iron Globe and Angle Valves Flanged and Threaded Ends.
Bronze Valves: MSS SP-80. Bronze Gate, Globe, Angle and Check Valves.
Steel Valves: ANSI B16.34. Steel Standard Class Valve Ratings.

2.4.4 Types of globe (GL) valves:

1 Threaded Ends 2" and Smaller (GL1): Class 125, bronze body, union bonnet, rising stem, teflon disc. Stockham B-13T. Nibco T-211-Y. Crane 108.

2 Soldered Ends 2" and Smaller (GL2): Class 125, bronze body, screwed bonnet, rising stem, teflon disc. Stockham B-14T. Nibco S-211-Y. Crane 1310.

3 Threaded Ends 2" and Smaller (GL3): Class 125, bronze body, union bonnet, rising stem, bronze disc. Stockham B-16. Nibco T-211-B. Crane 1. Milwaukee 502.

4 Soldered Ends 2" and Smaller (GL4): Class 125, bronze body, screwed bonnet, rising stem, bronze disc. Stockham B-17. Nibco S-211-B. Milwaukee 1502.

5 Flanged Ends 2½" and Larger (GL5): Class 125, iron body, bolted bonnet, rising stem, OS&Y, bronze-mounted, renewable seat and disc. Stockham G-512. Nibco F-718-B. Crane 351. Milwaukee F2981.

6 Threaded Ends 2" and Smaller (For By-Pass or Throttling) (GL6): Class 150, bronze body, union bonnet, rising stem, plug type renewable seat and disc. Stockham B-29.

7 Threaded Ends 2" and Smaller (GL7): Class 200, bronze body, union bonnet, rising stem, plug type renewable seat and disc. Stockham B-62. Nibco T-256-AP. Crane 212P. Milwaukee 592A

8 Flanged Ends 2½" and Larger (GL8): Class 250, iron body, bronze mounted, bolted bonnet, rising stem, OS&Y, renewable guided seat and disc. Stockham F-532. Nibco F-768-B. Crane 21E. Milwaukee F2983.

9 Threaded Ends 2" and Smaller (GL9): Class 300, bronze body, union bonnet, rising stem, regrinding seat and disc. Stockham B-66. Nibco T-275-B. Crane 362E. Milwaukee 572.

10 Flanged Ends 2½" and Larger (GL10): Class 300, steel body, bolted bonnet, rising stem, OS&Y, plug type disc design. Stockham 30-GPF. Crane 151.

2.5 Check Valves:

2.5.1 Construction: Construct valves of castings free of any impregnating materials. Construct valves with a bronze regrinding disc with a seating angle of 40º to 45º, unless a composition disc is specified. Provide stop plug as renewable stop for disc hanger, unless otherwise specified. Disc and hanger shall be separate parts with disc free to rotate. Support hanger pins on both ends by removable side plugs.

2.5.2 Comply with the following standards:

Cast Iron Valves: MSS SP-71. Cast Iron Swing Check Valves, Flanged and Threaded Ends.
Bronze Valves: MSS SP-80. Bronze Gate, Globe, Angle and Check Valves.
Steel Valves: ANSI B16.34. Steel Standard Class Valve Ratings.

2.5.3 Types of check (CK) valves:

1 Threaded Ends 2" and Smaller (CK1): Class 125, bronze body, screwed cap, horizontal swing, bronze disc. Stockham B-319. Nibco T-413-BY. Crane 1707. Milwaukee 509.

2 Soldered Ends 2" and Smaller (CK2): Class 125, bronze body, screwed cap, horizontal swing, bronze disc. Stockham B-309. Nibco S-413-B. Crane 1707S. Milwaukee 1509.

3 Flanged Ends 2½" and Larger (CK3): Class 125, iron body, bronze-mounted, bolted cap, horizontal swing, cast-iron or composition disc. Stockham G-931 or G-932 as applicable. Nibco F918-B. Crane 373. Milwaukee F2974 as applicable.

4 Threaded Ends 2" and Smaller (CK4): 200 WWP, bronze body, screwed cap, horizontal swing, regrinding type bronze disc, for fire sprinkler use. Nibco KT-403-W.

5 Flanged Ends 2½" and Larger (CK5): 175 WWP, iron body, bolted cap, bronze mounted, composition disc, UL listed, with ball drip if required. Stockham G-940. Nibco F-908-W.

6 Threaded Ends 2" and Smaller (CK6): Class 200, bronze body, screwed cap, Y-pattern swing, regrinding bronze disc. Stockham B-345. Nibco T-453-B. Crane 36. Milwaukee 518/508.

7 Flanged Ends 2½" and Larger (CK7): Class 250, iron body, bronze mounted, bolted cap, cast-iron disc. Stockham F-947. Nibco F-968-B. Crane 39E. Milwaukee F2970.

8 Threaded Ends 2" and Smaller (CK8): Class 300, bronze body, screwed cap, Y-pattern swing, regrinding bronze disc. Stockham B-375. Nibco T-473-B. Crane 76E. Milwaukee 517/507.

9 Flanged Ends 2½" and Larger (CK9): Class 300, cast steel body, bolted cap, horizontal swing, seal welded seat rings, chromium stainless disc. Stockham 30-SF. Crane 159.

2.6 Ball Valves:

2.6.1 General: Select with port area equal to or greater than connecting pipe area, include seat ring designed to hold sealing material.

2.6.2 Construction: Ball valves shall be rated for 150 psi saturated steam and 600 psi non-shock cold water. Pressure containing parts shall be constructed of ASTM B-584 alloy 844, or ASTM B-124 alloy 377. Valves shall be furnished with blow-out proof bottom loaded stem constructed of ASTM B-371 alloy 694 or other approved low zinc material. Provide TFE packing, TFE thrust washer, chrome-plated ball and reinforced teflon seats. Valves 1" and smaller shall be full port design. Valves 1¼" and larger shall be conventional port design. Stem extensions shall be furnished for use in insulated piping where insulation exceeds ½" thickness.

2.6.3 Comply with the following standards:

MSS SP-72. Ball Valves with Flanged or Butt Welding Ends for General Service.
MSS SP-110. Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

2.6.4 Types of ball (BA) valves:

1 Threaded Ends 2" and Smaller (BA1): Bronze two-piece full port body with adjustable stem packing. Nibco T-585-70. Stockham S216-BR-R-T. Milwaukee BA125. Apollo 77-100.

2 Soldered Ends 2" and Smaller (BA2): Bronze three-piece full port body with adjustable stem packing. Nibco S-595-Y-66. Milwaukee BA350. Apollo 82-200.

3 Threaded Ends 1" and Smaller (BA3): Bronze two-piece full port body, UL listed (UL 842) for use with flammable liquids and LP gas. Nibco T-585-70-UL.

4 Threaded Ends 2" and Smaller (BA4): 175 WWP, bronze two-piece body, UL listed for fire protection service. Nibco KT-585-70-UL and KT-580-70-UL.

5 Threaded Ends 2" and Smaller (BA5): 400 WWP, bronze two-piece body, for fire protection service. Nibco KT-580.

6 Threaded Ends 2½" and Smaller (BA6): 300 WWP, bronze three-piece body, gear operator with handwheel, indicator flag, accepts tamper switch, for fire protection, UL listed. Nibco T-505-4 and G-505-4.

7 Flanged Ends 2½" and Larger (BA7): Class 150, carbon steel full bore two-piece body with adjustable stem packing. Nibco F515-CS series. Apollo 88-240.

2.7 Butterfly Valves:

2.7.1 General: Comply with MSS SP-67, Butterfly Valves. Provide butterfly valves designed for tight shut-off. Where used for terminal or equipment removal or repair, select lug type valves. Select wafer type valves for other applications. Provide gear operators on all butterfly valves 6" and larger.

2.7.2 Types of butterfly (BF) valves:

1 Wafer Type 3" and Larger (BF1): 200 CWP, cast-iron body, lever-operated, cadmium-plated ductile iron disc, Type 410 stainless steel stem, EPT seat. Stockham LG-512. Nibco WD 2110-3. Crane 42-FXB-TL. Milwaukee MW222E-8416.

2 Lug Type 3" and Larger (BF2): 200 CWP, cast-iron body, lever-operated, cadmium-plated ductile iron disc, Type 410 stainless steel stem, EPT seat. Stockham LG-712. Nibco LD 2110-3. Crane 44-FXB-TL. Milwaukee ML132B-8416.

3 Wafer Type 3" and Larger (BF3): 150/200 CWP, cast-iron body, gear-operated, cadmium-plated ductile iron disc, Type 410 stainless steel stem, EPT seat. Stockham LG-522 and LG-521. Nibco WD 2110-5. Crane 42-FXB-G. Milwaukee MW 122B-8115.

4 Lug Type 3" and Larger (BF4): 150/200 CWP, cast-iron body, gear-operated, cadmium-plated ductile iron disc, Type 410 stainless steel stem, EPT seat. Stockham LG-722 and LG-721. Nibco LD 2110-5. Crane 44-FXB-G. Milwaukee ML 132B-8115.

5 Wafer Type 4" and Larger (BF5): 175 WWP, cast-iron body, gear-operated, nickel-plated ductile iron disc, Type 410 stainless steel stem, EPT seat, UL listed. Stockham LG-52U. Nibco WD 3510-8.

6 Lug Type 4" and Larger (BF6): 175 WWP, cast-iron body, gear-operated, nickel-plated ductile iron or aluminum bronze disc, Type 410 stainless steel stem, EPT seat, UL listed. Stockham LG-72U. Nibco LD 3510-8.

7 Grooved Type 4" and Larger (BF7): 175 WWP, cast-iron body, gear-operated, nickel-plated ductile iron or aluminum bronze disc, Type 410 stainless steel stem, EPT seat, UL listed. Stockham LG-82U. Nibco GD 1765-2.

2.8 Valve Features:

2.8.1 General: Provide valves with features indicated and, where not otherwise indicated, provide proper valve features as determined by Installer for installation requirements. Comply with ANSI B31.1

2.8.2 Valve features specified or required shall comply with the following:

1 Bypass: Comply with MSS SP-45, and except as otherwise indicated, provide manufacturer's standard bypass piping and valving. Provide for gate valves 8" and larger.

2 Drain: Comply with MSS SP-45, and provide threaded pipe plugs complying with applicable Division-15 pipe or tube section. Provide for gate valves 8" and larger.

3 Flanged: Provide valve flanges complying with ANSI B16.1 (cast iron), ANSI B16.5 (steel), or ANSI B16.24 (bronze).

4 Threaded: Provide valve ends complying with ANSI B2.1.

5 Solder-Joint: Provide valve ends complying with ANSI B16.18.

6 Trim: Fabricate pressure-containing components of valve, including stems (shafts) and seats from brass or bronze materials, of standard alloy recognized in valve manufacturing industry unless otherwise specified.

7 Non-Metallic Disc: Provide non-metallic material selected for service indicated in accordance with manufacturer's published literature.

8 Renewable Seat: Design seat of valve with removable disc, and assemble valve so disc can be replaced when worn.

9 Extended Stem: Increase stem length by 2" minimum, to accommodate insulation applied over valve.

10 Mechanical Actuator: Provide factory-fabricated gears, gear enclosure, external chain attachment and chain designed to provide mechanical advantage in operating valve for all valves 4" and larger that are mounted more than 7'-0" above the floor, or are otherwise difficult to operate regardless of height.

3 EXECUTION

3.1 Installation:

3.1.1 General: Install valves where required for proper operation of piping and equipment, including valves in branch lines to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward below horizontal plane.

3.1.2 Insulation: Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive insulation.

3.1.3 Applications Subject to Corrosion: Do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dielectric insulator.

3.1.4 Mechanical Actuators: Install mechanical actuators as recommended by valve manufacturer.

3.2 Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections:

3.2.1 Tube Size 2" and Smaller: Threaded valves. Soldered-joint valves may also be used.

3.2.2 Pipe Size 2" and Smaller: Threaded valves.

3.2.3 Pipe Size 2½" and Larger: Flanged valves.

3.3 Non-Metallic Disc: Limit selection and installation of valves with non-metallic disc to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.

3.4 Renewable Seats: Select and install valves with renewable seats, except where otherwise indicated.

3.5 Installation of Check Valves: Install in horizontal position with hinge pin horizontally perpendicular to center line of pipe. Install for proper direction flow.

END OF SECTION

SECTION 15120/PIPING SPECIALTIES

1 GENERAL

1.1 Drawings and general provisions of contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 This section is a Division-15 Basic Mechanical Materials and Methods section, and is part of each Division-15 section making reference to or requiring piping specialties specified herein.

1.3 Approval Submittals:

1.3.1 Product Data: Submit product data with installation instructions and UL listing for:

1.3.1.1 Fire barrier sealants.

2 PRODUCTS

2.1 General: Provide factory-fabricated piping specialties recommended by manufacturer for use in service indicated. Provide piping specialties of types and pressure ratings indicated for each service, or if not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes as indicated, and connections, which properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is Installer's option.

2.2 Escutcheons:

2.2.1 General: Provide pipe escutcheons as specified herein with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Furnish pipe escutcheons with nickel or chrome finish for occupied areas, prime paint finish for unoccupied areas.

2.2.2 Pipe Escutcheons for Moist Areas: For waterproof floors, and areas where water and condensation can be expected to accumulate, provide cast brass or sheet brass escutcheons, solid or split hinged.

2.2.3 Pipe Escutcheons for Dry Areas: Provide sheet steel escutcheons, solid or split hinged.

2.3 Dielectric Unions Waterways: Provide standard products recommended by manufacturer Victaulic Style 47 dielectric waterways for use in service indicated, which effectively isolate ferrous from non-ferrous piping (electrical conductance), prevent galvanic action and stop corrosion. Dielectric unions are not acceptable.

2.4 Fire Barrier Penetration Seals:

2.4.1 Provide seals for any opening through fire-rated walls, floors, or ceilings used as passage for mechanical components such as piping or ductwork in accordance with the requirements of Division 7.

2.4.2 Cracks, Voids, or Holes Up to 4" Diameter: Use putty or calking, one-piece intumescent elastomer, non-corrosive to metal, compatible with synthetic cable jackets, and capable of expanding 10 times when exposed to flame or heat, UL-listed.

2.4.3 Openings 4" or Greater: Use sealing system capable of passing 3-hour fire test in accordance with ASTM E-814, consisting of wall wrap or liner, partitions, and end caps capable of expanding when exposed to temperatures of 250 to 350°F, UL-listed.

2.5 Fabricated Piping Specialties:

2.5.1 Drip Pans: Provide drip pans fabricated from corrosion-resistant sheet metal with watertight joints, and with edges turned up 2-1/2". Reinforce top, either by structural angles or by rolling top over ¼" steel rod. Provide hole, gasket, and flange at low point for watertight joint and 1" drain line connection.

2.5.2 Pipe Sleeves: Provide pipe sleeves of one of the following:

2.5.2.1 Sheet-Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate from the following gages: 3" and smaller, 20 gage; 4" to 6" 16 gage; over 6", 14 gage.

2.5.2.2 Steel-Pipe: Fabricate from Schedule 40 galvanized steel pipe; remove burrs.

2.5.2.3 Iron-Pipe: Fabricate from cast-iron or ductile-iron pipe; remove burrs.

2.5.3 Sleeve Seals: Provide sleeve seals for sleeves located in foundation walls below grade, or in exterior walls, of one of the following:

2.5.3.1 Caulking and Sealant: Provide foam or caulking and sealant compatible with piping materials used.

2.6 Low Pressure Y-Type Pipeline Strainers:

2.6.1 General: Provide strainers full line size of connecting piping, with ends matching piping system materials. Provide Type 304 stainless steel screens.

2.6.1.1 Water Strainers: Select for 200 psi working pressure (water, oil or gas). Provide 20 mesh screens through 2" size and 1/16" perforations for 2½" size and larger.

2.6.1.2 Steam Strainers: Select for 125 psi working pressure at 450ºF. Provide 30 mesh screens through 2" size and 3/64" perforations for 2½" size and larger.

2.6.2 Select from the following types:

2.6.2.1 Threaded Ends, 2" and Smaller: Cast-iron body, screwed screen retainer with centered blowdown fitted with pipe plug.

2.6.2.2 Threaded Ends, 2-1/2" and Larger: Cast-iron body, bolted screen retainer with off-center blowdown fitted with pipe plug.

2.6.2.3 Flanged Ends, 2-1/2" and Larger: Cast-iron body, bolted screen retainer with off-center blowdown fitted with pipe plug.

3 EXECUTION

3.1 Pipe Escutcheons: Install pipe escutcheons on each pipe penetration through floors, walls, partitions, and ceilings where penetration is exposed to view; and on exterior of building. Secure escutcheon to pipe or insulation so escutcheon covers penetration hole, and is flush with adjoining surface.

3.2 Dielectric Unions Waterways: Install at each piping joint between ferrous and non-ferrous piping. Comply with manufacturer's installation instructions.

3.3 Fire Barrier Penetration Seals: Provide pipe sleeve as required. Fill entire opening with sealing compound. Adhere to manufacturer's installation instructions. Refer to Division 7.

3.4 Drip Pans: Locate drip pans under piping passing over or within 3' horizontally of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, weld rods to sides of drip pan. Brace to prevent sagging or swaying. Connect 1" drain line to drain connection, and run to nearest plumbing drain or elsewhere as indicated.

3.5 Pipe Sleeves: Install pipe sleeves of types indicated where piping passes through walls, floors, ceilings, and roofs. Do not install sleeves through structural members of work, except as detailed on drawings, or as reviewed by Architect/Engineer. Install sleeves accurately centered on pipe runs. Size sleeves so that piping and insulation (if any) will have free movement in sleeve, including allowance for thermal expansion; but not less than 2 pipe sizes larger than piping run. Where insulation includes vapor-barrier jacket, provide sleeve with sufficient clearance for installation. Install length of sleeve equal to thickness of construction penetrated, and finish flush to surface; except floor sleeves. Extend floor sleeves ¼" above level floor finish, and ¾" above floor finish sloped to drain. Provide temporary support of sleeves during placement of concrete and other work around sleeves, and provide temporary closure to prevent concrete and other materials from entering sleeves.

3.5.1 Install sleeves in fire-rated assemblies in accordance with the listing of the assembly and the fire barrier sealant.

3.5.2 Install sheet-metal sleeves at interior partitions and ceilings other than suspended ceilings. Fill annular space with caulking or fire barrier sealant as required.

3.5.3 Install steel-pipe sleeves at floor penetrations. Fill annular space with caulking or fire barrier sealant as required.

3.5.4 Install iron-pipe sleeves at all foundation wall penetrations and at exterior penetrations; both above and below grade. Fill annular space with caulking or mechanical sleeve seals.

3.6 Y-Type Strainers: Install Y-type strainers full size of pipeline, in accordance with manufacturer's installation instructions. Install pipe nipple and shutoff valve in strainer blow down connection, full size of connection, except for strainers ¾" and smaller installed ahead of control valves feeding individual terminals. Where indicated, provide drain line from shutoff valve to plumbing drain, full size of blow down connection.

3.7 Locate Y-type strainers in supply line ahead of the following equipment, and elsewhere as indicated, if integral strainer is not included in equipment:

Pumps
Temperature control valves.
Pressure reducing valves.
Temperature or pressure regulating valves.
Steam traps.

END OF SECTION

SECTION 15150/SUPPORTS, ANCHORS, AND SEALS

1 GENERAL

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

1.2 This section is a Division-15 Basic Materials and Methods section, and is a part of each Division-15 section making reference to or requiring supports, anchors, and seals specified herein.

1.3 Extent of supports, anchors, and seals required by this section is indicated on drawings and/or specified in other Division-15 sections.

1.4 Code Compliance: Comply with applicable codes pertaining to product materials and installation of supports, anchors, and seals.

1.5 MSS Standard Compliance:

1.5.1 Provide pipe hangers and supports of which materials, design, and manufacture comply with ANSI/MSS SP-58.

1.5.2 Select and apply pipe hangers and supports, complying with MSS SP-69.

1.5.3 Fabricate and install pipe hangers and supports, complying with MSS SP-89.

1.5.4 Terminology used in this section is defined in MSS SP-90.

1.6 UL and FM Compliance: Provide products which are Underwriters Laboratories listed and Factory Mutual approved.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide supports and hangers by Grinnel, Michigan Hanger Company, B-Line Systems, or approved equal.

2.2 Horizontal-Piping Hangers and Supports: Except as otherwise indicated, provide factory-fabricated horizontal-piping hangers and supports complying with ANSI/MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.

2.2.1 Adjustable Steel Clevises: MSS Type 1.

2.2.2 Steel Double Bolt Pipe Clamps: MSS Type 3.

2.2.3 Adjustable Steel Band Hangers: MSS Type 7.

2.2.4 Steel Pipe Clamps: MSS Type 4.

2.2.5 Pipe Stanchion Saddles: MSS Type 37, including steel pipe base support and cast-iron floor flange.

2.2.6 Single Pipe Rolls: MSS Type 41.

2.2.7 Adjustable Roller Hanger: MSS Type 43.

2.2.8 Pipe Roll Stands: MSS Type 44 or Type 47.

2.3 Vertical-Piping Clamps: Except as otherwise indicated, provide factory-fabricated vertical-piping clamps complying with ANSI/MSS SP-58, of one of the following MSS types listed, selected by Installer to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.

