SPECIFICATIONS
FOR

NEW SHOWER ROOMS

FIRE STATION #1

CITY OF MARTINSVILLE, VIRGINIA

65 WEST CHURCH ST.
MARTINSVILLE, VA, 24112

ARCHITECT'S COMMISSION NO. 1366

DATE: November 12,2024

CONRAD KNIGHT ARCHITECTURE, PLLC

212 STARLING AVENUE, SUITE 30
MARTINSVILLE, VIRGINIA 24112

TELEPHONE: (276) 638-8794
Email: 88knight@comcast.net

TABLE OF CONTENTS

NOTE; INDEX FOR MECHANICAL AND ELECTRICAL AT THE BEGENNING OF THOSE SECTIONS

BID FORM

PROJECT: **NEW SHOWER ROOMS**
FIRE STATION #1
CITY OF MARTINSVILLE, VA
65 WEST CHURCH ST.
MARTINSVILLE VIRGINIA 24112

OWNER: **CITY OF MARTINSVILLE, VA.**
55 EAST CHURCH ST.,
MARTINSVILLE VIRGINIA

ARCHITECT: **CONRAD KNIGHT ARCHITECTURE PLLC.**
212 STARLING AVE, SUITE 30,
MARTINSVILLE, VA.

In compliance with Specification Manual and Drawings (Bid Documents), the undersigned proposes to furnish all material, labor, equipment, fees and perform all work necessary for construction of project for consideration of the following Lump Sum price:

BASE BID

Print or type

_____DOLLARS (USA_)$_____

ALTERNATE NO. 1 (ADD) FOR ALTERNATE SEWER CONNECTION

Print or type

_____DOLLARS (USA_)$_____

ALTERNATE NO. 2 (DEDUCTD) TO OMIT THE PERFORMANCE BOND

Print or type

_____DOLLARS (USA_)$_____

ALTERNATE NO. 3 (DEDUCT) FOR TOILET ROOMS AND SHOWERS INSTALL EPOXY FLOORS IN LIEU OF CERAMIC

Print or type

_____DOLLARS (USA_)$_____

The Undersigned acknowledges receipt of Addendum No.:

#1.Dated:_____#2.Dated_____#3. Dated:_____#4. Dated:_____

UNIT PRICES:
In accordance with Section 01000, General Conditions (supplements) Paragraph 3.7, the above signed agrees to use a fee of _(_ ___)__% for extra work and(____)_% for work deleted as fixed percentages added to actual cost of work.

PAGE 1 OF 2

BID BOND ATTACHMENT: The above signed agrees that the Owner has up to Sixty (60) calendar days to accept the bid. In the event the Contractor fails to enter into the contract, furnish the required Performance and Payment bonds or begin work by the designated date, the Bid Bond will be forfeited as damages to the Owner.

Company Issuing Bond _____Date of Bond_____

CONTRACTOR'S COMPANY NAME & ADDRESS (Bidder)

_____

_____

Signature _____

Printed Name and Title_____

***If a partnership, all partners must sign proposal form.**

DATE_____

STATE OF VIRGINIA CONTRACTOR LICENSE NO._____**CLASS**_____

PAGE 2 OF 2, END OF BID FORM

SECTION IB-INSTRUCTIONS TO BIDDERS

A. DESIGNATION OF PARTIES: As used in these specifications, on the drawings and in contract documents, forms, etc., Dated June 14, 2022, the following terms are to mean the parties listed:

PROJECT:	NEW SHOWER ROOMS FIRE STATION #1 CITY OF MARTINVVILLE, VA 65 WEST CHURCH ST. MARTINSVILLE, VIRGINIA 24112
OWNER:	CITY OF MARTINSVILLE, VA 55 E. CHURCH ST MARTINSVILE, VIRGINIA, 24112
ARCHITECT:	Conrad Knight Architecture, PLLC 212 Starling Ave. Martinsville, Virginia 24112
CONTRACTOR:	The Contractor, his employees, his sub-contractors and suppliers of material and equipment.

B. RECEIPT OF PROPOSALS:

Bids will be RECEIVED AND OPENED IN THE OFFICE OF THE PURCHASING MANAGER LOCATED AT 990 FISHEL ST. MARTINSVILLE, VA 24112 ON DECEMBER 4, 2024 **AT 2:00 PM.**

No telephones will be available and if contractors are going to use cell phones, please check bid location for cell phone tower availability.

C. **EXPLANATIONS OF BID ITEMS, SCOPE OF WORK:**
The proposed projects consist of the construction of a Toilet/Concession building renovation improvement work and all other related items. All items shall be bid as a lump sum bid. Bid will be for a turn-key, complete project per drawings and specifications and addendums.

D. INSPECTION OF CONTRACT DOCUMENTS: Copies of the drawings and specifications will be available for inspection at the following locations:

Conrad Knight Architecture, PLLC
212 Starling Avenue Suite 30
Martinsville, VA 24112

E. CONTRACT DOCUMENTS: Copies of the drawings and specifications are available as a PDF file from the office of **CONRAD KNIGHT ARCHITECTURE PLLC, 212 Starling Avenue, Suite 30 Martinsville, Virginia 24112, 276-638-8794, 88knight@comcast.net**

F. PREPARATION OF PROPOSALS:

1) Proposals shall be submitted on the forms provided.
2) Seal proposal in an opaque envelope marked as follows:

PROJECT: NEW SHOWER ROOMS
FIRE STATION #1
CITY OF MARTINVVILLE, VA
65 WEST CHURCH ST
MARTINSVILLE, VIRGINIA 24112

Bidder's Name:_____

Virginia General Contractor's Registration No._____

3) No proposals submitted by mail or email

4) Fully fill in all blanks and state number in both writing and figures. In the event a discrepancy occurs between the written number and figures, the written number will control. Signatures shall be in longhand with name and title printed below.

5) Interlineations, alterations and irregularities of any kind may be cause for rejection of the proposal. Erasures or any other physical changes on the form shall be initialed by the bidder.

6) No telegraphic modification of bids will be permitted or considered.

G. CONTRACTOR'S REGISTRATION LAW: The attention of the bidders is invited to the ***Virginia*** code which requires evidence of a Certificate of Registration before his bid may be received and considered on a general or sub-contract.

H. ADDENDUM

Should a bidder find discrepancies in or omission from the drawings or documents, or should he be in doubt as to their meaning, he should at once notify the Architect in writing. The Architect will welcome such inquiries and if they are received five (5) or more days before the date set for the opening of proposals, they will be given consideration. Every interpretation made by the Architect will be issued in the form of an Addendum to the specifications which, if issued, will be on file in the office of the Architect at least three (3) days before the proposals are opened. Such addenda will also be mailed to each bidder, but it will become the bidder's responsibility to know of, examine and become familiar with all addenda issued. In closing a contract, such addenda will become part thereof. Neither Owner nor Architect will be responsible for any oral instructions.

I. CONTRACT DOCUMENTS

Upon acceptance of a bid by the Owner, the Contractor will be expected to execute a contract on A.I.A. Document No. A-101, as published by the American Institute of Architects entitled "Standard Form of Agreement Between Contractor and Owner for the Construction of Building."

J. CONTRACTOR QUALIFICATION STATEMENT

Owner reserves the right to request an AIA Form A 305,1986(Contractor Qualification Statement), prior to signing a contract.

K. FINANCIAL STATEMENT

Owner reserves the right to request a contractor financial statement prior to signing a contract.

L QUALIFICATIONS FOR EMPLOYMENT: The Contractor is to conform with all ***Virginia*** State Laws and Federal Laws applicable to the employment of labor on this project.

M. TRADE NAMES: Whenever manufactured products, devices or materials are specified under particular trade name or name of manufacturer, it SHALL NOT BE construed to mean that these are closed specifications. Other products comparable in type, quality, utility, and price may be acceptable, if approved in writing by the Architect prior to bid opening.

The submitting agency shall allow five (5) working days for processing the request from date of receipt of said request at the Architect's Office. The reply will be available at the Architect's Office or will be mailed on the fifth day.

N AWARD OF CONTRACT AND REJECTION OF BIDS: In receiving bids for work, the Owner incurs no obligation to accept the lowest of any proposal, to reject any and all bids, to award the contract to any of the bidders, and to award a contract for any part of the work or as a whole.

If notice of acceptance and award is given the undersigned within 30 days after the date of opening bids, the undersigned will execute and deliver an agreement or agreements in the prescribed form and furnish the required bonds, within fifteen (15) days after the agreement has been presented to him for signature.

O. EMPLOYMENT DISCRIMINATION BY CONTRACTOR PROHIBITED:

1) During the performance of this contract, the contractor agrees as follows:
   a) The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin, except where religion, sex or national origin, is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
   b) The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.
   c) Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

2) The contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order so that the provisions will be binding upon each subcontractor or vendor.

P. RETAINAGE: SEE GENERAL CONDITIONS

Q. AFFIDAVID

Contractor must provide with his/her bid an affidavit that he/she or their employees (having direct contact with students where work/services are being performed) have not been convicted of a felony or and offense involving the sexual molestation or physical or sexual abuse or rape of a child; and whether he/she has been convicted of a crime of moral turpitude. If contractor cannot supply this affidavit, he/she or their employees must undergo a background check (contractor will be responsible for the charge for this background check). Prior to awarding a contract for the provision of services the contractor or his employees that may have direct contact with Day Care students, the contractor and when relevant any employee who will have direct contact with students to provide certification that he/she has not been convicted of a felony or any offense involving the sexual molestation or physical or sexual abuse or rape of a child; and whether he/she has been convicted of a crime of moral turpitude. By definition , "direct contact with students" is being in the presence of students during regular school hours or during school-sponsored activities. Any person/firm making a materially false statement regarding any offense shall be subject to the loss of the contract to provide services/contracts.

R. **RIGHTS RESERVED BY THE OWNER**

1) To let other contracts in connection with this work which is necessary or expedient. The Contractor shall afford such other Contractors reasonable opportunity for the introduction and storage of their materials and for the execution of their work and shall properly connect and coordinate his work with theirs.
2) To reject any or all bids.
3) To award the contract to some other contractor than the lowest bidder should it be deemed to the best interests of the Owner.
4) To waive any informalities in any proposal.
5) To request a copy of contractors financial statement prior to executing contract.

S. CHANGE ORDERS AND MODIFICATIONS

1. The Architect may issue a request for modification to the work on form AIA Document G709 which will for information only and is not authorization for any action with reference to the request. This information will be submitted to the owner for consideration.
2. After Owner and Architect review and on Approval by the Owner, architect will issue a Change Order on AIA Document G701 for signatures.
3. The Contractor shall itemize the actual cost for changes as follows and submit to Architect:
   a. Labor, including foreman.
   b. Material entering permanently in the work.
   c. The Ownership or rental cost of construction plant and equipment during the time of use on the extra work.
   d. Power and consumable supplies for the operation of power equipment.
   e. Insurance
   f. To the above cost, there shall be added a fixed percentage fee of the actual cost; this fee shall be compensation to cover the cost of supervision, overhead, bond, profit and any other general expense. Contractor shall state in his bid the percentage for extra work and percentage for work deleted.
   g. Subcontractor prices shall be itemized same as above.

T. BID BOND

Submit with the proposal, in the form of a bid bond , certified check, or cashier's check, a bid guarantee made payable to the Owner, of not less than five (5%) percent of the amount of the proposal (request). The guarantee shall be submitted in accordance with the following understanding:

That the proposal may not be withdrawn for a period of 30-days after the schedule closing time for the receipt of bids; that if his bid is accepted, the bidder will enter into a formal contract with the Owner and furnish the required bonds; that if in the event of the withdrawal of said bid within said period, or the failure to enter into said contract and give said bonds within the time specified, the Contractor shall be liable to the Owner for the full amount of the bid guarantee as

representing damage to the Owner on account of default of the bidder in any particular thereof; that the bid guarantee will be returned to the successful bidder when he completes the formal contract and furnished the required bond and to the unsuccessful bidders within forty (40) days after the scheduled closing time for the receipt of bids, or within five (5) days after the award of the contract to others, whichever occurs first.

U. PERFORMANCE BOND AND PAYMENT BOND

The Contractor, if awarded the contract, will execute and deliver to the Owner, before any work is started, a Performance Bond and Labor and Material Payment Bond conditioned upon full and complete performance of the contract, underwritten by a surety company licensed in the state of VIRGINIA and approved by the Architect and the Owner in the amount of 100% of the Contract. Use A.I.A. document forms.

V. ALTERNATES:

ALTERNATE #1: TO CONNECT THE SEWER LINE AT THE ALTERNATE #1 LOCATION PER THE PLUMBING DRAWING.

ALTERMATE #2: THE AMOUNT TO OMIT THE PERFORMANCE AND PAYMENT BOND. THE BID BOND WILL REMAIN.

Note: Bid Bond is required

ALTERNATE #3: THE AMOUNT TO BE DEDUCTED TO OMIT TOILET ROOMS 1-5, CERAMIC TILE FLOORS, BASE AND WAINSCOT AND INSTALL AN EPOXY FLOOR FINISH WITH AN EPOXY COATED 4" HIGH 1/2" CEMENT BOARD BASE WITH A COVE AT THE BOTTOM AND PAINT THE WALL AREA WHERE TILE IS REMOWED WITH SAME PAINT AS SCHEDULED (P2 / P3); AND FOR THE SHOWER ROOMS,REMOVE THE CERAMIC FLOOR,BASE AND WAINSCOT TILE AND PAINT PER THE SCHEDULED AND INSTALL AN EPOXY FLOOR FINISH WITH AN EPOXY COATED 4" HIGH 1/2" CEMENT BOARD BASE WITH A COVE AT THE BOTTOM AND PAINT THE WALLS WITH I COAT OF BLOCK FILL- BENJAMINE MOORE WATERBORNE EPOXY BLOCK FILLER V163 AND 2 FINISH COATS OF BENJAMINE MOORE PRE-CATALIZED WATERBORNE EPOXY COATING V341, SEMI GLOSS.

W. DATE TO BEGIN CONSTRUCTION: WILL BE THE DATE OF THE CONTRACT/PURCHASE ORDER.

X. TIME OF COMPLETION: **All work shall be completed within 90 CALENDAR DAYS FROM THE DATE OF THE CONTRACT.**

Y. PRE BID. A PRE BID WALK THRU IS SCHEDULED FOR NOVEMBER 19, 2024 AT 10:00 AM. MEET AT THE REAR OF THE BUILDING.

END OF INSTRUCTIONS TO BIDDERS

ABBREVIATIONS

ABV.	Above
A.F.F.	Above Finished Floor
ALT.	Alternate
ALUM.	Aluminum
APPROX.	Approximate
B.V.	Back Vent
BM.	Beam
BRG.	Bearing
BLK.	Block
BOT.	Bottom

BLDG.	Building
B.U.	Built-Up
B.C.	Bookcase
C.I.	Cast Iron
CLG.	Ceiling
C.D.	Ceiling Diffuser
C.H.	Ceiling Height
C.B.	Chalkboard
CLOS.	Closet
C.O.	Clean Out
C.W.	Cold Water
COL.	Column
CONC.	Concrete
CMU.	Concrete Masonry Unit
CONT.	Continuingly
CU.	Copper
C.C.F.	Copper Coated Flashing
CORR.	Corridor
C.F.M.	Cubic Feet Per Minute
DBL.	Double
DET.	Detail
DIA.	Diameter
D.S.	Downspout
DWG.	Drawing
D.F.	Drinking Fountain
DN.	Down
DBA.	Deformed Bar Anchor
EA.	Each
EWC	Electric Water Cooler
ELEV.	Elevation
EQUIP.	Equipment
EXIST.	Existing
EXP.	Expansion
EXT.	Extinguish
FIN.	Finish
FL.	Floor
F.D.	Floor Drain
FTG.	Footing
GALV.	Galvanized
GA.	Gauge
G.I.	Galvanized Iron
GL.	Glass
G.F.	Ground Fault
HT. or HGT.	Height
HB	Hose Bib
HR.	Hour
HORIZ.	Horizontal
H.W.	Hot Water
HWH	Hot Water Heater
I.D.	Inside Diameter
JT.	Joint
JST.	Joist
L	Lavatory
LKRS.	Lockers
LIN. FT.	Linear Feet
LBS.	Pounds
M.O.	Masonry Opening
MECH.	Mechanical
MTL.	Metal
MAX.	Maximum
MIN.	Minimum
M.P.	Multi-Purpose
N.I.C.	Not In Contract
NO.	Number
O.C.	On Center
O.D.	Outside Diameter
O.P.	Outside of Plate

OPG.	Opening
OZ.	Ounce
PL.	Plate
P.S.I.	Pounds Per Square Inch
P.S.F.	Pounds Per Square Foot
PROJ.	Projected
QTR.	Quarter
R.	Radius
REQ'D.	Required
R.A.G.	Return Air Grille
R.D.	Roof Drain
RM.	Room
SS	Service Sink
SPECS.	Specifications
SEC. or SECT.	Section
SH.	Sheet
SQ.	Square
STL.	Steel
STO.	Storage
T.B.	Tack Board
THK.	Thickness
TOIL.	Toilet
T.O.M.	Top of Masonry
TYP.	Typical
U	Urinal
V.	Vent
V.T.R.	Vent Through Roof
VERT.	Vertical
W.	Waste
WC	Water Closet
WH	Wall Hydrant
W/	With

SECTION 01000 - GENERAL REQUIREMENTS

1.0 SPECIAL INSTRUCTIONS

1.1 Scope of Work: This outline shall not be construed to limit the responsibility of the Contractor to comply with all the requirements of the contract documents.

1.2 Related Documents:
A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

1.3.1 Drawings:
A. The following drawings Dated OCTOBER 29,2024 prepared by CONRAD KNIGHT ARCHITECTURE PLLC accompany this specification and form a part thereof.

ARCHITECTURAL DRAWINGS	TITLE
A1	Floor Plan, Demolition Plan
A2	Schedules, Details
HVAC-P-E 1	Plumbing HVAC Electrical Plans Schedules, Notes
HVAC/E -1	HVAC Floor Plan, Electrical Plan
P-1	Plumbing Floor Plan

1.3 Applicable Codes and Regulations:

A. All work must conform to the current ***Virginia*** Statewide Building Codes. In the event of conflict between the above rules and regulations and information contained on the drawings and specifications, the former shall take precedence and no extra compensation will be allowed for mechanical contractor due to his failure to observe such conflicts. The following codes and standards are applicable:

1) The ***Virginia*** State Building Code (IBC).....2018 Edition
2) Current Edition, Life Safety Code.....NFPA-101
3) Martinsville/***Henry County/Virginia*** Health Department Regulations
4) American National Standards Institute.....ANSI
5) American Society for Testing and Materials.....ASTM
6) All Federal and State Safety Regulations, Standards and OSHA
7) ***Virginia*** and ***Henry County*** Erosion and Sediment Control Standards.
8) ***Henry County*** Ordinances and Regulations

1.4 Temporary Facilities:

A. General:
1) Furnish all labor, materials, equipment and services necessary to erect and maintain temporary facilities and perform temporary work required in the performance of the Contract and as described below:

B. Sanitary Facilities:
1) Contractor may use the Owners facilities.

C. Temporary Electrical:
(1) Contractor may use the Owners electricity. Contractor to provide all necessary and code compliant materials and labor for hook-up. Service to be turned off when job is not working.
(2) Contractor to install a temporary 100 amp electrical box, per code, for job electric service.

D. Temporary Water Services:
(1) Contractor may use the Owners water for construction. Contractor to provide all necessary and code compliant materials and labor for hook-up. Service to be turned off when job is not working. Wash up areas will be such as not to stain grass, asphalt or concrete.
(2) Contractor to furnish drinking water.

E. Removal of Temporary Facilities:
1) The Contractor shall remove temporary facilities upon completion of the project at no additional expense to the Owner.

F. Cleaning Up:
1) Contractor at all times shall keep the premises free from accumulations of waste materials or rubbish caused by his operations. At the completion of the work, he

shall remove all his waste materials and rubbish from and about the job as well as his tools, construction equipment, machinery and surplus materials.

G. Protection: During the course of construction, the Contractor shall take every reasonable precaution in guarding the safety of the general public as required by State Laws and Local Codes.

1.5.1 Site Investigation: The Contractor acknowledges that he has satisfied himself as to the nature of the work, the general and local conditions, particularly those bearing upon transportation, disposal and handling and storage of materials, the character and need of equipment and facilities preliminary to and during the prosecution of the work. The Contractor further acknowledges that he has satisfied himself as to the character and quality of existing conditions. Any failure by the Contractor to acquaint himself with all the available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the work.

1.6 Drawings and Specifications: The drawings and specifications divide the work into sub-divisions and cannot be construed to separate the work of the building trades, but it is for convenience in t6e description of the work. They are intended to be complementary and what is called for by either shall be as binding as if called for by both. The Contractor will understand that the work herein described shall be held to provide all labor and materials necessary and to the entire completion of the work intended to be described and shall not avail himself of any manifestly unintentional error or omission should such exist.

1.7 Cutting and Patching:

A. Each section of this specification shall include all cutting, patching and digging for that trade division, unless therein specifically stated on the contrary, as required for the proper
accommodations of all work of other trades. This, however, does not relieve the Contractor from the responsibility as stated in Article 6.3 of the General Conditions.

B. All cutting and patching required of the contractor for the proper installation of all work is to be included under all sections of the specifications. All cutting shall be done in a neat and workmanlike manner and shall be subject to the approval of the Architects. Patching shall be done by workmen skilled in the trade which required patching.

1.8 Cooperation:

A. All trades shall cooperate in giving dimensions and locations of all openings, chases for pipes, etc., and install work under this Contract at such time as required, so as not to interfere with, or delay the building construction.

1.9 Permits and Taxes:

A. Permits and Licenses: The Contractor shall secure and pay for all permits and licenses required in connection with the execution of his work.

B. Duties and Taxes: The Contractor shall pay for all taxes levied by laws on all materials, labor or services furnished by him, including state and local sales taxes. The payments of all levies and all sales taxes shall be held to be included in the contract amount and no additional charges will be made to the Owner because of the imposition of these taxes during the performance of this contract.

1.10 Guarantee: The Contractor shall guarantee his work against defects in materials and workmanship for a period of one year from the date of final acceptance unless a longer period is specified elsewhere for a particular phase of the work. Contractor shall submit to Owner, prior to final payment, a letter stating that he guarantees his work for one year. This guarantee will also be acknowledged by the Surety of the Performance and Payment Bond prior to signing contract.

1.11 Standards of Quality:

A. In situations where one or more manufacturers are listed on specifications, and "or equal" is not included, these manufacturers are considered "Standards". Contractors shall base their bids on these "Standards". When two or more "Standards" are named together, any one of those named may be used by contractor, with the below exceptions:

B. Verification that any equipment proposed to be furnished on project is satisfactory from a physical size and shape, weight, and service maintainability standpoint and will not interfere with lights, structure, other equipment, etc., is the contractor's responsibility.

C. A specific manufacturer's equipment for layout and arrangement has been used in designing the plans. In a case where more than one manufacturer is named in the specifications for a specific piece of equipment, it means that these manufacturers produce an acceptable piece of equipment from a quality and performance standpoint. It

does not indicate that the architect has checked and verified that each of the named manufacturer's equipment will physically fit into the provided space and that there is sufficient space available for servicing and maintenance of equipment.

D. The Contractor may substitute a manufacturer which is equal to the one named in that paragraph, in cases where in words "or equal" appear. Such substitution must be approved by Architect, in writing, as covered hereinafter under "Shop Drawings and Equipment Submittals".

1.12 Workmanship:

A. All work of the installation to be done by skilled workmen in a workmanlike manner using the best modern practices. When completed, the work shall present a neat and workmanlike appearance. All work or material not in accordance with these specifications and not first class in every respect, must be removed from the work when ordered by the Architect.

B. All work shall be run parallel, level and perpendicular to building structure, except work underground may be run on the most direct route where it does not conflict with other structural or mechanical work.

1.13 Laying Out Work:

A. All work shall be laid out in advance of installation systems, especially where clearances must be guaranteed or interference avoided. It must be understood that the drawings are diagrammatic and do not pretend to solve the exact local conditions in chases, trenches or other locations, but only give the general layout of the work. Such general layout shall be executed at the job by the respective trades and no departure from the general scheme of piping shall be made without the consent of the Architect, but all work shall be installed in the best manner and in such a way as not to interfere with the finish of other parts or the workmanlike appearance of the whole.

1.14 Hardware:

A. Provide brackets, supports, braces, hangers, clamps, where required for the proper installation of pipe and equipment installed and connected in accordance with these specifications and accompanying drawings. All work to be concealed in finished areas except as noted otherwise on plans. All work in pipe chases and mechanical rooms shall be exposed.

