

**CSMS Life Cycle Renovations**  
**Buildings 4100, 4104, 4105, 4106, 4109 & 4114**  
**Camp Blanding Joint Training Site**  
**Starke, Florida**

CFMO Project No.: 219002

A/E No. 1804C

**To be constructed for and contract administered by**

**State of Florida**  
**Department of Military Affairs**  
**2305 State Road 207**  
**St. Augustine, Florida 32086**

100% Construction Documents

Date Issued: July 3, 2019

AKEL □ LOGAN □ SHAFER  
ARCHITECTS AND PLANNERS  
704 Rosselle Street  
Jacksonville, Florida 32204



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# **THE NON-TECHNICAL SPECIFICATION SECTIONS OF DIVISION ONE**

Construction Contract  
Project Manual



State of Florida  
Department of Military Affairs  
Construction and Facility Management Office  
Project Number: 219002  
Project Name: CSMS Life Cycle Renovations  
Project Location: Camp Blanding Joint Training Center, Starke, Florida

Revised, March 2014  
(All previous revisions are obsolete)

SECTION A  
REQUESTS FOR PROPOSALS

A-1 INVITATION TO BID

The "Invitation To Bid" form enclosed as Exhibit 1 shall be utilized for requesting proposals from all Bidders. The standard template for the Invitation to Bid (ITB) form shall be completed by the Contract Management Branch and distributed through the DMS Vendor Bid System (VBS), Florida Administrative Register (FAR) or local news media (newspaper), depending on the level of the project. The ITB shall contain all information needed for the site visit/pre-bid meeting, RFI's for addenda, submittal of bids and bid opening. Sources of information other than the DMA should not be relied upon.

A-2 FUNDING

The State of Florida's award, performance and obligation to pay under this contract is contingent upon availability of funding and an annual appropriation by the Legislature.

A-3 REQUIRED FORMS

The following are the forms required for use by this office. Project specific forms in Word .doc format are available by contacting the Contract Management Branch at [ng.fl.flarng.list.cfmo-contracting@mail.mil](mailto:ng.fl.flarng.list.cfmo-contracting@mail.mil). Use of other forms may cause rejection of bids or a delay in approval and payment of your invoices. Please do not use the forms attached as Exhibits, as these are samples only.

- Project Advertisement "Invitation To Bid" - Exhibit 1
- Insurance Form – Exhibit 2
- Contractor Qualifications Form FNG Form 5085 - Exhibit 3
- Proposal Form - Exhibit 4
- List of Subcontractors - Exhibit 5
- Agreement Between Owner & Contractor - Exhibit 6
- Performance Bond - Exhibit 7
- Labor and Material Bond - Exhibit 8
- Final Receipt of Payment & Release of All Liens & Claims - Exhibit 9
- Owners Certificate of Partial Pay Form 4012E - Exhibit 10
- Schedule of Contract Values - Exhibit 11
- Contractors Affidavit of Contract Completion - Exhibit 12
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- Percentage Factor/Contract Conditions - Exhibit 13
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- Minority Business Status Report - Exhibit 15
- CFMO Change Order Request Summary - Exhibit 16
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- Waiver and Release of Lien Upon Progress Payment – Exhibit 20

SECTION B  
INSTRUCTIONS TO BIDDERS

**B-1 SPECIFICATION TERMINOLOGY**

DEFINITION OF TERMS:

Whenever in these Instructions the following terms (or pronouns which replace these terms) are used, their intent and meaning shall be interpreted as follows:

OWNER

State of Florida, Department of Military Affairs  
2305 State Road 207  
St. Augustine, FL 32086

PROJECT MANAGER:

The authorized representative of the Owner charged with the construction management of the project for the Department of Military Affairs

CONTRACT MANAGER:

The authorized representative of the Owner charged with the contract management and administration of the project for the Department of Military Affairs.

ARCHITECT-ENGINEER/PROJECT REPRESENTATIVE:

The Design Professional (Architect-Engineer, Architect, Engineer or Other) commissioned by the Owner, acting directly or through a duly authorized representative.

BIDDER:

Any individual, firm, partnership or corporation submitting a proposal for the work contemplated.

SURETY:

The corporate body, which is bound with and for the Contractor, which is primarily liable, and which guarantees the faithful performance of the Agreement.

PROPOSAL:

A bid for the work contemplated, which the Bidder shall submit on approved forms (Exhibit 4).