2.3.1 Two-Bolt Riser Clamps: MSS Type 8.

2.3.2 Four-Bolt Riser Clamps: MSS Type 42.

2.4 Hanger-Rod Attachments: Except as otherwise indicated, provide factory-fabricated hanger-rod attachments complying with ANSI/MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger-rod attachments to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.

2.4.1 Steel Turnbuckles: MSS Type 13.

2.4.2 Malleable Iron Sockets: MSS Type 16.

2.5 Building Attachments: Except as otherwise indicated, provide factory-fabricated building attachments complying with ANSI/MSS SP-58, of one of the following MSS types listed, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods.

2.5.1 Center Beam Clamps: MSS Type 21.

2.5.2 C-Clamps: MSS Type 23.

2.5.3 Malleable Beam Clamps: MSS Type 30.

2.5.4 Side Beam Brackets: MSS Type 34.

2.5.5 Concrete Inserts: MSS Type 18.

2.6 Saddles and Shields: Except as otherwise indicated, provide saddles or shields under piping hangers and supports, factory-fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.

2.6.1 Protection Shields: MSS Type 40; of length recommended by manufacturer to prevent crushing of insulation.

2.6.2 Protection Saddles: MSS Type 39; use with rollers, fill interior voids with segments of insulation matching adjoining insulation.

2.7 Miscellaneous Materials:

2.7.1 Metal Framing: Provide products complying with NEMA STD ML 1.

2.7.2 Steel Plates, Shapes and Bars: Provide products complying with ANSI/ASTM A 36.

2.7.3 Cement Grout: Portland cement (ANSI/ASTM C 150, Type I or Type III) and clean uniformly graded, natural sand (ANSI/ASTM C 404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum amount of water required for placement and hydration.

2.7.4 Heavy-Duty Steel Trapezes: Fabricate from steel shapes or continuous channel struts selected for loads required; weld steel in accordance with AWS standards.

3 EXECUTION

3.1 Preparation

3.1.1 Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.

3.1.2 Prior to installation of hangers, supports, anchors and associated work, Installer shall meet at project site with Contractor, installer of each component of associated work, and installers of other work requiring coordination with work of this section for purpose of reviewing material selections and procedures to be followed in performing the work in compliance with requirements specified.

3.2 Installation of Building Attachments:

3.2.1 Install building attachments at required locations within concrete or on structural steel for proper piping support. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

3.2.2 In areas of work requiring attachments to existing concrete, use self drilling rod inserts, Phillips Drill Co., "Red-Head" or equal.

3.3 Installation of Hangers and Supports:

3.3.1 General: Install hangers, supports, clamps and attachments to support piping properly from building structure; comply with MSS SP-69. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with maximum spacings complying with MSS SP-69 or as listed herein, whichever is most limiting. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.

3.3.1.1 Horizontal steel pipe and copper tube 1-1/4" diameter and smaller: support on 6 foot centers.

3.3.1.2 Horizontal steel pipe and copper tube 1-1/2" diameter and larger: support on 10 foot centers.

3.3.1.3 Vertical steel pipe and copper tube: support at each floor.

3.3.1.4 Plastic pipe: support in accordance with manufacturer's recommendations.

3.3.1.5 Horizontal cast iron pipe inside building: support each length of pipe (at the joint).

3.3.1.6 Vertical cast iron pipe: support at each floor and at the base.

3.3.1.7 Fire protection piping: support in accordance with NFPA 13.

3.3.2 Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories.

3.3.3 Paint all black steel hangers with black enamel. Galvanized steel and copper clad hangers do not require paint.

3.3.4 Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.

3.3.5 Provision for Movement:

3.3.5.1 Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.

3.3.5.2 Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

3.3.5.3 Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded.

3.3.6 Insulated Piping: Comply with the following installation requirements.

3.3.6.1 Shields: Where low-compressive-strength insulation or vapor barriers are indicated, install coated protective shields. For pipe 8" and over, install wood insulation saddles.

3.3.6.2 Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.

3.3.7 Support fire protection piping independently of other piping.

3.4 Installation of Anchors:

3.4.1 Install anchors at proper locations to prevent stresses from exceeding those permitted by ANSI B31, and to prevent transfer of loading and stresses to connected equipment.

3.4.2 Fabricate and install anchors by welding steel shapes, plates and bars to piping and to structure. Comply with ANSI B31 and with AWS standards.

3.4.3 Anchor Spacings: Where not otherwise indicated, install anchors at ends of principal pipe-runs, at intermediate points in pipe-runs between expansion loops and elbows. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

3.4.4 Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions to limit movement of piping and forces to maximums recommended by manufacturer for each unit.

3.5 Equipment Bases:

3.5.1 Concrete housekeeping bases will be provided as work of Division 3. Furnish to Contractor scaled layouts of all required bases, with dimensions of base, and location to column center lines. Furnish templates, anchor bolts, and accessories necessary for base construction.

4.6.1 Provide concrete housekeeping bases for all floor mounted equipment furnished as part of the work of Division 15. Size bases to extend minimum of 4" beyond equipment base in any direction; and 4" above finished floor elevation. Construct of reinforced concrete, roughen floor

slab beneath base for bond, and provide steel rod anchors between floor and base. Locate anchor bolts using equipment manufacturer's templates. Chamfer top and edge corners.

END OF SECTION

SECTION 15160/MECHANICAL IDENTIFICATION

1 GENERAL

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

1.2 This section is a Division-15 Basic Mechanical Materials and Methods section, and is part of each Division-15 section making reference to or requiring identification devices specified herein.

1.3 Extent of mechanical identification work required by this section is indicated on drawings and/or specified in other Division-15 sections.

1.4 Refer to Division-16 sections for identification requirements of electrical work; not work of this section. Refer to other Division-15 sections for identification requirements for controls; not work of this section.

1.5 Codes and Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

2 PRODUCTS

2.1 General: Provide manufacturer's standard products of categories and types required for each application as referenced in other Division-15 sections. Where more than single type is specified for application, selection is Installer's option, but provide single selection for each product category.

2.2 Painted Identification Materials

2.2.1 Stencils: Standard fiberboard stencils, prepared for required applications with letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications, but not less than 1-¼" high letters for ductwork and not less than ¾" high letters for access door signs and similar operational instructions.

2.2.2 Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.

2.2.3 Identification Paint: Standard identification enamel.

2.3 Plastic Pipe Markers

2.3.1 Pressure-Sensitive Type: Provide manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers.

2.3.1.1 Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with name as shown or specified.

2.3.1.2 Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.4 Valve Tags:

2.4.1 Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Provide 1-½" diameter tags, except as otherwise indicated.

2.4.2 Plastic Laminate Valve Tags: Provide manufacturer's standard 3/32" thick engraved plastic laminate valve tags, with piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Provide 1-½" square black tags with white lettering, except as otherwise indicated.

2.5 Engraved Plastic-Laminate Signs:

2.5.1 General: Provide engraving stock melamine plastic laminate, in the sizes and thicknesses indicated, engraved with engraver's standard letter style a minimum of 3/4" tall and wording indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

2.5.2 Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8” for larger units.

2.5.3 Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.6 Stamped Nameplates: Provide equipment manufacturer's standard stamped nameplates for motors, AHUs, pumps, etc.

3 EXECUTION

3.1 Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.2 Ductwork Identification:

3.2.1 General: Identify air supply, return, exhaust, intake and relief ductwork with stenciled signs and arrows, showing ductwork service and direction of flow, in black or white.

3.2.2 Location: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures, and at 50' spacings along exposed runs.

3.2.3 Access Doors: Provide stenciled signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate and procedural information.

3.3 Piping System Identification:

3.3.1 General: Install pipe markers of one of the following types on each system indicated to receive identification, and include arrows to show normal direction of flow:

3.3.1.1 Plastic pipe markers.

3.3.1.2 Stenciled markers, black or white for best contrast.

3.3.2 Locate pipe markers as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces and exterior non-concealed locations.

3.3.2.1 Near each valve and control device.

3.3.2.2 Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.

3.3.2.3 Near locations where pipes pass through walls, floors, ceilings, or enter non-accessible enclosures.

3.3.2.4 At access doors, manholes and similar access points which permit view of concealed piping.

3.3.2.5 Near major equipment items and other points of origination and termination.

3.3.2.6 Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.

3.3.2.7 On piping above removable acoustical ceilings, except omit intermediately spaced markers.

3.3.3 The following piping shall be color-coded where exposed in mechanical and electrical rooms by completely painting the piping with the indicated color. Use standard colors where exposed in finished spaces. Use standard identification methods in concealed areas.

Fire protection piping - Red
Gas piping - Yellow

3.4 Valve Identification: Provide a permanently affixed coded valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated

equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures, HVAC terminal devices and similar rough-in connections of end-use fixtures and units. Coordinate code with operating instructions.

3.5 Valve Charts: Provide framed, glass covered valve charts in each mechanical room. Identify coded valve number, valve function, and valve location for each valve.

3.6 Mechanical Equipment Identification: Install engraved plastic laminate sign on a vertical surface on or near each major item of mechanical equipment and each operational device. Label shall indicate type of system and area served. Provide signs for the following general categories of equipment and operational devices:

3.6.1 Main control and operating valves, including safety devices.

3.6.2 Meters, gauges, thermometers and similar units.

3.6.3 Fuel-burning units including boilers, furnaces, and heaters.

3.6.4 Pumps, compressors, chillers, condensers, and similar equipment.

3.6.5 Heat exchangers, coils, evaporators, cooling towers, heat recovery units and similar equipment.

3.6.6 Fans, blowers, primary balancing dampers and VAV boxes.

3.6.7 HVAC air handlers and fan coil units.

3.6.8 Tanks and pressure vessels.

3.6.9 Air conditioning indoor and outdoor units.

3.7 Stamped Nameplates: Equipment manufacturers to provide standard stamped nameplates on all major equipment items such as motors, pumps, AHUs, etc. Where motors are hidden from view (within equipment casing, or otherwise not easily accessible, etc.), the equipment supplier shall furnish a duplicate motor data nameplate to be affixed to the equipment casing in an easily visible location, unless data is already included on the equipment nameplate.]

3.8 Fume Exhaust Fans: Provide engraved plastic laminate signs that identify which rooms are served by the exhaust fan per NFPA-45.

3.9 Adjusting and Cleaning:

3.9.1 Adjusting: Relocate any mechanical identification device which has become visually blocked by work of this division or other divisions.

3.9.2 Cleaning: Clean face of identification devices, and glass frames of valve charts.

END OF SECTION

SECTION 15170/ACCESS DOORS

1 GENERAL

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

1.2 This section is a Division-15 Basic Mechanical Materials and Methods section, and is part of each Division-15 section making reference to or requiring access panels specified herein.

1.3 Approval Submittals:

1.3.1 Product Data: When required by other Division-15 sections, submit product data for access doors. Submit with Division-15 section using access doors, not as a separate submittal. Include rating data.

1.4 O&M Data Submittals: Submit a copy of approval submittal. Include this data in O&M Manuals.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide access doors by Acudor, Milcor, Jay R. Smith, Zurn, BOICO, Elmdor, or approved equal.

2.2 General: Where floors, walls and ceilings must be penetrated for access to mechanical work, provide types of access doors indicated. Furnish sizes indicated or, where not otherwise indicated, furnish adequate size for intended and necessary access. Furnish manufacturer's complete units, of type recommended for application in indicated substrate construction, in each case, complete with anchorages and hardware.

2.3 Access Door Construction: Except as otherwise indicated, fabricate wall/ceiling door units of welded steel construction with welds ground smooth; 16-gauge frames and 14-gauge flush panel doors; 175° swing with concealed spring hinges; flush screw-driver-operated cam locks; factory-applied rust-inhibitive prime-coat paint finish.

2.4 Locks: Where indicated, provide flat pass key type 5-pin or 5-disc type cylinder locks, individually keyed unless otherwise indicated, 2 keys.

2.5 Locks: Provide Folger Adams or approved equal Model 415-6 high security deadlock six lever Number 12. All access doors shall be keyed the same throughout. Coordinate with the General Contractor.

2.6 Fire Rated Access Doors: Where required furnish with 20-gauge insulated sandwich panel, automatic closing mechanism, cylinder type lock (self-latching with inside release mechanism), and continuous concealed steel hinge pin. Access doors shall carry the UL 1-½ hour "B" label.

2.7 Insulated Access Doors: Provide 1.0” double wall insulated, hinged access doors. Provide 20 gauge satin coat steel door panels with 0.060” extruded aluminum door panel frames and 0.080” extruded aluminum flanged frame. Provide 0.75 PCF fiberglass insulation sandwiched between inner and outer panel. Provide extruded EDPM or closed cell neoprene draft seal gasket, zinc plated steel continuous hinge. Provide dual acting compression lever type handles, operable from either side of the door. Provide 2 handles for doors 48” tall or less. Provide 3 handles for doors over 48” tall.

2.8 Air and Water Sealed Access Doors: Provide wall/ceiling door units of welded stainless steel construction with welds ground smooth; 16-gauge frames and 16-gauge flush panel doors; 175° swing with continuous exposed stainless steel piano hinge; continuous bulb trim gasket; Stainless steel Phillips head screw latch; Stainless steel #4 satin polish finish.

3 EXECUTION

3.1 Access doors shall be installed to operate and service all mechanical equipment including valves, dampers, duct access panels, and other items requiring maintenance that are concealed above or behind finished construction. Access doors shall be installed in walls, chase and floors as necessary, but are not required in accessible suspended ceiling systems. Access doors shall have factory applied protective phosphate coating and baked enamel primer suitable for field painting.

3.2 Access doors shall be installed by the Division installing the substrate construction. However, responsibility for furnishing and determining location of access doors is part of this Division's work. The style of access door shall be suitable for construction into which installed.

3.3 Access doors shall be sized and located as required to provide proper maintenance and service access in accordance with the manufacturer's recommendations and code authority requirements for all devices and equipment.

END OF SECTION

SECTION 15180/TESTING, CLEANING, AND STERILIZATION OF PIPING SYSTEMS

1 GENERAL

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

1.2 This section is a Division-15 Basic Mechanical Materials and Methods section, and is part of each Division-15 section making reference to or requiring the testing and other procedures specified herein.

1.3 Notify the Architect/Engineer when system tests are ready to be witnessed at least 24 hours prior to the test.

1.4 All materials, test equipment, and devices required for cleaning, testing, sterilizing or purging shall be provided by the Contractor.

2 PRESSURE TESTS

2.1 General: Provide temporary equipment for testing, including pump and gauges. Test piping systems before insulation is installed wherever feasible, and remove control devices before testing. Test each natural section of each piping system independently but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with indicated medium and pressurize for indicated pressure and time.

2.2 Required test period is four hours.

2.3 No piping, fixtures, or equipment shall be concealed or covered until they have been tested. The contractor shall apply each test and ensure that it is satisfactory for the period specified before calling the Architect/Engineer to observe the test. Test shall be repeated upon request to the satisfaction of those making the inspection.

2.4 Observe each test section for leakage at the end of the test period. Test fails if leakage is observed or if pressure drop exceeds 5% of the test pressure.

2.5 Check of systems during application of test pressures should include visual check for water leakage and soap bubble or similar check for air and nitrogen leakage.

2.6 During heating and cooling cycles, linear expansion shall be checked at all elbows and expansion joints for proper clearance.

2.7 Repair piping systems sections which fail required piping test. Disassemble and re-install using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

2.8 Pressure Test Requirements:

2.8.1 Acid Waste and Vent Test all piping within the building with a 10 foot head of water. Test piping in sections so that all joints are tested. Provide test tees as required.

2.8.2 Domestic Water: Perform hydrostatic test on all piping within the building at twice the normal static pressure at service point, but not less than 100 psig. Once tested, flush out piping and leave under pressure of the supply main or 40 psig for the balance of the construction period.

2.8.3 Gas: Test with air or nitrogen at 150% of normal working pressure, but not less than 25 psig. The test and check for leaks shall be in accordance with NFPA-54.

3 CLEANING AND STERILIZATION

3.1 General: Clean exterior surfaces of installed piping systems of superfluous materials, and prepare for application of specified coatings (if any). Flush out piping systems with clean water or blowdown with air before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.

3.2 Flush and drain all water systems at least three times. Reverse flush systems from smallest piping to largest piping. Replace startup strainers with operating strainers.

3.3 Blowdown all gas, air and vacuum systems with air or nitrogen (at a rate of flow exceeding design) at least three times or until no residue shows at each outlet. Reverse blowdown systems from smallest piping to largest piping.

3.4 Sterilization of Domestic Water Systems:

3.4.1 Prerequisites: All new hot and cold water piping installed (complete), all fixtures connected, system flushed out, and system filled with water.

3.4.2 The shut off valve at the water main the point of connection shall be closed, all fixture outlets opened slightly, and a sterilizing solution shall be introduced at a manifold connection installed by the Contractor at the meter. the point of connection.

3.4.3 The solution shall contain 50 parts per million of available chlorine. The chlorinating material shall be either liquid chlorine or calcium hypochlorite. The solution shall be allowed to stand in the system for at least eight hours after which the entire system shall be flushed.

3.4.4 After final flushing, all aerators shall be removed, cleaned, and reinstalled. After final flush the residual chlorine shall not exceed 0.2 parts per million.

3.4.5 The Architect/Engineer shall be notified 24 hours prior to the procedure so that it can be witnessed.

3.4.6 Provide sampling and certified report by an independent testing lab. Provide written Health Department approval of disinfection samples.

3.5 Fuel Gas: Purge all fuel gas systems in accordance with NFPA 54.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 15190/EXCAVATION & BACKFILL

1 GENERAL

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

1.2 This section is a Division-15 Basic Mechanical Materials and Methods section, and is part of each Division-15 section making reference to or requiring excavation and backfill specified herein.

1.3 Existing Utilities: Underground utilities shown were taken from old drawings. The exact location of these utilities and irrigation branches and abandoned services are not known. Use extreme caution when excavating.

1.4 Refer to other Division-15 sections and/or drawings for specific requirements of the particular piping system being installed. Where another Division-15 section or the drawings conflict with requirements of this section, the other Division-15 section or the drawings shall take precedence over the general requirements herein.

1.5 OSHA: Contractor employee worker protection for all trenching and excavation operations shall comply with 29 CFR 1926.650 Subpart P and all current OSHA requirements.

1.6 Trench Safety Act: Contractor shall comply with all requirements of Florida Statutes Chapter 553, including the requirement to provide a separate line item to identify the cost to comply on a per lineal foot of trench and per square foot of shoring.

2 PRODUCTS

2.1 Sand: Clean, hard, uncoated grains free from organic matter or other deleterious substances. Sand for backfill shall be of a grade equal to mortar sand.

2.2 Gravel: Clean, well graded hard stone or gravel, free from organic material. Size range to be from No. 4 screen retentions to 1".

2.3 Earth: Fill free of clay, muck, stones, wood, roots or rubbish.

2.4 Identification Tape: Polyethylene 6 inches wide, 0.004 inches thick, continuously printed with "CAUTION" in large letters and type of pipe below.

2.5 Copper Identification Wire: 14-gauge.

3 EXECUTION

3.1 Ditching and Excavation: Shall be performed by hand wherever there is a possibility of encountering obstacles or any existing utility lines of any nature whatsoever. Where clear and

unobstructed areas are to be excavated, appropriate machine excavation methods may be employed. Avoid use of machine excavators within the limits of the building lines.

3.2 Bedding: Excavate to bottom grade of pipe to be installed, and shape bed of undisturbed earth to contour of pipe for a width of at least 50% of pipe diameter. If earth conditions necessitate excavation below grade of the pipe, such as due to the presence of clay, muck, or roots, subcut and bring bed up to proper elevation with clean, new sand (as described in paragraph 2.1), deposited in 6" layers and tamped. Notify Architect/Engineer if subcut exceeds 12", or if bed is of an unstable nature. In this case a 6" minimum layer of gravel will be required before sand bedding begins. Submit cost proposal if the earth conditions require subcut in excess of 12" or if gravel is required to achieve proper bedding.

3.3 Placing: Pipe shall be carefully handled into place. Avoid knocking loose soil from the banks of the trench into the pipe bed. Rig heavier sections with nylon slings in lieu of wire rope to avoid crushing or chipping. Pipe which is handled with insulation in place, coated pipe, and jacketed pipe shall have special handling slings as required to prevent damage to the material.

3.4 Backfilling: Deposit clean new sand (as described in paragraph 2.1) to 6" above the pipe and tamp. Then deposit sand or earth carefully in 6" layers, maintaining adequate side support, especially on nonferrous piping materials. Compact fill in 6" layers, using mechanical means, up to the top elevation of the pipe, and in 12" layers to rough or finish grade as required. Fine grade and restore surface to original condition.

3.5 Special: Excavations shall be installed and maintained in satisfactory condition during the progress of the work. Subsurface structures are to be constructed in adequately sized excavations. De-watering equipment shall be installed and properly maintained where required. Shoring shall be employed in the event of unstable soil condition, and in all cases where required by OSHA regulations and necessary to protect materials and personnel from injury.

3.6 Identification: Install identification tape directly above all underground piping, one tape for each pipe where multiple pipes are installed. Depth of tape shall be at least 6 inches below finished grade and 24" above buried pipe. Install copper wire above non-metallic pipes.