1.15 Standard Products:

A. Equipment and materials to be provided under this contract shall be the standard products of manufacturers regularly engaged in the production of such equipment and shall be the latest standard by the manufacturer and shall be new and unused. Equipment or materials proposed for use other than that specified must be approved prior to purchase by the Architect in writing. It shall bear the seal of approval of the Underwriter's Laboratories. Inc., and shall be new and unused.

1.16 Intent and Meaning:

A. The entire work provided for in these specifications and as shown on the drawings is to be constructed and finished to the full intent and meaning thereof; even though every item necessary for the proper finishing and successful operation of the entire work is not specifically mentioned.
B. The extent and general arrangement of the work is designated on the drawings. Detail of suggested departures due to unforeseen conditions or other causes shall be submitted to the Architect for approval.
C. Complete sentence structure is not in all cases used in these specifications and on drawings. Nevertheless, the listing, mentioning or scheduling of any material or labor means that the same is part of the work under this Contract.

1.17 Drawings:

A. Consult the drawings for details such as finishes, dimensions, materials, etc.

1.18 Field Observation:

A. Frequent visits to the construction site by the architect's office will be made in order to observe progress and quality of construction work and to determine if the results of such work are in accordance with the Contract documents.
B. Unnecessary field conferences and reviews may be subject to charges to the contractor by the architect or owner. Contractor will inspect the work for compliance prior to scheduling a review.

1.19 Equipment Cleaning and Adjustment:

A. Upon completion of the work, the entire site shall be thoroughly cleaned. Defective items that cannot be corrected shall be replaced without cost to Owner.

1.20 Locked Storage:

A. Contractor understands and agrees that the Owner does not accept ownership nor does it make payment on and equipment/materials until it is installed in the permanent intended location serving its designed purpose, and accepted by the Owner. An exception to the payment of materials could be made by Owner if the materials are stored on the owner's site and locked in a container that is approved by the owner and in the control of the owner. The container must be weather-tight and protected from theft and/or vandalism. Pay request for these materials must be accompanied by a signed letter from the contractor stating the contractor remains responsible for the quality, size, quantity, color and proper fit for the materials that are included in the pay request until the materials are installed in a permanent location serving the purpose they are designed for and they are accepted by the architect and the owner.

1.21 Safety Regulations:

A. Contractor, sub-contractors, suppliers, sales persons, etc. will at all times observe and be in compliance with OSHA and insurance company safety policy requirements. Contractor will maintain a safe work environment. Failure to comply will be adequate reason for stopping the work until safe conditions are resumed. If contractor is unable to provide a safe work place, then the bonding company will be notified to take appropriate steps to complete the work in a safe manner at no additional cost to the owner.

1.22 Drug Free Workplace:

A. All contractors, sub-contractors, vendors and suppliers visiting or working at the site shall maintain a drug free workplace, post notification statements about drug-free workplace for employees and must specify actions that will be taken against employees for violations of such prohibition

B. Contractors/Sub-contractors shall provide and maintain Material Safety Data Sheets on the work site for any chemicals that are used on the premises, immediately notify the Owner and Architect of any hazardous chemical brought on the site or of and hazardous condition that might exist during the performance of this contract.

1.23 SUBMITTALS, SHOP DRAWINGS and SAMPLES

A. SUBMITTALS AND SHOP DRAWINGS are required on all Equipment and Accessories attached to or part of the Work.

B. SUBMITTALS AND SHOP DRAWINGS are required for all structural building and foundation components will require a *STATE* registered Engineer stamp and signature.

C. COPIES: TWO hard copies are required and ONE will be returned. Shop drawing will not be digitally approved..

D. Identification: Mark all Shop Drawings with the following: Project Name, Architect name, Contractor Name, Manufacturer name and address, Supplies/ Sub Contractor name and address, Date. Items marked to match items on Drawings.

E. REVIEW SCHEDULE: Allow 7 days for initial review and 10 days for resubmittal review

1.24 SAMPLES: The Contractor shall furnish to the Architect all color samples required for this project within **10 days**. The Architect will not select color for any items until all color samples have been submitted and approved. Samples shall be delivered with all shipping charges prepaid. Each sample shall bear label indicating the material represented, the name of the producer and the title of the project. Approval of a sample shall not be construed to change or modify any contract requirement or price. Approved samples shall be retained by the Architect until completion of the project."

2.0 GENERAL CONDITIONS

2.1 AIA Documents:

A. The General Conditions of the Contract for Construction, AIA Document A-201, 2017 Edition Articles 1 through 15, Pages 1-40 inclusive, are a part of these specifications to be complied with by all Contractors working on the project. Copies of the General Conditions are **not** included in these specifications but are available on line upon

request from the Architect's office.

3.0 GENERAL CONDITIONS (SUPPLEMENTS)

3.1 Article 2 is supplemented to read:
RIGHTS RESERVED BY THE OWNER

1) To let other contracts in connection with this work which is necessary or expedient. The Contractor shall afford such other Contractors reasonable opportunity for the introduction and storage of their materials and for the execution of their work and shall properly connect and coordinate his work with theirs.
2) To reject any or all bids.
3) To award the contract to some other contractor than the lowest bidder should it be deemed to the best interests of the Owner.
4) To waive any informalities in any proposal.
5) To request a copy of contractors financial statement prior to executing contract.

3.2 Article 1 is supplemented to read, "The Contractor awarded the contract shall receive a PDF file of the drawings and specifications for construction purposes. Contractors will be responsible for reproduction cost for all sets for construction.

3.3 Article 3 is supplemented to read, "In the event of a conflict between the drawings, specifications, or other contract documents, not covered in addenda prior to bid opening, the larger size, better quality or the greater quantity of work materials or equipment shall govern. Where reference is made to an item of equipment, such reference, whether in singular or plural form, is intended to apply to all similar items required to make the project complete. Refer to plans for quantities required. Mention herein or indication on the drawings of articles, materials or methods requires that the Contractor perform such work according to the conditions stated and providing all necessary labor, equipment, materials, accessories, etc., to produce a complete and functioning systems."

3.4 Article 3 is changed as follows: "The Contractor's guarantee to correct any defects due to faulty materials or workmanship or damage resulting there from shall be for a period of one year from the date of final certificate. Any items or work with major repair or replacement shall have the warranty period date restarted from the date of the repair or replacement

3.5 Article 3.12 is supplemented to read, "The Contractor shall furnish to the Architect all color samples required for this project as soon as reasonable. The Architect will not select color for any items until all color samples have been submitted and approved. The Contractor shall submit to the Architect not less than Two Hard Copies (2) copies and one will be returned of all shop drawings. Samples shall be delivered with all shipping charges prepaid. Each sample shall bear label indicating the material represented, the name of the producer and the title of the project. Approval of a sample shall not be construed to change or modify any contract requirement or price. Approved samples shall be retained by the Architect until completion of the project."

3.6 Article 3.15 is supplemented to read, "The General Contractor shall be responsible for maintaining the cleanliness of the project on a daily basis. It shall be the general contractor's responsibility to perform the final cleaning-up of the building, including washing and polishing of all applicable surfaces, such as floors, walls, windows, ceilings, millwork, cabinetwork, all glass etc., and including equipment furnished by other contractors."

3.7 Article 7 is supplemented to read as follows: "The Contractor shall itemize the actual cost for changes as follows and submit to Architect:

A. Labor, including foreman.
B. Material entering permanently in the work.
C. The Ownership or rental cost of construction plant and equipment during the time of use on the extra work.
D. Power and consumable supplies for the operation of power equipment.
E. Insurance:

To the above cost, there shall be added a fixed percentage fee of the actual cost; this fee shall be compensation to cover the cost of supervision, overhead, bond, profit and any other general expense. Contractor shall state in his bid the percentage for extra work and percentage for work deleted.

F. Subcontractor prices shall be itemized same as above.

3.8 Article 9 is supplemented to read, " Monthly estimates shall be submitted on a format similar to the enclosed application for payment. The Owner shall **retain** an amount equal to **Ten percent (10%)** of all partial payments until such time that the Architect approves the project as substantially completed.

Final payment on the contract shall subject to final acceptance by the owner and architect and receipt by the Contractor of waivers of liens from all persons concerned in the construction of the project, including equipment manufacturers, employees, etc. The Contractor may furnish, in a manner suitable to the Owner, an affidavit certifying that the Contractor will indemnify and save harmless the Owner from all claims, damages, expenses, attorney's fees, etc., in any action of liens against the Owner resulting from this project."

3.9 Article 9 is supplemented to read: Contractor understands and agrees the installation and new equipment must meet all current applicable codes, regulations, and ADA requirements (including but not limited to the must current edition of the State Building Code with all amendment. The systems must be approved by the local building inspector. (Note: this includes the necessary testing required by the local authorities.

3.10 Article 11.1 is supplemented to read, "The Contractor shall provide and maintain the following insurance with such insuring companies and in such forms as shall be satisfactory to the Owner:

A. Workmen's compensation which shall provide protection against any liability imposed by the workmen's compensation law of the State of ***Virginia*** and shall include occupational disease with full medical coverage. Include employer's liability protection with a limit of at least $100,000.

B. Comprehensive general liability, including owned automobiles, hired and non-owned autos. Policies to be written by companies licensed to do business in the State where the project is located.

C. Certificates, in quadruplicate, for the above insurance shall be submitted and filed with the contract. Each certificate shall include the provision that the policy will not be cancelled or the coverage reduced or eliminated without first giving thirty (30) days registered mail notice to the Owner and Architect. Certificates shall state that Section 4.18, "Indemnification", from the A.I.A. General Conditions is insured. Blank certificates will be furnished by Owner for completion by Contractor's insurance carrier.

3.11 INSURANCE REQUIREMENTS:

Policy Type	Limit Type	Limit	Additional Insured	Waiver of Subrogation
Commercial General Liability	Each Occurence	$3,000,000**	Yes*	No
Automobile Liability	Combined Single Limit	$1,000,000	Yes*	No
Excess/Umbrella Liability **	Unspecified	Unspecified	See Below**	No
Worker’s Compensation	Statutory	Statutory	N/A	Yes*
Employer’s Liability	Each Accident	$1,000,000	N/A	Yes
	Disease			
	Each Employee	$1,000,000	N/A	Yes
	Disease – Policy	$1,000,000	N/A	Yes

**Additional Insured Language*: The Above General, Automobile and Excess/Umbrella Liability policies have been endorsed to add the Owner, its subsidiaries and affiliates as additional insured.

*Waiver of Subrogation Language: the above Worker’s Compensation & Employer’s Liability policies have been endorsed to include a waiver of subrogation as to the Owner, its subsidiaries and affiliates.

***Excess/Umbrella Liability* is optional and may be used to supplement other liability policies. An Additional Insured endorsement is required if used to supplement the General Liability policy.

Certificate Holder -It is required that the Owner be named as the certificate holder on your liability policies.
Please ensure that your agent/broker includes the following certificate holder language:

3.12 Fire Insurance and Extended Coverage: The General Contractor shall carry fire insurance with extended coverage and vandalism and malicious mischief to cover the complete bid price of the contract.

4.0 END OF SECTION 01000

SECTION 03000 - CONCRETE WORK

1.0 SCOPE OF WORK The work covered under this section of the specifications consists in furnishing all plant, labor, equipment, supplies and materials and in performing all operations in connection with the Concrete Work, as required by these specifications and the accompanying drawings.

2.0 SHOP DRAWINGS Six (6) copies of shop drawings for reinforcing steel shall be submitted to the Architect for approval. Obtain approval of drawings prior to fabricating any reinforcing material or proceeding with the work. Shop drawings shall indicate bending diagrams, assembly diagrams, splice location and lap of bars, shapes, dimensions and details of bar reinforcing accessories. Prepare drawings in accordance with the "Manual of Standard Practice for Detailing Reinforced Concrete Structures" (ACI 315). Bar supports shall conform to the "Bar Support Specifications" outlined in "Manual of Standard Practice" published by Concrete Reinforcing Steel Institute.

3.0 CAST-IN-PLACE CONCRETE

3.1 General:

A. The work under this division shall comply with the requirements of the ACI-318-63 and the ACI Manual of Standard Practice for Detailing Reinforcing Concrete Structures (ACI-315-65), and with the Virginia State Building Code unless otherwise specifically noted on the drawings or in the specifications. Applicable parts of the general and special conditions govern work under this division.

B. ASTM Standards: The latest edition of the following ASTM Standards and ACI recommended practices are considered a part of the specifications:

C-31	Method of Making and Curing Compressions and Flexural Test Specimens in the field.
C-33	Specifications for Concrete Aggregates
C-39	Method of Test for Compressions Strength of Molded Concrete Cylinders.
C-42	Method of Securing, Preparing and Testing Specimens of Hardened Concrete for Compressive and Flexural Strengths.
C-94	Specifications for Ready-Mixed Concrete
C-138	Standard Test Method, Yield, and Air Content (Gravimetric) of Concrete
C-143	Method of Test for Slump of Portland Cement Concrete
C-150	Specifications for Portland Cement
C-171	Specifications for Waterproof Paper Curing of Cement
C-172	Standard Method of Sampling Fresh Concrete
C-173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
C-231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
C-233	Air Entraining Admixtures for Concrete
C-260	Specifications for Air Entraining Admixtures
C-309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
C-330	Standard Specification for Lightweight Aggregate for Structural Concrete
C-470	Standard Specification for Molds for Forming Concrete Test Cylinders Vertically
C-494	Standard Specification for Chemical Admixtures for Concrete
ACI-301	Specifications for Structural Concrete for Buildings
ACI-305	Recommended Practice for Hot Weather Concreting
ACI-306	Recommended Practice for Cold Weather Concreting
ACI-308	Recommended Practice for Curing Concrete
ACI-309	Recommended Practice for Consolidation of Concrete
ACI-318	Building Code Requirements for Reinforced Concrete
ACI-347	Recommended Practice for Concrete Formwork

C. Ready-Mix Concrete: If ready-mix concrete is used, source and laboratory mix must be approved by the Architect. Concrete shall be mixed in accordance with recommendations of the National Ready-Mix Concrete Association.

3.2 Materials:

A. Portland Cement shall conform to ASTM C-150, Type I or Type II. Use the same brand throughout the entire project.

B. Aggregate for concrete shall conform to specifications for concrete aggregate (ASTM C-39).

C. Water shall be clean and free from injurious amounts of oils, alkalis, organic matter or other deleterious substances and potable.

D. Stone fill under all slabs on earth shall be washed stone conforming to the requirements for coarse aggregate for heavy weight concrete with a maximum size of 3/4" or compacted crusher run.

E. Pre molded expansion joint filler for joints in contact with the earth shall be asphalt impregnated preformed type conforming to ASTM D944-71. All other filler shall be preformed non-extruding type conforming to ASTM D1751-65. All Tex-Mastic or equal.

F. Vapor barrier shall be 6 mil polyethylene film installed under all interior floor slabs on grade. Lap joints 6".

G. Sand: Shall be clean river sand conforming to ASTM C-33.

3.3 Admixtures:

A. Admixtures, except air-entraining agents and water-reducing agents, shall be used only with the written permission of the architect.

B. Air-entraining admixture shall be used for all concrete work.

C. Air-entraining admixture shall conform to "Specifications for Air-Entraining Admixtures for Concrete", ASTM C-260.

1) The air-entraining admixture shall be used in strict accordance with the manufacturer's recommendations. It shall be added at the mixer in such quantity that a total air content, by volume, of the percentage specified ACI-318-83-4.5 is consistently entrained in concrete.

2) Air-entraining admixture shall be "Aerolith" manufactured by Sonneborn Building Products, "Sealtight" manufactured by the W. R. Meadows, Inc., Master Builders' "Vinsol Resin MB-VR" or approved equal. Percentage per yard to be no less than 4% and no more than 6%.

D. Water-reducing agents shall be "Sonotard" by Sonneborn Building Products, "Pozzolith 133-N" by Master Builders Company, or an approved equal. Water-reducing agent must be by the same manufacturer as air-entraining agent.

E. Calcium chloride or any accelerating admixture containing calcium chloride shall not be used as an admixture in any concrete.

F. Where more than one admixture is used, all admixtures shall be compatible.

3.4 Storage of Materials:

A. Placement and aggregate shall be stored in a manner that prevents deterioration of intrusion of foreign matter. Any materials which have deteriorated or have been damaged shall not be used for concrete.

B. Aggregate stock piles shall be arranged and used in a manner that will prevent segregation or contamination with other materials. Samples of materials shall be furnished to the architect upon request.

C. Sand shall be allowed to drain until it has reached a uniform content before it is used.

3.5 Concrete Mix:

A. Concrete for all parts of the work shall be homogeneous, and when hardened, shall have the required strength, resistance to deterioration, durability, resistance to abrasion, water tightness, appearance, and other specified properties.

B. Strength Requirements: All normal weight concrete shall be proportioned by Method I or Method 2 in accordance with Paragraph 3.8.2 of ACI Standard 301-72 to produce the following 28-day compressive strengths:

TYPE OF CONSTRUCTION	F'c (PSI) @28 days	W/C RATIO	Aggr. (ASTM)	Slump Min-Max	20% ASH CEMENT	Air Entrainment
Wall & Col. Footings	2500	.58	#57	4"-5"	517	No
Interior Slabs	3000	.49	#57	4"-5"	517	Yes

Exterior Work	3500	.47	#57	4"-5"	564	Yes
Formed Curbs	3500	.47	#57	4"-5"	564	Optional
Machine Curbs	3000	.49	#78	2"-3"	564	Optional
Bond Beams	2500	.58	#78	7"-8"	525	No

C. Proportions selected by an approved testing laboratory and approved by the contractor shall be used as a standard under this contract. The results of the proportions shall be submitted to the contractor for his approval. The concreting operations shall proceed under this mix design, but if at any time the tests of job concrete indicate that it fails to meet the required strength, slump, air content and rate of hardening requirements, the contractor shall be required to change the proportions to meet the requirements.

3.6 Reinforcement:

A. General:

1) Contractor shall provide all reinforcing steel, wire mesh and accessories as shown or required by the drawings or herein specified.

2) Shop drawings showing all reinforcing and cast-in-place accessories shall be submitted to the architect for approval.

B. Materials: (All materials this section shall be of domestic manufacture.)

1) Reinforcing steel: New billet stock of intermediate grade, ASTM A615, grade 60.

2) Smooth dowels shall be plain steel bars conforming to ASTM A306, grade 80 or A499.

3) Metal Accessories: Provide spacers, ties, chairs, bar supports and other devices required to properly support and fasten reinforcing steel in place in accordance with ACI-315-74. Accessories required by other trades shall be furnished by those trades.

C. Location: Welded wire fabric shall be installed in all concrete floor slabs and concrete walks and elsewhere as called for.

3.7 Fabrication:

A. Detailing and bending of bars shall be done in accordance with ACI Detailing Manual 315-74. Bars shall be bent cold.

3.8 Placing of Reinforcing Steel:

A. Bars: Reinforcement shall be placed accurately in accordance with plans and secured in position prior to placing concrete. Splices shall have a minimum lap of 24 bars diameters.

B. Footing Reinforcing: Provide #3 bar ties tied to continuous bars for alignment at all laps. Use #2 bars for grade markers and continuous bar supports. Do not use wood stakes. Hold reinforcing 3" above grade if not otherwise indicated on drawings.

C. Reinforcing Mesh: Install steel welded wire mesh in all floor slabs and all sidewalks. Wire mesh shall be pulled tight to insure exact placing in center of slab thickness.

3.9 Placing Concrete:

A. Concrete shall be conveyed from mixer to place of final deposit by methods which will prevent the separation or loss of materials. Equipment for chuting, pumping and pneumatically conveying concrete shall be of the size and design such as to insure at the delivery and a practically continuous pour of concrete without separation of materials.

B. Concrete shall be deposited continuously or in layers of such thickness that no concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located at points as provided for in the drawings or as

approved. Placing shall be carried on at such a rate that the concrete still contaminated by foreign materials shall not be deposited.

C. No free falls in excess of 3'-0" will be permitted. Use tremle or elephant trunks.

D. Concrete shall be thoroughly compacted in slabs by vibration or walk-in or other approved methods. After the concrete has been compacted it shall be struck off with along float in long strokes, leaving a completely smooth and creamy texture free of all honeycomb. Watch for and avoid high places as screeds.

E. Place concrete with the aid of mechanical vibration, under experienced supervisor and in forms designed to withstand vibrations. Supplement vibrating by spading. No raking is permitted.

F. Placing of concrete in framed elements shall not be started until the concrete previously placed in walls and columns is no longer plastic.

3.10 Construction Joints:

A. Written approval shall be received from the Architect for exact locations for joints not indicated on drawings.

B. All reinforcing steel shall be continued across joints. Keys and inclined dowels shall be provided as directed by the Architect. Longitudinal keys at least 1 1/2" deep shall be provided in all joints in walls and between walls and slabs or footings and between slabs.

C. The surface of the concrete at all joints shall be thoroughly cleaned and all forming removed before new concrete is placed.

D. Joints shall be formed by the use of a screed key joint of not lighter than 24-gauge galvanized metal for all floor slabs.

E. Construction joints, unless noted otherwise, shall be 20'-0" x 20'-0".

3.11 Expansion Joints:

A. Pre molded expansion-joint filler strips shall be 3/8 inch thick unless otherwise shown at all walls and columns.

B. Joint sealant shall be "Flexiseal" by Dap, Inc., "Hornflex" or "Vertiseal" by W. R. Grace & Co., "Sonolastic" by Sonneborne Building Products, "Lasto-meric" by Tremco Manufacturing Co. or an approved equal.

3.12 Concrete Floor Slabs on Ground:

A. Floor slabs poured on ground and/or stone fill shall be saw cut 1” deep not exceeding 400 sq. ft. in area. Joints shall be generally located on column lines, under walls etc.

B. and shall be formed straight and true.

B. Floor slabs poured on ground and/or stone fill shall not be poured until the superstructure is completed and stripped and all underground piping is installed. Permission may be given to the Contractor to pour the floor slab on ground before completion of the superstructure provided his method of safeguarding the slab during the completion of the work is considered adequate by the Architect.

3.13 Removal Strength:

A. When formwork removal or re-shoring removal is based on the concrete reaching its 28 day strength (or a specified percentage thereof) the concrete shall be presumed to have reached this strength when either of the following conditions have been met:

B. When test cylinders, field cured under the most unfavorable conditions prevailing for any portion of the concrete represented, have reached the required strength. Except for the field curing and age at test, the cylinder shall be molded and tested as specified.

C. When the concrete has been cured as specified for the same length of time as the age at test of laboratory cured cylinders which reach the required strength. The length of time the concrete has been cured in the field shall be determined by the cumulative number of days or fraction thereof, not necessarily consecutive, during which the temperature of the air in contact with the concrete is above 50 degrees F and the concrete has been damp thoroughly sealed from evaporation and loss of moisture.

3.14 Curing, Hardening and Protection:**VERIFY SEALER/HARDNER COMPATIBILITY WITH FLOOR FINISHES.**

A. Freshly deposited concrete shall be protected from prematurely drying and excessive hot or cold temperatures and shall be maintained without drying at a relatively constant temperature for the period of time necessary for the hydration of the cement and the proper hardening of the concrete.

B. Initial curing shall immediately follow the finishing operation. Concrete shall be kept continuously moist at least overnight by either (1) ponding or continuous sprinkling or (2) absorptive mat or fabric kept continuously wet.

C. Final curing shall immediately follow the initial curing and before the concrete is dried. Final curing shall be accomplished by using a concrete sprayable compound, applied in strict accordance with the manufacturer's directions.

D. The surface of all interior exposed concrete slabs and stair treads shall be treated and hardened by the use of an approved chemical hardener and shall be applied in 2 treatments as suggested by the manufacturer. Curing compound and hardener shall be "SealCure" by W. R. Meadows, Inc., Cure and Seal by Uclid or "Master Seal" by Master Builder or as approved by the Architect.

3.15 Cold and Hot Weather Concreting:

A. Cold Weather

1) Adequate equipment shall be provided for heating the concrete materials and protecting the concrete materials and protecting the concrete during freezing or near freezing weather. No frozen materials or materials containing ice shall be used.

2) All concrete materials and all reinforcement, forms, fillers and earth with which the concrete is to come in contact with shall be free from frost. Whenever the temperature of the surrounding air is 40 degrees F or below or when the weather conditions are such that the temperature is falling below 40 degrees F, all concrete placed in the forms shall have a temperature of between 50 degrees F and 70 degrees F and an adequate means shall be provided to maintain the temperature of not less than 70 degrees F for four (4) days or 50 degrees F for seven (7) days. The housing, covering, or other protection used in connection with curing shall remain in place and in tact at least 24 hours after the artificial heating is discontinued. No salt or other chemical shall be used for the prevention of freezing.