AGREEMENT:

"Agreement" shall mean the document entitled "Agreement between Owner and Contractor."

CONTRACT LEVELS:

LEVEL 1:

Contracts where Agreement has a Contract Sum which does not exceed \$35,000

LEVEL 2:

Contracts where Agreement has a Contract Sum greater than \$35,000 but does not exceed \$65,000.

LEVEL 3:

Contracts where Agreement has a Contract Sum greater than \$65,000 but does not exceed \$200,000.

LEVEL 4:

Contracts where Agreement has a Contract Sum greater than \$200,000 but does not exceed \$500,000.

LEVEL 5:

Contracts where Agreements Contract Sum exceeds \$500,000.

### THRESHOLD BUILDING:

Threshold Building means any building which is greater than three stories or 50 feet in height, or which has an assembly occupancy classification that exceeds 5,000 square feet in area and an occupant content of greater than 500 persons.

### SUBSTANTIAL COMPLETION:

The term "Substantial Completion" shall mean that the project under this contract is sufficiently completed in accordance with the Contract Documents, so that the Owner can occupy or utilize the work or designated portions thereof for the use for which it is intended, as expressed in the Contract Documents. The term "Substantial Completion" shall not mean the inclusion of such minor alterations and patching as the Final Inspection shall disclose.

## **B-2 BIDDER'S QUALIFICATION REQUIREMENTS AND PROCEDURES**

Each Bidder and each subcontractor whose field or area is governed by Chapter 399, 455, 489 or 633 of the Florida Statutes for licensure must hold a valid current license as required by the Statute. If the Bidder is a corporation, he must also be properly registered with the State of Florida, Department of State, Division of Corporations.

Bidder qualification requirements and procedures are established by Department rule (Rule 60D-5, Florida Administrative Code) and by the bidding conditions and Specifications. Failure of the Bidder to strictly meet and follow all such requirements and procedures may result in bid rejection or disqualification for contract award. For the Bidder's convenience, the provisions of Rule 60D-5.004 Bidder's Qualification Requirements and Procedures are set forth below.

### 60D-5-004 Bidder's Qualification Requirements and Procedures.

There are two steps in qualifying to perform construction of State projects: A.) Prequalification to submit a bid, and B.) Prequalification for award of the contract. However, the submission date of qualifications may change dependent upon the complexity of a project, funding time constraints or availability of personnel to perform qualification review and approval procedures. Contractor should verify at the Pre-Bid meeting the exact prequalification requirements and submission due dates.

Pre-qualifications with one agency will not automatically prequalify the contractor with other agencies. Pre-qualifications, unless otherwise stated in writing, shall be submitted on each project advertised by the Department. Qualification documents are not held on file for other projects.

#### A. Prequalification to submit a bid.

1. Prequalification requirements apply to all Bidders on Levels Four and Five contracts. Bidders must provide this information during the bidding of a specific project, unless otherwise advertised.

- a. Current State Contractor license certification or registration as required under Florida Statutes.
- b. Current Corporate Charter registration, if the potential Bidder is a domestic (Florida) corporation, or authority to transact business if the potential Bidder is a foreign (non-Florida) corporation, as may be required by Florida law.
- c. For projects that require (based on Agency discretion) a contractor with specific expertise and experience, the Agency may state additional prequalification requirements.
- d. A completed FNG 5085 Contractor Questionnaire. (See Exhibit 3)
- e. Proof of registration in [www.myfloridamarketplace.com](http://www.myfloridamarketplace.com) web site.

2. For projects that require a contractor with specific expertise and experience, the Agency may state additional prequalification requirements relating to demonstrated performance of similar work of similar size and complexity and the possession or availability of facilities or equipment needed for performance of the work in addition to prequalification requirements in accordance with conditions that will be established in the bidding documents.

3. In each instance where the bid documents set forth certain additional prequalification requirements each potential Bidder shall submit these prequalification data to the Agency as provided in the bid documents. The conditions may include a deadline date for submittal of additional prequalification data, which date will be earlier than the deadline for submission of bids. Bids are to be accepted only from those potential Bidders who have pre-qualified in accordance with this section and the terms of the bidding documents.

4. Each potential Bidder will be notified by the Agency to which it applied for prequalification of ineligibility to submit bids during the balance of the qualification period for a specific field or area of construction. A firm will be permitted to correct prequalification deficiencies if proof of correction is received 120 hours prior to the bid opening date and time. Any Bidder or potential Bidder that is determined to be ineligible because of failure to provide evidence of the minimum requirements will not be qualified to submit a bid and will be informed in writing of the deficiencies that must be corrected to be considered for future projects.