3.7 Depth of Cover: Minimum cover for underground piping is two feet unless indicated otherwise.

END OF SECTION

SECTION 15205/INSULATION FOR PLUMBING EQUIPMENT AND PIPING

1 GENERAL

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

1.2 Division-15 Basic Mechanical Materials and Methods Sections apply to work of this section.

1.3 Approval Submittals:

1.3.1 Product Data: Submit a producer's data sheets and installation instructions on each insulation system including insulation, coverings, adhesives, sealers, protective finishes, and other material recommended by the manufacturer for applications indicated. Submit for:

1.3.1.1 Fiberglass pipe insulation

1.3.1.2 Flexible unicellular piping insulation

1.4 O&M Data Submittals: Submit a copy of all approval submittals. Include in O&M Manual.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide insulation products by Armstrong, Johns Manville, Knauf, Owens Corning, Pittsburgh Corning, U.S. Rubber, or approved equal. All products shall be asbestos-free.

2.2 Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics, and adhesive) with a flame-spread rating of 25 or less, and a smoke-developed rating of 50 or less, as tested by ANSI/ASTM E84.

2.3 Pipe Insulation Materials:

2.3.1 Fiberglass Pipe Insulation: ASTM C547, Class 1 unless otherwise indicated. (Preformed sleeving with white all-service jacket, suitable for temperatures up to 450°F)

2.3.2 Staples, Bands, Wires, and Cement: As recommended by the insulation manufacturer for applications indicated.

2.3.3 Adhesives, Sealers, Protective Finishes: Products recommended by the insulation manufacturer for the application indicated.

2.3.4 Jackets: ASTM C921, Type I (vapor barrier) for piping below ambient temperature, Type II (vapor permeable) for piping above ambient temperature. Type I may be used for all piping at Installer's option.

3 EXECUTION

3.1 General:

3.1.1 Install thermal insulation products in accordance with manufacturer's written instructions, and in compliance with recognized industry practices to ensure that insulation serves intended purpose.

3.1.2 Install insulation materials with smooth and even surfaces and on clean and dry surfaces. Redo poorly fitted joints. Do not use mastic or joint sealer as filler for gapping joints and excessive voids resulting from poor workmanship.

3.1.3 Maintain integrity of vapor-barrier on insulation and protect it to prevent puncture and other damage. Label all insulation "ASBESTOS FREE".

3.1.4 Do not apply insulation to surfaces while they are hot or wet.

3.1.5 Do not install insulation until systems have been checked and found free of leaks. Surfaces shall be clean and dry before attempting to apply insulation. A professional insulator with adequate experience and ability shall install insulation.

3.1.6 Do not install insulation on pipe systems until acceptance tests have been completed except for flexible unicellular insulation. Do not install insulation until the building is "dried-in".

3.2 Fiberglass Pipe Insulation:

3.2.1 Insulate the following piping systems (indoor locations):

3.2.1.1 Cold water pipe: ½" thick.

3.2.2 Apply insulation to pipe with all side and end joints butted tightly. Seal longitudinal lap by pressurizing with plastic sealing tool. Apply 3 inch wide self sealing butt strips to joints between insulation sections. Insulate all fittings, flanges, valves and strainers with premolded insulation. Apply coat of insulating cement to fittings and wrap with glass cloth overlapping each wrap 1" and adjacent pipe 2". Finish with heavy coat of general purpose mastic. Premolded PVC covers may also be used, but no flexible inserts are allowed.

3.2.3 Provide hanger or pipe support shields of 16 gauge (minimum) galvanized steel over the insulation which extends halfway up the pipe insulation cover and at least 6" on each side of the hanger.

3.2.4 Omit insulation on exposed plumbing fixture runouts from faces of wall or floor to fixture; on unions, flanges, strainer blowoffs, flexible connections and expansion joints.

END OF SECTION

SECTION 15230/EXTERIOR INSULATION FOR DUCTWORK

1 GENERAL

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

1.2 Division-15 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Approval Submittals:

1.3.1 Product Data: Submit producer's data sheets and installation instructions on each insulation system including insulation, coverings, adhesives, sealers, protective finishes, and other material recommended by the manufacturer for applications indicated. Submit for:

1.3.1.1 Rigid duct insulation

1.3.1.2 Flexible duct insulation

1.3.1.3 Insulation for exterior ducts.

1.4 O&M Data Submittals: Submit a copy of all approval submittals. Include in O&M Manual.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide insulation products by Knauf, Owens-Corning, Johns Manville, Certainteed.

2.2 Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, coverings, sealers, mastic, and adhesive) with a flame spread rating of 25 or less, and a smoke-developed rating of 50 or less as tested by ANSI/ASTM 84.

2.3 Rigid Fiberglass Insulation Board: ASTM C612, Class 1 (non load bearing). Boards shall be 3 pcf density with UL rated aluminum foil vapor barrier (FSK).

2.4 Flexible Fiberglass Insulation: ASTM C553, Type I, Class B-3 (temperature less than 350□F). Duct wrap shall be 1 pcf density with UL rated aluminum foil vapor barrier (FSK).

2.5 General Purpose Mastic: Benjamin Foster 35-00 Series, Insulcoustic VIAC Mastic, Childers CP-10, or approved equal. The final selection of this product for the specific application indicated is the responsibility of the insulation supplier. The insulation system must meet the specified application.

2.6 Vapor Barrier Sealant: Benjamin Foster 30-35, Insulcoustic IC-501, 3M EC-1378, Childers CP-30, or approved equal. Provide "Low Odor" type. The final selection of this product for the

specific application indicated is the responsibility of the insulation supplier. The insulation system must meet the specified application.

2.7 Adhesive: Benjamin Foster 85-20, Insulcoustic IC-205, 3M EC-35, Childers CP-82, Childers CP-89, or approved equal. The final selection of this product for the specific application indicated is the responsibility of the insulation supplier. The insulation system must meet the specified application.

2.8 Fiber-Glas Mesh: 10x10 Mesh. Foster Mastafab or equal.

3 EXECUTION

3.1 Installation of Rigid Insulation: Insulate all supply, return and outdoor air ductwork exposed in mechanical rooms, mezzanines, fan lofts or in any finished spaces with 1½" thick rigid fiberglass insulation with vapor barrier.

3.1.1 Clean and dry ductwork prior to insulating. Butt insulation firmly together to ensure complete and tight fit over surfaces to be covered. Install insulation materials with smooth and even surfaces. Maintain integrity of aluminum vapor barrier wherever possible. Extend insulation without interruption through walls, floors and similar ductwork penetrations except where otherwise indicated.

3.1.2 Install with facing to the outside with a maximum of 25% compression. Butt all insulation joints firmly together. Longitudinal seam of the vapor retarder must be overlapped a minimum of 2". Staples shall be outward clinch and placed approximately 6" on center. All penetrations, joints, seams, and damage to the facing shall be sealed with glass fabric and mastic prior to system startup. For rectangular ducts over 24" wide, secure the insulation to the bottom of the duct with mechanical fasteners spaced on 12" centers to reduce sag. Do not overcompress the insulation with the retainer. Larger ducts shall be secured with fasteners on 12-inch centers and 3 inches from all edges.

3.1.3 Apply open mesh glass fabric embedded in vapor barrier mastic. Then apply a second coat of general purpose mastic with aluminum grey color. This finish shall be complete over all rigid insulation.

3.2 Installation of Flexible Insulation: Insulate all supply, return and outdoor air ductwork concealed above ceilings, in chases, or elsewhere, and the backs of all ceiling supply outlets with 2" thick fiberglass blanket insulation with vapor barrier.

3.2.1 Insulate round elbows and fittings with wrap such that thickness is equal to adjoining duct covering. Clean and dry ductwork prior to insulating.

3.2.2 Adhere insulation to duct with 50 percent coverage using approved insulation adhesive applied in 6-inch wide swaths with 6-inch spaces between swaths. Additionally secure insulation with perforated pins and Tuff-Bond or by self-sticking pins with a 3/8" self-tapping screw. Space on

12-inch centers and 3 inches from all edges. Ducts up through 24" wide only require one row of pins. Ducts over 24" wide shall have pins spaced as described herein.

3.2.3 Lap all joints 2 inches and seal joints with 4-inch wide strips of open mesh glass fabric embedded in two coats of general purpose mastic.

3.2.4 Seal all punctures and breaks in aluminum vapor barrier with open mesh glass fabric and vapor barrier sealant.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 15405/POTABLE WATER SYSTEM

1 GENERAL

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

1.2 Division-15 Basic Mechanical Requirements and Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of potable water systems work, is indicated on drawings and schedules, and by requirements of this section.

1.4 Refer to other Division-15 sections for site water distribution system; not work of this section unless noted.

1.5 Refer to appropriate Division-2 sections for exterior potable water system; not work of this section unless noted.

1.6 Insulation for potable water piping is specified in other Division-15 sections, and is included as work of this section. Insulation requirements include:

1.6.1 Cold water piping above ceilings and/or in attics.

1.7 Excavation and backfill required in conjunction with water piping is specified in other Division-15 sections, and is included as work of this section.

1.8 Code Compliance: Comply with applicable portions of Standard Plumbing Code pertaining to selection and installation of plumbing materials and products. Comply with local utility requirements.

1.9 Approval Submittals:

1.9.1 Product Data: Submit manufacturer's technical product data and installation instructions for:

Valves

Water hammer arresters

Access doors

1.10 Test Reports and Verification Submittals:

1.10.1 Disinfection: Submit report by Health Department.

2 PRODUCTS

2.1 General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with Standard Plumbing Code where applicable. Provide sizes and types matching pipe materials used in potable water systems. Where more than one type of materials or products is indicated, selection is Installer's option.

2.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following listed for each item.

2.3 Identification: Provide identification complying with Division-15 Basic Mechanical Materials and Methods section "Mechanical Identification". Provide manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct burial service; not less than 6" wide x 4 mils thick. Provide blue tape with black printing reading "CAUTION WATER LINE BURIED BELOW".

2.4 Pipes and Fittings: Provide pipes and pipe fittings complying with Division-15 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings", in accordance with the following listing:

2.4.1 Interior Water Piping:

2.4.1.1 Above Grade: Copper tube; Type L, hard-drawn temper; wrought-copper fittings, solder-joints.

2.4.2 Solder joints shall be made with 95-5 solder.

2.5 Piping Specialties: Provide piping specialties complying with Division-15 Basic Mechanical Materials and Methods section "Piping Specialties".

2.6 Supports and Anchors: Provide supports and anchors complying with Division-15 Basic Mechanical Materials and Methods section "Supports and Anchors".

2.7 Interior Valves: Provide valves complying with Division-15 Basic Mechanical Materials and Methods section "Valves", in accordance with the following listing:

2.7.1 Sectional and Shutoff Valves: GA1, GA2, GA3, BA1, BA2.

2.8 Water Hammer Arresters: Provide bellows type water hammer arresters, stainless steel casing and bellows, pressure rated for 250 psi, tested and certified in accordance with PDI Standard WH-201. Precision Plumbing Products, Josam, Zurn, Amtrol, Wade, Jay R. Smith, or approved equal.

2.9 Access Doors: Provide access doors to service all valves and other devices as required in accordance with Division-15 Basic Materials and Methods Section “Access Doors”.

3 EXECUTION

3.1 General: Examine areas and conditions under which potable water systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 Install mechanical identification in accordance with Division-15 Basic Mechanical Materials and Methods section "Mechanical Identification". Install underground plastic pipe markers during backfill, 6"-8" below grade.

3.3 Install water distribution piping in accordance with Division-15 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings".

3.3.1 Install piping with 1/32" per foot (¼%) downward slope towards drain point.

3.3.2 Locate groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.

3.4 Install piping specialties in accordance with Division-15 Basic Mechanical Materials and Methods section "Piping Specialties".

3.5 Install supports and anchors in accordance with Division-15 Basic Mechanical Materials and Methods section "Supports and Anchors".

3.6 Install valves in accordance with Division-15 Basic Mechanical Materials and Methods section "Valves".

3.6.1 Sectional Valves: Install on each branch and riser, close to main, where branch or riser serves two or more plumbing fixtures or equipment connections, and elsewhere as indicated.

3.6.2 Shutoff Valves: Install on inlet of each plumbing equipment item, and on inlet of each plumbing fixture, and elsewhere as indicated.

3.6.3 Drain Valves: Install on each plumbing equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere where indicated or required to completely drain potable water system.

3.7 Piping Runouts to Fixtures: Provide cold water piping runouts to fixtures of sizes indicated, but in no case smaller than required by Plumbing Code.

3.8 Install water hammer arresters in upright position, in locations and of sizes indicated in accordance with PDI Standard WH-201.

3.9 Locate and coordinate installation of access doors for all valves and devices in accordance with Division-15 Basic Mechanical Materials and Methods section “Access Doors”.

3.10 Piping Tests: Test, clean, and sterilize potable water piping in accordance with testing requirements of Division-15 Basic Mechanical Materials and Methods section "Testing, Cleaning, and Sterilization of Piping Systems".

END OF SECTION

SECTION 15415/ACID WASTE AND VENT SYSTEM

1 GENERAL

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

1.2 Division-15 Basic Mechanical Requirements and Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of acid waste and vent system work is indicated on drawings and schedules, and by requirements of this section. The system shall extend from all lab fixtures shown (complete with vent system) to the acid neutralization tank point of termination.

1.4 Excavation and backfill required in conjunction with underground building drain piping is specified in other Division-15 sections and is included as work of this section.

1.5 Refer to Division-7 section "Flashing and Sheet Metal" for flashings required in conjunction with acid waste systems; not work of this section.

1.6 Plumbing Code Compliance: Comply with applicable portions of Plumbing Code pertaining to plumbing materials, construction and installation of products.

1.7 Approval Submittals:

1.7.1 Product Data: Submit manufacturer's technical product data for:

1.7.1.1 Pipe and fittings

1.7.1.2 Cleanouts and covers

1.8 O&M Data Submittals: Submit a copy of all approval submittals. Submit maintenance data and parts lists for acid waste piping. Include these data in O&M manual.

2 PRODUCTS

2.1 General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in acid waste systems. Where more than one type of materials or products is indicated, selection is Installer's option.

2.2 Pipes and Fittings: Provide pipes and pipe fittings complying with Division-15 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings", in accordance with the following listing:

2.2.1 Cast Iron, Acid-Resistant: Provide Duriron piping and fittings; bell and spigot below grade and bell and spigot or mechanical joint above grade.

2.2.2 Polypropylene: Provide polypropylene piping and fittings; heat fused below grade and heat fused or mechanical joint above grade. Do not use in fire-rated assemblies or return plenums.

2.3 Pipe Specialties: Provide piping specialties complying with Division-15 Basic Materials and Methods section "Piping Specialties".

2.4 Supports and Anchors: Provide supports and anchors complying with Division-15 Basic Mechanical Materials and Methods section "Supports and Anchors".

2.5 Cleanouts: Provide factory-fabricated drainage piping products of size and type indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and governing regulations. Josam, Jay R. Smith, Wade, Zurn.

2.5.1 Cleanouts for Duriron Piping Systems:

2.5.1.1 Floor Cleanouts: Duriron cleanout plug with countersunk head installed in the vertical. Provide 10"x10" nickel-bronze access cover with frame. Wade W-8300-S.

2.5.1.2 Cleanouts in Piping: Duriron cleanout plug with countersunk head.

2.5.1.3 Wall Cleanouts: Same as cleanouts in piping, except provide nickel-bronze access cover with frame and screws. Wade W-8480-C.

2.5.1.4 Grade Cleanouts: Same as floor cleanouts, except use 10"x10", heavy duty, satin bronze access cover with frame. Wade W-8300-SS. In sidewalks and other finished concrete, provide access cover frames with a non-tilting tractor cover. Wade W-7035-Z or equal.

2.5.1.5 Cleanouts in Paved Areas: Cast iron body, adjustable housing, ferrule with plug and round loose scoriated tractor cover. Wade W-8300-MF. Coordinate concrete depth at site with adjustable flange.

2.5.2 Cleanouts for Polypropylene Piping:

2.5.2.1 Floor Cleanouts: Polypropylene cleanout adaptor with threaded polypropylene plug in the vertical. Provide 10"x10" nickel-bronze access cover with frame. Wade W-8300-S.

2.5.2.2 Cleanouts in Piping: Polypropylene cleanout adaptor with threaded polypropylene plug.

2.5.2.3 Wall Cleanouts: Polypropylene cleanout adaptor with tapped, threaded polypropylene plug and round stainless steel access cover with screw. Wade W-8480-R.

2.5.2.4 Grade Cleanouts: Same as floor cleanouts, except use 10"x10", heavy duty, satin bronze access cover with frame. Wade W-8300-SS. In sidewalks and other finished concrete, provide

access cover frames with a non-tilting tractor cover. Wade W-7035-Z or equal.

2.5.2.5 Cleanouts in Paved Areas: Cast iron body, adjustable housing, ferrule with plug and round loose scoriated tractor cover. Wade W-8300-MF. Coordinate concrete depth at site with adjustable flange.

3 EXECUTION

3.1 Examine substrates and conditions under which acid waste systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 Piping Installation:

3.2.1 Install above grade acid waste piping in accordance with Division-15 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings", the Standard Plumbing Code, and the manufacturer's printed instructions.

3.2.2 Install underground acid waste pipes as indicated and in accordance with Standard Plumbing Code and the manufacturer's printed instructions. Lay underground piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install required gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Clean interior of piping and dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed. Place plugs in ends of uncompleted piping at end of day or whenever work stops.

3.2.3 Install acid waste and vent piping pitched to drain at minimum slope of ¼" per foot (2%) for piping 3" and smaller, and 1/8" per foot (1%) for piping 4" and larger.

3.2.4 Duriron Piping: Install acid resistant packing and bell and spigot piping below grade. Install bell and spigot or mechanical joint piping above grade. Torque factory-supplied mechanical joints to at least 100 inch-pounds prior to testing.

3.2.5 Polypropylene Piping: Install fusion-welded fittings and joints below grade and fusion-welded or factory-supplied mechanical joint fittings above grade. Do not attempt to correct leaks in fused joints by using sealants or caulking; replace or remake the joint.

3.3 Install piping specialties in accordance with Division-15 Basic Mechanical Materials and Methods section "Piping Specialties".

3.4 Install supports and anchors in accordance with Division-15 Basic Mechanical Materials and Methods section "Supports and Anchors", and in accordance with the pipe manufacturer's written instructions.

3.5 Installation of Cleanouts: Install in above ground acid waste piping and acid waste drain piping as indicated, as required by Standard Plumbing Code; and at each change in direction of piping

greater than 45°; at minimum intervals of 50' for piping 4" and smaller and 100' for larger piping; and at base of each vertical acid waste stack. Install floor and wall cleanout covers for concealed piping, select type to match adjacent building finish.

3.5.1 Size: Cleanouts shall be full size up to 4". Piping over 4" shall have a reducing fitting to accommodate a 4" cleanout unless indicated otherwise on drawings.

3.5.2 Install cleanouts to allow adequate clearance for rodding.

3.5.3 Protect all finished surfaces of cleanouts with a suitable adhesive covering until construction is completed.

3.5.4 Cleanouts to Grade: Provide an 18" x 18" x 8" thick concrete pad around the cleanout. Set the cleanout ferrule, adapter, or access cover frame in the concrete as required. The cleanout shall be extended to the finished grade. The concrete pad shall slope away from the cleanout in all directions approximately one inch. Cover pad with fill to finished grade.

3.5.5 Cleanouts in Paved Areas: Provide concrete pad similar to cleanout to grade and coordinate concrete depth at site with adjustable flange. Access cover frames are required.

3.6 Flashing Flanges: Install flashing flange and clamping device with each stack and cleanout passing through waterproof membranes.

3.7 Vent Flashing Sleeves: Install on stacks passing through roof, secure to stack flashing in accordance with manufacturer's instructions. Provide insulation around stacks as required by manufacturer of piping. For metal roofs, sleeves and flashing are by Division-7.

3.7.1 Coordinate flashing work with work of waterproofing and adjoining substrate work.

3.7.2 Install floor drains at low points of surface areas to be drained, or as indicated. Set tops of drains flush with finished floor.

3.7.3 Install drain flashing collar or flange so that no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes, where penetrated.

3.7.4 Position drains so that they are accessible and easy to maintain.

3.8 Connection of Trap Primers: Connect trap primers as indicated, and in accordance with manufacturer's installation instructions. Pitch piping towards drain trap, minimum of 1/8" per foot (1%). Adjust trap primer for proper flow.

3.9 Piping Runouts to Fixtures: Provide acid waste piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated, but in no case smaller than required by Standard Plumbing Code.

3.10 Test, clean, flush, and inspect acid waste piping in accordance with requirements of Division-15

Basic Mechanical Materials and Methods section "Testing, Cleaning and Sterilization of Piping Systems".

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 15440/GAS SYSTEM

1 GENERAL

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

1.2 Division-15 Basic Mechanical Requirements and Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of gas systems work, is indicated on drawings and schedules, and by requirements of this section.

1.4 Excavation and backfill required in conjunction with gas service piping is specified in Division-15 sections, and is included as work of this section.