3) No concrete shall be poured when the temperature is below 40 degrees F except as follows:

If the Contractor proposes to pour concrete when the temperature is below 40 degrees F, he shall submit in writing his proposal for heating, protecting, and curing the concrete for approval. Concrete that is permitted to be poured in temperatures of 40 degrees F or less shall conform to ACI 306, "Recommended Practice for Winter Concreting", with the following exceptions:

A) No calcium chloride or other accelerators or "anti-freezes" shall be used.

B) High early strength, type III, cement shall not be used.

C) In addition to laboratory cured test cylinders, additional specimens for testing shall be cured under field conditions as required and directed by the Architect to check the adequacy of curing and protection of the concrete. All test paid for by Contractor.

B. Hot Weather

1) Concrete to be poured when the air temperature is above 80 degrees F shall have approved admixture designed to retard the rate of set. The admixture shall be used in strict accordance with the manufacturer's recommendations. Concrete shall have a placing temperature which will not cause difficulty from loss of slump, flashset or cold joints.

3.16 Patching and Surface Defects:

A. After forms have been removed, any concrete which is not formed as shown on the plans, or which is out of alignment or level beyond required tolerances or which shows a defective surface which cannot properly be repaired or patched shall be removed.

B. All tie holes and all repairable defective areas shall be patched immediately after form removal.

C. All honeycombed and other defective concrete shall be removed to sound concrete, but in no case to a depth of less than one (1) inch. The areas to be patched and an area of at least six (6) inches wide surrounding it shall be dampened to prevent absorption of water from the patching mortar. A bond of Portland cement and water shall be mixed to the consistency of thick paste and brushed into the surface to be repaired. The patching mixture shall be made of the same materials and of approximately the same proportions as used for the concrete except that the coarse aggregate shall be omitted. The patching mortar shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding surface. Patched areas shall be kept moist for a period of seven (7) days.

3.17 Finishing and Cleaning:

A. General:

1) Floors shall be level with a maximum tolerance of 1/8" in 10'-0" except where drains occur, in which case the floor shall be sloped to drain as indicated. No dry cement nor mixture of dry cement and sand shall be sprinkled directly on the surface of the concrete to absorb the moisture or to stiffen the mix.

2) Floors shall be level with a maximum tolerance of 1/8" in 10'-0" except where drains occur, in which case the floor shall be sloped to drain as indicated. No dry cement nor mixture of dry cement and sand shall be sprinkled directly on the surface of the concrete to absorb the moisture or to stiffen the mix.

3) The surface of the concrete shall be compacted and screeded as required to produce slabs of the required thickness with reasonably true and uniform surfaces to the required lines and grades. Steel trowel to a dense, smooth, unblemished surface. Do not float or trowel while concrete is wet. Where no other finish is specified, trowel and finish a second time when set is hard enough to ring the trowel.

B. Finishes:

1) Interior floor slabs: Smooth trowel finish
2) Interior floor slabs under hard tile or stone: Float finish
3) Exterior sidewalks: Broom finish
4) Exposed exterior and interior walls: Rubbed smooth

3.18 Concrete Tests:

A. **Tests shall be arranged for and paid for by the Contractor**. The following responsibilities will be required of the testing laboratory representatives when tests are called for.

1) Test the Contractor's proposed materials for compliance with the specifications.

2) Review and check test the Contractor's proposed mix design.

3) Conduct strength tests of the concrete in accordance with the following procedures.
   A) Test three specimens at 30 days and one at 7 days in accordance with "Method of Test for Compressive Strength of Molded Concrete Cylinders" (ASTM C39). The 28 day test result shall be the average of the strengths of three specimens. Should more than one specimen in a test show any defects, the entire test shall be discarded.
   B) Make one strength test for each 30 cubic yards or fraction thereof for each mix design of concrete placed in any one day, except that in no case shall a given mix design be represented by less than five tests.
   C) Report all test results to the Contractor on the same day that test are made.
   D) Make slump test on each truck load of concrete.
   E) Record of outside air temperature at the time of pouring.
   F) Record the location of each concrete pour.
   G) Reject concrete that comes to the job with slumps on excess of the maximum as specified.

B. Testing shall be done in accordance with ASTM C-39. Slump tests shall be made in accordance with ASTM C-143.

C. The use of the testing laboratory shall in no way relieve the Contractor of his responsibility to furnish materials and construction in full compliance with the plans and specifications.

D. If the average strength of the laboratory control cylinders for any portion of the structure falls below the compressive strengths called for on the plans, the Architect shall have the right to order a change in the mix proportions or the water contents for the remaining part of the job. Mail copies of all test reports to the Contractor and Architect.

E. If the test shows non-compliance, the Contractor shall correct the work to comply with contract documents at no cost to the Owner. Additional time will not be granted.

4.0 ENDOFSECTION03000

SECTION 04000 - MASONRY

1.0 SCOPE OF WORK The work covered under this section of the specifications consists in furnishing all plant, labor, equipment, supplies and materials and in performing all operations in connection with the Masonry Work as required by these specifications and the accompanying drawings.

2.0 MORTAR

2.1 General:

A. This section covers mortar for use in the construction of masonry work.

B. Cementtitious materials and aggregates shall be handled and stored in such a manner as to prevent deterioration or intrusion of foreign material.

C. Cement and mortar mix manufacturers must be approved by the Architect. Use only one brand throughout entire job.

2.2 Materials:

A. Sand: Aberdeen or Petersburg

B. Water: Potable, clean and free from deleterious amounts of acids, alkalis or organic materials.

2.3 Mixes:

A. Use Type S mortar for all unit masonry below grade, ASTM C91-71. (1800 psi at 28 days)
B. Use Type N mortar for all unit masonry above grade, ASTM C91-71. (750 psi at 28 days)

2.4 Mixing:

A. All cementitious materials, aggregate and water shall be mixed for a minimum of five minutes after the last ingredients have been added. Mortars shall be vigorously mixed with maximum amount of water consistent with the needs of the masonry for workability in a mechanical batch mixer.

2.5 Re tempering of Mortar:

A. Mortars which have stiffened on the board because of evaporation of water may be re tempered by adding water as needed to restore required consistency. Mortar shall be used and placed in final position within one hour after mixing.

2.6 Installation:

A. Masonry wall shall be laid with a common bond and shall be plumb, level and true to an exact line. Courses shall be kept horizontal and joints kept plumb. Each brick shall be buttered with mortar from the board then shoved in a full bed of mortar. Each block shall have mortar applied freely to the webs and sides before being set in place. Feathering the masonry with excess mortar cut from the bed will not be permitted.

2.7 Environmental Conditions:

A. No masonry construction will be permitted during extremes of climate factors or rainfall, temperature, relative humidity and wind. Construction will not be permitted during or immediately after periods of 100% relative humidity and when masonry units are saturated with water.

B. A winter admixture will **not** be permitted. Work will not be permitted when temperature is 40 degrees F and falling, and not until the temperature is 33 degrees F and rising. If rising temperature has not reached 40 degrees F by 12 noon, work shall be suspended.

C. Protection: During erection, keep walls dry by covering at the end of each day or shutdown period. Protect partially completed walls (not being worked on) similarly at all times. Covering shall overhand at least 2'-0" on each side of the walls and shall be anchored securely. Covering shall be waterproof.

2.8 Cleaning:

A. Brick and Block Work: All brick and block work shall be cleaned by using a piece of block and rubbing over the surface of the walls. Leave all surfaces clean and in a paintable condition.

B. Exposed brick work shall be cleaned with Sure-Clean & brushes rinsed with water to obtain manufactured color & appearance free of stains and discoloration.

3.0 CONCRETE UNIT MASONRY

3.10 General:

A SCOPE OF WORK The work covered under this section of the specifications consists in furnishing all plant, labor, equipment, supplies and materials and in performing all operations in connection with the Masonry Work as required by these specifications and the accompanying drawings.

3.2 Materials:

A. Concrete Masonry Units:

1) Size: Modular, thickness as indicated. Before using masonry block, submit samples with independent laboratory test report, National Board of Fire Underwriter's approval and receive approval of block by Architect.
2) Aggregate: Solite ASTM C-33 or Weblite.
3) Curing: Cure units in a moisture-controlled atmosphere or in an autoclave at normal pressure and temperature to comply with ASTM C90, Type I.
4) Compliance: With ASTM C-90-52 NCFIRB.
5) Moisture: 30% of absorption maximum.
6) Linear Shrinkage: 0.03% ASTM C-140.

B. Concrete Brick: Same as for CMU.

3.3 Erection:

A. Continuous joint reinforcement specified shall be laid in alternate horizontal joints of interior concrete masonry unit and brick partitions and in all exterior walls.

B. Bond each course of all units at corners in a masonry bond and at intersections with metal ties, anchors, or joint reinforcement spaced vertically not exceeding 16". Filling in with brick will only be permitted where brick and units will not be exposed in finish work.

C. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Lay solid units with full head and bed joints. Make joints uniform approximately 3/8" thick unless indicated otherwise.

D. Lay masonry plumb and true to line. Lay with courses level and spaced accurately. Use a story pole marked with all courses.

E. Break each course joint with course below unless shown otherwise. Keep bond plumb throughout.

F. Lay corners and reveals plumb and true. Avoid over plumbing and pounding corners and jambs to fit stretcher units after they are set in position.

G. Exterior brick work shall extend to footings, unless shown or noted otherwise on plans.

H. Joints:

1) Tool all exposed block joints with a metal rod to produce a concave joint.
2) All joints in block covered with drywall shall be struck off and pointed with the tip of the trowel only.

4.0 CLEANING:

A. Block Work: All block work shall be cleaned by using a piece of block and rubbing over the surface of the block walls. Leave all surfaces clean and in a paintable condition. Unpainted block in exposed locations shall be cleaned to their manufactured color and appearance.

5.0 ERECTION:

A. All CMU are to be laid in straight running bond in a full bed of mortar with all joints completely filled. Joints are to be approximately 3/8" thick and are to be tooled on exterior face as indicated below and as per approved sample. All CMU courses shall be kept true to level and held rigidly to the story and rod at all times. No CMU are to be laid in freezing weather.

C. Interior and exterior CMU: Struck flush and tooled with rod to produce a concave joints.

1) All joints shall be tooled the day the work is installed, and no tacky or wet joints shall be left.

6.0 EQUIPMENT AND MATERIALS SET BY MASONS

A. The masons shall set and build into the walls expansion joints, flashing, grilles, foundation ventilators, clean-out doors, anchors, bolts, etc., as required and furnished by the various other trades.

7.0 JOINT REINFORCEMENT

7.1 General: Furnish all joint reinforcement as indicated on the drawings and as herein specified.

A. Storage of Materials: Store all materials under cover and protect from rusting, oil, grease or distortion. Only materials needed for immediate use shall be removed from storage.

7.2 Materials:

A. ALL CMU Walls: For all walls use Dur-O-Wall standard LADDUR type in alternate horizontal joints or 16" on center vertically.

C. All Dur-O-Wall reinforcing shall be galvanized.

D. See drawings for wall anchors and dovetail slots required at wall connections.

7.3 Installation:

A. Joint Reinforcement: Place masonry reinforcing horizontally and continuous in all masonry every 16" on vertical height. Except for solid brick walls. The reinforcement shall be seated in the mortar bed by lighting cross ties as work progresses.

B. The top course of all masonry walls and the first two courses above and below all wall openings shall be reinforced. The reinforcement at the openings shall extend not less than 18" beyond each side of the opening.

C. Prefabricated corners and partition tees shall be used to insure continuous reinforcement at all wall intersections and corners.

D. Lap all joints six to eight inches (6" - 8").

8.0 END OF SECTION 04000

SECTION 05500 - MISCELLANEOUS METAL FABRICATIONS

1.0 GENERAL

1.1 Related Documents:

A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

1.2 Standards:

A. Where specific standards, tests or criteria of following organizations are referred to in these specifications, it is intended that the specification refers to the latest standard, test or criteria adopted by that organization unless a specific date of adoption is included as part of the reference herein.

1) American Institute or Steel Construction (AISC).
2) American Iron and Steel Institute (AISI).
3) American National Standards Institute (ANSI).
4) American Society for Testing and Materials (ASTM).
5) American Welding Society (AWS).
6) AISI "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", and "Code of Standard Practice for Steel Buildings and Bridges".
7) AISC "Specification for the Design of Cold-Formed Steel Structural Members".
8) AWS "Structural Welding Code".
9) ASTM A6 "General Requirements for Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".

1.3 Submittals:

A. Product Data: Submit copies of manufacturer's specifications, anchor details and installation instructions for products to be used as miscellaneous metal work and materials used in the fabrication of miscellaneous metal work, including paint products.

1) Access panels.
2) Steel used for:
   a) Ladders.
   b) Handrails and pipe railing.
   c) Steel lintels.
   d) Steel bearing plates.
   e) Standoff brackets for Curtain Wall system
3) Primers for steel and galvanized steel for primer under paint specified in Section 09900, "Painting".
4) Primers for steel and galvanized steel, for primer under special coating, specified in Section 09815, "Special Coating".

B. Samples: Submit for materials and finished products as indicated below.
1) Expansion joint covers.

C. Shop Drawings: Submit for fabrication and erection of miscellaneous metal assemblies. Include plans and elevations at not less than 1 in. to 1 ft.-0 in. scale, and include details of sections and connections at not less than 3 in. to 1 ft.-0 in. scale. Indicate anchorage and accessory items.

1) Access panels.
2) Ladders.
3) Hand rails and pipe railings.
4) Steel bearing plates.
5) Standoff brackets for Curtain Wall system

1.4 Quality Assurance:

A. Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting wherever taking field measurements before fabrication might delay work.

B. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly.

2.0 PRODUCTS

2.1 Metals:

A. Steel:

1) Steel shall conform to ASTM A36 for structural steel and A27 for cast steel. Miscellaneous steel not otherwise indicated or specified shall be mild steel.
2) Steel plates to be bent or cold-formed: ASTM A283. Grade C.
3) Structural tubing: (hot formed welded or seamless) ASTM A501.
4) Cold-drawn tubing: ASTM A512.
5) Pipe: ASTM A53.
6) Cold finished steel bars: ASTM A108.
7) Cold-rolled carbon steel sheet: ASTM A366.
8) Galvanized carbon steel sheet: ASTM A526 with zinc coat complying with ASTM A525 G90.
9) Stainless steel: basic, austenitic, Type 302, conforming to ASTM A167, Grade 2. Stainless steel shall receive No. 4 standard polish on exposed faces.

B. Iron:

1) Cast iron: Soft gray iron, true to pattern, smooth and straight, and free from defects impairing strength, durability, or appearance. ASTM A48, and unless designated otherwise, shall be Class No. 30 with a minimum tensile strength of 30,000 PSI.
2) Malleable iron: Conforming to ASTM A47, be high grade, white iron castings, fully annealed and of uniform, ductile structure throughout.
3) Wrought iron: Conforming to ASTM A207 for bars, A42 for plates and A162 for sheets.

C. Aluminum:

1) Aluminum: Extruded, forged or rolled new metal, as hereinafter noted for each item, of given alloy, or as is most suitable for intended use. Unless otherwise specified, finish will be "as fabricated", protected by a coating of water-white, methacrylate lacquer.

2.2 Fasteners:

A. Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, size and class required.

1) Bolts and nuts: Regular hexagon head type, ASTM A307, Grade A.
2) Lag bolts: Square head type.
3) Machine screws: Cadmium plated steel.
4) Wood screws: Flat head carbon steel.
5) Plain washers: Round, carbon steel.
6) Masonry anchorage devices: Expansion shields.
7) Toggle bolts: Tumble-wing type, type, class and style as required.
8) Lock washers: Helical spring type carbon steel.
9) Stainless steel bolts Type 302, No. 4 or 180 grit finish.
10) Headed stud shear connectors: ASTM A108, Grade 1015 or 1020, cold finished carbon steel; with dimensions complying with AISC specifications.

2.3 Paint:

A. Use a rust inhibitive metal primer paint containing less than 1 percent lead.

B. Select a primer paint compatible with required finish coat of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09900, "Painting".

2.4 Manufactured Products:

A. Access Panels and Frames:

1) Provide steel access panels and frames of size indicated and of style consistent with the wall type in which panel is to be mounted.

a) Frames shall be 16 gauge.
b) Panels shall be 16 gauge.
c) Provide continuous steel piano hinge with stainless steel pin.
d) Provide key operated cylinder locks, master keyed to the College Master Lock System.
e) Finish in manufacturer's standard baked-on rust inhibitive paint.

2) Acceptable manufacturers:

a) Boico, Birmingham Ornamental Iron Company.
b) Milcor; Inryco, Inc.

c) Karp; Karp Associates, Inc.

B. Loose Steel Lintels:

1) Provide loose structural steel lintels for openings and recesses in masonry walls and partitions, unless otherwise indicated. Weld adjoining members together to form a single unit where indicated. Provide not less than 8" solid brick bearing three-courses high at each side of openings, or 8" high CMU with concrete unless otherwise indicated.

C. Loose Bearing Plates:

1) Provide loose bearing plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting, as required.

D. Steel Railing:

1) Fabricate railings of standard weight nominal steel pipe per drawings. Form rail-to-end post connections and all changes in rail direction by miters.

2) Cut material square and remove burrs from all exposed edges, with no chamfer.

3) Make exposed joints butt tight and flush.

4) Close exposed ends of pipe and handrail by use of appropriate end cap.

5) Set vertical pipe supports extending into concrete into built-in steel pipe sleeves not over 6" deep. Caulk joint between rail uprights and sleeve with epoxy grout.

6) Locate intermediate rails as indicated on drawings.

7) Verify dimensions on site prior to shop fabrication.

8) Handrails to be 1 1/2"1 1/2" steel pipe. Handrail brackets Blum 305 at 60" O.C. Mount on steel plates as applicable. Extend handrails 1’ -0” past last and first riser.

2.5 Workmanship:

A. Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the project site. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

B. Use materials of size and thicknesses indicated, or if not indicated, of adequate strength and durability in finished product for intended use. Work to dimensions indicated using proven details of fabrication and support.

C. For the fabrication of steel stairs and other work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes including zinc coatings.

D. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. East exposed edges to a radius of approximately 1/32 in., unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Weld corners and seams continuously and in accordance with recommendations of AWS. Grind exposed welds smooth and flush, to match and blend with adjoining surfaces.

F. Form exposed connections with hairline joints which are flush and smooth, using concealed fasteners wherever possible, use exposed fasteners of type indicated, or if not indicated, use Phillips flathead (countersunk) screws or bolts.

G. Provide for anchorage of type required, coordinated with supporting structure. Fabricate and space anchoring devices, as required, to provide adequate support for intended use.

H. Cut, reinforce, drill and tap miscellaneous metal work as may be required to receive other items of work.

I. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent grating, plates, doors or other work to be retained by framing. Unless shown otherwise, fabricate from structural steel shapes and plates and steel bars, of welded construction using metered corners, welded brackets and splice plates and a minimum number of joints for field connections. Equip units with integrally welded anchor strips for casting into poured concrete. Furnish inserts, if units must be installed after concrete is poured. Except as otherwise indicated, space anchors 2 ft.-0 in. O.C.

J. Shop Painting:

1) Shop paint all miscellaneous metal work, except those members of portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded and galvanized surfaces, unless otherwise noted.
2) Remove scale, rust and other deleterious materials before shop coat of paint is applied.
3) Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning".
4) Clean and coat castings with coal-tar-pitch varnish.
5) Apply one shop coat of metal primer paint to fabricated metal items, except apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish from first.
6) Brush or spray on metal primer paint immediately after surface preparation. Apply in accordance with manufacturer's instructions.

3.0 EXECUTION

3.1 Field Conditions:

A. Verify measurements in field for work fabricated to fit job conditions.

B. Examine adjoining work on which miscellaneous metal work is dependent before starting work.

C. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal items to in-place construction including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors, as required.
1) Furnish inserts and anchoring devices which must be set in concrete or built in to masonry for installation of miscellaneous metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

D. Perform cutting, drilling and fitting required for installation of miscellaneous metal items. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.

E. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind joints smooth and touch-up shop paint coat. Do not weld, cut or abrade surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

3.2 Field Welding:

A. Comply with AWS Code for procedures of manual shielded metalarc welding, appearance and quality of welds made, and methods used in connecting welding work.

3.3 Touch-Up Painting:

A. Clean field welds, bolted connections, and abraded areas of shop paint immediately after erection and paint exposed areas with same paint as used for shop coat.

B. Adjust gates and leave in proper operating condition.

3.4 Installation of Manufactured Items:

A. Install manufactured items in accordance with manufacturer's written installation instructions.

4.0 MISCELLANEOUS METALS & HARDWARE

4.1 General:

A. Furnish all miscellaneous steel or metal items herein specified, shown on plans, or incidental to the completion of the project.

B. All materials shall be free from defects that impair strength, durability and appearance.

4.2 Materials:

A. Rough Hardware: Furnish all bolts, nuts, washers, nails, expansion shields, toggle bolts, clips, plates, etc., as necessary for complete installation.

B. Mechanical Equipment Supports: Furnish all angles, columns, etc., as required mechanical equipment supports as shown on the structural drawings and mechanical drawings.

C. Miscellaneous railings, catch basin grates, etc., as required by drawings.

4.3 Installation:

A. Nails (Where Applicable): Generally the minimum fastening of wood members using nails is as follows:
   1) 2 x 4's to plates or blocking: Four 8d "toe nail" or Two 16d thru plates into studs.
   2) 2 x 6's to plate or blocking: Six 8d "toe nail" or Three 16d thru plates into studs.
   3) 1/2" Plywood or OSB Sheathing to Wood Framing - 8d @ 12" on center.
   4) Blocking: Three 16d for 2 x 4's, Four 16d for 2 x 6, 2 x 8.
   5) Bands: Three 16d for 2 x 6 and 2 x 8, Four 16d for 2 x 10 and 2 x 12.

5.0 ENDOFSECTION05500

SECTION 06000 - CARPENTRY

1.0 GENERAL

1.1 Scope of Work: The work covered under this section of the specifications consist in furnishing all plant, labor, equipment, supplies and materials and in performing all operations in connection with the carpentry work, as required by these specifications and the accompanying drawings.

1.2 Co-ordination: The carpentry and millwork shall be co-ordinated with the work of all the other trades so that there will be no delay in the progress of the work.

1.3 Foreman: Provide on the job a competent carpenter foreman who is familiar with the type of construction covered by these plans and specifications. He shall lay out the work of the different trades, marking lines of partitions, rooms, doors, opening heights, etc., and shall be constantly available to the Architect and their representatives for all instructions. All incidental questions involving methods of installation, dimensions, or other matters not clearly or definitely specified or shown shall be referred to the Architect for decision before installation is made.

1.4 Workmanship:

A. Competent and skilled mechanics shall be provided at the job, capable of producing a high quality of workmanship. All work shall be straight, plumb, square and true, substantially anchored, fitted, mitered, scribed and glued where necessary; all in first-class and workmanlike manner. Mechanics skilled in the respective trades shall be assigned to a special carpentry work such as "trimming out" fitting hardware, erecting cabinet and panel work as required by the drawings.

B. All woodwork shall be installed by skilled carpenters, all joints are to be neatly made and tightly fitted and glued. Sand all surfaces clean and smooth.

C. Scarred work or work marred by tools will not be accepted. The contractor shall remedy any such damaged work at no cost to the Owners. All reasonable precautions shall be taken to protect work until final inspection.

D. Cutting and Fitting: The carpenter shall do all such work in his line as is usually required by the plumbing and electrical contractors and other mechanical contractors about the building and shall cooperate with the other contractors in every possible way.

E. Rough and Finish Fastening Hardware: Furnish and install all screws, nails, brackets, fasteners, bolts and etc., to securely erect this work. All fastening shall be done in a strong and substantial manner and any work not installed consistent with good practices shall be removed and redone at the discretion of the Architect at no additional cost to the Owner.

F. Installation of Finish Hardware: The General Contractor shall install finished hardware. Only competent workmen shall be used for this work.

G. Refitting: The Contractor shall do all necessary refitting and adjusting of doors and hardware for a period of one year after the date of final acceptance and at no additional cost to the Owner.

H. Guarantee: The Contractor shall guarantee all carpentry work and all millwork materials and workmanship against defect for a period of one year after final acceptance, and he shall replace and make good all defective workmanship or material which develop in this period at no additional cost to the Owner.

2.0 ROUGH CARPENTRY

2.1 General: This shall include the installation of all wood framing, plates, bucks for wooden frames, all shoring and wood centering for masonry of stone, blocking, templated, nailers, sleepers, screeds, stripping, grounds and furring. This work is to be accurately done and nailed together in a strong substantial manner.