Each potential Bidder notified of its eligibility may submit a bid at the time and place designated in the bidding documents as long as the Bidder is qualified and eligible to perform the work required by the bidding documents.

#### B. Pre-qualifications for award of the contract

1. Requirements: Any Bidder that has submitted a bid on Levels Four and Five contracts must satisfy the following requirements as judged by the Agency in order to be eligible for award of the contract for construction.

- a. Satisfactory compliance with bid pre-qualification criteria.
- b. On projects where the bid total exceeds \$100,000, the Bidder must provide with the bid, a good faith deposit in the amount of 5% of the bid by way of a bid bond from a surety insurer authorized to do business in this State as surety or a certified check accompanying the bid, such requirement may be satisfied by the Bidder depositing in lieu of such certified check, a cashier's check, treasurer's check or bank draft of any national or state bank.
- c. On projects where the bid exceeds \$100,000, unless such requirement has been waived in accordance with Rule 60D-5.0041, the Bidder must provide with the bid, evidence of ability to provide the necessary performance and payment bonds for the project by providing a letter of intent to provide a 100% performance bond and a 100% labor and material payment bond from a surety company authorized to do business in the State of Florida by the Department of Insurance, and meeting the financial and performance rating required by the bidding documents. For contract amounts not exceeding \$500,000 the provisions of Section 287.0935 F.S. shall govern.
- d. Supervisor - On Level 5 projects, the Contractor must agree to provide field (on-site) supervision (through a named superintendent) for each of the general, concrete forming and placement, masonry, mechanical, plumbing, electrical and roofing trades. In addition, the Contractor shall assign and name a qualified employee to provide scheduling direction to the entire project. Supervisory employees (including field superintendents, foremen and schedulers at all levels) must have been employed in a supervisory (leadership) capacity of a substantially equivalent level on a similar project for at least two years within the last five years. The Contractor shall include a resume of experience for each of those employees identified by him to supervise each trade, and for scheduling, with its submittal of the experience questionnaire (item d above).
- e. Specific expertise and experience a contractor's staff must have to perform a project requiring unique or specialized capabilities.

2. The Agency will evaluate all data submitted within fourteen days of receipt and determine whether the firm is a qualified Bidder. Should the Bidder be judged unqualified, its bid will be rejected and the Bidder submitting the next low responsive bid will be given seven (7) working days to submit its qualification data. Additional qualification data may be requested.

#### **B-3 FAMILIARITY WITH LAWS**

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

#### **B-4 FLORIDA PRODUCTS AND LABOR**

The Contractor's attention is called to Section 255.04, Florida Statutes, which requires that on public building contracts Florida products and labor shall be used wherever price and quality are equal.

#### **B-5 TAXES**

Although the Owner is not subject to the Florida Sales and Use Tax, any Contractor who purchases materials and services, which will be used in the construction of State-owned buildings, will not be exempt from the tax on these materials and services as evidenced by the following excerpt from the Florida Statutes:

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

The Owner is not subject to:

- A. Federal Excise Taxes on materials or appliances that are incorporated into and become a part of the completed improvement.
- B. Federal Tax on Transportation of Property.

In every case of a purchase of materials to be incorporated in the work, which are subject to Federal Excise Tax, the Owner will furnish to the Contractor the necessary Federal Excise Tax Exemption Certificate upon receipt of a copy of the supplier's invoice showing the item or items, the net price, and Federal Excise Tax separately.

The Bidder shall take these factors into consideration in preparing his proposal, including therein the cost of the State Sales Tax and Use Tax on materials, but excluding the cost of those taxes not applicable.

### **B-6 ALTERNATES**

If the Owner wishes to learn the relative or additional construction cost of an alternative method of construction, an alternative use or type of material or an increase or decrease in scope of the project, these items will be defined as alternates and will be specifically described by the contract documents. Alternates will be listed in the Proposal form in a manner that the Bidder shall be able to clearly indicate what sums he will add to (or deduct from) his Base Bid.