1.5 Codes and Standards

1.5.1 NFPA Compliance: Fabricate and install gas systems in accordance with NFPA 54 "National Fuel Gas Code". Provide LP gas storage and handling equipment in accordance with NFPA 58 "Standard for Storage and Handling of Liquified Petroleum Gases".

1.5.2 Utility Compliance: Fabricate and install gas systems in accordance with local gas utility company requirements and standards.

1.6 Approval Submittals:

1.6.1 Product Data: Submit manufacturer's technical product data and installation instructions as follows:

1.6.1.1 Gas cocks and/or ball valves

1.6.1.2 Laboratory gas cocks

1.6.1.3 Gas appliance connectors.

1.6.1.4 Access doors

1.7 O&M Data Submittals: Submit a copy of approval submittals. Submit maintenance data and parts lists for gas cocks, ball valves, control valves, lab gas cocks, appliance connectors, gas vents, LP storage tanks, regulators. Include these data in O&M manual.

2 PRODUCTS

2.1 General: Provide piping materials and factory-fabricated piping products of sizes, types,

pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with NFPA 54 where applicable. Base pressure rating on gas piping system maximum design pressures. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in gas systems. Where more than one type of materials or products are indicated, selection is Installer's option.

2.2 Identification: Provide identification complying with Division-15 Basic Mechanical Materials and Methods section "Mechanical Identification".

2.3 Pipes and Fittings: Provide pipes and pipe fittings complying with Division-15 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings", in accordance with the following listing:

2.3.1 Building Distribution Piping:

2.3.1.1 Pipe Size 2" and Smaller: Black steel pipe; Schedule 40; malleable-iron threaded fittings.

2.3.1.2 Pipe Sizes 2" and Smaller: Gas piping within each laboratory shall be Type L hard drawn copper with silver solder brazed joints.

2.3.1.3 Pipe Size 2½" and Larger: Black steel pipe; Schedule 40; wrought-steel buttwelding fittings.

2.4 Piping Specialties: Provide piping specialties complying with Division-15 Basic Mechanical Materials and Methods section "Piping Specialties".

2.5 Sealants: Provide UL-listed or AGA approved sealants for gas piping.

2.6 Supports and Anchors: Provide supports and anchors complying with Division-15 Basic Mechanical Materials and Methods section "Supports and Anchors".

2.7 Valves: Provide valves complying with Division-15 Basic Mechanical Materials and Methods section “Valves” and in accordance with the following listing.

2.7.1 Gas Cocks 2" and Smaller: UL-listed, AGA approved, 150 psi non-shock WOG, full port, bronze straightway cock, flat or square head, threaded ends.

2.7.2 Gas Cocks 2½" and Larger: UL-listed, CGA approved, MSS SP-78; 175 psi, lubricated plug type, full port, semi-steel body, single gland, wrench operated, flanged ends.

2.7.3 Acceptable Manufacturers for gas cocks: Subject to compliance with requirements, provide products of one of the following: Resun R1430 and R1431, Milliken 200M and 201M or approved equal.

2.7.4 Laboratory gas cocks are specified in Division-15 section "Plumbing Fixtures, Equipment and Trim".

2.7.5 Laboratory gas cocks are furnished by the laboratory equipment supplier.

2.8 Gas Appliance Tube Connectors: Provide commercial grade appliance connectors with a 2 year manufacturer's warranty. Tubing shall be Type 304 stainless steel tubing with type 304 stainless steel braiding to protect tubing from elongation. Tubing shall be complete with factory installed end connectors. Provide products that are AGA or CGA approved. Indicate maximum BTU input for each length and size used on submittal.

2.9 Access Doors: Provide access doors to service all valves and other devices as required in accordance with Division-15 Basic Materials and Methods Section "Access Doors".

3 EXECUTION

3.1 Examine areas and conditions under which gas systems materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer. Coordinate with gas supplier prior to starting work.

3.2 Install mechanical identification in accordance with Division-15 Basic Mechanical Materials and Methods section "Mechanical Identification".

3.3 Install gas piping in accordance with Division-15 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings".

3.3.1 Use sealants on metal gas piping threads which are chemically resistant to gas. Use sealants sparingly, and apply to only male threads of metal joints.

3.3.2 Remove cutting and threading burrs before assembling piping.

3.3.3 Do not install defective piping or fittings. Do not use pipe with threads which are chipped, stripped or damaged. Do not use bushings in the gas system.

3.3.4 Plug each gas outlet, including valves, with threaded plug or cap immediately after installation and retain until continuing piping, or equipment connections are completed.

3.3.5 Ground gas piping electrically and continuously within project, and bond tightly to grounding connection.

3.3.6 Install drip-legs in gas piping where indicated, and where required by code or gas company requirements.

3.3.7 Install "Tee" fitting with bottom outlet plugged or capped, at bottom of pipe risers.

3.3.8 Use dielectric unions where dissimilar metals are joined together.

3.3.9 Install piping with 1/64" per foot (1/8%) downward slope in direction of flow.

3.3.10 Install piping parallel to other piping, but maintain minimum of 12" clearance between gas piping and steam or hydronic piping above 200°F.

3.3.11 For piping underground beneath buildings, install in welded conduit. Extend conduit inside and terminate in accessible portion of building and seal. Extend conduit outside minimum of 4" from building, and vent above grade.

3.4 Install piping specialties in accordance with Division-15 Basic Mechanical Materials and Methods section "Piping Specialties".

3.5 Install supports and anchors in accordance with Division-15 Basic Mechanical Materials and Methods section "Supports and Anchors".

3.6 Installation of Valves:

3.6.1 Gas Cocks: Provide at connection to gas train for each gas-fired equipment item; and on risers and branches where indicated.

3.6.2 Locate gas cocks where easily accessible, and where they will be protected from possible injury.

3.6.3 Control Valves: Install as indicated. Refer to Division 16 for wiring; not work of this section.

3.7 Equipment Connections: Connect gas piping to each gas-fired equipment item, with drip leg and shutoff gas cock. Comply with equipment manufacturer's instructions.

3.8 Appliance Connectors: Install tubing, valves, connectors, fittings in accordance with their listing. Hose, fittings and valves shall not restrict gas flow and shall be rated for the capacity of the appliance they serve. Hoses shall not be crimped. Hoses behind movable appliances shall not be crimped when appliance is extended from wall or when appliance is set in working position. Appliance restraining device shall set to engage just prior to the connector being fully extended. Check all tubing, piping, fittings & valves for leakage at less than 50 part per million.

3.9 Locate and coordinate installation of access doors for all valves and devices in accordance with Division-15 Basic Mechanical Materials and Methods section “Access Doors”.

3.10 Piping Tests: Inspect, test, and purge gas systems in accordance with NFPA 54, local utility requirements, and Division-15 Basic Mechanical Materials and Methods section "Testing, Cleaning and Sterilization of Piping Systems".

END OF SECTION

SECTION 15750/ELECTRIC HEATERS

1 GENERAL

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

1.2 Division-16 Basic Electrical Materials and Methods sections apply to work specified in this section.

1.3 Extent of electric heater work is indicated by drawings and schedules and as specified herein.

1.4 Codes and Standards:

1.4.1 Electrical Code Compliance: Comply with applicable local electrical code requirements of the authority having jurisdiction, and NEC as applicable to construction and installation of electric heaters.

1.4.2 UL Compliance: Comply with applicable requirements of UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors". Provide electric heaters which are UL-listed and labeled.

1.4.3 NEMA Compliance: Provide electrical heater accessories which comply with NEMA standards.

1.4.4 SMACNA Compliance: Comply with applicable requirements of SMACNA's "Ducted Electric Heat Guide for Air Handling Systems" pertaining to electric heating terminals.

1.4.5 NFPA Compliance: Comply with applicable requirements of NFPA 90A standards pertaining to construction and installation of duct heating coils.

1.5 Approval Submittals:

1.5.1 Product Data: Submit manufacturer's product data and installation instructions for electric heaters showing dimensions, weights, capacities, and electrical characteristics. Submit wiring diagrams showing connections to electrical power feeders, and associated control wiring. Clearly differentiate between wiring which is manufacturer-installed and that which is field-installed.

1.5.1.1 Duct heater

1.6 O&M Data Submittals: Submit maintenance data and parts list for duct heaters, unit heaters, baseboard heaters, radiant heaters, radiant panels, control, and accessory; including "trouble-shooting" maintenance guide. Include this data, product data and a copy of approval submittals in O&M manual.

2 PRODUCTS

2.1 Duct Heaters:

2.1.1 General: Provide electric duct heating coils with automatic reset thermal cutouts for primary over-temperature protection and with load-carrying manual reset thermal cutouts, factory-wired in series with each heater stage, for secondary protection. Include overcurrent cutouts and sub-circuit fusing for the assembly.

2.1.2 Select coils for proper watt density, air velocity, and temperature rise, and with the following construction features:

2.1.2.1 Finned Tubular Electric Coils: Construct coils with resistance wire of 80 percent nickel/20 percent chromium, installed in copper plated steel tubing and surrounded by compacted magnesium-oxide powder. Provide spiral-wound copper plated steel fins brazed continuously to tubes.

2.1.2.2 Open-Coil Electric Element: Construct coils with resistance wire of 80 percent nickel/20 percent chromium, insulated by floated ceramic bushings. Recess bushings into casing openings and secure on supporting brackets, spaced 4" on center maximum.

2.1.2.3 Heating Capacity: Size coils based on the ratings of the required output (BTUH), electrical input (watts, voltage, phase) and cfm. Provide the number of stages indicated; arrange stages to prevent stratification at part load.

2.1.2.4 Coil Layout: Vertical (air flow horizontal).

2.1.2.5 Casing Assembly: Slip-in type.

2.1.2.6 Casing Assembly: Flanged type.

2.1.2.7 Casing Material: Provide galvanized steel or aluminized steel coil casing.

2.1.3 Provide the following built-in controls:

2.1.3.1 Contactor for use on electric duct heaters of specified capacity for not less than 100,000 cycles. UL listed.

2.1.3.2 Normally open S.P.S.T. relay energized from power wiring to the fan motor of the air handling unit. This relay shall be connected to prevent the heater from operating unless the fan motor is energized.

2.1.3.3 Automatic reset type high limit thermostat which de-energizes the heater if temperature in the vicinity of the electric heater exceeds the producer's recommended temperature.

2.1.3.4 Semi-automatic reset type higher limit thermostat which de-energizes heater if temperature in

the heater exceeds the setting of the automatic reset controller by more than 50°F. This control requires manual reset on trip.

2.1.3.5 Transformer with primary fusing.

2.1.3.6 Pressure-type air flow switch.

2.1.3.7 Interlocking fused disconnect switch.

2.1.4 Provide the following accessories:

2.1.4.1 Mercury contactors for quiet switching.

2.1.4.2 SCRs for solid state modulation of capacity.

2.1.4.3 PE switch controls.

2.1.5 Acceptable Manufacturers: Subject to compliance with requirements, provide duct heating coils of one of the following:

Brasch Mfg. Co.
Chromalox Div.; Emerson Electric Co.

3 EXECUTION

3.1 Examine areas and conditions under which electric heaters are to be installed and notify Contractor in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 Duct Installation:

3.2.1 Install a sheet metal sleeve on the interior of the insulation in ducts with internal insulation, or ducts fabricated of ductboard. The sleeve shall extend 24 inches on both sides of the duct mounted heaters, or as required to meet the listing of the equipment.

3.2.2 Install duct heaters for proper access to terminal boxes for maintenance. Mount with terminal boxes on the side of the duct.

3.2.3 Install duct heaters with at least 48 inches between the heater and any upstream turn, elbow, or fan. Limit upstream duct transitions to 20° taper and downstream duct transitions to 30° taper.

3.2.4 Install slip-in heaters that are necessarily smaller than the ducts with equalizing grids to maintain bypass air.

3.3 Hang units from substrate using threaded rods and building attachments. Secure rods to unit

hanger attachments. Adjust hangers so unit is plumb and level.

3.4 Install electric heaters including components as indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices; complying with applicable installation requirements of NEC and NECA's "Standard of Installation".

3.5 Coordinate with electrical work, including wiring/cabling, as necessary to properly interface installation of heating units with other work.

3.6 Clean dust and debris from each heater as it is installed to ensure cleanliness. Comb out damaged fins before installing enclosures. Touch-up any scratched enclosure surfaces to match original finishes.

3.7 Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Std 486A.

3.8 Grounding: Provide equipment grounding connections for electric heaters as indicated. Tighten connections to comply with tightening torque values specified in UL Std 486A to assure permanent and effective grounding.

3.9 Upon completion of installation of electric heaters, and after the building circuitry has been energized, test heating units to demonstrate capability and compliance with requirements. Where possible, field correct malfunctioning units, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

3.10 Replace electric heaters and accessories which are damaged. Remove damaged items from the construction site.

END OF SECTION

SECTION 15815/ CENTRAL LAB EXHAUST FANS

1 GENERAL

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

1.2 Division-15 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent fan work required by this section is indicated on drawings and schedules, and by requirements of this section.

1.4 Coordination:

1.4.1 Refer to Division-7 sections for installation of prefabricated roof curbs; not work of this section.

1.4.2 Refer to Division-15 section "Testing, Adjusting, and Balancing" for balancing of fans.

1.4.3 Refer the Division-15 control systems sections for control work required in conjunction with fans.

1.4.4 Refer to Division-16 sections for power supply wiring from power source to power connection on fans. Division-16 work will include starters, disconnects, and required electrical devices, except where specified as furnished, or factory-installed, by manufacturer and interlock wiring between fans and field-installed control devices.

1.5 Codes and Standards:

1.5.1 ACMA Compliance: Provide fans which have been tested and rated in accordance with ACMA standards, and bear ACMA Certified Ratings Seal.

1.5.2 UL Compliance: Provide fans which are listed by UL and have UL label affixed.

1.6 Approval Submittals:

1.6.1 Project Data: Submit manufacturer's technical data, including specifications, capacity ratings, dimensions, weights, materials, accessories furnished, and installation instructions. Submit assembly-type shop drawings showing unit dimensions, construction details, methods of assembly of components, and field connection details.

1.7 Test Reports and Verifications Submittals:

1.7.1 Startup Report: Submit fan startup report with vibrations analysis for each fan.

1.8 O&M Data Submittals:

1.8.1 Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring to

hood, fans, and extinguishing systems. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.

1.9 Acceptable Manufacturer's: Subject to compliance with requirements, provide fans by Strobic Air.

2 PRODUCTS

2.1 General: Except as otherwise indicated, provide standard prefabricated fans of type and size indicated, modified as necessary to comply with requirements, and as required for complete installation.

2.2 Lab Exhaust Fans:

2.2.1 Housing: Steel with corrosion resistant coating as indicated. Provide inlet bell and straight-through, bifurcated nozzle type design with nozzle and entrainment.

2.2.2 Fan Wheel: Welded steel impeller with corrosion resistant coating.

2.2.3 Drive: Direct drive with TEFC motor out of air stream.

2.2.4 Plenum: Steel with corrosion resistant coating, rigid insulation, mounting flanges, access panels and vortex breaker sized for triplex installation. Provide motorized damper with vinyl edge seals in each exhaust fan suction.

2.2.5 Hardware: Type 316 stainless steel and monel.

2.2.6 Motorized Dampers: Provide dampers sized for 50% of total air flow. Provide dampers with parallel blades at indicated static pressure. Construct blades of 16-gauge aluminum. Provide ½" diameter ball bearings, ½" diameter steel axles spaced on 9" centers. Construct frame of 2" x ½ " x 1/8" steel channel for face areas 25 sq. ft. and under; 4" x 1-1/4" x 16 ga. channel for face areas over 25 sq. ft. Provide galvanized steel finish on frame with aluminum tough-up. Provide rain hoods.

2.2.7 Silencers: Provide inlet and discharge silencers for each fan.

2.2.8 Provide factory startup and vibration analysis.

3 EXECUTION

3.1 General: Except as otherwise indicated or specified, install fans in accordance with manufacturer's installation instructions and recognized industry practices to insure that fans serve their intended function.

3.2 Coordinate fan work with roofing work as necessary for proper interfacing. Framing of openings,

caulking, and curb installation is not work of this section.

3.3 Ductwork: Refer to Division-15 section "Ductwork". Connect ducts to fans in accordance with manufacturer's installation instruction.

3.4 Install fans on steel support to withstand 125 MPH wind velocity. Install vibration isolators. Provide flexible connections at all duct connection to the plenum.

3.5 Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to electrical Installer. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-16 sections. Verify proper rotation direction of fan wheels. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer.

3.6 Remove shipping bolts and temporary supports within fans. Adjust dampers for free operation.

3.7 Testing: After installation of hoods and fans has been completed, test each fan to demonstrate proper operation of units at performance requirements specified. The startup and testing shall be directed by a factory-trained representative. Perform a vibrations analysis and submit results with startup report. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected.

3.8 Cleaning: Clean factory-finished surfaces. Remove all tar and soil. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION

THIS PAGE INTENIONALLY LEFT BLANK

SECTION 15830/LABORATORY FUME HOOD

1 GENERAL

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

1.2 Division-15 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of fume hood work required by this section is indicated on drawings and schedules, and by requirements of this section.

1.4 Refer to other Division-15 sections for ductwork connections, plumbing connections, and controls, not work of this section.

1.5 Refer to Division-16 sections for power wiring and connections, not work of this section.

1.6 Codes and Standards

1.6.1 Comply with NFPA-45 requirements.

1.6.2 SEFA 1, Scientific Equipment and Furniture Association, Recommended Practices for Laboratory Fume Hoods

1.6.3 NFPA 45, National Fire Protection Association, Fire Protection for Laboratories Using Chemicals

1.6.4 ASTM E84-09C, ANSI 2.5, NFPA 255, UL 723, UBC 8-1 (42-1), Standard Test method for Surface Burning Characteristics of Building Materials

1.6.5 ASHRAE 110, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Method of Testing Performance of Laboratory Fume Hoods

1.6.6 ANSI/ASSP Z9.5 American Society of Safety Professionals, Laboratory Ventilation

1.6.7 OSHA, Federal Register 29 CFR Part 1910, Occupational Safety & Health Administration, U.S. Department of Labor, Occupational exposures to hazardous chemicals in laboratories.

1.6.8 Comply with NFPA-70, NEC requirements.

1.7 Manufacturer's Qualifications

1.7.1 ISO 9001 Certified manufacturing plant and processes.

1.7.2 Ten installations of equal or larger size. Provide references.

1.8 Approval Submittals:

1.8.1 Product Data: Submit technical product data and assembly drawings of new hoods showing all features, accessories, dimensions, and roughing in locations for all mechanical and electrical services, and all hood modifications.

Bypass Pass Through fume hoods

1.9 O&M Data Submittals: Include maintenance data and a copy of approval submittals in the O&M manual.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide fume hoods by: Labconco Corporation or approved equal.

2.2 General Design: All fume hoods shall be hoods for pass through application of airfoil design with radiused foil sections at the bottom and sides of the hood opening to insure maximum operating efficiency and minimum eddying of air currents. They shall be the bypass type to provide a relatively constant exhaust air volume through the hood regardless of sash position

2.2.1 Fume hoods shall function as ventilated, enclosed workspaces, designed to capture, contain, and exhaust fumes, vapors and particulate matter produced or generated within the enclosure.

2.2.2 Fume hood shall be factory designed to function as a by-pass fume hood.

2.2.3 Structure and Materials of construction

a. Hoods are of double wall construction.

b. Powder-coated, cold rolled steel exterior

c. Galvanized steel support members

d. Sheet molded composite panel internal liner.

2.2.4 Baffles

a. Moving or adjustable baffles are not acceptable.

2.2.5 Sash

a. Two independent sashes of 3/16” tempered safety glass.

b. Maximum opening is 28".

c. Unobstructed viewing height is 37.5".

d. Hood incorporates perforated sash handles to bleed air into the hood chamber directing fume concentrations away from the user's breathing zone.

2.2.6 Airfoil:

a. Hoods are provided with airfoils across the bottom of the sash areas that allows airflow into the hood regardless of user's position.

2.2.7 Besides the exhaust blower, no additional blowers are required for specified containment.

2.2.8 Access for maintenance is from both the faces and exterior sides of the hood.

2.2.9 Services:

a. Hood manufacturer shall furnish and deliver all service outlets, accessory fittings, electrical receptacles, and switches, as listed in these specifications, equipment schedules or as shown on drawings.

b. Plumbing fittings mounted on the fume hood superstructures shall be pre-plumbed.

c. Final plumbing and electrical connections are the responsibility of those contractors' fulfilling requirements of Divisions [15 and 16].

d. All electrical services are pre-wired to a single point internal junction box at the top right of the hood.

2.2.10 Hoods without service fixtures must pass through a 34" opening without disassembly.

2.3 Efficiencies

2.3.1 The fume hood shall maintain constant volumetric rate (+/- 5 CFM) and static pressure losses (+/- 0.01" H2O) across all sash positions.

2.3.2 Noise Criterion: The hood shall have a Noise Criterion (NC) rating of less than 50; measured 36" in front of the hood with full open sash, at 100 fpm face velocity.

2.3.3 Illumination: Shall be a minimum average of 80 foot-candles inside the work area.

2.3.4 Materials of Construction: Interior and Exterior materials of construction and finishes shall meet the requirements in Part 2 of this specification.