2.2 Grounds and Furring:

A. Install all necessary grounds to secure trim and all other interior work.

B. Grounds shall be securely fastened to structural frames and shall be set plumb and true to a line.

C. All grounds and furring in contact with masonry and concrete slab shall be pressure treated with Osmose K33 Salts.

2.3 FASTENERS:

A. General use framing nails shall be medium diamond point, flat head common nails or deck screws.

2.4 Installation

A. Provide blocking or furring for anchoring light fixtures, outlets, equipment supports, mechanical openings, etc.

3.0 END OF SECTION 06000

SECTION 07920 - CAULKING & SEALANTS

1.0 GENERAL

1.1 Scope of Work: The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances and materials and in performing all operations in connection with the installation of all Caulking & Sealants, complete in strict accordance with this specifications and the applicable drawings.

2.0 PROTECTION

2.1 General:

A. This contractor shall protect all his materials and work incorporated in the building or stored on the site and he shall replace all work damaged during his operation.

B. This contractor shall at all times protect the finished wall faces against defacement and other damage that could be caused by this equipment or materials. Where necessary to transport equipment or materials over finished roof surfaces, these shall be adequately protected against damage.

3.0 CLEANING Clean masonry walls and flashing free from stains resulting from this work.

4.0 INTERIOR & EXTERIOR WHERE CAULKING IS PAINTED:

A. Material: Caulking to be DAP Acrylic Latex Caulk

B. Installation:

1) Install in strict accordance with the manufacturer's instructions.

2) Clean Joints to be caulked.

3) Caulk all openings, around frames, louvers, stone, etc., except material for expansion joints to be same as for exterior.

5.0 EXTERIOR WHERE CAULKING IS NOT PAINTED:

A. Materials: Sealant compound to be Dow Chemical or General Electric Silicone Sealant. Backing to be closed cell non-staining polyethylene in round or square shape. Color to be selected by the Architect.

B. Installation:

1) Installation shall be in strict accordance with the manufacturer's direction.

2) Caulking compound shall be forced to a depth of 1/2". Joints shall be completely filled.

3) Caulk under all door thresholds, surround all windows and door frames, louvers and other openings, concrete coping head joints and expansion joints.

6.0 END OF SECTION 07920

SECTION 08100 - HOLLOW METAL DOORS AND FRAMES

1.0 GENERAL

1.1 Related Documents:

A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

1.2 General:

A. Doors and frames shall be neat in appearance, free from defects, waves, scratches, cuts, dents, ridges, holes, warp or buckle. Molded members shall be clean-cut, straight and true, with joints coped or mitered, well formed and in true alignment. Exposed welded and soldered joints shall be dressed smooth.

1.3 Quality Assurance:

A. Provide hollow metal work manufactured by a single firm specializing in the production of this type of work. (Select from list of approved manufacturers.)

B. Doors and frames shall comply with the Steel Door Institute "Recommended Specifications for Standard Doors and Frames (SDI 100)" and as specified.

1.4 Requirements of Regulatory Agencies:

A. Where a fire-resistance classification is scheduled for hollow metal work, provide fire-rated hollow metal doors and frames investigated and tested as a fire door assembly, complete with type of fire door hardware required. Identify each fire door and frame with UL labels indicating applicable fire rating of both door and frame.

1.5 Submittals:

A. Shop Drawings:

1) Submit for the fabrication and erection of hollow metal work. Include details of each frame type, elevations of door design type, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Indicate fabrication, erection and anchorage details at 3 in to 1 ft-0 in scale. Indicate anchorage and accessory items. Provide a schedule listing the location in the building of each door and frame, using the same reference numbers for details and openings as those on the Contract Drawings.

1.6 Product Delivery, Storage and Handling:

A. Deliver hollow metal work with packaging to provide protection during transit and job storage.

2.0 PRODUCTS

2.1 Metal:

A. Steel: ASTM A366 and ASTM 568 or A569 and ASTM 568, cold rolled or hot rolled, stretcher leveled degree of flatness, pickled and oiled, if hot-rolled material.

B. Galvanized Steel Sheets: ASTM A526 zinc-coated carbon steel sheet of commercial quality with ASTM A525, G60 zinc coating mill phosphatized.

C. Thickness of Metal: Sheet steel is listed in decimal equivalents of manufacturers, standard gauges. Minimum thickness shall be as follows:

Interior Use:

Item	Steel	Gauge
Door Frames .059	16	
Flush Type Doors, Face Sheets	.047	18
Surface Sheets	.035	20
Sheet Metal Not Otherwise Specified	.047	18
Louvers	.035	20
Decorative Deep Embossed Panel	.035	20

Exterior Use:

Item	Steel	Gauge
Door Frames .0747	14	
Flush Type Doors, Face Sheets	.059	16
Surface Sheets	.035	20
Sheet Metal Not Otherwise Specified	.047	18
Louvers	.059	16
Decorative Deep Embossed Panel	.047	18

D. Core material shall be foamed-in-place or slab insulation, solid mineral insulation or honeycomb meeting the following requirements:

1) Foamed-in-place insulation or rigid slab sheets laminated to each panel shall be a no-burning type in accordance with ASTM Standard D1692; shall have a compressive strength and a shear strength of not less than 20 PSI; shall have an insulation to steel strength, at least equal to the strength of the insulation; shall be dimensionally stable within plus or minus 5 percent volume after 24-hour exposure to temperatures ranging from minus 15 degrees F. to 200 degrees F.; shall have no voids exceeding 2-inch in any direction; and shall have a density of not less than 1.8 pounds per cubic foot.

2) Solid mineral insulation shall have a density of not less than 20 pounds per cubic foot.

3) Honeycomb material shall have a crushing strength of not less than 4,000 PSF, and the lamination shall withstand not less than 1,100 PSF surface shear.

2.2 Hollow Metal Flush Doors:

A. Provide hollow metal doors, heavy duty full flush of sizes indicated complying with SDI 100 minimum materials and construction requirements.

B. Provide flush design doors 1-3/4 inch thick, seamless hollow construction, unless otherwise indicated.

C. Provide decorative deep embossed panels on each side, six panel design, closed top and bottom channel.

D. Exterior doors shall have closed flush top.

E. Flush doors shall be of fully welded construction with no visible seams or joints on their faces.

F. Door sizes shown are nominal. Sizes shall include standard clearances as follows: 3/32-inch at jambs and head; 3/16-inch at floor where opening has threshold and 11/16-inch at opening without threshold. Where resilient floor covering is shown, the thickness is included in the 11/16-clearance.

G. Meeting stiles of single-swing double doors shall have standard bevel; for double-acting doors, they shall be rounded.

H. Internal construction of the door shall conform to one of the following methods:
   1) Standard Honeycomb with bottom weep holes and bottom channel.
   2) Polyurethane, polystyrene or solid structural mineral core bonded to the inside of both faces.

I. Exterior doors shall be fabricated to provide an insulating "R" value for thermal resistance of not less than "R" equals 7.5.
   1) All exterior doors shall be provided with thresholds and weatherstripping.

J. Cutouts shall be framed for glazed panels, louver panels or vision panels. Such accessories shall be shop fitted to the door.

K. Louvers shall be sight proof, light proof. Ventilating louvers shall have a minimum free area of 60 percent.

2.3 Hollow Metal Frames:

A. Provide hollow metal frames for doors of sizes and profiles indicated.

B. Frames shall be knock down type.

C. Form exterior frames of hot-dip galvanized steel sheets with a stretcher level degree of flatness and complying with ASTM A526, with ASTM A525, G60 zinc coating, mill phosphatized.

D. Drill stops to receive door silencers. Provide 3 silencers on strike jambs of single-leaf frames and 4 silencers on head of double-leaf frames. Install plastic plugs to keep holes clear during construction.

E. Provide 26-gauge steel plaster guards or mortar boxes, welded to frame at back of all finish hardware cutouts.

2.4 Hardware Preparation:

A. Prepare hollow metal units to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling and tapping, in accordance with final finish hardware schedule and templates provided by hardware supplier.

B. Provisions for receiving hardware shall meet requirements of U. S. Department of Commerce Standard CS 242 and American National Standard ANSI A115 where applicable, with modifications as specified. Reinforcement shall be of same metal as item to which applied.

C. Minimum thickness of reinforcement for doors and frames in decimals of an inch for the following items:

Items	Thickness	Gauge
Surfaces Applied Hardware	.0598	16
Locks, Latches and Strikes	.0747	14
Hinges	.1345	10
Flush Bolts	.0747	14
Door Closers (Manual/Power Operated)	.1046	12
Top and Bottom Pivots	.1495	9

D. Welding of Hardware Reinforcement: Either continuous fillets at both edges of long dimension, 2-inch fillet, not over two inches apart on all contact edges, or spot welds at points not over two inches apart in both directions of contact surface.

E. Hardware shall be shop fitted, either to templates or to the hardware item. Where locations of hardware are not shown, requirements specified under Section 08900, Architectural Hardware, shall apply.

F. Frame anchors, doors, hinges and exit device reinforcement shall meet requirements of ANSI Standard A151.1. These requirements shall be applicable regardless of whether doors and frames are steel, stainless steel, or aluminum.

G. Reinforce hollow metal units to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.

H. Thresholds shall be constructed of metal to match hardware or provided with permanent finish to match.

2.5 Shop Painting:

A. Concealed and exposed metal surfaces shall be cleaned of mill scale, rust, oil, grease, dirt and other foreign materials, chemically treated to provide a strong bond between metal and paint, and given a factory dip, or spray coat of primer. Exposed surfaces shall then be filled and ground smooth, followed by one coat of primer. Each coat of paint shall be baked separately, or oven-dried, in accordance with manufacturer's standard practice.

B. Paint: Shop primer paint shall be rust inhibitive metallic oxide or synthetic resin primer. Type of primer shall be at the manufacturer's option.
C. Apply shop coats of even consistency to provide a uniformly finished surface ready to receive field-applied paint.

2.6 Glazed Hollow Metal Frames:
A. Provide frames of sizes indicated with metal moldings to secure glazing. Moldings shall not be less than 20 gauge sheet steel, with butt corners. Secure to frames with snap-on attachments. Screwed-on moldings will not be acceptable. Moldings shall be on secure side of space.

2.7 Glass:
A. Glass, glazing materials and glazing installation requirements are specified in Section 08810.

2.8 Anchors and Fasteners:
A. Anchors for built-in bucks shall be 2 by 1/8-inch flats with turned ends, and shall extend not less than 12 inches into masonry unit and tile and 8 inches into brick masonry. Anchors shall be bolted to bucks through slotted holes for adjustment.
B. Anchors for bucks set in prepared openings shall be 3/8 by 2-1/2 inch expansion bolts.
C. Anchors for frames or rough bucks set in stud partitions shall be angle or channel sections and engaging both edges of each stud. Fasten to wood studs with round head wood screws and to steel studs with round head machine screws, lock washers and nuts.
D. Anchors shall be placed near top and bottom of each jamb and at intermediate points, not more than 25 inches apart.
E. Adjustable floor clip angles and removable spreaders shall be provided at bottom of door jambs. Spreaders shall be left in place until the bucks or frames are properly set and secured.
F. Floor anchors shall be 2-inch diameter, fitted with lock nut and traveling nut for vertical adjustment, extending not less than 2 inches into the structural floor. Anchors shall be grouted into concrete slab or fill over steel floor system.
G. Provide concealed fastenings for trim applied to rough bucks.
H. Anchors for aluminum items shall be zinc-coated steel.

2.9 Provide steel doors and frames manufactured by one of the following:
A. CECO Corp.
B. Republic Steel Corp.
C. Steelcraft Manufacturing Co.
D. Virginia Metal Products.

3.0 EXECUTION

3.1 General:
A. Install hollow metal units and accessories in accordance with final shop drawings and manufacturer's installation instructions.

3.2 Frame Installation:
A. Comply with the provisions of SDI - 105 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.
B. Except for frames located at in-place concrete or masonry and at drywall installations place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned and braced securely until permanent anchors are set.
C. After wall construction is completed, remove temporary braces and spreaders, leaving frame undamaged.

3.3 Door Installation:
A. Fit hollow metal doors accurately in frames, with clearances specified in SDI 100.
B. Install fire-rated doors with clearances specified in NFPA Standard No. 80.

3.4 Adjust and Clean:
A. Check and re-adjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise damaged.

4.0 END OF SECTION 08100

SECTION 08710 - FINISH HARDWARE

1.0 GENERAL

1.1 Related Documents:

A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

1.2 The work required under this section includes the furnishing of all materials required to complete the finish hardware as shown on drawings, specified herein, or as required for a complete installation.

1.3 When the hardware is delivered to the job, the Contractor shall receive it, check it against the hardware schedule, and store it in a safe place under lock and key. After installation, protect all items against damage until final inspection.

1.4 Substitutions: The materials or products specified herein and indicated on drawings by trade name, manufacturer's name or catalog number shall be provided as specified. Substitutes not listed in the specifications will not be permitted unless approved by the Architect. Manufacturers are as follows:

Hinges - Hager; acceptable substitute by McKinney or Stanley.
Push-Pull-Kick Plates - Lindstrom; acceptable substitute by H.B.Ives or Baldwin.
Stops, Bolts - H. B. Ives; acceptable substitute by Baldwin or Glyn-Johnson.
Thresholds - Zero; acceptable substitute by Reese or Pemko. Locks, Deadbolts, Latchsets - Russwin; acceptable substitute by Corbin or Yale. Closers, Holders - Russwin; acceptable substitute by Corbin or Yale.

1.5 Schedule, Templates:

A. Hardware Schedule: Submit six (6) copies of complete schedule of finish hardware. Schedule each item of hardware required for each door or item or equipment. List hardware item number, manufacturer, manufacturer's number or symbol and finish.

1.6 Installation:

A. Install hardware accurately fitted, securely applied and carefully adjusted. Install in accordance with manufacturer's instructions. Use care not to injure other work when installing.

B. Provide and use boring jigs or mortising tools and other special equipment and appliance as required for proper installation of hardware items.

C. When required, remove and replace doors so that door bottoms and tops may be repainted.

D. Remove all visible hardware before painting is begun and replace afterwards, prior to completion of building.

E. All closers and exit devices shall be installed with sex nuts and bolts.

F. Do not paint fire door labels or any hardware item.

1.7 General:

A. All locks shall be keyed separately. Grand master key, sub master key & change key.

B. Furnish three (3) keys per lock.

C. Key cabinet office to be a Key Control Systems, Inc., cabinet of size sufficient to hold all keys, plus 25% expansion. Provide lock and dual tag system complete with tags, labels, hooks, receipt holder, complete.

D. Locks - cylindrical locksets, dust proof, box type strikes all doors.

E. Install Zero No. 64A thresholds under all doors where floor covering changes from one material to another acceptable substitutes by Reese S225A or Pemko 173 A.

F. Mounting heights for locksets, push plates and pulls to be as per the latest ANSI-BHMA standard. Submit schedule for approval.

G. Each single metal door frame to receive three rubber door silencers per leaf, two for pairs.

H. Door closers are to be lacquered to match adjacent hardware.

I. Kick plate size when scheduled to be 8" high and width 2" less than the door width for single doors. For pairs of doors, the width shall be 1" less than door width. All unless called for otherwise.

J. When scheduled, each item or group of hardware is to be noted with its respective set listed in the Specification of Hardware Sets. Example Item #1 (Set #1).

K. The base metal of all hardware shall be brass or bronze, except closers which shall have cast iron cases and forged steel arms. Hinges on interior doors are to be plated steel unless otherwise noted. Thresholds to be aluminum.

L. Sizes for door closers and overhead holders are to be as recommended in manufacturer's catalogs.

M. Schedule of Hardware Sets - Each single, pair or battery of doors represented by the door number is to have the items listed for each respective set.

N. Where doors are called for to be in fire rated walls, the hardware shall be rated according to wall rating.

2.0 MATERIALS

2.1 Sizes for door closers and overhead holders are to be as recommended in manufacturer's catalogs.

Schedule of Hardware Sets - Each single, pair or battery of doors represented by the door number is to have the items listed for each respective set.

HARDWARE SETS: SEE DRAWINGS FOR DOOR HARDWARE SCHEDULE. SEE DOOR SCHEDULE FOR FIRE RATED DOORS AND HARDWARE. ALL HARDWARE FINISHES-US26D

2.0 END OF SECTION 08710

Fire Station #1
City of Martinsville
Arch. Comm. No. 1366

SECTION 09650 – EPOXY FLOORING

1.0 GENERAL

1.1 Related Documents:
A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

1.2 Submittals:
A. Color Selection Sample: Submit full range of colors and patterns for selection.

1) Epoxy Floor.

1.3 Product Handling:
A. Store flooring materials as packaged by the manufacturer seals and labels intact. Care shall be taken to prevent damage and freezing during delivery, handling, and storage. Store materials at the point of installation. Stack only as recommended. Support stored material continuously.

1.4 Environmental Conditions:
A. Materials and the area in which materials are to be installed shall be maintained at the following temperatures.
1) For at least 24 hours before installation of materials, and continuing for at least 48 hours after installation, maintain temperature at not less than 70 degrees F. to not more than 90 degrees F.
2) Maintain a minimum temperature of 70 degrees F. after material is installed.

2.0 PRODUCT

2.1 EPOXY FLOOR AND BASE

A. TYPE: DECORATIVE VINYL MOSAIC CHIP SYSTEM, 30 MIL THICKNESS EQUAL TO GENERAL POLYMER.

A. CONCRETE FLOOR PREPERATION: Grind, fill, repair holes, cracks as required. BUFF grindg over existing epoxy. DIAMOND WHEEL grinding at quarry and concrete surfaces. Vaccum.
B. USE A "RENDERING" course of urethane cement over quarry tile in lieu of epoxy.
D. PRIMER BINDER: 3579A / 3579B, 250 SQ. FT. PER GAL. 6 MIL THICKNESS
E. BASE COAT: 3746A / 3746B, 250 SQ. FT. PER GAL.
F. MOSAIC CHIPS: Broadcast to completely cover resin until resin is completely dry / covered. Remove loose chips.
G. GROUT COAT: PREMIX 3746A AND ADD TO 3746B , 160-200 SQ. FT. PER GAL.
H. SEAL COAt: PREMIX 4686A, ADD TO 4686B,250-300 SQ. FT. PER GAL.
I. CURE TIME: 24 HOURS
J. BASE: Attach a 1/2" x 4" Georgia Pacific SOLID 1/2" CEMENT board to CMU using adhesive and TREATED tapcon screws at 16" oc. Cover as for Floor Finish. Min 3/4" cove at floor intersection.
K. COLOR: to be selected.
L. FURNISH WRITTEN WARRANTY.

3.0 Protection:

A. Close spaces in which flooring is being set to traffic and to other work, until flooring is firmly set.

3.1 Cleaning:

A. Immediately upon completion of flooring in a room or area, dry clean floors and adjacent surfaces with a cleaner approved by manufacturer as applicable.

4.0 END OF SECTION 09650

SECTION 09900 - PAINTING

1.0 GENERAL

1.1 Related Documents:

A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

1.2 Description of Work:

A. The extent of painting work is as indicated on the drawings and schedules, and as herein specified.

B. The work includes the painting and finishing of all interior and exterior exposed items and surfaces throughout the project, except as otherwise indicated.

C. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified under other sections of the work.

D. The work includes the field painting of un-insulated pipes; the insulation of insulated pipes; and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under the mechanical and electrical work, except as otherwise indicated.

E. The term "paint", as used herein, means all coating systems materials, which includes primers, emulsions, enamels, stain, sealers and fillers, and other applied materials, whether used as prime, intermediate or finish coats.

F. Paint all exposed surfaces, whether or not colors are designated in any "schedule", except where the natural finish of the material is specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas. If color or finish is not designated, the Architect will select these from standard colors available for the materials systems specified.

1.3 Painting Not Included:

A. The following categories of work are not included as part of the field-applied finish work, or are included in other sections of these specifications.

1) Shop priming:

A) Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for structural steel, miscellaneous metal items, hollow metal work, and similar items. Also, for such fabricated components as architectural woodwork, wood casework, and shop-fabricated or factory-built mechanical and electrical equipment or accessories.

2) Pre-finished items:

A) Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) metal toilet enclosures, pre finished partition systems, acoustic materials, Architectural woodwork and casework, finished mechanical and electrical equipment, including light fixtures and distribution cabinets, elevator frames, doors and equipment.

3) Concealed surfaces:

A) Unless otherwise indicated, painting is not required on wall or ceiling surfaces in concealed areas and generally inaccessible areas, such as foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts, as applicable to this project.

B) Painting of all piping, equipment, and other such items within these areas, is required as indicated.

4) Finished metal surfaces:

A) Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise indicated.

5) Operating parts and labels:

A) Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting, unless otherwise indicated.

B) Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.4 Product Handling:

A. Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label.

B. Store materials in location approved by the Architect.

C. Provide paint manufacturers printed label on each container with the following information:
1) Name or title of material.
2) Manufacturer's stock number.
3) Manufacturer's name.
4) Analysis of major pigment and vehicle constituents.
5) Thinning instructions.
6) Application instructions.
7) Color name and number.
8) Manufacturers' recommended wet and dry film thickness in mils.

1.5 Job Conditions:

A. Do not apply paint when the temperature of surfaces to be painted and the surrounding air temperatures are below 50 degrees F. or above 90 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.

B. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces. Painting may be continued during inclement weather, only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

1.6 Submittals:

A. Product Data:

1) Submit manufacturer's technical information, including paint label analysis and application instructions for each material proposed for use. Transmit a copy of each manufacturer's instructions to the paint applicator.

B. Samples:

1) Submit samples on 12" hardboard, provide samples of each color and material, with texture to simulate actual conditions. Resubmit each sample as requested until acceptable sheen, color, and texture is achieved.

2) On actual wood surfaces, provide samples of each transparent-finish stained wood finish. Label and identify each as to location and application.

3) On concrete masonry, provide samples of masonry for each type of finish and color, defining filler, prime and finish coats.

C. Sample Installation:

1) On at least 300 sq. ft. of surface as directed, provide full-coat finish samples until required sheen, color, and texture is obtained; simulate finished lighting conditions for review of in-place work.

D. Schedule:

1) List each material and cross-reference to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classifications.

1.7 Color Selection:

A. Prior to beginning work, the Architect will furnish sample color chips with a color schedule for surfaces requiring painting.

B. Proprietary names used to designate colors or materials are not intended to imply that products of the manufacturers are required to the exclusion of equivalent products of other manufacturers.

C. The number of interior colors will be limited to 25.

1.8 Paint Coordination:

A. Provide finish coats which are compatible with prime paints used. Review other Sections of the Specifications in which prime coats are specified to ensure compatibility of total coatings system. Upon request, furnish information on characteristics of specified finish materials, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify Architect, in writing, of anticipated problems, using specified coating systems with substrates specified to receive prime coats in other sections.

2.0 PRODUCTS

2.1 Materials:

A. Provide the best quality grade of the scheduled types of coatings regularly manufactured by the acceptable paint manufacturers. Materials not displaying the manufacturer's identification as a standard, best grade product will not be acceptable.

B. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only within recommended limits.

C. Provide paints of durable and washable quality. Use paint materials which will withstand normal washing, as required to remove pencil marks, ink, ordinary soil, etc., without showing discoloration, loss of gloss, staining, or other damage.

D. Painting materials scheduled are products of the Devoe & Raynolds Co. Comparable products produced by the following manufacturers are acceptable alternates to those scheduled:

1) Benjamin Moore and Company.

2) Martin Senour Paints.

3) Pittsburgh Paints.

4) Glidden

5) Sherwin-Williams Company.

3.0 EXECUTION

3.1 Inspection:

A. Examine the areas and conditions under which painting work is to be performed. Notify the Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Starting of painting work will be construed as acceptance of the surfaces within any particular area.

C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.

3.2 Surface Preparation:

A. General:

1) Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.

2) Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items.

3) Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program the cleaning and painting that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

B. Cementitious Materials:

1) Prepare cementitious surfaces of concrete, concrete block, cement plaster and cement-mineral fiber board to be painted by removing all efflorescence, chalk, dust, dirt, grease, oils, and by roughening, as required to remove glaze, concrete hardeners and form release compounds.

2) Before priming, fill holes with mortar or other patch material to match adjacent surfaces. After priming fill any remaining holes with putty. Imperfections, without exception, shall be smooth and blend with adjacent surfaces.

3) Determine the alkalinity and moisture content of the surfaces to be painted by performing appropriate tests. If the surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint. Do not paint over surfaces where the moisture content exceeds limits permitted by the manufacturer's printed directions.

4) Acid etch concrete floor surfaces scheduled to be painted with a 5 percent solution of muriatic acid, or other proprietary cleaner. Flush floor with clean water to neutralize acid, and allow to dry before painting.