### **B-7 ADDENDA**

In case the Architect-Engineer finds it expedient to supplement, modify or interpret any portion of the Bidding Documents during the bidding period, such procedure will be accomplished by the issuance of written Addenda to the Bidding Documents. Addenda shall be made available to all prospective Bidders. It is the Bidders responsibility to ensure receipt of all issued addenda before bid due date. Failure to acknowledge addenda on the Exhibit 4 proposal form may be cause for rejection.

### **B-8 INTERPRETATION OF BIDDING DOCUMENTS**

No interpretation of the meaning of the Drawings, Specifications or other Bidding Documents and no correction of any apparent ambiguity, inconsistency or error therein will be made to any Bidder orally. Every request for such interpretation or correction shall be in writing, and addressed to the Architect-Engineer (or the contact indicated in the bidding documents). All such interpretations and supplemental instruction will be in the form of written Addenda to the Bidding Documents, sent via E-Mail by the Architect-Engineer or posted on the VBS by a Contract Management Branch Official.

Only the interpretation or correction so given by the Architect-Engineer (or Owner appointed expert) in writing shall be binding, and prospective Bidders are advised that no other source is authorized to give information concerning, or to explain or interpret, the Bidding Documents. The DMA will not be responsible for information obtained through sources other than those used by the DMA for solicitations (Vendor Bid System or Florida Administrative Register) that may cause rejection of bids.

### **B-9 EXAMINATION OF BIDDING DOCUMENTS AND SITE OF WORK**

Bidders are required, before submitting their proposals, to visit the site of the proposed work and completely familiarize themselves with the nature and extent of the work and any local conditions that may in any manner affect the work to be performed and the equipment, materials and labor required. They are also required to examine carefully any Drawings, Specifications and other Bidding Documents to inform themselves thoroughly regarding any and all conditions and requirements that may in any manner affect the work. Only those contractors listed on the pre-bid /site visit meeting sign-in roster will be allowed to bid.

**B-10 BASIS FOR BIDDING - TRADE NAMES**

For clarity of description and as a standard of comparison, certain equipment, materials, etc., have been specified by at least two trade names or manufacturers. To ensure a uniform basis for bidding, the Bidder shall base his Proposal on the particular system, equipment or material specified. After the contract is let, other equipment materials, etc., as manufactured by other manufacturers may be accepted only if, in the opinion of the Architect-Engineer, same is equivalent in quality and workmanship and will perform its intended purpose satisfactorily.

**B-11 BID GUARANTEE**

On projects where the base bid and sum of all additive alternates exceeds \$100,000, bids shall be accompanied by a bid guarantee of not less than five (5) percent of the amount of the bid, which may be a certified check, a cashier's check, treasurer's check, bank draft or Bid Bond made payable to the Owner. If a bid bond is submitted, it must be signed by a Florida Licensed Resident Agent who holds a current Power of Attorney from the Surety Company issuing the Bond and the Power of Attorney must be attached to the Bid Bond. Such check or Bid Bond shall be submitted with the understanding that it shall guarantee that the Bidder will not withdraw his bid for a period of forty (40) days after the scheduled closing time for the receipt of bids; that if his bid is accepted, he will enter into a written contract with the Owner in accordance with the form of agreement included as a part of the Contract Documents, and that the required Performance Bond and Labor and Material Payment Bond will be given; and that in the event of the withdrawal of said bond within said period, or failure to enter into said Agreement and give said bonds within ten (10) calendar days after he has received notice of acceptance of his bid, the Bidder shall be liable to the Owner for the full amount of the bid guarantee as representing the damage to the Owner on account of the default of the Bidder in any particular hereof. The Bid Bonds or checks shall be returned to all except the apparent lowest two qualified Bidders after the formal opening of bids. The remaining Bid Bonds or checks will be returned to the two lowest Bidders after the Owner and the accepted Bidder have executed the Agreement and the Performance Bond and Labor and Material Payment Bond have been approved by the Owner. If the required Agreement and Bonds have not been executed within forty (40) calendar days after the date of the opening of the bids, then the Bid Bond or check of any Bidder will be returned upon his request, provided he has not been notified of the acceptance of his bid prior to the date of such request.