2.4 Materials:

2.4.1 Hood Interior Liner and Baffle

2.4.1.1 Liner material must comply with UL 1805, and be listed within NRTL test report as proof of compliance.

2.4.1.2 General Material Properties

e. Nonflammable, corrosion and chemical-resistant

f. Sheet molded homogenous polyester panels

g. Minimum thickness is 3/16"

h. Smooth, white finish

2.4.1.3 Flame and Smoke Characteristics

a. Flame retardant, self-extinguishing, with a flame spread rating of 25 or less in accordance with ASTM-E84

b. Smoke Density: 115

2.4.2 Sheet Steel

2.4.2.1 Side panels and access panels 20-gauge (or heavier) sheet steel.

2.4.2.2 Hood corner posts are 16-gauge sheet steel.

2.4.2.3 Ceiling enclosure panels are 18 gauge sheet steel.

2.4.2.4 Cold-rolled, commercial steel (CS) sheet, complying with ASTM A 1008/A 1008M.

2.4.3 Chemical Resistant Finish

2.4.4 General: Prepare, treat, and finish welded assemblies after welding. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling.

2.4.5 Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Third party validation required.

2.4.6 Powder-coat process required. Paint processes that release Volatile Organic Compounds (VOC) are not acceptable

2.4.7 Color for Fume Hood Finish: As selected by architect from Manufacturer's full range:

2.4.8 Safety Glass

2.4.8.1 Tempered

a. Clarity and temper test to be as specified in latest edition of Glass Tempering Association, Engineering Standards Manual, Section 8.1.

b. Surface and interior visible quality to be as specified per ASTM C 1036, Standard Specification for Flat Glass, Table 4, Quality level Q3.

2.5 Construction:

2.5.1 Superstructure:

a. Self-supporting, rigid structural assembly, to support inner wall consisting of fume hood liner and outer wall of sheet metal exterior.

b. Fabricated from galvanized steel.

c. Space shall accommodate fume hood wiring and plumbing components for service fixtures.

d. Access to fixture valves concealed in wall provided by exterior removable access panels or through removable access panels on the front posts.

2.5.2 Exterior

a. Fabricate from steel sheet with component parts screwed together.

b. Apply chemical-resistant finish to interior and exterior surfaces of component parts before assembly.

c. Interchangeable side panels shall lift off without the use of tools to allow access to plumbing lines, service fittings, electrical wiring, counterbalance sash weights, and light fixtures. Exposed fasteners or hardware, and Velcro type fasteners, are not acceptable.

d. Corner posts

1) Pre-punched and plugged to accommodate up to 4 service fixtures per corner post.
2) All services are accessible from the front of the hood.
3) Aerodynamic shape
4) Accommodate two electrical duplexes per corner post.
5) Right hand corner post includes electrical switches and pre-cut for Airflow monitor installation.
6) Un-used penetrations shall be plugged.

e. Top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.

f. Panel above header shall be removable without the use of tools to allow access to mechanical connection, electrical wiring, counterbalance sash weights, and light fixtures. Exposed fasteners or hardware, and “hook-and-loop” type fasteners, are not acceptable.

2.5.3 Dimensions

a. Overall exterior dimensions are as follows:

4 foot nominal width: 48” w x 59” h x 33.4” d

b. Overall interior dimensions are as follows:

4 foot nominal width: 38.1” w x 48” h x 23.9” d

2.5.4 Hood Liner

a. Adhere interior liner components to superstructure.

b. Stainless steel fasteners shall be used on the interior ceiling for structural integrity.

c. Fasteners exposed to chemical environment are not acceptable.

d. Punch fume hood lining side panels to receive four service fittings, for use with remote controls, per side. Provide removable plug buttons for holes not used for indicated fittings.

2.5.5 Hood Baffle

a. The baffle system shall be constructed with the same material as the fume hood liner.

b. The baffles shall be removable for cleaning.

c. Exposed components to be non-metallic. Metal components exposed to chemical environment are not acceptable.

d. Moving parts or adjustment of any kind is not acceptable.

2.5.6 Exhaust Connection

a. Stainless steel with Chemical-Resistant Finish

b. 12.81" ID to accommodate any 12” nominal duct without the need for a transition adapter. Additional components required to accommodate 12” nominal mechanical system are not acceptable.

c. Ducting shall go inside the duct collar to ensure condensate travels into the hood and evaporates. Duct collars that allow duct connection over the collar are not acceptable.

2.5.7 Airfoil

a. 316 stainless steel with Chemical-Resistant Finish.

b. Airfoils are required on each face of the fume hood.

c. Airfoils shall have an aerodynamic radius to sweep the air into the hood with minimal turbulence. Airfoil directs airflow across work top to remove heavier-than-air gases.

d. Must have 5 rows of perforations to allow the air to bypass underneath and through the foil and sweep across the work surface to prevent any back flow of fumes escaping from the front of the hood opening. This airflow continues even if blocked by the presence of the operator.

e. Foil must extend back under the sash to prevent closure of the lower by-pass opening when the sash is in the fully closed position, directly on top of the airfoil.

2.5.8 Sash Assembly

a. Glass: Fully tempered safety glass with unobstructed, side-to-side view of fume hood interior and service fixture connections.

b. Dimensions: The full sash opening height is 28", the total unobstructed viewing height is 37.5" measured from the work surface.

c. Sash Tracks: Steel with Chemical Resistant Finish. Shall include bump stops for opening and closing.

d. Sash Handle: extruded aluminum with Chemical Resistant Finish. Sash handle includes a perforated air passage directly atop the handle to bleed air into the hood chamber and direct chemical fumes away from the user's breathing zone. The handle is ergonomic in design and is easy to grasp when operating

e. Sash guides: Corrosion resistant extruded poly-vinyl chloride.

f. Vertical Sash System

1) Hoods have two single vertical sashes counterbalanced by independent sash weights suspended by two vinyl-coated stainless steel cables that pass-through ball bearing pulleys.
2) Design system to hold sash at any position without creep and to prevent sash drop in the event of cable failure.
3) One defeatable sash stop on each face to restrict sash opening height to 25”.

2.5.9 Electrical Components

a. Lighting

1) Provide UL Listed, high-efficiency, quick-start, T8 Fluorescent lighting systems, including bulbs.
2) 4 Foot Hoods - 2 each, Fluorescent lamps
3) Vapor-Proof: all electrical components shall be outside of the contaminated air space. Lighting shall be located behind a laminated safety glass shield, sealed to the top of the hood liner.
4) The Fluorescent light assemblies shall be serviceable from outside the fume hood cavity, without the use of tools.
5) Light switch to be included on the lower right corner post, at heights compliant with the Americans with Disabilities Act (ADA).

b. Blower Switch

1) Hoods shall be provided without a blower switch, as they will share a single mechanical system with other hoods.

c. Electrical Receptacles

1) The hoods shall accommodate up to eight (two per corner post) electrical receptacles as indicted in schedule or drawings.
2) Cover plates shall be acid resistant thermoplastic.

d. Wiring

1) Every electrical component shall be individually wired to a single point internal field wiring box (including individual duplexes/receptacles).
2) Field wiring box to be 7" x 4" x 2.5", grounded, and have (12) 7/8" diameter knock out penetrations.
3) Final wiring and circuit dedication is to be by Division 16.

e. Fume hood to have third party validation of compliance to UL 1805 and UL 61010-1 by a Nationally Recognized Testing Laboratory (NRTL)

f. The fume hood features a sash alarm to ensure only one sash is open at a time. If the second sash is raised, an audible alarm will sound until one sash is closed.

2.5.10 Hood Safety Practices Label: Corrosion resistant plate attached to the left corner post of the fume hood with the following Hood Safety Practices:

a. For use with substances that produce hazardous levels of airborne chemicals: gas, fumes, vapors, dust

b. Do not put your head in the hood.

c. Minimize drafts and sudden movements in front of the hood.

d. Work a minimum of six inches inside the hood.

e. Elevate equipment above the work surface.

f. Keep sill and baffle unobstructed.

g. Do not use the hood for storage.

h. Adjust the sash to smallest opening possible when in use.

i. Close sash when unattended.

j. Do not remove any of the hood components.

k. Do not place flammable solvents near heat, flame or sparks.

l. Do not evaporate large amounts of flammable liquids.

m. Wipe up spills immediately.

n. Routinely validate airflow.

o. If the ventilation system malfunctions, or airflow alarm indicates unsafe condition, close sash and discontinue hood operation immediately-call for help.

p. Do not use with Biohazards or Perchloric Acid

2.5.11 Fume Hood Accessories

a. Service Fixtures: Color-coded hose nozzle outlets and valves mounted inside the fume hood and controlled from the exterior with color-coded index handles

1) The hoods are equipped without service fixtures or will be provided with a total of up to 8 service fixtures as indicated in schedule.
2) Hose connectors located inside the fume hood cavity are chemically-resistant, glass-filled polypropylene with 6 serrations.
3) Service lines shall be factory installed from valve to outlet

Copper tubing unless otherwise noted
Brass service lines for gas
Connections shall be made with quick-connect compression fittings on the inlet and outlet of the valve body, soldered and brazed connections not easily disassembled are not acceptable.
Services pre-piped to the top of the hood.

4) Valves

Extruded brass valve and rotating seat, TFE-coated silicone bronze stem and TFE packing.
Fixture handles are plastic and color coded as well as labeled for the designated type of service.
Fixtures are rated at maximum pressure of 200 psi.
Valves are front loaded, located on the fume hood corner post for remote use.

2.5.12 Ceiling Enclosure Panels:

a. Provide 4-sided filler panels matching fume hood exterior to enclose space above fume hoods at front and sides of fume hoods and extending from tops of fume hoods to ceiling.

b. Exposed fasteners are not acceptable.

c. Height shall be sufficient to extend from top of hood through ceiling.

2.5.13 Face Velocity Monitor/Alarm

a. Digital Airflow Monitor

1) Provide audible and visual alarm in the event of an unsafe face velocity.
2) Alarm must sit flush with the fume hood corner post.
3) Based on a thermally compensated thermistor in the alarm module, and air passing through a separate airstream into the hood interior.
4) Velocity shall be displayed digitally on the user facing LCD in fpm or m/s.
5) LED lights display red for alarm, yellow for caution, and green for normal operation.
6) Must include external alarm and night setback functions.
7) Alarm mute shall be accessible from the front of the monitor; visual alarm must remain activated until alarm condition is corrected.
8) UL Listed electrical components.
9) Calibration shall be through a menu driven step by step procedure.

b. Field Calibration by Test and Balance, following a complete balancing of the mechanical system.

2.5.14 Work Surface

a. 1.25” thick, molded from solid modified epoxy resin, with smooth, non-specular, black finish.

b. One inch radius front edge for optimal fume hood performance.

c. 3/8” dished area to match the fume hood interior work space and form a water tight pan for spill containment.

d. Include a 2.5” diameter hole on each side for service pass-through and piping. Hole to be covered by hood superstructure upon installation.

e. Physical Properties:

Flame-Spread Index: 25 or less per ASTM E 84.

f. Cupsink

1) 3 x 6” dimension, polypropylene construction
2) Provide with strainers and tailpieces, NPS 1-1/2 (DN 40)
3) To sit flush with dished area of work surface
4) Cupsink(s) to be located.

Left side.

3 EXECUTION:

3.1 Install hoods as shown on the drawings and schedule in accordance with printed instructions of

manufacturer.

3.2 Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building and structural support.

3.3 Securely attach access panels, but provide for easy removal and secure reattachment. Where fume hoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

3.4 Neighboring splash blocks shall not be attached directly to the hood.

3.5 Install according to standards required by authority having jurisdiction.

3.6 Sequence installations to ensure utility connections are achieved in an orderly and expeditious manner.

3.7 Touch up minor damaged surfaces caused by installation. Replace damaged components as directed by Architect.

3.8 Contractor shall provide fluorescent light bulbs.

3.9 Coordinate connection of all plumbing piping with the plumbing contractor.

3.10 Coordinate connection of light fixtures, switches, lights, and receptacles with the electrical contractor.

3.11 Refer to other Division-15 sections for fume hood control requirements. Coordinate cutouts and mount all switches, alarms and indication lights on the front of the hood to be easily seen by the user.

3.12 Startup:

3.12.1 Leave hood operational and ready for testing and balancing.

3.12.2 A representative of the hood manufacturer shall verify that hoods and hood modifications are properly installed prior to testing.

3.12.3 Calibrate flow alarms and verify operation.

3.13 Field Quality Control

3.14 NFPA 45 requires that fume hoods be field tested when installed.

3.15 Field test installed fume hoods according to ASHRAE 110 to verify compliance with performance requirements.

3.15.1 Adjust fume hoods, hood exhaust fans, building's HVAC system, and make other corrections until tested hoods perform as specified in fume hood schedule.

3.15.2 After making corrections, retest fume hoods that failed to perform as specified.

END OF SECTION

SECTION 15840/HVAC METAL DUCTWORK

1 GENERAL

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

1.2 Division-15 Basic Mechanical Materials and Methods Sections apply to work of this section.

1.3 Extent of HVAC metal ductwork is indicated on drawings and in schedules, and by requirements of this section.

1.4 Refer to other Division-15 sections for exterior insulation of metal ductwork.

1.5 Refer to other Division-15 sections for ductwork accessories.

1.6 Codes and Standards:

1.6.1 SMACNA Standards: Comply with SMACNA's "HVAC Duct Construction Standards, Metal and Flexible" 1985 Edition for fabrication and installation of metal ductwork, unless otherwise noted.

1.6.2 NFPA 90A Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.6.3 NFPA 96 Compliance: Comply with NFPA 96 "Standard for Installation of Equipment for Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment".

1.7 Approval Submittals:

1.7.1 Product Data: Submit manufacturer's technical product data and installation instructions for the following.

1.7.1.1 Factory-fabricated ductwork

1.7.1.2 Sealants

1.7.1.3 Adhesive

1.7.1.4 Flexible duct

1.7.1.5 Spin-in fittings

1.7.1.6 Side take-off fittings

1.7.2 Shop Drawings: Submit scaled layout drawings of HVAC metal ductwork and fittings including, but not limited to, duct sizes, locations, elevations, and slopes of horizontal runs, wall and floor penetrations, and connections. Show interface and spatial relationship between ductwork and proximate equipment. Show modifications of indicated requirements, made to conform to local shop practice, and how those modifications ensure that free area, materials, and rigidity are not reduced.

2 PRODUCTS

2.1 Ductwork Materials:

2.1.1 Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, stains and discolorations, and other imperfections, including those which would impair painting.

2.1.2 Galvanized Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lockforming quality; with G 90 zinc coating in accordance with ASTM A 525; and mill phosphatized for exposed locations. Stamp gauge and manufacturer's identification on each sheet. Break sheets so that identification is exposed.

2.1.3 Stainless Steel Sheet: Where indicated, provide 18-gauge stainless steel complying with ASTM A 167; Type 302, 304, 316; with No. 4 finish where exposed to view in occupied spaces. Provide No. 1 finish elsewhere. Protect finished surfaces with mill-applied adhesive protective paper, maintained through fabrication and installation.

2.1.4 Aluminum Sheet Metal: Where indicated, provide ASTM B 209 (ASTM B 209M), Alloy 3003, Temper H14 aluminum sheet form with standard, one-side bright finish for exposed ducts and mill finish for concealed ducts.

2.2 Miscellaneous Ductwork Materials:

2.2.1 General: Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.

2.2.2 Duct Sealant: Provide non-hardening, non-migrating mastic or liquid elastic sealant, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork.

2.2.3 Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork. For exposed stainless steel ductwork, provide matching stainless steel support materials. For aluminum ductwork, provide matching supports unless materials are electrolytically separated from ductwork.

2.2.4 Flexible Ducts: Provide flexible ductwork with an R-value of R-6unless the ductwork is in a ceiling return plenum. R-4 is acceptable for flexible ductwork installed in ceiling return plenums. The use of flexible ductwork for connection of supply air including terminal units and return air devices is acceptable only where shown on the drawings.

2.2.4.1 Construction: Provide reinforced metalized polyester jacket that is tear and puncture resistant, air tight inner core with no fiberglass erosion in the air stream and an encapsulated wire helix. Flexible ductwork shall have a recommended operating pressure of 6" w.g. for sizes 4" through 12" diameter and 4" w.g. for sizes 14" through 20" diameter. All diameters shall be suitable for a negative operating pressure of 0.75" w.g. Flexible ductwork shall meet the requirements of UL-181, the Florida Energy Code, SBCC, NFPA 90A and NFPA 90B.

2.2.4.2 Acceptable Manufacturers: Subject to compliance with requirements, provide R-6 flexible ductwork by: Atco 36, Flexmaster 8M-R6 or Thermaflex M-KE R6. Provide R-4 flexible ductwork by: Atco 30, Flexmaster 8M or Thermaflex M-KE for ductwork in ceiling return plenums.

2.2.5 Spin-in and Side Take-off Fittings: Provide round branch run-outs as follows.

2.2.5.1 Supply air diffuser connections shall be conical with damper and one-inch-high insulation stand-off equal to Crown 3200 DS or Flexmaster CBDE-BO.

2.2.5.2 Return air grille connections shall be straight sided with damper and one-inch-high insulation standoff equal to Crown 724-D5 or Flexmaster FLD-BO.

2.2.5.3 Exhaust air grille connections shall be straight sided with damper equal to Crown 724 or Flexmaster FLD.

2.2.5.4 Where duct height does not permit the use of conical spin-in fittings, use low profile side take-off fittings equal to Crown 3300-DS or Flexmaster STOD-BO.

2.2.6 Fittings: Provide radius type fittings fabricated of multiple sections with maximum 15° change of direction per section. Unless specifically detailed otherwise, use 45° laterals and 45° elbows for branch takeoff connections. Where 90° branches are indicated, provide conical type tees.

2.3 Fabrication:

2.3.1 Shop fabricate ductwork in 4, 8, 10 or 12-ft lengths, unless otherwise indicated or required to complete runs. Preassemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for reassembly and coordinated installation.

2.3.2 Shop fabricate ductwork of gauges and reinforcement complying with SMACNA "HVAC Duct Construction Standards", except provide sealant at all joints. Supply duct between AHU discharge and terminal units shall be minimum 4" pressure class. Duct downstream of terminal units, supply duct from air conditioning units and all return and exhaust duct shall be minimum 2" pressure class unless otherwise noted.

2.3.3 Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to 1½ times associated duct width; and fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30° for contracting tapers and 20° for expanding tapers.

2.3.4 Fabricate ductwork with accessories installed during fabrication to the greatest extent possible. Refer to Division-15 section "Ductwork Accessories" for accessory requirements.

2.3.5 Fabricate ductwork with duct liner in each section of duct where indicated. Laminate liner to internal surfaces of duct (100% coverage) in accordance with instructions by manufacturers of lining and adhesive, and fasten with mechanical fasteners (Grip Nails or Stic Klips) on 16 centers. On horizontal runs install top and bottom first and wedge sides between top and bottom. Apply a brush coat of fire-retardant over-all joints, visible cut edges, and leading edges

to prevent erosion.

2.4 Factory-Fabricated Low Pressure Ductwork (Maximum 2" W.G.):

2.4.1 Material: Galvanized sheet steel complying with ASTM A 527, lockforming quality, with ASTM A 525, G90 zinc coating, mill phosphatized.

2.4.2 Gauge: 28-gauge minimum for round ducts and fittings, 4" through 8" diameter. 26-gauge minimum 9" through 14", 24-gauge minimum 15" through 26".

2.4.3 Elbows: One piece construction for 90° and 45° elbows 14" and smaller. Provide multiple gore construction for larger diameters with standing seam circumferential joint.

2.4.4 Divided Flow Fittings: 90° tees, constructed with saddle tap spot welded and bonded to duct fitting body.

2.4.5 Acceptable Manufacturers: Subject to compliance with requirements, provide factory-fabricated ductwork by Semco Mfg., Inc. or United Sheet Metal Div., United McGill Corp, or approved equal.

3 EXECUTION

3.1 General: Examine areas and conditions under which HVAC metal ductwork is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 Installation Of Metal Ductwork:

3.2.1 General: Assemble and install ductwork in accordance with recognized industry practices which will achieve air-tight (5% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8” misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling. Support vertical ducts at every floor.

3.2.2 Supports: Install concrete inserts for support of ductwork in coordination with formwork, as required to avoid delays in work. Install self-drilling screw anchors in prestressed concrete or existing work.

3.2.3 Field Fabrication: Complete fabrication of work at project as necessary to match shop-fabricated work and accommodate installation requirements. Seal joints in round or oval ductwork with hard cast or shrink bands, and sheet metal screws, or by welding. High velocity rectangular ducts shall have approved joints and be made airtight with sealer or welding.

3.2.4 Routing: Locate ductwork runs, except as otherwise indicated, vertically and horizontally. Avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct useable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of

building. Limit clearance to ½" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. In finished and occupied spaces, conceal ductwork from view by locating in mechanical shafts, hollow wall construction or above suspended ceilings, unless specifically noted as "Exposed". Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.

3.2.5 Internally Lined Ductwork: Cover leading and trailing edge of duct liner with sheet metal nosing zee.

3.2.6 Electrical Equipment Spaces: Do not route ductwork through transformer vaults or other electrical equipment spaces and enclosures.