C. Wood:

1) Clean wood surfaces to be painted of all dirt, oil, or other foreign substances with scrapers, mineral spirits (alcohol wash), and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off.

2) Prime, stain, or seal wood required to be job painted immediately upon delivery to job. Prime edges, ends, face, undersides, and backsides of such wood, including cabinets, counters, cases, paneling, etc. When transparent finish is required, use spar varnish for back priming.

3) Back prime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.

4) Seal tops and bottoms of wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

5) Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other approved sealer, before application of the priming coat.

6) After priming, fill small nail holes and imperfections in finish surfaces with putty and larger holes with plastic wood-filler. Sandpaper smooth when dried. Imperfections shall, without exception, be filled and sanded until smooth.

7) Do not paint exterior wood surfaces immediately after rain or in foggy weather.

D. Ferrous Metals:

1) Clean non-galvanized, ferrous surfaces that have not been shop-coated of all oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning, complying with SSPC recommendations.

2) Touch-up all shop-applied prime coats which have damaged, or bare areas, where required by other sections of the specifications. Wire-brush, solvent clean, and touch-up with the same primer as the shop coat.

E. Galvanized Metal:

1) Clean thoroughly to remove grease, residue and corrosion products on the surface with solvent or chemical washes used as directed by the manufacturer.

F. Aluminum:

1) Treat prior to painting with a proprietary surface conditioner, in accordance with manufacturers' directions. Remove corrosion by wire brushing.

G. Plaster and/or CWB Joint Compound:

1) Plaster (joint compound) shall be thoroughly dry and cured; test for excess moisture and spotty drying. Surface shall be free from moisture, dirt, grease, and all foreign material.

H. Oil and Grease:

1) Remove by wiping clean with mineral spirits.

I. Mold or Mildew:

1) Remove mold or mildew before painting. Scrub surface with stiff brush and a solution of one quart of household bleach to three quarts of water. Allow solution to remain on surface for 10 minutes, then thoroughly rinse with clean water. Allow to dry for 2 days before painting.

J. Dirt and Other Foreign Matter:

1) Remove with stiff bristle brush and blow clean with air pressure or steam clean.

3.3 Mechanical and Electrical Work:

A. Painting of piping: Uninsulated pipe and the insulation over insulated piping shall be painted as follows:

1) Paint pipe and insulation exposed in occupied spaces.

2) The requirements for painting pipe are in addition to stenciling and tagging, required in Division 15.

B. Painting of mechanical and electrical work, other than piping, is limited to those items exposed in occupied spaces.

3.4 Materials Preparation:

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density, and stir as required during the application of the materials. Do not stir surface film into the material. Remove the film and if necessary, strain the material before using.

3.5 Application:

A. General:

1) Apply paint by brush, roller or spray in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool, as recommended by the paint manufacturer for material and texture required. Spray paint uniformly with suitable equipment.

2) The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat

has completely dried. Sand between coat applications with fine sandpaper, or rub surfaces with pumice stone, where required, to produce an even, smooth surface in accordance with the coating manufacturer's directions.

3) Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance.

4) "Exposed surfaces" shall mean areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, etc., are in place in areas scheduled to be painted.

5) Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only.

6) Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

7) Paint the back sides of access panels, removable or hinged covers to match the exposed surfaces.

8) Finish doors on tops, bottoms, and side edges the same as the faces.

9) Sand lightly between each succeeding enamel or varnish coat.

B. Minimum Coating Thickness:

1) Apply each material at not less than the manufacturer's recommended spreading rate, to provide a total wet and dry film thickness of not less than that indicated on the manufacturer's printed label.

C. Scheduling Painting:

1) Apply the first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

2) Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

3) ARCHITECT SHALL INSPECT AFTER EACH COAT. DO NOT APPLY SUCCESSIVE COAT WITHOUT APPROVAL.

D. Prime Coats:

1) Before application of finish coats, apply a prime coat to material which is required to be painted or finished, and which has not been prime coated.

2) Recoat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

3) All surfaces to be painted shall be primed.

E. Brush Application:

1) Brush-out and work all brush coats onto the surfaces in an even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable. Neatly draw all glass lines.

2) Brush apply all primer or first coats, unless use of mechanical applicators is permitted.

F. Mechanical Applications:

1) Limit roller applications (generally) to interior wall and ceiling finishes for second and third coats. Apply each roller coat to provide the equivalent hiding as brush-applied coats.

2) Confine spray application (generally) to metal framework, decking, and similar surfaces where hand-brush work would be difficult.

3) Wherever spray application is used, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double back with spray equipment for the purpose of building up film thickness of 2 coats in one pass.

G. Completed Work:

1) Match approved samples for color, texture and coverage. Remove, refinish, or repaint work not in compliance with specified requirements.

H. Protection:

1) Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct any damaged by cleaning, repairing or replacing, and repainting, as acceptable to the Architect.
2) Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

I. Clean-up:

1) During the process of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.
2) Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
3) At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

4.0 PAINTING SCHEDULE (NUMBERS BY BENJAMIN MOORE unless noted otherwise)or Equal with approved data sheet submittal.

A. **SEE DRAWING FINISH SCHEDULE FOR ROOM AND BUILDING EXTERIOR FINISHES.**

5.0 END OF SECTION 09900

SECTION 10800 - TOILET ACCESSORIES

1.0 GENERAL

1.1 Related Documents:

A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

1.2 Submittals:

A. Product Data:

1) Submit manufacturer's product literature and manufacturer's printed installation instructions for each type of accessory.

B. Schedule:

1) Submit schedule of accessories indicating location and mounting heights of each accessory.

1.3 Product Handling:

A. Deliver materials and products in original packages and containers.

B. Store items in clean, dry location at temperature and humidity recommended by manufacturer and protected from construction activity.

2.0 PRODUCTS

2.1 General Requirements for Accessories:

A. Acceptable Manufacturers: Products of the following manufacturers are acceptable:

1) A & J Washroom Accessories.

2) Bradley Corporation.

3) Bobrick Washroom Equipment, Inc.
4) McKinney unit of L. B. Foster Company.

B. Material:

1) Sheet metal: Type 304 stainless steel conforming to ASTM A167.

2) Anchors and supports: Form of stainless steel or hot-dip galvanized steel.

C. Finish:

1) Except as specified otherwise, exposed components shall be brushed stainless steel conforming to BHMA No. 630.

2) When bright polished is specified, exposed components shall be polished stainless steel conforming to BHMA No. 629.

D. Fasteners and Mounting:

1) Fasteners shall be concealed cadmium-plated or stainless steel screws and bolts and as furnished by the manufacturer of the accessories.

2) Fasteners shall be of size as recommended by the accessory manufacturer and as appropriate for the substrate.

E. Locks and Keys:

1) Provide cam-action, key operated locks for use in refilling dispensers.

2) Key all dispenser refill locks alike and furnish four keys.

2.2 Types of Accessories: In each Toilet Room

A. Soap Dispenser: Georgia Pacific “GoJo” 274012 TFX, one at each lavatories .

B. Hand Dryer: WORLD DRYER J-973 Airforce, brushed stainless steel, 68db, 208V, 4.8Amps, One in each Toilet.

C. Toilet Paper Dispenser: Georgia Pacific two roll Coreless, 7 1/8" H. #4TH54. One at each water closet.

D. Mirrors: Bobrick B292 Series, 18" x 36". One over each Lavatory . 40" to bot for H'cap lavatory

G. Grab Bar (GB-2): Provide Bobrick B-550 Series, mounted 1-1/2-inch from side wall, conforming to ANSI A117 42"long, concealed mounting. One at each water closet. Mounting height 35' AFF. For H'cap compartment.

H. Grab Bar (GB-1): Same as 'G' except 36" long. One at each H'cap water closet. Mounting height 35' AFF. For H'cap compartment

I. Grab Bar (GB-3): Same as GB-1 except 18" long vertical. For H'cap compartment

3.0 EXECUTION

3.1 Installation:

A. Install accessories in accordance with manufacturer's printed installation instructions. Set all items rigidly in place, plumb, level and centered.

B. Mirrors shall be installed using concealed theft-proof wall hangers and fasteners, in accordance with manufacturer's printed installation instructions.

C. Anchor grab bars securely in place using concealed anchors into solid wood blocking or masonry.

E. **Mount all items in H'cap Toilets per ADA (H'cap) requirements.**

4.0 END OF SECTION 10800

Fire Station #1
City of Martinsville
Arch. Comm. No. 1366

GENERAL REQUIREMENTS, HEATING VENTILATING AIR CONDITIONING-HVAC INDEX

Fire Station #1
City of Martinsville
Arch. Comm. No. 1366

SECTION 15010 - GENERAL REQUIREMENTS, HEATING VENTILATING AIR CONDITIONING-HVAC

1.0 GENERAL

1.1 Related Documents:
The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

1.2 Applicable HVAC Standards:
Air Moving and Conditioning Association, Inc.
Sheetmetal and Air Conditioning Contractor National Association, Inc.
American National Standards Institute
American Society of Heating, Refrigeration and Air Conditioning Engineers
American Society of Mechanical Engineers
American Society for Testing Materials
National Electrical Manufacturer's Association
Air conditioning and Refrigeration Institute

1.3. The work included in this Division of the Specification shall include HVAC systems, as indicated and as specified. Provide all supervision, labor, material, equipment, machinery, plant, and other items necessary to furnish and install the HVAC systems.

1.4 Scope of Work:

A. Provide complete systems. Completeness shall mean not only that all material and equipment have been installed, but that all material and equipment have been adjusted for proper operation, and that, in the opinion of the Architect, all material and equipment are operating as designed, and are ready for use.

B. Details not shown or specified, but necessary for the proper installation and operation of the systems, shall be included in the work, the same as if specified or shown.

C. The HVAC Contractor shall provide exterior louvers and screens necessary for heating, ventilating, and air-conditioning systems.

D. In instances where the specifications call for an installation to be done in accordance with manufacturer's recommendations, a copy of these recommendations will be furnished and will be kept in the job superintendent's office at all times in order to be accessible to the architect and/or owner's representative.

E. All permits, tap and service fees shall be provided for by the HVAC Contractor.

F. The work covered under this division of the specifications consists in furnishing all plant, labor, equipment, supplies and material and in performing all operations in connection with the heating, ventilating, and air conditioning work. This division of the specifications is divided into several sections for convenience in specifying common work and equipment as it may relate to more than one trade. All sections of these specifications are applicable to all trades equally as required.

G. The HVAC Contractor shall provide water, gas, compress air, and drain connections for all HVAC and all other equipment shown furnished by Owner requiring same.

H. The HVAC Contractor shall provide and install electrical interlock and control wiring. Mechanical Contractor shall furnish and install and wire switches and firestats in the control system.

1.5 Codes and Standards:

A. Comply with the requirements of governmental departments having jurisdiction, and with the requirements of local utility companies.

B. Conform to the Statewide Building Code and all code-referenced standards applicable to the execution of the work, including the National Fire Codes of the National Fire Protection Association.

C. All material and equipment for the electrical portion of the HVAC systems shall bear the approval label or shall be listed by the Underwriters' Laboratories, Incorporated. No work performed shall void this approval label or listing.

1.6 Manufacturer's Directions and Supervision:

A) Follow manufacturer's directions for installation, testing and operation of all apparatus and equipment indicated on the drawings or specified.

B) Where supervision by a manufacturer is required as hereinafter specified, follow all instructions and recommendations of the manufacturer. The manufacturer shall supervise the installation, connection, start-up, adjustment, instruction of the Owner and final tests of such equipment or system. Where two or more manufacturer's equipment is interrelated, take responsibility to coordinate their work and provide supervision.

2.0 PRODUCTS

2.1 General:

A. Materials and equipment shall be selected as to fit properly into the building spaces.

B. Standard Products: Materials and equipment shall be the standard catalogued products of manufacturers regularly engaged in the production of such materials and equipment, and shall be of the manufacturer's latest standard design that complies with the Contract Documents. Where two or more units of the same class of equipment are required, they shall be products of a single manufacturer; however, the component parts of the system need not be products of the same manufacturer. All equipment shall bear the label of an approved agency.

C. Identification: Each major component of equipment shall have the manufacturer's name, address, and model and serial number inscribed on a nameplate securely affixed in a conspicuous place. The nameplate of the distributing agent will not be acceptable.

D. Quantities: Provide the number of items indicated, and required for complete systems.

E. Where no specific kind or quality of material is specified, furnish a first-class standard article approved by the Architect.

2.2 Escutcheon plates:

A. Plates shall be nickel or chromium plated, of split-ring type, sized to match the pipe or conduit.

B. Plates provided for pipes passing through sleeves which extend beyond the floor or wall surface shall be of the deep recessed type.

3.0 EXECUTION

3.1 Workmanship:

A. Provide the best workmanship available. Inferior workmanship will be rejected and the work shall be reinstalled, when, in the judgement of the Architect, the workmanship is not of the highest quality.

B. Furnish the services of an experienced superintendent, who shall be constantly in charge of the installation of the work. Furnish the services of skilled workmen and labor required to unload, transfer, erect, connect-up, adjust, start, operate, and test each system.

C. Except where otherwise specified or indicated, all equipment and materials shall be installed in accordance with the recommendations and requirements of the manufacturer of the equipment, for the use prescribed for the project. Perform all tests recommended by the manufacturer.

D. Materials and equipment shall be delivered, erected, connected, and finished in every detail, and shall be so arranged as to fit properly into the building space.

3.2 Protection and Cleaning:

A. Be responsible for work and equipment until finally inspected, tested, and accepted. Protect work against theft and damage. Carefully store materials and equipment received on site which are not immediately installed.

B. Close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

C. Before acceptance of the work, remove all construction dirt from material and equipment. All work, including the inside of equipment shall be left in clean condition.

3.3 Scaffolding, Rigging, and Hoisting:

A. Furnish scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

3.4 Adjustment of Controls:

A. Provide the personnel and equipment required to adjustment completely the temperature controls to the satisfaction of the Architect. At the completion of the work, arrange a meeting at the job site to demonstrate the proper operation of the temperature control system to the Owner and the Architect.

3.5 Quiet Operation and Vibration:

A. Provide mechanical systems free from objectionable airborne noise and which do not transit noise or vibration to the structure.

B. HVAC systems shall operate under all conditions of load without any sound or vibration which is objectionable in the sole opinion of the Architect. In case of moving machinery, sound or vibration noticeable outside the room in which it is installed, or annoyingly noticeable inside the room where it is installed, will be considered objectionable.

3.6 Accessibility:

A. Be responsible for the sufficiency of shafts and chases, and adequate clearance in double partitions and hung ceilings, for the proper installation of the work. Where the indicated shafts and chases are inadequate, notify the Architect prior to performing the work.

B. Locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include, but shall not be limited to, valves, traps, cleanouts, motors, controllers, machinery, and drain points. If required for adequate accessibility, furnish access doors for this purpose.

C. Install access panels for each inaccessible valve, machine, control damper, or other device requiring access. Access panels not specified within this division of the specification shall be provided and installed as metal door and frame, key latch. Furnish to other trades the locations of these panels in sufficient time to allow their installation in the normal course of work.

3.7 Foundations, Supports, Piers, and Attachments:

A. Except where otherwise indicated, all equipment shall be attached securely to the building structure. Attachments shall be of a strong and durable nature. Attachments that, in the opinion of the Architect are not adequate shall be replaced or strengthened as directed.

3.8 Electrical Connections:

A. Power Wiring: Power wiring from the power source to the motor, or pre-wired equipment junction box, shall be provided as a part of the work specified in Division 16. Provide power wiring from the interior of the equipment to the motor, and to an equipment junction box if it is included with the equipment, in accordance with the requirements of Division 16. Furnish manufacturer's data and other information to coordinate the extent, location, and terminal condition of power wiring.

B. Temperature Control, Interlocking, and Equipment Control Wiring: Regardless of voltage, provide all temperature control wiring, transformers, all interlock wiring, and equipment control wiring for the specified equipment.

3.9 Cutting and Patching:

A. Provide cutting and patching in floors, walls and ceilings required to install the work which includes sprinkler work, plumbing and plumbing fixture carriers. Patching shall match adjacent surfaces.

B. No structural members shall be cut without the approval of the Architect. 3.10 Sleeves:

A. Provide and locate all sleeves and inserts required before the floors and walls are built, or be responsible for the cost of cutting and patching required for pipes where sleeves and inserts were not installed, were incorrectly located, or are required to be placed in existing construction. Provide all drilling required for the installation of the hangers.

B. Where sleeves are placed in exterior walls below grade, the space between the pipe or conduit and the sleeves shall be packed with an approved material and made completely watertight.

3.11 Firestopping:

A. Ducts:

1) Where ducts pass through fire walls, fire separation walls, or floor slabs, the clearance in the construction around the duct shall not exceed one-half inch on each side and shall be filled solidly with an approved firestopping material, such as concrete, masonry, or mineral fiber. Both ends of the openings shall be caulked with insulating cement. The fire-resistance rating of the floor or wall assembly shall be maintained.

B. Pipes, Tubes, and Conduits:

1) Fire wall and fire separation wall penetrations:

A) Noncombustible pipes, tubes and conduits: Where noncombustible pipes, tubes, and conduits penetrate fire walls or fire separation walls, install firestopping around the penetrating pipes, tubes, and conduits. The firestopping shall be capable of maintaining the integrity of the fire wall or fire separation wall, when subjected to the test temperatures prescribed in ASTM E119 for the duration of time equal to the fire-resistance rating of the wall and when subsequently subjected to the hose stream test prescribed in ASTM E119.

3.12 Excavating and Backfilling:

A) The HVAC subcontractor shall do all trench and pipe excavation and backfilling required for his work inside and outside the building, including repairing of finished surfaces, all required shoring, bracing, pumping, and all protection for safety of persons and property. In addition, it shall be the responsibility of the mechanical subcontractor to check the indicated elevations of the utilities entering and leaving the building. If such elevations require excavations lower than the footing levels, the Architect shall be notified of such conditions and a redesign shall be made before excavations are commenced. It is also the responsibility of the subcontractors to make the excavations at the minimum required depths in order not to undercut the footings.

3.13 Covering of Work:

A) No HVAC equipment, raceways or other work of any kind shall be covered up or hidden from view before it has been examined or approved by the Architect. Any unsatisfactory or imperfect work or materials that may be discovered shall be removed and corrected immediately after being rejected and other work and materials shall be provided which shall be satisfactory to the Architect.

3.14 Painting and Finishing of Factory-Painted Equipment:

A) Where factory finishes are provided on equipment, marred or damaged surfaces shall be touched up or refinished to leave a smooth, uniform finish at the time of substantial completion.

3.15 Measurements:

A. The drawings are diagrammatic and indicate the general arrangement of systems and work included in the Contract. Do not scale the drawings. Refer to the architectural drawings for dimensions and details of construction, and the exact location of fixtures and other equipment. Where fixtures, air devices, louvers, and equipment are not located definitely, obtain this information from the Architect, prior to installation.

B. In the event of discrepancy between actual measurement and those indicated, which prevents following good practice or the intent of the drawings and specification, notify the Architect, and do not proceed with the work until instructions from the Architect have been received.

3.16 Cooperation with Other Trades:

A. Plan work in advance and coordinate all space requirements with other trades involved. Where conflicts occur, request clarification from the Architect.

B. Follow drawings in laying out work, and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, notify the Architect before proceeding with the installation. HVAC equipment, piping, and ducts installed above ceilings shall allow for the installation of lighting fixtures.

C. Make modifications in the layout as needed to prevent conflict with work of other trades, or for proper execution of the work. Provide offsets in piping and duct runs required to coordinate the installation with the work of other trades, and to install the work within the available space.

D. Give full cooperation to other trades and furnish information requested or necessary to permit the work of all trades to be installed satisfactorily and in a timely manner.

E. Where HVAC work will be installed in close proximity to, or will interfere with work of other trades, assist in working out space conditions to make satisfactory adjustment. If work is installed before coordinating with other trades, or as to cause any interferences with work of other trades, make the necessary changes in the work to correct the condition without extra charge to the Owner.

F. Furnish to other trades, as required, all templates, patterns, setting plans, and shop details necessary for the proper installations of the work, and for the purpose of coordinating adjacent work.

4.0 HANGERS AND SUPPORTS

4.1 Pipe Hangers:

1) General

A. All piping above the floor slab either vertical or horizontal shall be installed with hangers to support pipe without strain or sagging.

B. Where wood roof trusses exist, attach hanger with threaded rod to a 2 x 4 laid across two bottom cords of trusses. Use nut and washer where rod passes through 2 x 4.

C. Use offset type hangers for all pipes receiving insulation.

D. Use 1 1/2 x 1 1/2 angle at bottom of ducts, with threaded rods attached as described in Par. (B) above

E. Unacceptable hangers - wire, rope, perforated thin strap, electrical conductors.

F. Horizontal pipe hanger spacing:

1) Plastic - 5'-0" o.c. maximum at hub or connector.

2) Copper - 6'-0" o.c. maximum for pipe up to 1/2", 8'-0" o.c. maximum for 3/4" and l" pipe, 10'-0" o.c. maximum for l l/14" pipe and larger.

3) Install hangers at all changes in directions both vertical and horizontal.

4) Ductwork: Metal straps, 1” by 14ga., both sides at each joint.

G. Copper hangers for copper pipe.

5.0 End of Section 15010

SECTION 15880 - AIR DISTRIBUTION SYSTEM

1.0 GENERAL

1.1 Applicable Publications:

A. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Incorporated publications.
   1) HVAC Duct Construction Standards (latest edition).
   2) Fibrous Glass Duct Construction Standards (latest edition).

B. American Society for Testing and Materials (ASTM):
   1) E84 - Test for Surface Burning Characteristics of Building Materials.

C. Underwriters' Laboratories, Inc. (UL):
   1) 181 - Factory Made Air Ducts and Connectors.

D. National Fire Protection Association (NFPA):
   1) 90A - Air Conditioning and Ventilation Systems.

E. National Sanitation Foundation (NSF):
   1) 113

F. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE):
   1) 52 - Method of Testing Air Cleaning Devices Used in General Ventilation For Removing Particulate Matter.

G. Air Diffusion Council (ADC):
   1) 1062R4 - Certification, Rating, and Test Manual.

H. Air Movement and Control Association, Inc. (AMCA):
   1) 210 - Laboratory Methods of Testing Fans for Rating Purposes.

1.2 Fan Selection:

A. All selections shall allow for 10 percent additional static pressure and not require use of the motor service factor.

B. All fan performance ratings shall be in accordance with AMCA 210.

1.3 Submittals:

A. Product Data: Include performance curves for fans.
   1) Ductwork construction details.
   2) Damper, fire.
   3) Manual damper.
   4) Back draft damper.
   5) Ceiling diffuser, square or rectangular face.
   6) Registers and grilles.
   7) Power roof ventilators.
   8) Ceiling exhaust fan.
   9) Gravity ventilator.
   10) Air filters.

2.0 SHEET METAL:

A. Shop Drawings: A complete sheet metal drawings showing ductwork to be fabricated and installed, shall be submitted to the Architect by the Contractor for approval. This Contractor shall possess an approved copy of this submittal, returned from the Architect, prior to beginning fabrication. Submittal shall reflect the space requirements of other trades such as electrical, plumbing and structural. Shop drawings shall be stamped approved by the Mechanical Contractor, Electrical Contractor, and General Contractor to substantiate that adequate coordination for space requirements and accessibility have been provided and that no conflicts exist between the trades, prior to submission to the Architect.

B. SMACNA Manual: The current edition of "Sheet Metal Construction for Ventilating and Air Conditioning Systems", Section 1 - Low Pressure System and High Pressure duct construction and fibrous glass duct construction shall be in the sheet metal subcontractor's possession.

C. Coordination: Work of other trades shall be examined and arrangements made to provide all necessary offsets, bends, changes, including enlargements and reductions, etc., as required to eliminate conflict with other trades. Install duct system so that under operating conditions, it shall be free from vibration or noise.

D. Classification of Sheet Metal:
   1) Low velocity - all ductwork systems shall be classified low velocity.

E. Construction: The duct system materials and installation shall be in accordance with SMACNA Duct Construction Standards and the National Fire Protection Association (N.F.P.A.) recommendations where applicable. Where a more strict requirement is specified in the contract documents, it shall govern.

F. Products - Sheet Metal and System Materials:
   1) Sheet Metal and System Materials as follows:

	SERVICE	MATERIAL
A)	Low velocity supply and return, exhaust	Galvanized steel, ASTM 527, sheet steel, hot dipped zinc coated loc-forming quality pre code.

   2) Fittings for all duct systems shall be of the same material as the duct.
   3) Round elbows shall be smooth, having centerline radius of 1 1/2 times the duct diameter.
   4) Manual damper operators shall be locking type as manufactured by Young Regulator Company or equal.
   5) Duct tape by the 3-M Company, Permacel Company, the Kendall Company, or Hardcast Inc., minimum 12.0 mils thick plastic coated cloth type for non-metallic ductwork and metal foil for metallic ductwork. Tape shall be approved by SMACNA.
   6) Duct sealants premium grade S2 duct sealer Foster 30-02 duct sealant by the Fuller Company, or approved equal.

7) Hanging support and bracing material for galvanized ductwork shall be galvanized steel and aluminum for aluminum. Supports for factory manufactured duct systems shall be in accordance with manufacturer's requirements.

8) Duct sleeves through walls shall be at least 14 gauge galvanized steel.

10) Ducts called for to be lined shall be increased in each direction an amount equal to the lining thickness to maintain design dimensions.

11) Cross break or reinforce ducts having a depth or width or width of 12 inches or greater. Reinforce ducts having a depth or width greater than 36"

12) Splitters: Where indicated on the drawings and elsewhere as required to properly balance the system, splitter dampers for adjustment of distribution to respective branches shall be installed. Splitters shall be as shown per the SMACNA manual.

14) Hand Dampers: Hand operated butterfly type dampers shall be galvanized steel, 18 U. S. gauge or heavier. Dampers for ducts to 12 inches deep shall be one blade carried on a 3/8 inch round steel rod mounted inside of duct without frame and fitted with locking type Dampers for ducts of greater depth shall be multi blade type, 12 inches maximum blade width over 30 inch blade length.

15) Provisions for Insulation: Provisions shall be made for neat insulation finish around damper operating quadrants, splitter adjusting clamps, access doors, and similar operating devices, where the drawings and insulating specifications indicate that ducts shall be insulated. A metal collar shall be mounted on duct equivalent in depth to the insulation thickness and of suitable size to which insulation may be finished.

16) Vanes and Deflectors: Where shown on the drawings or elsewhere as required, vanes and deflectors shall be provided of galvanized steel sheet the same thickness as used in ductwork of corresponding size. All such vanes shall be securely anchored to duct or casing and have freestanding edges braced as necessary for making them rigid. Air turning vanes for square or short radius elbows in rectangular ducts shall be double turning vanes.

17) Furnish volume control and multi-louver or butterfly balancing dampers type to control air volume and direction and for balancing entire system. Reinforce ducts at damper locations to provide rigidity.

18) Counterflashing: This Contractor shall counterflash all ducts where they pierce the outside walls.

G. Arrangement:

1) Obstructions and Restrictions: Specific permission of the Architect is required in instances where obstructions are to be located within ducts. When obstructions cannot be avoided, obstructions shall be eased in accordance with the SMACNA manual.

2) Hanging: Ducts shall be supported from the building structure with galvanized steel hangers up to and including 12 inches each side of duct and angles and end hangers over 12 inches as recommended per the manual. Inserts of other acceptable anchors shall be used to secure hangers to masonry portion of building. Hangers shall be secured to concrete structural members.

3) Change in Direction: Generally, changes in direction and shape shall be kept to the minimum permitted by distribution requirements and building conditions. Turn shall be made with ells as conditions necessitate in the following order of preference. Unvaned elbow, throat radius, 3/4 width of duct and full heel radius less than 36 inches in width. Three (3) inch square throat and square heel with close-spaced, double thickness turning vanes designed for maintaining constant velocity through the elbow 36 inches and above in width.

4) Transformations: Transformations to effect a change in area are as follows:
   A) Transformation slope shall not exceed 20 degrees for an increase-in-area transformation.
   B) Transformation slope may be 30 degrees but 20 degrees is preferable for a decrease-in-area transformation.
   C) The angle of transformation at connections to heaters or other equipment shall not exceed 30 degrees on the approaching side of the equipment and 45 degrees on the leaving side. When the transformation section is provided with vanes approved by the Architect, the Angle of approach may be increased to meet space conditions.

5) Branch Connections: From main ducts shall be one of the following methods. Refer to drawings for the type construction for each specific connection.
   A) Straight tap with extractor.
   B) Long-radius elbow with splitter damper when duct width is less than 36 inches for the connection.

1.6 Grilles, Diffusers, Registers, Louvers:

A. General:

1) All diffusers shall be square or round as indicated on the drawings.

2) Diffusers, grilles, and registers shall be the product of Metal-Aire whose catalog numbers are used on drawings. Products of Anemostat, Carnes or Barber-Coleman having equivalent features and performance will be approved.

B. Products:

1) SUPPLY GRILLES: SEE DRAWINGS.

C. Execution:

Fit all units tightly to the surface on which they are mounted with no gaps between the outlet and the mounting surface.

1.7 Air Inlet and Outlet Louvers (where applicable):

A. Description: Provide Carnes Louvers, Model L-30, weatherproof with channel frame. Material shall be 6063-T5 .081 inches thickness aluminum. Louver depth shall be four (4) inches. Bird screen mesh shall be 0.041 diameter, PVC coated, galvanized wire spaced 1/2" on center and attached to extruded aluminum U frame on inside of louver.

B. Installation:
   1) Install in accordance with manufacturer's instructions where shown on drawings.
   2) Caulk around frames with sealing compound complying with Fed Spec TT-S-227 or TT-S-230 for exterior application. Polysulfide grease sealant is not permitted.

1.8 Balancing Airflows:

A. This Contractor shall balance the airflows to within five percent (5%) of those shown on the plans.
   1) Fan motor voltage and amperage ratings and readings.
   2) Fan RPM's.
   3) Average and design velocity reading and cfm at each supply, return, and exhaust grille.

E. Adjust fire dampers as follows:
   1) Disconnect fusible link.
   2) Operate the fire damper several times.
   3) Adjust and correct all fire dampers to assure free, positive operation and proper latching.
   4) Reconnect fusible link.

1.9 System Test and Balance:

A. The Contractor shall make any changes required for correct balance at no additional cost to the Owner. Such changes may encompass but are not necessarily restricted to pulleys, belts, ductwork, dampers, or the addition of dampers and access doors. The Contractor shall provide labor, equipment and cost of performing necessary corrections.

B. All duct work and coils shall be cleaned and left free of loose insulation and construction debris.

C. The Contractor shall put all heating, ventilating and air conditioning systems into full operation and shall continue the operation of same during each working day of testing and balancing. Correct operation of equipment and system components, and cleanliness of ductwork shall be the responsibility of the Contractor.

D. Filters shall be cleaned or replaced just prior to final balancing.

E. All fans shall be initially started, lubricated and balanced to eliminate noise and vibration.

3.0 Flexible Ductwork:

Shall be Thermaflex M-KE factory insulated with 2 inch thick, 0.75 lb/cu ft.,R-6.8, glass fiber blanket with an integral vapor barrier. Duct shall be UL listed with a flame spread rating not greater than 25 and a smoke-developed rating not greater than 50.

4.0 END OF SECTION 15880

Fire Station #1
City of Martinsville
Arch. Comm. No. 1366

SECTION 15990 - TESTING AND BALANCING

1.0 GENERAL

1.1 Applicable Publications:

A. Associated Air Balance Council (AABC) publications.

B. National Environmental Balancing Bureau (NEBB) publications.

C. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals (latest edition).

1.2 Scope:

A. The work required herein shall consist of the measurement and setting of air specified for the systems, recording data, making tests, and preparing reports, all as hereinafter specified.

B. The work covered under this section of the specifications shall be performed after completion of the installation of the air conditioning, heating, plumbing, and ventilating system, and prior to acceptance by the Owner.

1.3 Submittals:

A. Field Test Report:

1) Final testing and balancing reports.

2) Furnish 3 copies of report to Architect

2.0 ADJUSTMENT - CORRECTIONS

When all work is completed, the entire mechanical installation shall be rung out and be absolutely free from leaks or defect. The contractor shall make a final test in the presence of the Architect or his representative. With all equipment energized and all controls in automatic position, the systems and equipment specified herein shall be proven to operate safely and perform per design specifications. If not, adjustments and corrections shall be made until satisfactory operation is achieved. Two sets of reading are required, one under full load and one under no load.

3.0 POST ACCEPTANCE TESTS

Should completion of the building occur at such time that the required performance test must be conducted and test data recorded and submitted during a season when both heating and cooling system performance cannot be checked, the contractor shall perform the tests and record all such data as is available with system operating automatically under the prevailing weather conditions. That part of the system operation which cannot be recorded because of the prevailing weather shall be delayed until the weather is appropriate at which time the remaining part of the required tests shall be conducted and data recorded accordingly. Portions of the tests may not be delayed without written consent of the Architect.

4.0 ADJUSTING AND BALANCING

Testing, adjusting and balancing shall be performed in accordance with the procedures of the associated air-balance council and until design function and operation is achieved. Calibrate instruments prior to balancing. Types, serial numbers, and dates of calibration of all instruments shall be listed in the final air and water balance reports. System shall be in complete operation with controls working before air balance and testing shall begin. Adjust pulleys, motors, and dampers for correct air balance. Independent contractor who specializes in the practice of testing, adjusting and balancing mechanical equipment and systems may be used to perform test.

5.0 AIR DISTRIBUTION EQUIPMENT

5.1 Adjust blower RPM to deliver specified CFM.

5.2 Set design air quantities in main ducts by adjusting fan speeds. Adjust branch dust air quantities by using volume or splitter dampers. Permanently punch mark dampers after air balance is complete to enable them to be restored to their correct position, if disturbed at any time.

5.3 Air quantities in main and branch ducts shall be measured by traversing cross sectional area of duct with pitot tube. Ducts with velocities of 1000 feet per minute or more shall be measured with inclined manometers (draft gage) or magnehelic gages, ducts having velocities of less than 1000 feet per minute shall be measured with micronanometers, hook gages. Openings in ducts for pitot tube insertion shall be closed after readings are made.

5.4 Record for the air quantities of registers, grilles, and diffusers shall be determined by using velocity meters.

5.5 With the assistance of the temperature control manufacturer's representative, set adjustment of automatically operated dampers to operate at design conditions.

6.0 CLEANING

At the completion of the work, the HVAC installation shall be thoroughly cleaned. All equipment, pipe, valves, fixtures, and fittings shall be cleaned of metal cuttings, plaster, concrete, grease, etc.; and factory-applied prime coat paints shall be touched up with matching paints.

7.0 END OF SECTION 15990

Fire Station #1
City of Martinsville
Arch. Comm. No. 1366
GENERAL REQUIREMENTS, PLUMBING INDEX

SECTION 15020 - GENERAL REQUIREMENTS, PLUMBING

1.0 GENERAL

1.1 Related Documents:

A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

1.2 APPLICABLE PLUMBING PUBLICATIONS

A. American National Standards Institute (ANSI):
   1) A112.26.1 - Water Hammer Arrestors.

B. American Society of Sanitary Engineering (ASSE):
   1) 1001 - Pipe Applied Atmospheric Type Vacuum Breakers.
   2) 1003 - Water Pressure Reducing Valves for Domestic Supply Systems.
   3) 1011 - Hose Connection Vacuum Breakers.
   4) 1012 - Backflow Preventers with Intermediate Atmospheric Vent.
   5) 1013 - Reduced Pressure Principle Backflow Preventers.

C. American Society for Testing and Materials (ASTM):
   1) B32 - Specification for Solder, Metal.
   2 B88 - Specification for Seamless Copper Water Tube.

D. Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS):
   1) SP-58 - Pipe Hangers and Supports - Materials, Design, and Manufacture.
   2) SP-69 - Pipe Hangers and Supports - Selection and Application.

E. Plumbing and Drainage Institute (PDI):
   1) WH-201 - Water Hammer Arrestors.

F. Virginia Plumbing Code 2006 Edition

G. Virginia Construction Code 2006 Edition

1.3 Scope of Work:

A. Provide complete systems. Completeness shall mean not only that all material and equipment have been installed, but that all material and equipment have been adjusted for proper operation, and that, in the opinion of the Architect, all material and equipment are operating as designed, and are ready for use.

B. Details not shown or specified, but necessary for the proper installation and operation of the systems, shall be included in the work, the same as if specified or shown.

C. In instances where the specifications call for an installation to be done in accordance with manufacturer's recommendations, a copy of these recommendations will be furnished and will be kept in the job superintendent's office at all times in order to be accessible to the architect and/or owner's representative.

D. All permits, tap and service fees shall be provided for by the Plumbing Contractor.

E. The work covered under this division of the specifications consists in furnishing all plant, labor, equipment, supplies and material and in performing all operations in connection with the heating, ventilating, and air conditioning work and plumbing work. This division of the specifications is divided into several sections for convenience in specifying common work and equipment as it may relate to more than one trade. All sections of these specifications are applicable to all trades equally as required.

F. The Plumbing Contractor shall provide water and drain connections for all plumbing and all other equipment shown furnished by Owner requiring same.

G. The Plumbing Contractor shall provide and install electrical interlock and control wiring. Mechanical Contractor shall furnish and install and wire switches and firestats in the control system.

1.4 Codes and Standards:

A. Comply with the requirements of governmental departments having jurisdiction, and with the requirements of local utility companies.

B. Conform to the Statewide Building Code and all code-referenced standards applicable to the execution of the work, including the National Fire Codes of the National Fire Protection Association.

A. All material and equipment for the electrical portion of the mechanical systems shall bear the approval label or shall be listed by the Underwriters' Laboratories, Incorporated. No work performed shall void this approval label or listing.

1.5 Manufacturer's Directions:

A) Follow manufacturer's directions for installation, testing and operation of all apparatus and equipment indicated on the drawings or specified.

2.0 PRODUCTS: SEE SCHEDULE ON DRAWINGS

2.1 General:

A. Materials and equipment shall be selected as to fit properly into the building spaces.

B. Standard Products: Materials and equipment shall be the standard catalogued products of manufacturers regularly engaged in the production of such materials and equipment, and shall be of the manufacturer's latest standard design that complies with the Contract Documents. Where two or more units of the same class of equipment are required, they shall be products of a single manufacturer; however, the component parts of the system need not be products of the same manufacturer. All equipment shall bear the label of an approved agency.

C. Identification: Each major component of equipment shall have the manufacturer's name, address, and model and serial number inscribed on a nameplate securely affixed in a conspicuous place. The nameplate of the distributing agent will not be acceptable.

D. Quantities: Provide the number of items indicated, and required for complete systems.

E. Where no specific kind or quality of material is specified, furnish a first-class standard article approved by the Architect.

2.2 Escutcheon plates:

A. Plates shall be nickel or chromium plated, of split-ring type, sized to match the pipe or conduit.

B. Plates provided for pipes passing through sleeves which extend beyond the floor or wall surface shall be of the deep recessed type.

3.0 EXECUTION

3.1 Workmanship:

A. Provide the best workmanship available. Inferior workmanship will be rejected and the work shall be reinstalled, when, in the judgement of the Architect, the workmanship is not of the highest quality.

B. Furnish the services of an experienced superintendent, who shall be constantly in charge of the installation of the work. Furnish the services of skilled workmen and labor required to unload, transfer, erect, connect-up, adjust, start, operate, and test each system.

B. Except where otherwise specified or indicated, all equipment and materials shall be installed in accordance with the recommendations and requirements of the manufacturer of the equipment, for the use prescribed for the project. Perform all tests recommended by the manufacturer.

C. Materials and equipment shall be delivered, erected, connected, and finished in every detail, and shall be so arranged as to fit properly into the building space.

3.2 Protection and Cleaning:

A. Be responsible for work and equipment until finally inspected, tested, and accepted. Protect work against theft and damage. Carefully store materials and equipment received on site which are not immediately installed.

B. Close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

C. Before acceptance of the work, remove all construction dirt from material and equipment. All work, including the inside of equipment shall be left in clean condition.

3.3 Scaffolding, Rigging, and Hoisting:

A. Furnish scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

3.4 Adjustment of Controls:

A. Provide the personnel and equipment required to adjustment completely the temperature controls to the satisfaction of the Architect. At the completion of the work, arrange a meeting at the job site to demonstrate the proper operation of the temperature control system to the Owner and the Architect.

3.5 Quiet Operation and Vibration:

A. Provide mechanical systems free from objectionable airborne noise and which do not transit noise or vibration to the structure.

B. Plumbing systems shall operate under all conditions of load without any sound or vibration which is objectionable in the sole opinion of the Architect. In case of moving machinery, sound or vibration noticeable outside the room in which it is installed, or annoyingly noticeable inside the room where it is installed, will be considered objectionable.

3.6 Accessibility:

A. Be responsible for the sufficiency of shafts and chases, and adequate clearance in double partitions and hung ceilings, for the proper installation of the work. Where the indicated shafts and chases are inadequate, notify the Architect prior to performing the work.

B. Locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include, but shall not be limited to, valves, traps, cleanouts, motors, controllers, machinery, and drain points. If required for adequate accessibility, furnish access doors for this purpose.

C. Install access panels for each inaccessible valve, machine, control damper, or other device requiring access. Access panels not specified within this division of the specification shall be provided and installed as specified in Section 05500, "Miscellaneous Metal Fabrications". Furnish to other trades the locations of these panels in sufficient time to allow their installation in the normal course of work.

3.7 Foundations, Supports, Piers, and Attachments:

A. Provide foundations, supports, pads, bases, and piers required for the plumbing work.

B. Provide concrete pads for all base-mounted water heaters and other floor-mounted plumbing equipment. Pads shall be four inches thick and extend six inches beyond the machine base in all directions. The top edge of all pads shall be chamfered. Insert 6-inch steel dowel rods into the floor to anchor pads.

C. Except where otherwise indicated, all equipment shall be attached securely to the building structure. Attachments shall be of a strong and durable nature. Attachments that, in the opinion of the Architect are not adequate shall be replaced or strengthened as directed.

3.8 Electrical Connections:

A. Power Wiring: Power wiring from the power source to the motor, or pre-wired equipment junction box, shall be provided as a part of the work specified in Division 16. Provide power wiring from the interior of the equipment to the motor, and to an equipment junction box if it is included with the equipment, in accordance with the requirements of Division 16. Furnish manufacturer's data and other information to coordinate the extent, location, and terminal condition of power wiring.

3.9 Cutting and Patching:

A. Provide cutting and patching in floors, walls and ceilings required to install the work which includes sprinkler work, plumbing equipment, pipe and plumbing fixture carriers. Patching shall match adjacent surfaces.

A. No structural members shall be cut without the approval of the Architect

3.10 Sleeves:

A. Provide and locate all sleeves and inserts required before the floors and walls are built, or be responsible for the cost of cutting and patching required for pipes where sleeves and inserts were not installed, were incorrectly located, or are required to be placed in existing construction. Provide all drilling required for the installation of the hangers.

3.11 Firestopping:

A) Where pipes and tubes penetrate floor slabs, provide a pipe penetration protection system for each pipe, tube, and conduit. The pipe penetration protection system shall be tested in accordance with ASTM E814 and have an F rating and a T rating of at least 1 hour, but no less than the required fire-resistance rating of the floor assembly. The test shall be conducted with a minimum positive pressure differential of 0.03 inches of water column.

3.12 Excavating and Backfilling:

A) The mechanical subcontractor shall do all trench and pipe excavation and backfilling required for his work inside and outside the building, including repairing of finished surfaces, all required shoring, bracing, pumping, and all protection for safety of persons and property. In addition, it shall be the responsibility of the Plumbing subcontractor to check the indicated elevations of the utilities entering and leaving the building. If such elevations require excavations lower than the footing levels, the Architect shall be notified of such conditions and a redesign shall be made before excavations are commenced. It is also the responsibility of the subcontractor to make the excavations at the minimum required depths in order not to undercut the footings.

3.13 Covering of Work:

A) No work of any kind shall be covered up or hidden from view before it has been examined or approved by the Architect. Any unsatisfactory or imperfect work or materials that may be discovered shall be removed and corrected immediately after being rejected and other work and materials shall be provided which shall be satisfactory to the Architect.

3.14 Painting and Finishing of Factory-Painted Equipment:

A) Where factory finishes are provided on equipment, marred or damaged surfaces shall be touched up or refinished to leave a smooth, uniform finish at the time of substantial completion.

3.15 Measurements:

A. The drawings are diagrammatic and indicate the general arrangement of systems and work included in the Contract. Do not scale the drawings. Refer to the architectural drawings for dimensions and details of construction, and the exact location of fixtures and other equipment. Where fixtures and equipment are not located definitely, obtain this information from the Architect, prior to installation.

B. In the event of discrepancy between actual measurement and those indicated, which prevents following good practice or the intent of the drawings and specification, notify the Architect, and do not proceed with the work until instructions from the Architect have been received.

3.16 Cooperation with Other Trades:

A. Plan work in advance and coordinate all space requirements with other trades involved. Where conflicts occur, request clarification from the Architect.

B. Follow drawings in laying out work, and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, notify the Architect before proceeding with the installation. Mechanical equipment, piping, and ducts installed above ceilings shall allow for the installation of lighting fixtures.

C Make modifications in the layout as needed to prevent conflict with work of other trades, or for proper execution of the work. Provide offsets in piping runs required to coordinate the installation with the work of other trades, and to install the work within the available space.

D. Give full cooperation to other trades and furnish information requested or necessary to permit the work of all trades to be installed satisfactorily and in a timely manner.

E. Where plumbing work will be installed in close proximity to, or will interfere with work of other trades, assist in working out space conditions to make satisfactory adjustment. If work is installed before coordinating with other trades, or as to cause any interferences with work of other trades, make the necessary changes in the work to correct the condition without extra charge to the Owner.

F. Furnish to other trades, as required, all templates, patterns, setting plans, and shop details necessary for the proper installations of the work, and for the purpose of coordinating adjacent work.

4.0 EQUIPMENT AND MANUFACTURING DRAWINGS

Submittal drawings are required on EVERY ITEM INDICATED AND NAMED BY MANUFACTURER, including, but not limited to, the following data:

A. Equipment items.
B. Wiring diagrams, Electrical characteristics.
C. Performance data, motor horsepower.
D. Manufacturer.
E. Pump curves marked at design conditions, construction.

F. Complete sprinkler layout if shown on drawings. Approval must be secured form State Inspection Bureau where applicable, as well as the applicable insuring agency prior to submission to the Architect.
G. Weights and physical dimensions.

5.0 MAINTENANCE MANUALS
5.1 Provide two (2) copies in separate plastic 3-ring binder with stiff back with identifying name lettered across the side and the end, including catalog pages of each item or equipment, wiring diagrams showing the internal and external elements and their connection, manufacturer's maintenance manual separated into loose leaf form with fabric reinforcements on the ring holes, bill of material showing necessary data of ordering parts with bill of material to include parts lists, and other incidental material as suggested by the manufacturer or Architect.

A. Plumbing equipment and specialties.
B. Fire protection equipment if applicable.

6.0 OPERATING AND MAINTENANCE DIAGRAMS
6.1 For items listed, approved wiring and control diagrams of the entire system, framed under glass shall be posted at locations designated by the Architect.

A. Plumbing equipment.
B. Fire protection system if applicable.

7.0 HANGERS AND SUPPORTS
7.1 Pipe Hangers:
1) General
A. All piping above the floor slab either vertical or horizontal shall be installed with hangers to support pipe without strain or sagging.
B. Where wood roof trusses exist, attach hanger with threaded rod to a 2 x 4 laid across two bottom cords of trusses. Use nut and washer where rod passes through 2 x 4.
C. Use offset type hangers for all pipes receiving insulation.
D. Unacceptable hangers - wire, rope, perforated thin strap, electrical conductors.
E. Horizontal pipe hanger spacing:
1) Cast iron - 5'-0" o.c. maximum at hub or connector.
2) Plastic - 5'-0" o.c. maximum at hub or connector.
3) Copper - 6'-0" o.c. maximum for pipe up to 1/2", 8'-0" o.c. maximum for 3/4" and 1" pipe, 10'-0" o.c. maximum for l 1/14" pipe and larger.
4) Install hangers at all changes in directions both vertical and horizontal.

7.2 Support piping systems in accordance with ANSI B 31.1 "Power Piping" so as to maintain required pitch of lines, prevent vibration and provide for expansion and contraction movement and drainage.
A. Supports or hangers for horizontal piping as follows: (Spacing not applicable where there are concentrated loads between supports such as valves or specialties.)