3.2.7 Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gauge as duct. Overlap opening on 4 sides by at least 1½". Fasten to duct and substrate. Where ducts pass through fire-rated floors, walls, or partitions, provide firestopping between duct and substrate.

3.2.8 Coordination: Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.

3.2.9 Installation: Install metal ductwork in accordance with SMACNA HVAC Duct Construction Standards. Fan discharge outlet ducts shall be installed correctly with regard to "system effect" per AMCA Publication 201.

3.3 Installation of Flexible Ducts:

3.3.1 Maximum Length: For any duct run using flexible ductwork, do not exceed 8'-0" extended length. Flexible duct shall only be allowed as detailed on the drawings.

3.3.2 Installation: Install in accordance with Section III of SMACNA's "HVAC Duct Construction Standards, Metal and Flexible". Support flexible ducts to eliminate pinching and kinking which would restrict flow. Peel back insulation and slide the inner core over the spin-in or diffuser neck, seal with duct sealant and install Panduit strap tightly. Slide insulation back over the inner core and install another Panduit strap over the insulation outer jacket. Tape is not acceptable.

3.3.3 Seal all exposed edges of fiberglass insulation with glassfab and mastic.

3.4 Leakage Tests: After each duct system is completed, test for duct leakage in accordance with Sections 3 and 5 of the SMACNA HVAC Air Duct Leakage Test Manual. Test pressure shall be equal to pressure class of duct, less 0.5" static pressure. Repair leaks and repeat tests until total leakage is less than 5% of system design air flow for low pressure systems and less than 1% for systems rated over 3".

3.5 Clean ductwork internally free of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration. Keep ducts closed with poly during construction to prevent contamination by construction dust and debris.

3.6 Balancing: Refer to Division-15 section "Testing, Adjusting, and Balancing" for air distribution balancing of metal ductwork; not work of this section. Seal any leaks in ductwork that become apparent in balancing process.

3.7 System Adjustment: Adjust the system to provide functional operation to the extent possible, and leave ready for Testing and Balancing work. It is not the intent of this section to provide final testing and balancing, but to leave the system operational with a minimum of noise.

END OF SECTION

SECTION 15855/DUCTWORK ACCESSORIES

1 GENERAL

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

1.2 Division-15 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of ductwork accessories work is indicated on drawings and in schedules, and by requirements of this section.

1.4 Refer to other Division-15 sections for testing, adjusting, and balancing of ductwork accessories; not work of this section.

1.5 Codes and Standards:

1.5.1 SMACNA Compliance: Comply with applicable portions of both SMACNA "HVAC Duct Construction Standards, Metal and Flexible" and "Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems".

1.5.2 UL Compliance: Construct, test, and label fire dampers in accordance with UL Standard 555 "Fire Dampers and Ceiling Dampers". Construct, test and label smoke dampers in accordance with UL Standard 555S "Leakage Rated Dampers for use in Smoke Control Systems" .

1.5.3 NFPA Compliance: Comply with applicable provisions of NFPA 90A "Air Conditioning and Ventilating Systems" pertaining to installation of ductwork accessories.

1.6 Approval Submittals:

1.6.1 Product Data: Submit manufacturer's technical product data for each type of ductwork accessory, including dimensions, capacities, and materials of construction; and installation instructions as follows:

1.6.1.1 Low pressure manual dampers

2 PRODUCTS

2.1 Dampers:

2.1.1 Low Pressure Manual Dampers: Provide 16-gauge dampers of single-blade type (12" maximum blade width) or multiblade type. Damper blades to be gang-operated from a single shaft with nylon or ball bearings on each end. Provide indexed locking quadrant. Parallel or opposed blade style is acceptable. Provide 2" standoff on locking quadrant for externally insulated duct.

2.1.2 Acceptable Manufacturers: Subject to compliance with requirements, provide dampers by Air Balance, American Warming & Ventilating, Arrow Louver and Damper, Penn Ventilator Co., or Ruskin Mfg. Co.

2.2 Turning Vanes: Provide manufactured or fabricated single wall turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards".

2.3 Duct Access Doors:

2.3.1 General: Provide duct access doors of size indicated, or as required for duty indicated.

2.3.2 Construction: Construct of same or greater gauge as ductwork served. Provide insulated doors for insulated ductwork. Provide flush frames for uninsulated ductwork, extended frames for externally insulated duct. Provide one side hinged, other side with one handle-type latch for doors 12" high and smaller, 2 handle-type latches for larger doors.

2.3.3 Acceptable Manufacturers: Subject to compliance with requirements, provide access doors by Air Balance, Inc., Duro Dyne Corp., Ruskin Mfg. Co., or Ventfabrics, Inc.

3 EXECUTION

3.1 Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 Installation of Ductwork Accessories:

3.2.1 Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.

3.2.2 Install balancing dampers at all main ducts adjacent to units in return air, outside air and where indicated.

3.2.3 Install turning vanes in square or rectangular 90□ elbows in supply, return, and exhaust air systems, and elsewhere as indicated.

3.2.4 Install access doors to open against system air pressure, with latches operable from either side, except outside only where duct is too small for person to enter. Install on entering air side of reheat coils. Install at fire dampers and smoke dampers. Opening size shall be per NFPA 90A for servicing fire and smoke dampers. Provide label with 1-1/2" letters to indicate location of fire protection devices.

3.2.5 Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.

3.3 Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories as required to obtain proper operation and leakproof performance.

3.4 Adjusting And Cleaning:

3.4.1 Adjusting: Adjust ductwork accessories for proper settings. Install fusible links in fire dampers and adjust for proper action.

3.4.2 Final positioning of manual dampers is specified in Division-15 section "Testing, Adjusting, and Balancing". However, the system shall be left functional with all dampers open or throttled.

3.4.3 Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 15860/GRILLES, REGISTERS AND CEILING DIFFUSERS

1 GENERAL

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

1.2 Division-15 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of air outlets and inlets work is indicated by drawings and schedules, and by requirements of this section.

1.4 Refer to other Division-15 sections for ductwork and duct accessories required in conjunction with air outlets and inlets and for balancing of air outlets and inlets; not work of this section.

1.5 Codes and Standards:

1.5.1 ADC Compliance: Test and rate air outlets and inlets in certified laboratories under requirements of ADC 1062 "Certification, Rating and Test Manual". Provide air outlets and inlets bearing ADC Certified Rating Seal.

1.5.2 NFPA Compliance: Install air outlets and inlets in accordance with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.6 Approval Submittals:

1.6.1 Product Data: Submit manufacturer's technical product data for air outlets and inlets indicating construction, finish, and mounting details.

1.6.2 Performance Data: For each type of air outlet and inlet furnished, provide aspiration ability, temperature and velocity traverses, throw and drop, and noise criteria ratings. Indicate selections and data as required.

1.7 O&M Data Submittals: Submit cleaning instructions for finishes and spare parts lists. Include this data and a copy of approval submittals in O&M manual.

2 PRODUCTS

2.1 General:

2.1.1 Except as otherwise indicated, provide manufacturer's standard grilles, registers, and ceiling diffusers where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation.

2.1.2 Manufacturers not listed in the following specification will not be considered for approval unless accepted by addendum prior to bid.

2.1.3 Performance: Provide grilles, registers and ceiling diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device equal to the basis of design.

2.1.4 Ceiling and Wall Compatibility: Provide grilles, registers and diffusers with border styles that are compatible with adjacent wall and ceiling systems, and that are specifically manufactured to fit into ceiling module or wall with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems and walls which will contain each type of ceiling diffuser, grille, or register.

2.1.5 Appearance: All grilles and registers shall be aluminum construction and all diffusers shall be steel or aluminum construction, unless otherwise noted, with uniform matching appearance for each type of outlet. Ceiling mounted grilles and registers shall be set to be sight tight from the predominant exposure.

2.1.6 Finish: All ceiling mounted grilles, registers, and diffusers shall be finished with baked white enamel. Wall and door mounted grilles and registers shall be finished with clear anodized finish baked white enamel.

2.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products by Titus or Metal Aire.

2.3 Square Ceiling Diffusers (CD-1): Provide square face, adjustable, 360 degree pattern diffusers with one-piece stamped cones, no corner joints, round necks. Provide lay-in panel as required. Provide trim ring for diffusers in hard ceilings to allow opening to be used for access. Diffusers with 24 x 24 face: Titus TMSA-AA, Metalaire 5700 A -A .Diffusers with 12 x 12 face: Titus TMS -AA, Metalaire 5800 -A

2.4 Transfer Grilles (TG): Provide transfer grilles with ½ inch by ½ inch by ½ inch aluminum core with minimum 90% free area. Outer border shall be constructed of heavy extruded aluminum suitable for installation in a 24 inch by 24 inch ceiling grid. Titus 50F or Metalaire RGCC.

3 EXECUTION

3.1 Coordinate installation with ceiling and light fixture installation. Locate ceiling outlets as indicated on architectural Reflected Ceiling Plans. Unless otherwise indicated, locate ceiling outlets in the center of acoustical ceiling modules with sides parallel to the grid.

3.2 Install air outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to insure that products serve intended functions.

3.3 Coordinate with other work, including ductwork and duct accessories, as necessary to interface installation of air outlets and inlets with other work.

3.4 Set air volumes to values shown on the drawings so that the system is functional. Leave ready

for test and balance contractor.

3.5 Furnish to Owner three operating keys for each type of outlet and inlet that require them; obtain receipt.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 15895/CHEMICAL FUME EXHAUST DUCT SYSTEM

1 GENERAL

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

1.2 Division-15 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of chemical fume exhaust system work required by this section is indicated on drawings and by requirements of this section.

1.4 Codes and Standards

1.4.1 Comply with NFPA 91 requirements.

1.4.2 Comply with NFPA 45 requirements.

1.4.3 Approval Submittals:

1.4.4 Shop Drawings: Submit 1/4" scale ductwork layout shop drawings showing all duct sizes, transitions, offsets, location, test openings, control devices, equipment connections, and related equipment.

2 PRODUCTS

2.1 Stainless Steel Ductwork: Provide round or rectangular ductwork as indicated, of Type 304 316 stainless sheet steel. Refer to Division-15 section "Metal Ductwork". All ductwork, elbows, and angles to 18" diameter shall be 18 gauge.

2.2 PVC Coated Steel Ductwork: Provide PVC coated steel ductwork where indicated with a 4 mil PVC coating on the inside and a 4 mil PVC coating on the outside., Ducts shall be fabricated of 22-gauge galvanized steel complying with ASTM A 527. The PVC coated steel duct system shall utilize PVC coated steel fittings and connectors and be joined with stainless steel screws and the manufacturer's approved sealant and tape to archive air tight, water-tight system. United McGill, Monroe Metals, or approved equal. Contractor's option.

2.3 Refer to other Division-15 sections for Fans, Ductwork Accessories, Air Cleaning Equipment. Coordinate equipment selections for complete ductwork systems.

3 EXECUTION

3.1 Install chemical fume exhaust ductwork systems as shown on the drawings and in compliance with the referenced codes. Comply with requirements of other Division-15 sections that specify duct system components.

3.2 Stainless Steel Ductwork: Continuously weld all joints to provide an air-tight and liquid-tight system; seal class A. All joints shall be ground and polished. All joints shall be butt-welded. Position longitudinal seams at the top of the duct.

3.3 PVC Coated Steel Ductwork: Factory fabricate. Assemble at the jobsite in accordance with the manufacturer's printed instructions. Touch up all scratches and exposed edges with manufacturer's sealant.

3.4 Equipment Connections: Provide flanged and bolted connections at all hoods and fans unless a flexible connection is indicated. Gasket material shall be 1/8" thick, 60-70 durometer, full face type suitable for the service.

3.5 Flexible Connections: Refer to Division-15 section, "Ductwork Accessories", except make double thickness and seal air tight.

3.6 Support ducts sufficiently to place no load on connected equipment and to prevent sagging of ducts.

3.7 Cleanouts: Provide cleanouts every 10 feet and at changes in direction in horizontal duct runs unless accessible from hood or fan connections. Flanged, removable duct sections may be used instead of cleanouts.

3.8 Slope all horizontal duct runs, without pockets, to drain. Provide capped close nipple to permit removal of moisture and condensation.

3.9 Taper transitions 5" long for each 1" change in diameter.

3.10 Provide ductwork test openings in accessible locations and coordinate with Test and Balance company. Close test openings with corrosion-resistant plugs suitable for the service.

3.11 Testing: Pressure test ductwork as described in Division-15 section, Metal Ductwork and leave ready for Test and Balance company. Notify Engineer at least 24 hours in advance of tests. Leakage must be less than 1% of design air flow.

END OF SECTION

SECTION 15970/START-UP REQUIREMENTS FOR HEATING, VENTILATING, & AIR CONDITIONING (HVAC) SYSTEMS

1 GENERAL

1.1 Intent: It is the intent of this section to require that the startup requirements and report noted herein be performed prior to starting TAB work on each system. Work can be phased with permission of the Engineer.

1.2 Coordination:

1.2.1 The Contractor shall furnish to the TAB Contractor a complete set of plans, specifications, addenda, shop drawings, equipment performance data sheets, change orders, etc. as requested by the TAB Contractor.

1.2.2 The Contractor shall participate in a TAB coordination meeting to discuss interface requirements with the TAB Contractor and to establish a schedule for TAB work prior to start of TAB work.

1.3 Test Reports and Verification Submittals:

1.3.1 Submit Startup Report as described herein for each system. Attach Factory Startup Report for equipment as required by other Division-15 sections.

2 PRODUCTS: None

3 EXECUTION:

3.1 The TAB work shall not commence until the Engineer has received written notice from the Contractor that HVAC systems are 100% complete and are fully operational. Submit Startup Report as described herein.

3.2 The Contractor shall place all HVAC systems and equipment into complete operation during each working day of TAB work.

3.3 The Contractor shall provide access to HVAC systems and equipment by supplying ladders and/or scaffolding, and opening access panels and equipment room doors.

3.4 The TAB Contractor will provide to the Contractor TAB punch lists of non-complying HVAC work as they are discovered. The Contractor shall replace or repair non-complying work as soon as possible in order not to delay completion of TAB work.

3.5 Airside Systems: The Contractor shall provide the following information to the Engineer to substantiate proper start-up and preliminary adjustments of air handler units, belt driven fans, and duct systems.

3.5.1 Verify that air grilles (supply, return, exhaust, transfer, outdoor, etc.) are installed and connected to the duct system.

3.5.2 Verify that duct systems are clean of debris.

3.5.3 Verify that ducts attached with flexible connectors are aligned within ½" and have a uniform gap between ducts of 1"-1.5". Flexible connectors shall not leak and shall be insulated.

3.5.4 Verify that filters are clean and filter spacers are installed.

3.5.5 Verify that balancing dampers at grilles and branch ducts are operational and are fully opened.

3.5.6 Verify that fan discharges are appropriate for the outlet ductwork with regards to the "system effect" per AMCA Publication 201. Inappropriate fan discharges will not be accepted.

3.5.7 Verify proper fan rotation.

3.5.8 Verify proper belt drive alignment.

3.5.9 Verify fan motor overload elements are correctly sized.

3.5.10 Adjust fan sheave until CFM is at or above design CFM. Provide additional sheaves and belts as required. Verify that motor is not overloaded.

3.5.11 Verify that HVAC control systems are fully operational.

3.6 Hydronic Systems: The Contractor shall provide the following information to the Engineer to substantiate proper start-up and preliminary adjustments of HVAC pumps and piping systems.

3.6.1 Verify that the hydronic systems are properly flushed, filled, vented, purged and chemically treated and that all leaks are repaired. Verify proper air venting.

3.6.2 Verify that the correct strainer screens are clean and installed.

3.6.3 Verify that pump/motor shafts are correctly aligned.

3.6.4 Verify proper pump rotation and flow direction.

3.6.5 Verify that all balancing valves and circuit setters are fully opened.

3.6.6 Verify that test ports, pressure gauges and thermometers are properly installed and are accessible at coils. Extensions to allow for pipe insulation are required.

3.6.7 Verify that HVAC control systems for coils, fans, etc. are fully operational.

3.7 Fume Hood Systems: The Contractor shall provide the following information to the Engineer to substantiate the operation and proper startup of fume hood and related laboratory systems.

3.7.1 Verify that all fume hood exhaust fans have proper belt alignment and fan rotation.

3.7.2 Verify that fume exhaust fan controls properly sequence, stage and control static pressure.

3.8 Startup Report: The Contractor shall submit the startup information required by this section to the Engineer in a typed report organized as outlined herein. The Startup Report is required to meet the written notice described herein prior to starting TAB work. TAB work will not start until the Startup Report has been submitted and approved.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 15985/TESTING AND BALANCING OF MECHANICAL SYSTEMS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section. Division-15 Basic Mechanical Materials Sections apply to work of this section.

1.2 Description of Work:

1.2.1 Extent of testing, adjusting, and balancing work (TAB) is indicated by requirements of this section, and also by drawings and schedules, and is defined to include, but is not necessarily limited to, air distribution systems, hydronic distribution systems and associated equipment and apparatus of mechanical work. The work consists of setting speed and volume (flow) adjusting facilities provided for systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as required.

1.2.2 Coordination: Coordinate with the General Contractor and Mechanical Contractor responsible for the HVAC system installation as required to complete the TAB work.

1.3 The intent of this specification is to balance HVAC systems within the tolerances listed, maintaining the pressure relationships indicated, with a minimum of noise.

1.3.1 Airflow Tolerances:

1.3.1.1 Air Handling: The supply air, return air and outdoor air quantities shall be balanced within ±5% of design values.

1.3.1.2 Exhaust Fans: The exhaust fan quantities shall be set as required to maintain the design exhaust terminal flows within ±5% of design values. If no exhaust terminals exist, exhaust fan air quantities shall be balanced within ± 10% of design values.

1.3.1.3 Ceiling Diffusers, Supply Registers, Return and Exhaust Inlets: Balance to an air quantity within ±10% of the design values.

1.3.2 Temperature Tolerances:

1.3.2.1 Room Temperatures: Balance systems and controls within ±2ºF of indicated settings.

1.3.3 Fume Hoods: Balance fume hood systems as required to match scheduled conditions.

1.4 Quality Assurance: The TAB Contractor shall be certified as one of the following:

1.4.1 Tester: A firm certified by National Environmental Balancing Bureau (NEBB) in those testing and balancing disciplines required for this project, who is not the Installer of the systems to be tested and is otherwise independent of the project. Comply with NEBB's "Procedural Standards

for Testing, Adjusting and Balancing of Environmental Systems" as applicable to this work.

1.4.2 Tester: A firm certified by Associated Air Balance Council (AABC) in those testing and balancing disciplines required for this project. AABC-certified firms are independent by definition. Comply with AABC's Manual MN-1 "AABC National Standards", as applicable to this work.

1.4.3 Industry Standards: Comply with American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.

1.5 Job Conditions:

1.5.1 Do not proceed with testing, adjusting, and balancing work until HVAC work (including Controls) has been completed and is operable. Ensure that there is no residual work still to be completed.

1.5.2 Do not proceed until work scheduled for testing, adjusting, and balancing is clean and free from debris, dirt and discarded building materials.

1.5.3 Do not proceed until architectural work that would affect balancing (walls, ceiling, windows, doors) have been installed.

1.5.4 Testing may proceed system by system, but each HVAC system must be complete as describe herein.

1.5.5 The mechanical contractor shall make any changes in pulleys, belts, and dampers, and/or add dampers as required for correct balancing.

1.6 Approval Submittals

1.6.1 Submit the name of the proposed test and balance company for the Engineer's approval within thirty (30) days after awarding of contract.

1.7 Test Reports and Verification Submittals:

1.7.1 Submit four (4) copies of the dated test and balance report upon completion of TAB work. The report shall include a list of instruments used for the work. The report shall be signed by the supervisor who performed the TAB work.

2 PRODUCTS

2.1 Patching Materials: Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.

2.2 Test Instruments: Utilize test instruments and equipment of the type, precision, and capacity as

recommended in the referenced standard. All instruments shall be in good condition and shall have been calibrated within the previous six (6) months (or more recently if required by standard).

3 EXECUTION

3.1 General:

3.1.1 Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Do not proceed with TAB work until unsatisfactory conditions have been corrected in manner acceptable to Tester.

3.1.2 Test, adjust and balance environmental systems and components, as indicated, in accordance with procedures outlined in applicable standards, and as modified or detailed herein.

3.1.3 Test, adjust and balance systems during summer season for air conditioning systems and during winter season for heating systems, including at least a period of operation at outside conditions within 5ºF wet bulb temperature of maximum summer design condition, and within 10ºF dry bulb temperature of minimum winter design condition. When seasonal operation does not permit measuring final temperatures, then take final temperature readings when seasonal operation does permit. The Contractor shall return for a change of seasons test at no additional cost to the Owner and submit the revised TAB report.

3.1.4 Punch List: Prepare a deficiency (punch)list for the Contractor with a copy of the Engineer that lists all items that are incorrectly installed or are functioning improperly. Provide a retest after all items are corrected.

3.1.5 Prepare TAB report of test results, including instrumentation calibration reports, in format recommended by applicable standards, modified as required to include all data listed herein.