NOMINAL PIPE (INCHES)	MAXIMUM SPACING (In Feet) FOR METAL WATER PIPING
1 1/2" and below	8
2" and 2 1/2"	10
3"	12
4" and 5"	14

NOMINAL PIPE (INCHES)	MAXIMUM SPACING (In Feet) FOR PLASTIC WATER PIPING
1" and below	5
1 1/2" - 2 1/2"	8
3" - 5"	10
6" and up	12

B. Pipe that cannot be suspended from overhead supports, use substantial cast iron or welded steel wall brackets to support the hangers, etc., required.
C. A 16 gauge galvanized steel band, 10 inches long, may be inserted between the hanger and the insulation on the bottom half of the pipe. May be used in place of saddle.
D. Attach supports and hangers by using malleable iron or galvanized steel concrete inserts. Power concrete screws, beam clamps with lock nuts or retaining straps, or other special fastening devices, as required, for the support of hangers.
E. Install supports or guides to restrict excessive horizontal motion in vertical piping.
F. Pipes through exterior walls shall have space between pipe and sleeve caulked with lead wool and lead, or other approved expanding waterproofing material.
G. Horizontal pipe lines, passing through interior walls and partitions, shall be provided with schedule 40 PVC or ABS sleeves. Sleeve diameters shall be sufficient to accommodate pipe and insulation. Length of sleeve to be same as thickness of the partition or wall through which it passes.

8.0 VALVES, COCKS, MANUAL FAUCETS
8.1 General:
A. Valves shall be as schedules on the drawings and shall be the products of one manufacturer.
B. See schedules in another part of these specifications for additional valves.

8.2 Valves:

A. Butterfly valves shall be Stockham LG512-B53E 200# cold water pressure. Valves by Pratt, Norris or Weco will be acceptable, if equal.

B. Stop and waste valves at base of risers or for branch mains on all water lines and in supply lines to wall hydrants and where detailed shall be bronze, globe, solder ends, non rising stem.

C. Drain valves at low points within building shall be bronze, boiler soldered ends (Nibco 72, 73, or 74) as required. Valves by Tanner & Jenkins will be acceptable, if equal.

9.0 PIPE AND PIPE FITTINGS

9.1 General:

A. Drawings show generally the approximate routing of service lines and drains. However, execution of the work shall be coordinated more precisely. Exact locations shall be coordinated with the spaces, the building structure and other trades.

B. All measurements shall be established at the job site. Pipe shall be accurately cut and installed in place without any springing, forcing, or touching any other object except hangers, earth or insulation.

C. Plugs and caps shall be installed where shown or necessary for a complete job.

D. All systems shall be provided with complete drainage.

E. Water mains shall be covered with 42 inches of earth and all other lines with 30 inches on the outside and 12 inches of earth on inside.

F. All pipe except gas piping shall be concealed in the building walls, ceilings and floors except as indicated or called for. Exposed pipes shall be run parallel to walls and floors with true right angles. No underground installation of water piping except as shown.

H. Definitions and Terms:

1) Outside shall mean 5 feet beyond the perimeter of buildings.
2) Inside shall mean inside the buildings and to 5 feet beyond the perimeter of the building.

I. Expansion joints shall be installed for proper expansion and contraction. All domestic hot water supply and return piping and all steam heating and return piping shall be anchored at the center of all changes in direction over 50 feet. Anchors shall be a maximum of 200 feet on center attached to the building structure where approved by the Architect.Install anchors per ASHRAE recommendations. Pipe expansion loops shall be provided for above piping where the runs exceed 100 feet and a maximum of 200 feet on center thereafter all in accordance with ASHRAE recommendations and ANSI Code for Pressure Piping ANSI B31.1 with addenda 31.10A-1969.

9.2 Products:

A. Pipe:

1) Black galvanized and steel pipe shall meet dimensional requirements of ANSI 836.10 and the minimum requirements of ASTM A106.
2) Polyethylene (virgin) pipe, Schedule 40, ASTM D2104 and ASTM D2239.
3) Copper tube type K, L: ANSI H23.1, ASTM B88.
4) PVC pipe, Schedule 40: ASTM D1785, ASTM D2241.
5) PVC pipe Schedule 40: ASTM D1785, ASTM D2241 for storm drain.
6. PEX with brass fittings

9.3 Pipe Fittings:

A. Flanges:

1) 150 lb. and 300 lb., screwed: ANSI B16.5 and ASTM A105.

B. Unions:

1) Steel pipe - 2 1/2 inches and over: Flanged, gasket joint, 150 psi, per requirements of ANSI B16.5 and ASTM A181, grade 1.
2) Steel pipe - 2 inches and under: Shall be black or galvanized (match pipe), malleable iron, brass seat, ground joint for 150 psi, per requirements of ANSI B16.11 and ASTM A197.
3) Copper pipe over 2 inches: 150 psi braze companion flange, cast solder fittings, per requirements of ANSI B16.24.
4) Copper pipe - 2 inches and under: Wrought or extruded copper for braze joints per requirements of ANSI B16.22.

C. Wrought solder fittings: ANSI B16.22.

D. Cast solder fittings: ANSI B16.18.

E. Polyethylene (virgin) pipe fittings: Schedule 40, C.S. 197, to be the same chemical resistance as pipe, approved by N.S.F. for corrosive waste system and so marked.

F. PVC fittings: ASTM D2466-78.

G. Nipples: Shall meet standards of National Bureau of Standards C.S. 5, titled "Pipe Nipples, Brass, Copper, and Steel." Nipples shall be of same material and weight as pipe with which it is used. Nipples with an unthreaded section of one (1) inch or less shall be heavy duty. Running thread nipples are not allowed.

H. Joints between plastic pipe and cast iron pipe and vitrified clay: Shall be made with stainless steel and neoprene gasket no hub connector.

9.4 Installation:

A. Inspection and Preparation: Review drawings, specifications, building/site and other trades work to insure that there is adequate space to install piping to meet design conditions.

Allow clearance for insulation. Schematic arrangement of piping system are not intended to show exact location. Fittings and extra pipe necessary to avoid interference shall be furnished and installed without additional expense to the Owner. Where piping is installed without coordinating with other trades and it causes interference with work of other trades, changes to resolve interference shall be made at no extra charge. Notify Architect where interference with other trades exists.

B. General: Run piping concealed in finished areas unless otherwise indicated. Run piping exposed in equipment rooms, boiler rooms. Do not allow trash and dirt to enter pipes. Run piping parallel to the wall of the building, vertical piping straight and plumb, with all pipe centered in pipe sleeves. Do not conceal gas pipe except where specifically noted. Offsets where necessary, shall follow offsets in the building. Provide clearance equal to the insulation plus two (2) inches.

C. Changes in pipe size shall be made by using factory made reducers. Eccentric reducers with the flat side on bottom shall be used in steam and water piping.

D. Changes in direction of pipe shall be made using factory made fittings using long radius type.

E. Tees: Factory made tee fitting shall be used for branch connections.

F. Soldering: Joints between sections of pipe and fittings shall be soldered using factory made solder fittings. Before soldering, thoroughly clean and burnish with sanding cloth or fitting brush especially made for this operation. Apply an approved flux on the cleaned surface and apply heat and solder. Joints that leak shall be taken apart, re-cleaned and remade. Solder for copper pipe to be 95% tin, 5% antimony and 60-40 lead-tin for steel pipe. Acid core solder will not be allowed.

G. Installation of Control Valves and Specialties: Mechanical contractor shall install all control valves as the piping system is built.

1) Plastic Pipe Joints: Clean burs and fins from pipe and clean before applying adhesive. Pipe shall fit fully into fitting or one half into unions. Ends of all pipes shall be cut with ends square and true. Apply adhesive to male portion only, insert and align properly. No strain shall be allowed. Adhesive shall be equal to ASTM D2235-76a for ABS piping and ASTM D2564-78c for PVC pipe. Recommended practices per ASTM shall be followed in installing ABS piping and PVC pipe shall follow ASTM D2855-78 practices. Where leaks occur, cut joint out, throw away and install new material and fittings.

2) Screw Joints: Steel piping to be joined by threading shall be cut squarely, to proper lengths, threaded and all burrs removed. Cut threads full and clean removing excess cutting lubricant from inside and outside of pipe and apply joint compound to male threads only. Not more than three threads shall be visible at any joint after installation. Where leaks occur, remake joints if tightening does not stop leak.

3) Brazing: Joints between sections of pipe and between fittings and pipe using factory made brazing fittings shall be cleaned and burnished. Use a suitable flux, with an oxy-acetylene torch, using sil-fos brazing alloy. Acid flux shall not be used. Joints that leak shall be taken apart, cleaned, and remade.

4) Make joints in polyethylene pipe by the heat fusion procedure.

5) Flanges and unions shall be faced true and made square and tight. Unions shall be 125 psi service, bronze seat type. Flanges shall be ASA Standard 125 psi service with 1/16 inch thick asbestos or red rubber gaskets. Unions or flange joints shall be provided on each side of each valve 2 1/2 inches or larger and in each line immediately proceeding the connection to each major piece of equipment such as heating coil, and other similar items.

H. Furnish and install drain valves for water piping systems in accessible locations, to permit complete system drainage.

I. Soil, waste and vent stacks are not shown on drawings and shall be installed in compliance with the requirements of the plumbing code.

J. Slopes: Slope pipe to outside as indicated below:

1) Underground drainage and storm pipe (minimum):
   A) Six (6) inches and larger - 1/8 inch per foot.
   B) Five (5) inches and under - 1/4 inch per foot except where noted.

2) Pipe supported by hangers in building (minimum): 1/4 inch per foot.

Change in direction shall be made with factory made standard wyes, 1/2 wyes, 45's, long sweep quarter bends, sixth, eights or sixteenth bends. No tees or cresses shall be allowed except in vent piping. The maximum direction change shall be 90 degrees.

K. Expansion in the system piping shall be made by using turns, expansion swing joints, expansion loops, offsets, anchors and etc., as necessary, to control pipe movement, in accordance with ANSI B31.1, chapter 2.

L. Closed Systems: Install manual air vents at the tops of all risers, at the top of all coil piping, at all high points. Install in each system one capped low-point fill valve and one capped drain valve.

M. Provide a cleanout just above floor level for all rain conductors passing through floor. Insulated hot water, heating water and steam piping to be supported by roller or trapeze hangers with a steel protection saddle.

N. Sanitary and Storm Sewer Pipe in Earth: Trench bottoms shall be solid and shall support the entire length of each pipe. Lay pipe true to line and grade. Foreign materials shall be kept from entering pipes during laying operations. Close up incomplete runs of pipe with factory made caps, set loose.

O. Adjusting System Devices: Inspect and adjust flush valves, air vents, airtrol fittings, pressure gages, thermometers, safety valves, etc., for proper operation.

10.0 PIPE MATERIAL: Install piping materials in accordance with the following schedule. Valve numbers are from Stockham Catalog; however, valves of equal service, construction and quality by Nibco, Jenkins, and Crane will be acceptable.

SERVICE	SIZE	TYPE PIPE	TYPE FITTING	TYPE VALVE
Domestic Cold Water Supply Above Ground Up to Pressure Tank	All Sizes	Type L copper	Brass	Brass
Domestic Cold And hot Water Supply Above Ground Beyond Pressure Tank	All Sizes	PEX	Brass	Brass
Domestic Water Supply Below Ground	All Sizes	PVC Sch 80	PVC	PVC Gate
AC Drains Sanitary Waste & Vent below ground inside & outside & inside pipe chases inside	All Sizes	PVC, DWV Sch. 40 ASTM D2665-73	PVC, DWV Sch. 40 ASTM D2665-73	
Storm Water Below grade	All Sizes	SDR-35	SDR-35	

PEX PIPE COLOR: COLD WATER—BLUE
HOT WATER—RED
HOT WATER RETURN—GRAY.

10.0 END OF SECTION 15020

Fire Station #1
City of Martinsville
Arch. Comm. No. 1366

SECTION 15250 - INSULATION OF PLUMBING SYSTEMS

1.0 GENERAL

1.1 Applicable Publications:

A. American Society for Testing and Materials (ASTM):
   1) C547 - Pipe Insulation.
   2) E84 - Test for Surface Burning Characteristics of Building Materials.

B. Underwriter's Laboratories (UL):
   1) 723 - Tests for Surface Burning Characteristics of Building Materials.

1.2 Product Delivery, Storage and Handling:

A. Exercise care in transporting and handling to avoid damage.

B. Store insulation off the ground in a clean and dry area protected from weather.

1.3 Job Sequence:

A. Install insulation over pipes only after they have been leak tested, cleaned, dried, inspected and approved.

1.4 Definitions:

A. Concealed: Piping, equipment that is not exposed.

B. Exposed: Piping, and equipment exposed to view in finished areas, including mechanical, and electrical equipment rooms and roofs. Shafts, chases, interstitial spaces unfinished attics, crawl spaces and pipe basements are not considered finished.

1.5 Scope of Work:

The Contractor shall furnish and install complete insulation systems and all related items necessary for pipes, equipment and appurtenances to complete the work specified herein and shown on the drawings.

1.6 Material Approval:

The Contractor shall submit for approval six sets of catalog data sheets that describes systems material, its performance and the installation method. Data shall be submitted for all insulation systems even if the items to be used are those specified.

1.7 Brand Names:

May be Johns-Manville, Owens Corning or Armstrong equal to thicknesses and quality specified hereafter. Johns-Manville materials are used in these specifications unless noted otherwise.

1.8 Flame Spread:

All components of the insulation for both piping equipment and ductwork, including facings, mastics and adhesives, shall have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed, or as per code for insulation, tape, etc., in plenums used for air return. Ratings shall be as determined by Underwriters Laboratories, Inc., or other approved testing laboratory.

1.9 General:

A. Insulation shall be applied on clean, dry surfaces and only after tests and approvals required by the specifications have been completed.

B. All pipe insulation shall be continuous through wall and ceiling openings and sleeves.

B. Insulation shall be continuous and unbroken where pipe is supported by hangers.

2.0 DOMESTIC HOT AND COLD WATER

A. Scope of Work: The following piping systems shall be insulated as specified herein and the work shall consist of all insulation and related items necessary for a complete and finished installation:
   1) All Domestic Hot Water Supply and Returns
   2) Domestic Cold Water to a point 20'-0" developed length from where exterior pipe enters building. Where applicable.

B. Material:
   1) Pipe Insulation: Glass Fiber insulation with factory applied jacket. Johns-Manville Flame-Safe or approved equal.

THICKNESS TABLE

Temperatures	Pipe Size	Thickness	Density
All Temperatures	All	1"	3 1/2#

   2) Jacket
      EXPOSED
      All service jackets with vapor barrier coating
      CONCEALED
      White kraft bonded to aluminum foil, reinforced with fiber glass yarn
   3) Fittings
      Premolded one-piece PVC insulated fitting covers.
   4) Adhesive: Johns-Manville U-GLUE, Benjamin foster 30-35.
   5) Seam Seal: Johns Manville UNI-FIT

C. Application:
   1) Pipe Insulation: Insulate all piping in a neat, workmanlike fashion in accordance with thicknesses listed in table above. Longitudinal laps of jackets shall be stapled with outward clinching staples at 4", o.c., and butt joints shall be wrapped with a 3" minimum

wide strip of the jacketing material securely sealed in place. Adhesive to be Johns-Manville U-GLUE, Benjamin Foster 30.35 or approved equal.

A. Cold water pipe - staple and seam seal joints.

B. Hot Water Pipe - staple only.

3.0 END OF SECTION 15250

Fire Station #1
City of Martinsville
Arch. Comm. No. 1366
SECTION 15400 - PLUMBING SYSTEM

1.0 GENERAL
1.1 Scope: Furnish and install all labor, devices, and materials for the Complete work.
1.2 See other sections of these specifications for additional material, equipment and explanation. Materials, equipment and other information listed herein is to complement specifications in other sections.
1.3 Related Documents:
A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

2.0 INSTALLATION
2.1 Run piping approximately as shown on the drawings or as structural and architectural conditions will permit. Installed piping is not to interferewith the opening of doors or other moving parts nor be near or over any portion of the electrical equipment where there might be possibility of damage. Piping shall be installed as high as possible. All lines shall be installed so level without low sagging that they may be drained. All take offs shall run down from mains to facilitate draining system. Minimum pipe sizes are the sizes shown on the drawings or specified herein. All piping shall be new and shall be full weight material as specified. After cutting pipe, ream out full bore. All foreign matter from the inside of the pipe shall be removed before installation.
2.2 Run piping in straight lines with all riser lines plumb with such offsets only as indicated or absolutely necessary. Low points in the lines shall not be permitted. Contractor shall determine all grades and maintain his own direction and levels throughout the progress of the work and shall be responsible that the end result is acceptable. Dimensions shall be determined at the site. Piping system shall have flanges or unions for the installation and removal of piping and equipment. Piping shall be installed so as to prevent undue stresses and strains on piping and hangers from expansion or contraction. Installation of the correct loops, offsets, or expansion joints shall be the responsibility of the Contractor. Pipe or filling failure due to stiff connections must be removed and replaced at no cost to the Owner.
2.3 Plumbing Contractor shall furnish and install all solid wood blocking (min. 2x6) for fixtures.

3.0 SLEEVES AND ESCUTCHEON PLATES

Provide sleeves for pipes where piping penetrates masonry walls and escutcheon plates where piping penetrates finished walls and ceilings. All piping penetrating through sleeves and behind escutcheon plates shall be adequately sealed with rigid insulation mortar and/or caulking. Where pipe and sleeves occur in fire rated walls or exit corridor walls, full material shall be caulking for rating of wall.

4.0 DOMESTIC COLD AND HOT WATER DISTRIBUTION SYSTEMS
4.1 Service:
Domestic water distribution shall connect to the PSA water system. Furnish and install a complete system.
4.2 Shock Absorbers:
Shall be installed on each hot and cold water riser and/or fixture branch. Also, they shall be installed at each flush valve and/or fast closing valve. Shock absorbers are to be Plumbing Drainage Institute, Smith 5000, Wade W10, or Josam 1485 series or equal, approved and installed as recommended by manufacturer.
4.3 All hot and cold water piping shall be run above the ceiling unless specifically indicated otherwise.
4.4 Piping:
A. Materials:
All to be equivalent to Mueller Brass Company, copper. "Streamline" hard tempered government type as listed below, Federal Specification WW-T799 and ASTM B88-33.
B. Above Floor Slab: All Size - Type "L".
C. Note: All pipe 3/4" and smaller below floor slab shall be Type "L" soft tubing. No joints or connections are allowed below floor slab.
4.5 Solder: Use only "lead free" solder.

5.0 SANITARY SEWER SYSTEM
5.1 General:
A. All plumbing fixtures, plugged outlets, etc., shall be correctly connected and vented. All vents through roof (VTR) shall extend a full 12" above the roof surface. Flashing shall be installed by the General Contractor. All pipe and fittings shall be first class in every way, new and free of defects. All material should be carefully checked before it is installed.
B. Installation and materials shall be as per recommendations printed in The Society of the Plastics Institute, Inc., PPI Technical Report - Standards for Plastic Piping, December 1979, or most recent date.
5.2 Urinal Flanges: Connections shall be brass.
5.3 Pipe and Fittings:
All piping and fittings shall be plastic pipe PVC, DWV, Schedule 40, ASTM D2665-73 (DWV).
5.4 Joining Materials:
Shall meet ASTM D2564-78a for PVC, all installed per Plastic Pipe Institute Standards.
5.5 Changes in Direction:

Sewer drain lines shall change direction by using standard long sweep quarter bends, 1/16, 1/8, 1/6 bends, 1/2" "Y" fittings or 45 degree fittings. No. 50 bends shall be used. Changes in direction from horizontal to vertical may be made with short quarter bends or sanitary "Tees".

5.6 Grade on Piping:
All sanitary soil and waste piping shall have a minimum grade of 1/4" per foot except pipe six (6) inches and larger may have minimum grade of 1/8" per foot.

6.0 STORM SEWER SYSTEM (IF APPLICABLE)

6.1 General:

A. The storm sewer system consists of furnishing and installing all roof drains and inside rain conductors, for the collecting of roof rain water and transferring it to the discharge points.

B. Installation and materials shall be as per recommendations printed in "The Society of the Plastics Institute, Inc.," PPI Technical Report - Standards for Plastic Piping, December 1979, or most recent date.

6.2 Pipe:
All pipe and fittings shall be plastic pipe PVC, DWV. Schedule 40, ASTM D2665-73 S(DWV). Use same type for entire job. Outside pipe and fittings shall be SDR.

6.3 Changes in Direction:
Sewer drain lines shall change direction by using standard long sweep quarter bends, 1/16, 1/8, 1/6 bends, 1/2" "Y" fittings or 45 degree fittings. No. 50 bends shall be used. Changes in direction from horizontal to vertical may be made with short quarter bends or sanitary "Tees."

6.4 Grade on Piping:
Minimum of 1/4" per foot except pipe 6" and larger may have a minimum grade of 1/8" per foot.

6.5 Joining Materials: Shall meet ASTM D2564-78a for PVC, all installed per Plastic Pipe Institute Standards.

7.0 FLOOR DRAINS

7.1 Furnish and install all floor drains where indicated, complete with strainers, seepage flanges, traps, trap primers as required by Code, all to suit the service required and the floor construction. Drains shall be of the sizes as indicated on the drawings.

7.2 All drains to be set level and at proper elevations to provide smooth and uniform drainage.

7.3 Floor drains as manufactured by Josam Mfg. Co., J. R. Smith, or by Smith & Wade will be acceptable providing they meet and comply with types selected. All floor drains shall have standard P-traps.

7.4 Equipment Drain Stub Outs:
Waste drains (where lines stub up for equipment) shall be as detailed on drawings. Cap all stub outs with threaded caps.

7.5 FD-1: Josam 30002-A unless noted otherwise on Drawings.

8.0 CLEANOUTS

8.1 General:
Provide cleanouts at the base of all soil vent stacks and at other points as required by Code and where indicated on the drawings. These cleanouts shall be the same size of pipe into which installed, except that cleanouts larger than 4" inches will not be required. Cleanouts shall be installed so that rod will not pass more than three 45 degree angles or equivalent when rodding soil lines.

See Room Finish Schedule to determine type. Minimum distance between inside cleanouts shall be 75'-0" whether shown on the drawings.

1) Finished Room Floors - Josam 56010, J. R. Smith 4020, or Wade 7000 Series cast iron cleanout with threaded adjustable collar, round nikaloy scoriated top, and tapered tread bronze plug.
1) Unfinished Floors - Josam 56050, J. R. Smith 4220, or Wade 1420 Series all cast iron cleanout with threaded adjustable collar, round heavy duty scoriated top.
3) Vinyl Asbestos Tile Floors - Josam 56010 cast iron cleanout with threaded adjustable collar, round nikaloy top with recess for tile, with tapered tread bronze plug.
4) Carpeted Floors - Josam 56050, J. R. Smith 4220, or Wade 1420 Series cast iron cleanout with threaded adjustable collar, round heavy duty top complete with marker having the inscription "SAN. C.O." for use on carpeted floors, complete with vandal proof screw.
5) Yard Areas - Josam 58860, J. R. Smith 4250, or Wade 8300 Series, cast iron concrete surface level cleanout with secured scoriated cover and tapered tread bronze plug.
6) All Walls - Josam 58890, J. R. Smith 4472, or Wade 8590 Series cast brass countersunk plug and stainless steel round access cover of appropriate size, complete with securing screw.

9.0 HOSE BIBBS, HYDRANTS AND VACUUM BREAKERS, VALVES

9.1 WH-1 Wall Hydrant Josam 71050 - 3/4" female inlet, 3/4" hose thread, vacuum BKR., loose key tee handle, all chromium plated, with wall flange. Set solid in mortar.

9.2. All hose bibbs that do not have integral vacuum breakers shall have atmospheric type backflow preventer.

9.3 Valves For Copper Pipe:

A. General: Valves by Kennedy, Nibco, and Tanner will be acceptable. See other sections of these specifications for additional valves.

B. Gate Valve: For valves normally open, solid wedge bronze solder ends, 200 lbs., non-shock water pressure. All valves shall be gate valves unless below listed application applies.

C. Globe Valves: Bronze with bronze solder ends, 300 lbs, non-shock water pressure, for use where valve is normally closed or for by pass.

D. Cut-off and/or Drain Valve: Bronze. Rising stem valve. 200 W.O.G. non shock, 1/2" valve in the line as the drain valve or a bronze gate valve with waste plug.

E. Cut-off Valves: For cut-off valves only - Bronze gate valve 300 lbs non-shock pressure.

F. Balancing Valves: Sarvo Type V-50 or V-60 Series, brass body, 125 lbs. working pressure.

G. Check Valves: Bronze with bronze solder ends, swing check bronze seat and bronze disc, 300 lbs. non-shock water pressure.

10.0 AS BUILT DRAWINGS

A. HVAC CONTRACTOR WILL FURNISH TO THE ARCHITECT A COMPLETE SET OF AS BUILT DRAWINGS SHOWING CHANGES FROM THE CONTRACT. CHANGES WILL BE RED LINE DRAWINGS ON AN ORIGINAL BLUEPRINT.

10.0 END OF SECTION 15400

Fire Station #1
City of Martinsville
Arch. Comm. No. 1366
SECTION 15450 - PLUMBING FIXTURES & EQUIPMENT

1.0 GENERAL

A. Furnish and install all fixtures as indicated on the drawings and as hereinafter specified. All supply fittings, cut-off valves, vents, supporting and connecting devices, traps and trap assemblies, valves, faucets seals, etc., for complete hookup and operation shall be furnished.

B. All plumbing fixtures shall be provided as shown in the schedule and on the drawings and shall be complete with all fittings, bolts, caps, trim, plates and hangers suitable for mounting requirements for a complete installation.

C. Fixtures and equipment shall be covered and protected against dirt, water, and chemical or physical or mechanical injury.

D. Hot water supplied and controlled at the left and cold water at the right.

E. Finished installation of plumbing fixtures shall present a neat, finished and uniform appearance. All fixtures, trim, fittings and accessories shall be properly fitted and free from defects, and of same manufacturer, color and finish.

F. Fixture and Equipment supply lines shall be equipped with individual stop valves.

1.1 Related Documents:

A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

2.0 PRODUCTS

A. Fixture manufacturer numbers used are American Standard, unless noted otherwise equals by Eljer, Kohler, or Crane will be acceptable.

B. All fixtures and seat/covers shall be white.

C. Exposed piping, trim, fittings, floor and wall plates shall be polished chromium or nickel plated brass.

D. Plumbing fixtures, unless noted otherwise, shall be vitreous china and be of "first quality" throughout, free from pores and with close grain, with flat mounting surfaces. Surfaces glaze shall be totally fused to the fixture body and glaze shall cover all exposed parts. The inside of water closet bowl trapways shall be completely glazed.

E. Acid resisting enamel shall be throughout the entire thickness of the enamel coating.

F. **FIXTURE SCHEDULE: SEE DRAWING HVAC-P-E-1**

3.0 SUPPLY FITTINGS, STOP VALVES, AND SEALS

A. Individual stops on all supply lines for all plumbing fixtures except flush valves shall be furnished. Provide cut off valve above ceiling for flush valve fixtures, showers, etc.

B. Stop valves shall have a brass body with brass or die cast zinc alloy handle. Valve and handle shall be chromium plated.

C. Faucets shall be of "first quality" brass casting with a polished chromium plated finish. Faucets to be as listed in the schedule on the drawings, or equal.

B. Supply pipe shall be chromium plated threaded brass tube, and the top connection shall match the faucets.

C. P-traps shall be constructed of brass tube with a polished chromium plated finish, with a minimum wall thickness of 20 gage.

D. Drinking fountain shall have supply, gate valve, 1 l/2" inch C.I. P-trap, and built-in pressure regulator to deliver steady flow from 30 to 60 psi supply pressure.

4.0 INSTALLATION

A. No fixtures, trimming, finished pipe valves shall be installed until after hard tile has been cleaned and accepted.

B. Verify that wall and floor conditions match with equipment to be installed to produce a first quality installation. Detrimental conditions must be corrected before fixtures are ordered or installed.

C. Where no carrier is required and where fixtures are mounted on C.M.U. walls, they shall be supported with bolts of sufficient size and length to receive the fixture attached to steel backing plates or sufficient length by 4" wide by l/4" minimum thickness imbedded in mortar.

D. Carriers to be recessed or mounted behind the wall.

E. Supports for plumbing fixtures shall be installed as the walls are built.

F. Install the flush valve supply piping for each fixture so that the center line of the valve discharge is directly above the center line of the fixture spud. Bending will not be permitted.

G. Cap all plug pipe during construction.

H. Where piping passes through walls or floors, install polished chrome finished brass wall or floor plates to cover openings.

I. Clean fixtures, materials and equipment with a detergent prior to inspection in accordance with respective manufacturers' recommendations. Do not allow any acid cleaning material from the hard tile work to come in contact with the plumbing work.

5.0 APPLICABLE PUBLICATIONS

A. American National Standards Institute (ANSI):

1) A112.21.1 - Floor Drains.

2) Z21.22 - Relief Valves and Automatic Gas Shut-off Devices for Hot Water Supply Systems.

B. American Society of Sanitary Engineering (ASSE):
   1) 1005 - Water Heater Drain Valves.
   2) 1011 - Hose Connection Vacuum Breakers.
   3) 1019 - Freezeless Automatic Draining, Anti-Backflow Type Wall Hydrants.

6.0 QUALITY ASSURANCE

A. Provide materials, equipment, and installation in accordance with the Virginia Uniform Statewide Building Code (2006).

7.0 END OF SECTION 15450

SECTION 15460 – TESTING,CLEANING AND AS BUILT DRAWINGS

1.O GENERAL
1.1 Scope: Furnish and install all labor, devices, and materials for the Complete work.
1.2 See other sections of these specifications for additional material, equipment and explanation. Materials, equipment and other information listed herein is to complement specifications in other sections.
1.3 Related Documents:
A. The AIA Document A201 "General Conditions of the Contract for Construction" and Conditions of Division 1 here before stated are part of this Section.

2.0 ADJUSTMENTS AND CORRECTIONS
2.1 Prior to completion contractor will visit all equipment and systems and make adjustments to insure proper operations.

3.0 STERILIZING AND FLUSHING PIPING SYSTEM
3.1 Water Piping: Sterilize with chlorine, 50 parts per million for a 12 hour period after which the system shall be flushed before being put into service.
3.2 Sterilizing Water Supply Equipment: See "Water Supply Equipment."
3.3 Flushing Piping Systems: Thoroughly flush all piping to insure the removal of sediment, pipe scale, etc., from water lines, removing such working parts from flush valves as may be deemed necessary.
3.4 Record of Sterilizing and Flushing Systems: After the water piping has been sterilized and the systems flushed the contractor shall advise the architect in writing that this has been accomplished and the date(s) that it was done.

4.0 SYSTEM TESTING
4.1 Contractor shall pressure test all potable water systems at 150 psi.
4.2 Contractor shall test all sanitary sewer system per state plumbing code.
4.3 Contractor shall test sprinkler system per NFPA 13 AND TEST WATER MAIN AND FIRE DEPARTMENT CONNECTION TO EXISTING SYSTEM AS DETAILED ON DRAWINGS.

5.0 CLEANING

5.1 At the completion of the work and before final inspection, the plumbing HVAC and sprinkler installation shall be thoroughly cleaned. All equipment, pipe, valves, fixtures, and fittings shall be cleaned of metal cuttings, plaster, concrete, grease, etc.; and factory-applied prime coat paints shall be touched up with matching paints.

5.2 Piping shall be cleaned by flushing draining and refilling until system is free of contamination.

6.0 AS BUILT DRAWINGS

A. PLUMBING CONTRACTOR WILL FURNISH TO THE ARCHITECT A COMPLETE SET OF AS BUILT DRAWINGS SHOWING CHANGES FROM THE CONTRACT. CHANGES WILL BE RED LINE DRAWINGS ON AN ORIGINAL BLUEPRINT.

7.0 END OF SECTION 15460

SECTION 16000 - ELECTRICAL DETAIL REQUIREMENTS INDEX

SECTION 16000 - ELECTRICAL DETAIL SPECIFICATIONS

1.0 SCOPE OF WORK: The work covered under this division of the speci9ications consists in furnishing all plant, labor, equipment, supplies and materials and in performing all operations in connection with the electrical work as required by these specifications and the accompanying drawings. All work shall comply with the National Electric Code and State Building Code.

2.0 EQUIPMENT AND MANUFACTURER'S DRAWINGS: Certified drawings and engineering data sheets are required for equipment items listed on the drawings.

3.0 INTENT AND MEANING: The entire work provided for in these specifications and as shown on the drawings is to be constructed and finished to the full intent and meaning thereof; even though every item necessary for the proper finishing and successful operation of the entire work is not specifically mentioned.

4.0 REGULATIONS AND INSPECTIONS: Install all materials and equipment in accordance with the rules and regulations of the National Board of Fire Underwriters, the current National Electric Code including supplements and amendments, the local power company, the local telephone company and local city ordinance. In the event of conflict between the above rules and regulations and information contained on the drawings and specifications the former shall take precedence and no extra compensation will be allowed for electrical contractor due to his failure to observe such conflicts.

5.0 INSTALLATION OF WORK: Provide pull boxes, supports, braces, hangers, clamps, steel cable, turn-buckles and eyes, claws, etc., where required for the proper installation of panelboards, raceways, starting and control equipment, lighting fixtures and all other equipment installed and connected in accordance with these specifications and accompanying drawings. All work to be concealed in finished areas, except as noted otherwise on plans. All work in pipe chases and mechanical rooms shall be exposed.

6.0 EMPTY RACEWAYS: The electrical contractor shall pull fishing wires through all empty conduits in the presence of the architect or his representative before acceptance of job. These wires are to remain in the conduit.

7.0 WIRING METHODS

7.1 General:

A. All wiring shall be done in accordance with the S.E.U.A. regulations, the National Electrical Code and in compliance with the rules and regulations of the Electrical Power Company serving this location.

B. All conductors within the building for service and feeders from panel to panel shall be installed in 'EMT' conduit terminated in boxes or cabinets unless otherwise specified.

C. Electric Metallic Tubing (EMT) in sizes 2" and smaller will be acceptable for all locations except raceways underground, or in concrete.

D. All conduit for raceways underground in concrete and over 2" shall be rigid.

E. Flexible metal conduit may be used for short motor connections and where in the opinion of the Architect, rigid raceways are impracticable.

7.2 Materials:

A. Rigid Metal Conduit: Shall be mild steel tube, sherardized or hot-dipped galvanized equal to that manufactured by National, Walker, Republic or Youngstown. Couplings shall be hot-dipped galvanized or sherardized. If hot-dipped, galvanized rigid conduit is used, exposed threads shall be painted after installation with two coats of asphaltum paint where concealed, and two coats of lead and oil paint of installed exposed.

All joints shall be threaded and made up tight with conduit brought butt to butt in standard conduit couplings as specified herein before, except that where it is possible to turn the conduit itself, standard sherardized or galvanized conduit unions may be used. No pipe couplings running threads will be permitted.

Single locknut and bushings connections to sheet metal and thin wall section boxes and cabinets. Cadium or galvanized finished locknuts and bushings equal to T & B in all respects.

B. Electrical Metallic Tubings: Of mild steel tube in sizes over 3/4" to 2" tubing shall be hotdipped, galvanized or electrogalvanized as manufactured in accordance with U.L. Standards and so labeled. Enameled inside will be acceptable. E.M.T. shall be threadless and equal to that as manufactured by National, Republic or Youngstown.
Specifications for installation of rigid metal conduit applied to E.M.T. Except that

E.M.T. joints to be made with U.L. listed threadless type fittings. Water-tight fittings
required in masonry on exterior walls.

C. Flexible Metal Conduit: 1/2" up to and including 3/4" single strip steel, galvanized or equal in respect to that as manufactured by National Electric Products Corp.

7.3 Special Fittings:

A. Insulating Bushings: Underwriters listed, equal to T & B in all respects, install where required by Section 3736b, N.E.C.
B. Ground Clamps: T & B #3902 or #3903 series as required by ground conductor, grounding rod or water pipe size.

C. E.M.T. Fittings: Shall be T & B or equal with steel set screw, indented compression type.

D. "LB" and "LBO"'s: Shall be equal to Crouse Hinds, galvanized steel and threaded.

E. Flexible Metal Conduit Fittings: Shall be liquid-tight equal to T & B, standard type.

8.0 CONDUCTORS

8.1 General: All wires and cable shall be listed by Underwriters Laboratories for 600 volt service and shall bear the Underwriters label. All shall be equal to Hazard, National Phelps, Dodge or Anaconda. All requirements of the current Underwriters Laboratories standard, the various applicable NEMA Standard and ASTM specifications shall be met.

8.2 Markings: All wires and cable shall be permanently marked on one foot or closer centers with manufacturer's identification, N.E.C. type letter and conductor sizes.

8.3 Colors: All wires #6 and smaller to be in three colors in accordance with Section 212 N.E.C. additional colors acceptable for control wiring, etc., larger wire and cable may be applied in colors or have ends painted after installation.

8.4 Size of Conductors:

Line voltage wiring: No. 12 AEG minimum, except where specifically indicated otherwise. Larger sizes of wires and cables are shown on drawings.

Low Voltage Wiring (Less than 10 Volts): No. 14 AWG, unless otherwise specified or indicated.

Control Wiring: From motor controls is not carrying motor current No. 14, unless otherwise indicated or specified.

8.5 Stranding: All conductors No. 8 and larger shall be standard.

8.6 Insulation: Unless specified otherwise on drawings

A. In raceways underground or cast in concrete slabs or fill or earth:

1) No. 8 and larger: Type USE, Style RR, National "Flexy" or Hazard "Watertite-Hazaprene."

2) No. 10 and smaller: Moisture/resistant thermoplastic covered type THW.

B. In Raceways Other Than (A):

1) No. 8 and larger: Type THW or XHHW

2) No. 10 and smaller: Type TW

C. Wire and cable sizes specified or shown on drawings are copper conductors.

8.7 Ties: All conductors inside enclosures such as panelboards, etc., shall be pulled together in a neat manner and tied with plastic or nylon ties.

9.0 SOLDERS, CONNECTORS AND LUGS

9.1 Material: All devices coming in contact with conductors and all current-carrying parts shall be copper or code approved alloy.

10.0 TESTING

10.1 General: When all work is completed, the entire installation shall be rung out and be absolutely free from grounds and short circuits, except those required grounds as per code requirements.

10.2 System Readings: Two sets of readings are required, one under full load and one under no load. Record amp and voltage readings for each phase and voltage between phases. Readings to be taken at the main panel and at the branch circuit panelboard. Test and record grounding conductor resistances. Submit in triplicate to the Architect on a form showing the following: Project Name, Architect's Name, Electrical Contractor's Name, Dates Tests Were Made, Dates Data Submitted, Type Voltmeter Used & When Calibrated, Type Ammeter Used & When Calibrated, Resistance in OHMS of Service Ground, List Panels and Show Voltage No Load, (phase to phase) (phase to ground), Voltage Full Load, (phase to phase) (phase to ground), Maximum Load Amps for Phase A, B and Neutral.

10.3 Equipment Readings: Readings for voltage and amps for each motor and each piece of equipment having resistance heating circuits shall be taken. Record for each motor the motor nameplate data. The motor heat protector and other data pertaining to heater selection. Coordinate work with other sub-contractors responsible for equipment. Submit in triplicate.

11.0 OUTLET, SWITCH AND JUNCTION BOXES

11.1 For Conduit System: Boxes shall be equal to Appleton, National Electric, Steel City or approved equal with ears turned in, galvanized after assembly or sherardized, multiple gang boxes shall be one piece type. Provide plaster rings as required. Provide cover plates as required.

11.2 For wiring without conduit: Boxes shall be metal or plastic type with ears turned out. Boxes shall have internal clamps to hold conductors in place. All boxes shall be as approved by N.E.C. Provide cover plates as required.

12.0 DISCONNECT SWITCHES, FUSES, MOTOR CONTROLLERS, ETC.

12.1 Disconnect Switches: Quick-made, quick-break, 250 volt, number poles, and amperage as shown on drawings, horsepower rated, type ND safety switches in NEMA type 1 enclosures fusible with positive pressure fuse clips, unless otherwise indicated on drawings, Square D, Westinghouse, or approved equal. All switches by same manufacturer. Provide weatherproof disconnect switches, if called for on drawings. Stamped steel handles will not be approved.

12.2 Fuses: Dual element, time-lag, 250 volt, cartridge, type Fusetrons as manufactured by Russman. Sizes shown on drawings. Caution labels indicating size of Fusetron to be used for replacement shall be installed in all appropriate locations on switches and panels.

13.0 MECHANICAL EQUIPMENT WIRING

13.1 The Electrical Contractor shall do electrical power wiring, including conductors, boxes, conduit and all other necessary devices for a complete operation for all mechanical and plumbing work.

13.2 Motors: All electric motors and motor driven equipment shall be furnished and installed in place by others ready for connections thereto by Electrical Contractor. Motor branch circuits, feeders, switches, etc., are designed for sizes as shown on drawings which sizes are in accordance with the other sections of these specifications. The motors and motor driven equipment actually installed may vary from these sizes. The electrical contractor shall check this in accordance with the N.E.C. and notify the architect, if any changes are required. The electrical contractor shall do all electrical wiring for mechanical work.

14.0 THERMOSTAT CONTROLS: 2 X 4 BOX AND 1/2" CONDUIT BY CONTRACTOR, WIRING By Others.

15.0 INTERCOM AND TELEPHONE SERVICE: (if shown on drawing) The electrical contractor shall install computer and telecommunication conduit and wall boxes as indicated on drawings. Minimun size of wall boxes shall be 4" x 4", MINIMUM SIZE OF CONDUIT WILL BE 3/4".

16.0 INSPECTION CERTIFICATE: Furnish to the architect three (3) copies of the local building inspector's report for acceptance.

17.0 WIRING DEVICES

17.1 Local Switches: Single Pole, double pole, three-way and four-way in all area to be Bryant 4900 Series 20A, 120V, or equal, color to be grey.

17.2 Receptacle Outlets: Convenience wall: Flush, double grip contacts 20A, 125V duplex Bryant 5262-I, or equal, color to be grey.

17.3 Plates:
For exposed work: Galvanized steel plates
For concealed work: stainless steel
Screws: Screw heads to match plate finish

17.4 Floor Boxes (for power and telephone and communications)if shown on drawings: Steel City Series 68 with carpet flange plate # P-60-CP-AL and blank cap.

17.5 Plugmould (if shown on drawings): Walker Plugmould # AL2000B with AL2000C cover, grounded, duplex outlets at 12" oc, 3 #12 wires, complete with outlet cover plates and caps.

18.0 LIGHT FIXTURES

18.1 General: All fixtures, LED, metal halide and fluorescent, as scheduled hereinafter shall be furnished with lamps. The lamp wattage and number of lamps is shown in the fixture schedule. Fixtures shall be furnished and installed with lamps as shown on drawings. All fixtures to carry U.L. Listings and fluorescent fixture ballast to be Class "P" and sound rating shall be equal to G.E. rating "A".

18.2 Hanging: Fixture studs, steel rods conduit stems or bar hangers required for all fixtures. All fluorescent fixtures mounted in or on suspended ceilings to be individually supported with two (2) #10 galvanized steel wires, or fixture clips as approved by code.

19.0 MANUFACTURER'S TECHNICAL ASSISTANCE: The contractor shall include in the purchase price of all materials and equipment technical assistance from the manufacturer. Factory engineering assistance where required shall be included. All equipment shall be inspected by qualified factory representatives whether required by the architect or not. A report shall be submitted in duplicate to the architect. Technical assistance for equipment furnished by owner will be furnished by the owner.

20.0 ELECTRICAL POWER SERVICE: The contractor shall co-ordinate installation of the service with the power company and supply all labor and materials not furnished by the power company for a complete service. Verify ground fault on secondary side and co-ordinate with electrical devices.

21.0 SAFETY SWITCHES
A. Furnish and install where called for as follows:

21.1 Requirements of Regulatory Agencies:

A. Conform to National Electrical Code and applicable inspection authority.

21.2 Reference Standards:

A. Underwriters' Laboratories, Inc., Annual Product Directories.
B. Classification of standard types of nonventilated enclosures for Electric Controllers, National Electrical Manufacturers' Association.

21.3 Submittals:

A. Submit shop drawings and product data in accordance with submittal section.

21.4 Products:

A. General:
B. Provide, where indicated, NEMA type general duty fusible and non-fusible safety type disconnecting switches in NEMA 1 enclosures. Enclosures exposed to wet or damp conditions shall be in NEMA 3R enclosures.
C. Safety switches shall be General Electric, Westinghouse, or Square 'D'.
D. Enclosures:

1) Provide disconnects of size and type indicated on drawings and as required by the National Electric Code.
2) The switch enclosures shall be of ample strength and rigidity to retain their shape under all conditions of use for which they are designed. General purpose enclosures shall be designed to prevent accidental contact with the switch live parts and shall be suitable for general purpose application indoors, where they are not exposed to unusual conditions.
3) Rainproof enclosures shall be constructed to prevent entrance of rain above the level of the lowest live part of the switch and to prevent entrance of drops of water or solid particles when striking the enclosure from the downward vertical.

4) The enclosures shall be fabricated of high quality steel and shall have no rough edges or burrs that may be injurious to persons operating the switches. The enclosure shall be cleaned and treated with iron phosphates prior to receiving gray paint (ASA 61).

5) Switch mechanisms shall be operable manually by means of a front mounted handle assembly. The handle assembly shall operate the contacts in a quick make, quick break manner. Handle assembly shall be of the type which will accept a minimum of three padlocks.

6) With enclosure cover open, the switch contacts shall be prominently visible in both the "on" & "off" positions.

7) Switch contacts shall be fabricated of silver plated silver tungsten alloy. Line stationary contacts shall be formed of one piece. Line movable contacts shall have no more than two joints per pole exclusive of fuse clips.

8) Fusible switches shall be provided with high pressure fuse holders. Fuse holder pressure must not be exerted by current carrying springs. Fuse holders shall be suitable for use with Class H or Class J fuses or be capable of being fused with Class R fuses if required.

9) Switch covers shall bear metal nameplates inscribed with switch operating data. Switch covers shall be interlocked with switch mechanism and shall be provided with a front accessible interlock defeater.

10) Switches shall conform to the requirements for heating, overload, endurance and dielectric strength of UL 98, Standard for Enclosed Switches. Switches rated in horsepower shall also withstand the test for overload requirements of NEMA KS-1, Standard for Enclosed Switches.

D. Fuses:

1) Furnish and install all fuses scheduled on drawings.

2) Fuses shall be listed and meet UL and/or NEMA standards for Class RK5, RK1, and L.

3) Dual element class RK1 low peak, high interrupting capacity with current limiting capabilities shall be used for non-motor loads 600 amperes and below.

4) Dual elements Class RK5, precision time delay, high interrupting rating shall be used where motor loads are indicated.

5) Class L fuses shall be provided as indicated on drawings for devices larger than 600 amps.

6) Fuse voltage ratings shall be 250 volts for 120/240 volts and 120/208 volt systems and 600 volts for 277/480 volt systems.

7) Provide spare fuses in the amount of 20%, but no less than 3 or more than 9 of all types required for all switches requiring fuses, including switchboards, distribution panels, etc., store in the original boxes in a cabinet in the Main Electrical Room. Cabinet shall be furnished and installed by Contractor.

8) Fuses shall be Reliance, Bussman, or Chase-Shawnut.

21.5 Execution
Mount all switches 60A and larger on 12-gauge formed steel channels having a cross sectional dimension at least 1-1/2 in. x 1-1/2 in. The channel and fittings shall have galvcrom or hot-dipped galvanized finish to resist rust formation. Install channels vertically. Channels shall be Kindorf, or equal.

22.0 GROUNDING

22.1 General Requirements:
22.2 The electrical system shall be grounded as indicated on the drawings, but in no case shall the grounding be less than the requirements of the National Electrical Code. All metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, portable equipment and other conductive items in close proximity with electrical circuits shall operate continuously at ground potential and provide a low impedance path for possible ground fault currents.

22.3 Products

D. Inaccessible ground connections shall be made with the exothermic welding process, using equipment as manufactured by Burndy, Erico Products, Copperweld, or approved equal.

22.0 Execution

A. All grounding rods and conductors shall be copper.

B. Conduit: All inside ground wire where exposed inside room or spaces shall be insulated and run in conduit.

C. The entire system shall be grounded in accordance with N.E.C. including but not limited to conduit, lighting, motors, starters, electrical cabinets, pumps, sprinkler piping, mechanical and electrical equipment.

23.0 EMPTY CONDUIT SYSTEM:

1. Furnish and install empty conduit system for use by the Telephone and Data System, Nurse Call System/ Television Cable, Fire Alarm and Security System. Minimum size of conduit shall be 1/2 " unless shown otherwise on the drawings.

2. Outlet boxes shall be a minimum of 4x4 with one gang device ring and telephone cover plates to match the switch and receptacle covers.

3. The empty conduit system shall have conduit and boxes where indicated on the drawings and shall have a conduit run in the wall and turn out 1'-0" above the ceiling.

24.0 MECHANICAL EQUIPMENT AND OTHER DEVICES REQUIRING ELECTRICAL CONNECTIONS

1. Electrical Contractor will make Power connections to all HVAC, Plumbing and other power operated devices including low voltage for the magnetic door holders, MAG LOCKS.

25.0 FIXTURES: See schedule ON DRAWINGS. Furnish lamps for all fixtures.

26.0 AS BUILT DRAWINGS: Electrical Contractor will furnish a set of electrical “as built” drawings, to the Architect, indicating changes from the contract documents. Show changes by red line on original drawing

27.0 END OF SECTION 16000