3.1.6 Patch holes in insulation, ductwork and housings, which have been cut or drilled for test purposes, in manner recommended by original Installer.

3.1.7 Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials.

3.1.8 Include in the TAB report recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.

3.1.9 Include an extended warranty of ninety (90) days after completion of test and balance work, during which time the Engineer, at his discretion, may request a recheck, or resetting of any component as listed in test report. The TAB company shall provide technicians and instruments and make any tests required by the Engineer during this time period.

3.2 Controls

3.2.1 Check all HVAC controls for proper location, calibration and sequence of operation.

3.2.2 Check operation of all controllers and controlled devices to verify proper action and direction. Check the operation of all interlocks.

3.2.3 Check all control valves for complete closure and correct action under all operating conditions.

3.2.4 Check all labs supply and exhaust system controls.

3.3 Air Balancing

3.3.1 Set dampers, volume controls and fan speeds to obtain specified air delivery with minimum noise level. Rebalance as required to accomplish this. Simulate fully loaded filters during test.

3.3.2 Record air terminal velocity after completion of balance work.

3.3.3 Record all fan speeds.

3.4 Data Collection:

3.4.1 In addition to the data required for any specified performance tests, measure and record the temperatures, pressures, flow rates, and nameplate data for all components listed herein.

3.4.2 It is the intent of this section to record data on balanced systems, under normal operating or design conditions.

3.4.3 Temperatures:

1. Outside dry and wet bulb temperatures.
2. Dry bulb temperature in each room and at least one wet bulb temperature in each zone.
3. Inlet and outlet temperature of each heat exchange device-both fluids.

3.4.4 Pressures:

1. Suction and discharge static pressure of each fan.
2. Water pressure drop through each heat exchanger.

3.4.5 Flow rates:

1. Flow rate through each fan.
2. Flow rate through each coil or heat exchange device.

3.4.6 Nameplate Data:

1. Complete nameplate data for all equipment.
2. Motor data to include horsepower, phase, voltage, RPM, full load nameplate current, fuse rating in disconnect switch, number or manufacturer's size designation, and ampere rating of overcurrent and low voltage protection devices in starters.

3.5 All test openings in ductwork shall be resealed in an approved manner.

END OF SECTION

THIS PAGE INTENIONALLY LEFT BLANK

SECTION 15995/HVAC SYSTEM COMMISSIONING

1 GENERAL

1.1 Intent: This section describes the work performed by the HVAC Commissioning Authority and the supporting work required by the Contractor. The Commissioning Authority will be provided by the Owner. selected by the owner and assigned to the Contractor. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 Intent of Commissioning Process:

1.2.1 Verify operation and functional performance of HVAC systems for compliance with "Design Intent". "Design Intent" is used to indicate the detailed requirements for the HVAC system, comprised of:

1.2.1.1 Design criteria and assumptions

1.2.1.2 HVAC system description and contract documentation

1.2.1.3 Intended methods of system operation and maintenance

1.2.2 Document HVAC tests and inspections.

1.2.3 Verify application of operation and maintenance manuals, as-built (record) documents, spare parts listing, special tools listing, and other items as may be specified herein for support of HVAC systems and equipment.

1.2.4 Coordinate and direct training to personnel for operation and maintenance of HVAC equipment and systems.

1.3 Contractor Scope of Work: Contractor shall perform all testing and demonstrate system operation to support the Commissioning Authority. Furnish labor and materials to support complete HVAC commissioning as specified herein. Support interim commissioning of HVAC systems during initial season operation and follow-up commissioning of required HVAC systems during additional season operation.

1.4 Quality Assurance:

1.4.1 Reference: ASHRAE Guideline 1-1989, *Guideline for Commissioning of HVAC Systems*.

1.4.2 Qualifications: The HVAC Commissioning Authority shall be a Professional Engineer licensed in the State of Florida, with the following qualifications:

1.4.2.1 A minimum of eight (8) years of experience in the HVAC design/construction industry.

1.4.2.2 A successful history of other projects similar in size and complexity in which commissioning of the HVAC systems has been performed.

1.5 Documentation:

1.5.1 Provide the following to the Commissioning Authority:

1.5.1.1 Project plans and specification (contract documents), authorized revisions, approved HVAC shop drawings and submittals, Startup Reports, Test and Balance Reports, factory start-up and certification reports, etc.

1.5.1.2 Records of required code authority inspections, documentation sign-offs, etc.

1.6 Submittals:

1.6.1 HVAC Commissioning Authority will provide the following to the Contractor prior to starting the commissioning process.

1.6.1.1 Commissioning Plan consisting of specific equipment and system checklists.

1.6.1.2 Training Plan outlining required training and documentation.

1.6.2 Contractor shall submit the following prior to starting the commissioning process.

1.6.2.1 O & M Manuals.

1.6.2.2 Startup Reports per Division-15 section 15970.

1.6.2.3 Test and Balance Report per Division-15 section 15985.

1.6.2.4 List of tools and spare parts required by other Division-15 sections.

1.7 Responsibilities:

1.7.1 Contractor:

1.7.1.1 Contractor shall verify completeness of the building envelope, perimeter and interior items which effect proper operation and control of HVAC equipment and systems.

1.7.1.2 The Contractor shall assure participation and cooperation of trade subcontractors (electrical, Test and Balance, controls/energy management, IAQ, and HVAC) under his contract as required for the commissioning process.

1.7.1.3 The Contractor shall secure the services of a professional video service to record all training sessions provided by the subcontractors. All training sessions shall be professionally videotaped and two copies provided to the Owner.

1.7.2 Subcontractors:

1.7.2.1 The subcontractors shall be responsible for providing labor, material, equipment, etc., required within the scope of their specialty to facilitate the commissioning process. The subcontractors shall perform tests and verification procedures required by the commissioning process when requested by the Commissioning Authority and directed by the Contractor.

1.7.3 Owner:

1.7.3.1 Owner will schedule their personnel to participate in the HVAC Commissioning process. This may include building security personnel, HVAC operation personnel and maintenance personnel. Personnel operating and maintaining equipment and systems will attend training sessions., factory schools, and educational institutions where indicated.

1.7.3.2 Owner shall advise HVAC Commissioning Authority regarding changes in building occupancy and/or usage.

2 PRODUCTS

2.1 Instrumentation: Instrumentation shall be provided by agency performing prior tests. Instruments shall be operated by the individual agency requested by the HVAC Commissioning Authority, as specified elsewhere herein.

3 EXECUTION

3.1 General: The HVAC Commissioning Authority will actively participate in construction phase of the project to assure compliance with HVAC Commissioning requirements.

3.2 Procedure:

3.3 The Contractor and designated subcontractors shall attend a pre-commissioning meeting and establish requirements for HVAC Commissioning. The meeting shall outline:

3.3.1 Responsibility of each trade affected by HVAC Commissioning, as required by appropriate section of the specification and indicated on equipment and system checklists provided by the Commissioning Authority.

3.3.2 Requirements for documentation as listed elsewhere herein.

3.3.3 Requirements for documentation of HVAC test and inspections required by code authorities.

3.3.4 Requirements for the HVAC Commissioning program during specified operational seasons, part and full loads and as further delineated in Paragraph 3.4.

3.3.5 Format for training program for operation and maintenance personnel.

3.4 HVAC Commissioning:

3.4.1 To assist in the commissioning process, Operation and Maintenance manuals shall be completed and turned over to the Commissioning Authority as soon as possible during the course of the project, but in no case later than one month prior to the initial date scheduled for substantial completion.

3.4.2 The Commissioning Authority will develop and submit a specific start-up, check-out and sign-off form for every piece of major equipment and system, as well as other equipment hereinafter listed. These forms and lists do not necessarily indicate all the activities, tests and procedures which will be required for the commissioning and start-up of each piece of equipment and system.

3.4.3 The Contractor shall develop a work plan to demonstrate system and equipment operation. Systems shall be operated under actual or simulated full load conditions. Identify the operating conditions in the work plan. Where appropriate, systems shall be operated, tested, and started up, to assure operation for each of their seasonal or different characteristics, (for example heating and cooling).

3.4.4 After all components and every system has been completely commissioned, provide a 2-week, 24-hour per day fully functional automatic operation period of all systems simultaneously. This shall be successfully concluded before systems are accepted by the Owner.

3.4.5 Execute the final approved start-up and commissioning plan.

3.4.6 HVAC Commissioning shall begin only after HVAC equipment and systems, along with related equipment, systems, structures and areas are complete. Systems may be commissioned individually if requested by the Contractor and approved by the Commissioning Authority.

3.4.6.1 Verify Test and Balance readings, such as:

3.4.6.1.1 Supply and return air volumes

3.4.6.1.2 Fan performance

3.4.6.1.3 Branch duct readings

3.4.6.2 Verify calibration of thermostats and related controls, such as:

3.4.6.2.1 Damper settings

3.4.6.2.2 Valve positions

3.4.6.3 Verify readings of remote data and control systems (Energy Management Control System), such as:

3.4.6.3.1 Temperatures

3.4.6.3.2 Air Flows

3.4.6.3.3 Differential pressures

3.4.6.4 Verify that the total HVAC system is performing to provide conditions as outlined in "Design Intent", for seasonal full load and part load conditions, as follows:

3.4.6.4.1 Temperature

3.4.6.4.2 Humidity

3.4.6.4.3 Air changes

3.4.6.4.4 Air movement

3.4.6.4.5 Air quality

3.4.6.4.6 Zone control

3.4.6.4.7 Energy Management

3.4.6.4.8 Pressurization

3.4.6.4.9 Control response

3.5 HVAC Start-Up Procedures:

3.5.1 Prior to start-up of any air handling equipment, the Commissioning Authority and the Contractor shall inspect the installation and verify that:

3.5.1.1 Ductwork is complete, clean and pressure-tested per specifications.

3.5.1.2 Prefilters and final filters are installed by the Contractor per design specifications; prefilters are to be replaced by the Contractor as required during this start-up period. The final filters shall be replaced by the Contractor any time that the static pressure drop across the filter exceeds 1.0". The filters installed shall meet design specifications and shall be dated with a felt-tip marker upon installation.

3.5.1.3 All electrical work is complete.

3.5.1.4 Safety devices are in place and operational.

3.5.1.5 Energy Management controls are installed and have been verified to be operational by the

controls contractor.

3.5.1.6 All piping has been installed and insulated per specifications.

3.5.2 Prior to Occupancy:

3.5.2.1 No less than two weeks prior to substantial completion, the HVAC system for the space to be occupied shall be approved by the Commissioning Authority to be operational under the start-up procedures and shall be set up by the Contractor to operate continuously on a 24-hour basis. The following requirements shall be established by the Commissioning Authority and adhered by to the contractors during this period:

3.5.2.1.1 The Energy Management Control System is completely installed, and the EMCS Contractor has submitted a statement verifying that the system is complete and operational.

3.5.2.1.2 The HVAC air side and water systems shall be balanced at design levels by the Contractor, all systems and devices shall be operating according to specifications, and the Contractor's TAB report has been submitted to an approved by the HVAC system Design Engineer.

3.5.2.1.3 Outdoor air shall be set at maximum design levels and maintained at those levels continuously during the two-week ventilation period.

3.5.2.1.4 Chilled water temperature (where applicable) shall be operating at design levels. Supply air off-coil temperatures shall be at design levels.

3.5.2.1.5 All exhaust systems are operational and functioning according to design CFM and specifications.

3.5.2.1.6 All electric heaters and hydronic reheat systems are installed and operational.

3.5.2.1.7 Prefilters shall continue to be replaced by the Contractor as required per the start-up schedule. The final filter shall be replaced by the Contractor at any time that the static pressure drop across the filter exceeds 1.0".

3.5.2.1.8 All interior spaces are secured with doors and windows normally closed.

3.5.2.1.9 Interior air quality shall be maintained at 75ºF and relative humidity less than 60%.

3.5.3 At Occupancy: Following the date of final completion and prior to occupancy, the Commissioning Authority shall verify all prefilters and final filters have been replaced with new, approved, specified filters.

END OF SECTION

SECTION 16000/ELECTRICAL GENERAL REQUIREMENTS

1.0 GENERAL

1.01 SECTION INCLUDES:

A. Electrical General Requirements specifically applicable to Division 16 Sections, in addition to Division 1 - General Requirements.

1.02 PROJECT/SITE CONDITIONS:

A. Install work in locations shown on Drawings, unless prevented by project conditions.

B. Prepare drawings showing proposed rearrangement of work to meet project conditions, including changes to work specified in other Sections. Obtain permission of Engineer before proceeding.

C. Before submitting a proposal for the work contemplated in these specifications and accompanying Drawings, each bidder shall examine the site and familiarize himself with all the existing conditions and limitations. No additional compensation will be allowed because of the Contractor's misunderstandings as to the amount of work involved or his lack of knowledge of any condition in connection with the work.

1.03 REGULATORY REQUIREMENTS:

A. Permits and Inspections: This Contractor shall secure and pay for all permits, and inspections required on work performed under this section of the Specifications. He shall assume full responsibility for all assessments and taxes necessary for the completion and acceptance of the work.

B. Applicable Standards and Codes: All materials and workmanship shall comply with all applicable codes, specifications, local ordinances, industry standards and utility company regulations. In case of difference between building codes, specifications, federal and state laws, local ordinances, industry standards and utility company regulations and the Contract Documents, the most stringent requirements shall govern. The Contractor shall promptly notify the Engineer in writing of such differences. Should the Contractor perform any work that does not comply with the requirements of the applicable building codes, federal and state laws, local ordinances, industry standards and utility company regulations, he shall bear all costs arising in correcting the deficiencies. Applicable codes and standards shall include all State laws, State Board of Health and State Rating Bureau, local ordinances, utility company regulations and the applicable requirements of the following:

1. Standard Building Code
2. National Fire Protection Association – NFPA
3. National Electrical Manufacturers Association - NEMA

4. National Bureau of Standards
5. American National Standards Institute - ANSI
6. Underwriters' Laboratories - UL

1.04 COOPERATION:

A. Cooperate with others in laying out the electrical work so that this phase of the work will properly fit the building and other contractors' requirements.

1.05 PRODUCTS FURNISHED BY OTHERS:

A. Products are furnished by the Owner or under other Divisions of these Specifications that require electrical connection. This Contractor shall provide all necessary materials and labor to connect to the electrical system all equipment and fixtures having electrical power connection requirements. Refer to other Divisions of these Specifications for additional or specific requirements. Actual rough-in dimensions shall be obtained from Shop Drawings or measurements of the equipment or fixture.

B. The unpacking, assembling and setting of equipment furnished by the Owner or under other Divisions of these Specifications will be performed by others, unless stated otherwise.

C. Because the manufacturer of the equipment actually purchased or supplied may vary slightly from that specified, as hereinbefore stated, some rearranging of the requirements may be necessary. This Contractor shall make connections as required by the actual equipment furnished.

1.06 SEQUENCING AND SCHEDULING:

A. Construct work in sequence under provisions of applicable sections of these specifications.

B. Power outages shall be scheduled with the Owner and other Contractors. Outages shall be at the convenience of the Owner.

1.07 APPROVAL OF MATERIALS AND EQUIPMENT:

A. Whenever a material, article, or piece of equipment is identified on the Drawings or in these Specifications by reference to manufacturer's or vendor's name, trade name, catalog number or the like, it is so identified for the purpose of establishing a standard of quality and shall not be construed as limiting competition. Any material, article, or piece of equipment of other manufacturers or vendors, which will perform adequately the intent of the design, will be considered equally acceptable provided written approval has been granted by the Engineer. Materials submitted for approval shall comply with all applicable Sections of these Specifications prior to acceptance. Submit proposed substitutions to the Architect for approval at least ten (10) days prior to the bid so that an addendum can be issued to all contractors. Engineer's opinion shall be final on the equality of substituted items.

B. After the Contract has been awarded, catalog cuts on the following items shall be submitted to the Architect/Engineer for final approval before purchase of the equipment whether substitutions are

being made or not:

1. Light Fixtures
2. Panelboards and Switchboards
3. Distribution Equipment
4. Wiring Devices
5. Fabricated Equipment
6. Automatic Transfer Switches

1.08 OBSERVATION, TESTING AND BALANCING:

A. Observation: The complete job will be, during and/or after construction, subject to the administration of the Engineer. Site visits shall be conducted by the Architect/Engineer or his designated representative as necessary to maintain compliance with the Contract requirements.

B. Testing: Prior to acceptance by the Owner/Engineer, the Contractor shall conduct and record insulation tests of all feeder and motor branch circuits. The insulation testing shall be accomplished utilizing an meg-ohm meter. Verification of test results shall be witnessed by the Architect or his designated representative. The Contractor shall submit a written report of all readings of each feeder and circuit.

C. Balancing: All branch circuits and feeders shall be tested under maximum and typical load conditions, and loads shall be balanced on the phases of the electrical system. The Contractor shall submit written report of final load readings of all loads on each feeder.

1.09 WORKMANSHIP:

A. All work shall be executed in a neat and substantial manner by skilled workman, well qualified, and regularly engaged in the type of work required. Substandard work shall be removed and replaced by the Contractor at no cost to the Owner.

1.10 OPERATING AND MAINTENANCE INSTRUCTIONS/AS BUILT DRAWINGS:

A. Four (4) complete sets of instructions containing the manufacturer's operating and maintenance instructions for each piece of equipment shall be furnished to the Owner. Each set shall be permanently bound and shall have a hard cover. One complete set shall be furnished at the time that the test procedure is submitted, and remaining sets shall be furnished before the Contract is completed. Flysheets shall be placed before instructions covering each subject. The instruction sheets shall be approximately 8-1/2" by 11" with large sheets of Drawings folded in. The

instructions shall include information for major pieces of equipment and systems.

B. Upon completion of the work and at the time designated, the services of one project engineer shall be provided by the Contractor to instruct the representative of the Owner in the operation and maintenance of the systems.

C. This Contractor shall provide as-built Drawings at the completion of the job. Drawings shall show all significant changes in equipment, wiring, routing, location, etc.

1.11 GUARANTEE:

A. This Contractor shall guarantee to the Owner, all work performed under this contract to be free from defects in workmanship and material for a period of one year from date of final acceptance by Owner and Architect. Any defects arising during this period will be promptly remedied by the Contractor without cost to the Owner. Lamps and fuses burned out during normal operation after acceptance are exempt from guarantee. This Contractor shall furnish the Owner with an estimated time, from notification of a problem to presence on the site, for all service calls on warranty items.

1.12 COMPLIANCE:

A. In the event of a conflict between Specifications, Drawings, Codes, Requirements, etc., the most stringent requirements shall govern.

B. The interpretation of conflicts and resolution thereof shall remain the right of the Architect/Engineer or his designated representative.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 16100/LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS, CABLES, AND DEVICES

1.0 GENERAL

1.01 RELATED DOCUMENTS:

A. Section 16000 - Electrical General Requirements, apply to the work specified in this Section, with additions and modifications specified herein.

1.02 SECTION INCLUDES:

A. Wire and Cable

B. Wiring Devices

2.0 PRODUCTS

2.01 WIRE AND CABLE

A. Building Wire:

1. Feeder and Branch Circuits 10 AWG and Smaller: Copper, solid conductor, 600 volt insulation, rated 75 degrees C, THHN/THWN.

2. Feeder and Branch Circuits 8 AWG and 6 AWG: Copper, stranded conductor, 600 volt insulation, rated 75 degrees C, THHN/THWN.

3. Feeder and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation, rated 75 degrees C, THW.

4. Control Circuits: Copper, stranded conductor, 600 volt insulation, THHN/THWN.

B. Remote Control Signal Cable (where applicable):

1. Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600 volt insulation, rated 60 degree C, individual conductors twisted together, shielded, and covered with PVC jacket.

2. Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 60 degree C, individual conductors twisted together, shielded, and covered with PVC jacket; UL listed.

C. Cords: Oil-resistant thermoset-insulated multi-conductor flexible cord with identified equipment grounding conductor, suitable for extra hard usage in damp locations, type SO.

2.02 WIRING DEVICES AND WALL PLATES:

A. Manufacturers:
   1. Hubbell
   2. Leviton
   3. Arrow Hart

B. Wall Switches: AC general use, quiet-operating snap switch rated 20 amperes and 120/277 volts AC, with plastic toggle handle, ivory color.

   1. Single Pole Switch: Hubbell 1221-I (Or approved equal)

   2. Three Way Switch: Hubbell 1223-I (Or approved equal)

C. Receptacle:

   1. Convenience Receptacle Configuration: Type 5-20R, plastic face, **color by architect/owner**. Example: Model 5262-I manufactured by Hubbell.

   2. Specific Purpose Receptacle: Configuration indicated on Drawings with black plastic face.

   3. Provide straight-blade receptacles to NEMA WD 1.

   4. Provide straight-blade receptacles to NEMA WD 5.

   5. GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter. Example: Model GFR-5352IA manufactured by Hubbell (Or approved equal). Device shall be compliant to the requirements of UL 943.

D. Wall Dimmer: Rotary dial or slide type, **color by architect/owner**. Model C-2000 manufactured by Lutron.(or approved equal such as Leviton) Rating of 2000 watts at 120 volts, AC.

E. Decorative Cover Plate: Smooth Stainless steel, **color by architect/owner**, ANSI 302.

F. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device covers **rated raintight while in use** in accordance with Article 410-57 of the National Electrical Code.

G. Attachment Plug Cap: Match receptacle configuration provided for equipment connection.

H. Cord Reels: Provide cord reels as indicated on the drawings. Cords shall be sized per loads served and shall be 50’ in length.

3.0 EXECUTION

3.01 EXAMINATION AND PREPARATION:

A. Verify that interior of building has been physically protected from weather.

B. Verify that mechanical work which is likely to injure conductors has been completed.

C. Completely and thoroughly swab raceway system before installing conductors.

3.02 INSTALLATION:

A. Wiring Methods:

1. Concealed Interior Locations: Building wire in raceway.

2. Exposed Interior Locations: Building wire in raceway.

3. Above Accessible Ceilings: Building wire in raceway.

4. Wet or Damp Interior Locations: Building wire in raceway.

5. Exterior Locations: Building wire in raceway.

6. Underground Locations: Building wire in raceway.

7. Hazardous Locations: Building wire in raceway conforming to applicable NEC Articles as identified on the Drawings.

B. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring. Conductors shall be sized to compensate for voltage drop.

C. Neatly train and secure wiring inside boxes, equipment and panelboards.

D. Use UL listed wire pulling lubricant for pulling conductors in raceways.

E. Make splices, taps, and terminations to carry full ampacity of conductors without perceptible temperature rise.

F. Devices shall mount flush or as indicated on the Drawings.

G. Install wiring devices in accordance with manufacturer's instructions.

1. Install wall switches 48 inches above floor, "OFF" position down.

2. Install wall dimmers 48 inches above floor. De-rate ganged dimmers as instructed by manufacturer. Do not use a common neutral, provide a separate neutral for each dimmed circuit.

3. Unless noted otherwise, install convenience receptacles 18 inches above floor, 6 inches above counters or splashbacks, with grounding pole on bottom.

4. Install GFCI receptacles at all outdoor locations and all indoor locations as required by NFPA70, and as indicated.

5. Install specific purpose receptacles at heights shown on Drawings.

6. Install cord and attachment plug caps on equipment under the provisions of Section 16100. Size cord for connected load and rating of branch circuit over-current protection.

K. Install wall plates flush and level.

1. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

2. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3. Install weatherproof coverplates on all devices/boxes in wet or outdoor locations.

3.03 FIELD QUALITY CONTROL:

A. Perform field inspection and testing of circuits under provisions of Section 16000.

1. Inspect wire and cables for physical damage and proper connection.

2. Torque test conductor connections and terminations to manufacturer's recommended values.

3. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

END OF SECTION

SECTION 16200/RACEWAY SYSTEMS

1.0 GENERAL

1.01 RELATED DOCUMENTS:

A. Section 16000 - Electrical General Requirements, apply to the work specified in this section, with additions and modifications specified herein.

1.02 SECTION INCLUDES:

A. Conduit and Conduit Fittings

B. Electrical Boxes and Fittings

C. Cable Tray

2.0 PRODUCTS

2.01 CONDUIT AND FITTINGS:

A. Conduit:

1. Metal Rigid Conduit: Galvanized steel.

2. Metal Tubing: Galvanized steel.

3. Flexible Conduit: Steel.

4. Liquid-Tight Flexible Conduit: Flexible conduit with PVC Jacket.

5. Plastic Conduit and Tubing: NEMA TC 2; PVC. Use Schedule 40 conduit.

B. Conduit and Fittings:

1. Conduit Fittings and Conduit Bodies: NEMA FB 1. Conduit fittings to be steel, threaded type. Split couplings are not acceptable.

2. Tubing Fittings: NEMA FB 1. Tubing fittings to be steel compression type for conduit up to 2" in diameter and set screw type for conduit 2-1/2" and larger.

3. Flexible Conduit Fittings: NEMA FB 1. Flexible conduit fittings to be steel set screw or screw in type.

4. Liquid-Type Flexible Conduit Fittings: NEMA FB 1. Liquid-tight flexible conduit fittings to be

steel compression type.

5. Plastic Fittings and Conduit Bodies: NEMA TC 3.

2.02 ELECTRICAL BOXES:

A. Boxes:

1. Sheet Metal: NEMA OS 1; galvanized steel, 4" or 4-11/16" square. Provide galvanized plaster/tile ring for recessed outlet boxes.

2. Cast Metal: Aluminum or cast feralloy, deep type, gasketed cover, threaded hubs.

3. Nonmetallic: NEMA OS 2.

B. Large Enclosures: NEMA 250; Type 4, steel enclosures with manufacturer's standard enamel finish and cover, held closed screws.

2.03.1 CABLE TRAY (where applicable):

A. Manufacturers: (Manufacturers not listed shall be submitted for approval)

1. B-line

2. Mono-Systems

B. Ladder type, constructed of aluminum with 9” rung spacing, 6” siderails and 18” wide

C. Fittings: Horizontal 90° elbows, horizontal tees, and horizontal crosses with all metal accessories to connect to straight sections.

D. Support: Supports shall be fabricated channel, and threaded rods.

E. Grounding: Provide grounding straps as each junction, splice, fitting, etc.

3.0 EXECUTION

3.01 EXAMINATION AND PREPARATION:

A. Examine supporting surfaces to determine that surfaces are ready to receive work.

B. Electrical boxes shown on Contract Drawings are approximate locations unless dimensioned.

3.02 INSTALLATION:

A. Use conduit and tubing for raceways in the following locations:

1. Underground Installations: Rigid steel conduit, painted with two coats of epoxy asphaltum paint, or Schedule 40 PVC conduit.

2. Installations In Concrete: Rigid steel conduit, or Schedule 40 PVC conduit.

3. In Slab Above Grade: Rigid steel conduit, or Schedule 40 PVC conduit. Where likely to be damaged, use Schedule 80 PVC in lieu of Schedule 40 PVC.

4. Exposed Outdoor Locations: Rigid steel conduit or Schedule 40 PVC. Schedule 80 PVC to be used in areas prone to damage.

5. Wet Interior Locations: Rigid steel conduit or electrical metallic tubing. Use threaded or raintight fittings for conduit.

6. Concealed Dry Interior Locations: Rigid steel conduit or electrical metallic tubing.

7. Exposed Dry Interior Locations: Rigid steel conduit or electrical metallic tubing.

8. Feeders: Galvanized rigid steel conduit and PVC conduit on all feeders. Schedule 40 PVC may be used in environments where there is an unlikely probability that the conduit will be damaged. Otherwise, use schedule 80 PVC if RMC is not used.

B. Size raceways for conductor type installed.

1. Minimum Size Conduit: 1/2 inch.

C. Arrange conduit and tubing to maintain headroom and to present a neat mechanical appearance.

1. Route exposed raceway parallel and perpendicular to walls and adjacent piping.

2. Maintain minimum 6 inch clearance to piping and 12 inch clearance to heat surfaces such as flues, piping, and heating appliances.

3. Maintain required fire, acoustic, and vapor barrier rating when penetrating walls, floors, and ceilings.

4. Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack with pitch pocket.

5. Group in parallel runs where practical. Use rack constructed of steel channel. Maintain spacing between raceways or de-rate circuit ampacities to NFPA 70 requirements.

6. Use approved manufactured conduit hangers and clamps; do not fasten with wire or perforated pipe straps. Utilize conduit hangers for conduits located below floor slabs.

7. Use conduit bodies to make sharp changes in direction.

8. Terminate all conduits with insulated bushings.

9. Use suitable caps to protect installed raceway against entrance of moisture and dirt.

10. Provide a pull string in all empty raceways.

11. Install expansion joints fittings where raceway crosses building expansion joints.

12. Install plastic conduit and tubing in strict accordance with the manufacturer's recommendations. When plastic conduit is installed, use galvanized rigid elbows for 90-degree bends.

D. Install electrical boxes as shown on the Drawings, and as required for splices, taps, wire pulling, equipment connections and regulatory requirements.

1. Use cast outlet box in exterior locations, wet locations, and exposed interior locations.

2. Use large enclosure for interior pull and junction boxes larger than 12 inches in any dimension.

3. Locate and install electrical boxes to allow access. Provide access panels if required.

4. Locate and install electrical boxes to maintain headroom and to present a neat mechanical appearance.

5. Install pull boxes and junction boxes above accessible ceilings or in unfinished areas.

6. Provide knockout closure for unused openings.

7. Align wall-mounted outlet boxes plumb and level for switches, and similar devices.

8. Coordinate mounting heights and locations of outlets above counters and backsplashes.

9. Install lighting outlets to locate luminaires as shown on the Drawings.

E. Use recessed outlet boxes in finished areas where indicated.

1. Secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness, and plaster/tile ring installation.

2. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.

3. Locate boxes in masonry walls to require cutting corner only. Coordinate masonry cutting to achieve neat openings for boxes.

4. Do not install boxes back-to-back in walls; provide 6 inch separation, minimum. In acoustic-rated walls provide 24 inch separation minimum.

5. Do not damage insulation.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 16300/SERVICE AND DISTRIBUTION

1.0 GENERAL

1.01 RELATED DOCUMENTS:

A. Section 16000 - Electrical General Requirements, apply to the work specified in this Section, with additions and modifications specified herein.

1.02 SECTION INCLUDES:

A. System Description

B. Utility Requirements

C. Grounding

D. Switchboards

E. Panelboards

F. Enclosed Switches

G. Fuses

H. Transformers

I. Enclosed Circuit Breakers

J. Plug-in Duct

1.03 SYSTEM DESCRIPTION:

A. Existing 120/208V, 3-phase, 4-wire service from utility company to remain.

1.04 PROJECT CONDITIONS:

A. Verify field measurements for the equipment to ensure proper fit within the space proposed.

1.05 UTILITY REQUIREMENTS:

A. The serving utility is **FPU.**

B. Existing.

2.0 PRODUCTS

2.01 SWITCHBOARD:

A. Manufacturers:

1. Square D Company
2. Cutler-Hammer
3. Siemens
4. General Electric

B. Switchboard: NEMA PB2.

1. Line and Load Terminations: Accessible from front only of switchboard, suitable for conductor materials used.
2. Main Sections Devices: Individually mounted.

C. Ratings: As shown on Drawings.

D. Bussing:

1. Bus Material: Copper or Aluminum with tin plating sized in accordance with NEMA PB2.
2. Bus Connections: Accessible from front for maintenance.
3. Ground Bus: Copper

E. Enclosure: Type 1 General purpose as shown on the Drawings.

1. Align sections at front and rear.
2. Height: 90 inches
3. Finish: Manufacturer's standard light gray enamel over external surfaces.

F. Future Provisions:

1. Fully equip spaces for future devices with bussing and bus connection provisions; continuous current rating as indicated on the Drawings.
2. Do not taper main bus rating.

G. Switching and Over-Current Protection Devices:

1. Molded Case Circuit Breakers: NEMA AB 1.

2. Solid State Molded Case Circuit Breakers: NEMA AB 1; with electronic sensing, timing and tripping circuits for adjustable current settings; ground fault trip; instantaneous trip and adjustable short time trip.

H. Switchboard Instruments:

1. Ground Fault Sensors: Zero sequence type.

2. Ground Fault Relay: Adjustable ground fault sensitivity from 200 to 1200 amperes, time delay adjustable from 0 to 1 second.

3. Square D Power Logic metering.

2.02 PANELBOARDS:

A. Manufacturers:

1. Square D Company Only…No Equals Accepted!

B. Distribution Panelboards: NEMA PB 1; circuit breaker type.

1. Enclosures: Type 1 or 3R as shown on Drawings.

2. Mounting: Surface or flush mount as shown on Drawings.

3. Bus: Copper.

4. Ground Bus: Copper

5. Voltage and phase: As shown on Drawings.

6. Minimum Integrated Equipment: As shown on Drawings.

7. Hinged door with lock.

8. Circuit Breakers: Bolt-on, ratings as shown on Drawings.

C. Light and Power Panelboards: NEMA PB 1; circuit breaker type.

1. Enclosures: Type 1 or 3R as shown on Drawings.

2. Surface or flush mount as shown on Drawings.

3. Bus: Copper.

4. Ground Bus: Copper.

5. Voltage and phase as shown on Drawings.

6. Minimum Integrated Equipment: As shown on Drawings.

7. Hinged door with lock.

8. Circuit Breakers: Bolt-on, ratings as shown on Drawings.

D. Accessories: Provide panel and branch device accessories as shown on Drawings.

E. Future Provisions: Where space provisions are indicated on the Drawings provide bussing, bus extensions, etc. require to mount future circuit breakers. Where spare provisions are indicated on the Drawings provide circuit breakers complete and ready for connection.

2.03 ENCLOSED SWITCHES:

A. Manufacturers:

1. Square D Company…Equals Accepted!

B. Enclosed Switch Assemblies: NEMA KS 1; Type HD.

1. Fuse Clips: Designed to accommodate Class `R' or `J' fuses as shown on Drawings.

C. Enclosures: NEMA KS 1; Type 1, 3R, and 4X as required.

D. Ground: Provide grounding lug.

E. Ratings: 600 or 250 volts to match system service requirements, poles and ampere ratings as indicated on the Drawings.

2.04 FUSES:

A. Manufacturers:

1. Bussman

2. Shawmut

3. Little Fuse

B. Service Entrance/Feeder Circuits-601 Amp and Larger

1. Current Limiting

2. UL Class L

3. 200,000 Ampere RMS Interrupting Rating

4. Voltage Rating: As required for system compatibility.

C. Service Entrance/Feeder Circuits-600 Amp and Smaller

1. Current Limiting

2. UL Class RK1

3. 200,000 Ampere RMS Interrupting Rating

4. Voltage Rating: As required for system compatibility

D. Motor, Motor Controller, Transformer and Inductive Circuits

1. Current Limiting

2. UL Class RK1, Time Delay

3. 200,000 Ampere RMS Interrupting Rating

4. Voltage Rating: As required for system compatibility.

2.05 TRANSFORMERS:

A. Manufacturers:

1. Square D Company

2. ITE-Siemens

3. General Electric Company

4. Cutler Hammer

B. Description: Enclosed air-cooled dry type transformer.

C. Ratings:

1. Primary Voltage: As shown on Drawings.

2. Secondary Voltage: As shown on Drawings.

3. Capacity: KVA ratings as shown on Drawings.

4. Basic Impulse Level: 10 BIL.

5. Insulation Class/Temperature Rise: Class 220/115 degrees C.

D. Configuration: Two winding, delta-wye.

E. Winding Taps: Four full capacity primary taps, each at 2.5 percent below rated voltage; and two full capacity primary taps, each at 2.5 percent above rated voltage.

F. Mounting: Wall, floor, or trapeze as shown on Drawings.

G. Enclosures: Code gauge steel, NEMA 1 or 3R as required.

2.06 ENCLOSED CIRCUIT BREAKERS:

A. Manufacturers:

1. Square D Company only…No Equals Accepted!

B. Circuit Breaker: NEMA AB 1.

1. Voltage: As shown on Drawings.

2. Enclosure: NEMA AB 1; Type 1 or 3R as required.
3. Accessories: As indicated on Drawings.

2.07.1 PLUG-IN DUCT

A. Manufacturers:

1. Square D Company

2. ITE-Siemens

3. General Electric

4. Cutler Hammer

B. Plug-in Duct

1. Bus Material: Copper

2. Enclosure: NEMA 1

3. Mounting: Suspended from structure

4. Rating: 225 amperes, 600 volt, 3 phase, 4 wire

C. Plug-in Units

1. Fusible switches

3.0 EXECUTION

3.01 EXAMINATION AND PREPARATION:

A. Make arrangements with utility company to obtain permanent electrical service to the facility.

3.02 INSTALLATION:

A. Install utility services in accordance with utility company standards and requirements.

1. Underground Service: Refer to 'Power Riser Diagram' for details. (Verify with utility prior to bid/construction.)

B. Install equipment in accordance with manufacturer's instructions.

C. Install switchboard to NEMA PB 2.1.

D. Install panelboards to NEMA PB 1.1.

E. Ground the electrical service in accordance with NFPA 70, National Electrical Code, Article 250.

F. Provide labels for all switchboards, panelboards, and distribution equipment.

G. Provide typewritten directory inside panel door for all panelboards.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 16400/BASIC ELECTRICAL MATERIALS AND METHODS

1.0 GENERAL

1.01 RELATED DOCUMENTS:

A. Section 16000 - Electrical General Requirements, apply to the work specified in this Section, with additions and modifications specified herein.

1.02 SECTION INCLUDES:

A. Supports

B. Identification

C. Connection of Equipment

D. Cleaning and Painting

E. Cutting and Patching

1.03 PROJECT CONDITIONS:

A. Existing project conditions indicated on Drawings are based on casual field observation and existing record documents.

B. Verify field measurements and circuiting arrangements as shown on the Drawings.

C. Report discrepancies to Engineer before disturbing existing installation.

2.0 PRODUCTS

2.02 SUPPORTS:

A. Fabrication Steel: Galvanized or painted steel of standard shapes and sizes.

B. Manufactured Channel: Hot dipped galvanized with all hardware required for mounting as manufactured by Unistrut, Kindorf, or Powerstrut (Manufacturers not listed shall be submitted to engineer for approval).

C. Miscellaneous Hardware: Standard sizes treated for corrosion resistance.

2.03 IDENTIFICATION:

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

B. Wire and Cable Markers: Cloth type, split sleeve type, or tubing type.

C. Panel Directories: Typewritten under plastic cover.

3.0 EXECUTION

3.01 INSTALLATION:

A. Install Products in accordance with manufacturer's instructions.

B. Except where specifically indicated otherwise, all exposed non-current-carrying metallic parts of electrical equipment, metallic raceway systems, and service neutral of the electrical system shall be grounded.

1. Equipment grounding shall be accomplished by installing a separate grounding conductor in each raceway of the system. The Conductor shall be provided with a distinctive green insulation or marker and shall be sized in accordance with Table 250-122 of the National Electrical Code for circuit ampacity ratings.

C. Make electrical connections to equipment in accordance with equipment manufacturer's instructions.

1. Verify that wiring and outlet rough-in work is complete and that equipment is ready for electrical connection, wiring, and energization.

2. Make wiring connections in control panel or in wiring compartment of pre-wired equipment. Provide interconnecting wiring as required by equipment manufacturer.

3. Install and connect disconnect switches, controllers, control stations, and control devices as required by equipment manufacturer.

4. Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit in damp or wet locations.

5. Install pre-fabricated cord set where connections with attachment plug is indicated or specified, or use attachment plug with suitable strain-relief clamps.

6. Provide suitable strain-relief clamps for cord connections to outlet boxes and equipment connection boxes.

D. Install support systems sized and fastened to accommodate weight of equipment and conduit, including wiring, which they carry.

1. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using precast insert system, expansion anchors, preset inserts, beam clamps, or spring steel clips.

2. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion and anchors on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.

3. Do not fasten supports to piping, ceiling support systems, ductwork, mechanical equipment, conduit, etc.

4. Do not use powder-actuated anchors.

5. Do not drill structural steel members.

6. Fabricate supports from structural steel or steel channel.

7. Install surface mounted cabinets and panelboards with minimum of four anchors.

8. Provide steel channel supports to stand cabinets one inch off wall in wet locations.

9. Bridge studs top and bottom with channels to support flush mounted cabinets and panelboards in stud walls.

10. Install free-standing electrical equipment on 4 inch high concrete pads.

E. Identify electrical distribution and control equipment, and loads served, to meet regulatory requirements and as specified herein.

1. Degrease and clean surface to receive nameplates.

2. Secure nameplates to equipment fronts using screws or rivets with edges parallel to equipment lines.

3. Use nameplates with 1/4 inch lettering to identify Switchboard, Panelboards, Safety Switches, Motor Starters and Branch Devices of Switchboards.
4. Panel directories shall accurately indicate load served and location of load.

5. Engrave plates as indicated by Schedules on the Drawings.

F. Install wire markers on each conductor in panelboard gutters, boxes, and at load connections.

1. Use distribution panel and branch circuit or feeder number to identify power and lighting

circuits.

2. Use control wire number as indicated on schematic and interconnection diagrams or equipment manufacturer's shop drawings to identify control wiring.

G. Cleaning and Painting: The respective Contractors for the various phases of work shall clear away all debris, surplus materials, etc., resulting from their work or operations, leaving the job and equipment furnished in the clean first class condition.

1. All fixtures and equipment shall be thoroughly cleaned of plaster, stickers, rust, stains and other foreign matter or discoloration, leaving every part in an acceptable condition ready for use.

2. The Contractor shall refinish and restore to the original condition and appearance, all electrical equipment which has sustained damage to manufacturer's prime and finish coats or enamel or paint. Materials and workmanship shall be equal to the requirements described for other painting.

H. Cutting and Patching: This Contractor shall provide all cutting, digging, etc., incident to his work and shall make all required repairs thereafter to the satisfaction to the Engineer, but in no case shall the Contractor cut into any major structural element, beam, or column without written approval of the Engineer.

1. Pavements, sidewalks, roads, curbs, walls, ceilings, floors, and roofs shall be cut, patched, repaired and/or replaced as required to permit the installation of the electrical work.

2. The Contractor shall bear the expense of all cutting, patching, painting, repairing, or replacing of the work of other trades required because of his fault, error, or tardiness or because of any damage done by him.

END OF SECTION