**B-12 SURETY COMPANIES ACCEPTABLE TO STATE**

To be acceptable to the State as Surety for Bid Bonds, Performance Bonds and Labor and Material Payment Bonds, a Surety Company shall comply with the following provisions:

- A. The Surety Company shall have a currently valid Certificate of Authority, issued by the State of Florida, Department of Insurance, authorizing it to write surety bonds in the State of Florida.
- B. The Surety Company shall have currently valid Certificate of Authority issued by the United States Department of Treasury under Sections 9304 to 9308 of Title 31 of the United States Code.
- C. The Surety Company shall be in full compliance with the provisions of the Florida Insurance Code.
- D. The Surety Company shall have at least twice the minimum surplus and capital required by the Florida Insurance Code at the time the invitation to bid is issued.
- E. If the Contract Award Amount exceeds \$500,000, the Surety Company shall also comply with the following provisions:
  - 1. The Surety Company shall have at least the following minimum ratings in the latest issue of Best's Key Rating Guide.

Policy Required:

<u>Contract Amount</u>	<u>Holder's Rating</u>	<u>Financial Rating</u>
\$ Up to 1,000,000	A-	CLASS I
1,000,000 to 2,000,000	A-	CLASS II
2,000,000 to 5,000,000	A-	CLASS III
5,000,000 to 10,000,000	A-	CLASS IV
10,000,000 to 25,000,000	A-	CLASS V
25,000,000 to 50,000,000	A-	CLASS VI



2. The Surety Company shall not expose itself to any loss on any one risk in an amount exceeding ten (10) percent of its surplus to policyholders, provided:

a. Any risk or portion of any risk being reinsured shall be deducted in determining the limitation of the risk as prescribed in this section. These minimum requirements shall apply to the reinsuring carrier providing authorization or approval from the State of Florida, Department of Insurance requirements to do business in this state have been met.

b. In the case of the surety insurance company, in addition to the deduction for reinsurance, the amount assumed by any co-surety, the value of any security deposited, pledged or held subject to the consent of the surety and for the protection of the surety shall be deducted.

### **B-13 PREPARATION AND SUBMISSION OF BIDS**

Each Bidder shall copy the proposal form (Exhibit 4) on his own letterhead, indicate his bid prices thereon in proper spaces, for the Base Bid and for alternates on which he bids. Any erasure or other correction in the proposal may be explained or noted over the signature of the Bidder.

Proposals containing any conditions, omissions, unexplained erasures, alterations, items not called for or irregularities of any kind may be rejected by the Owner.

Each bid must give the full business name, federal ID number, address, telephone and fax of the Bidder and state whether it is an individual, corporation or partnership. The bid must be signed before submitting in duplicate in a sealed envelope. The envelope must be clearly marked on its face as follows:

**ATTENTION: SEALED BID - PROJECT NO.: 219002**

**PROJECT NAME: CSMS Life Cycle Renovation**

**ATTENTION: CFMO Contract Management Branch**

The bid shall be submitted only prior to the time and the place specified in the Invitation to Bid or in accordance with any Addendum issued subsequent to the advertisement. Sealed bid envelopes submitted by mail or by delivery service must be delivered within a separate mail or delivery envelope, also marked "SEALED BID". Bids not delivered in sealed envelopes may be returned to the Bidder. All bids submitted by mail or delivery service need to be confirmed by Bidder with the CFMO Contract Management Branch.

### **B-14 LISTING OF SUBCONTRACTORS**

In order that the Owner may be assured that only qualified and competent subcontractors will be employed on the project, each Bidder shall submit in duplicate with his proposal a list of the subcontractors who will perform the work for each Division of the Specifications utilizing the "List of Subcontractors" form enclosed as Exhibit 5. The Bidder shall have determined to his own complete satisfaction that a listed subcontractor has been successfully engaged in this particular type of business for a reasonable length of time, has successfully completed installations comparable to that which is required by this Agreement and is qualified technically and financially to perform the work for which he is listed. Only one subcontractor shall be listed for each phase of work.

Any Bidder who lists a subcontractor not certified and/or registered by the State to perform the work of his trade if, such certification or registration is required for the trade, by Florida Laws, will be rejected as non-responsive.

No change shall be made in the List of Subcontractors, before or after the award of a contract, unless agreed to in writing by the Owner.

### **B-15 WITHDRAWAL OF BIDS**

Bids may be withdrawn on written, e-mail or facsimile request received from Bidders prior to the time fixed for opening. Negligence on the part of the Bidder in preparing the bid confers no right for withdrawal of the bid after it has been opened.

## **B-16 RECEIPT AND OPENING OF BIDS**

Bids will be opened publicly at the time and place stated in the Bidding Documents. An official time clock will be used to monitor the closing of the bids and to time-stamp bids as received. No responsibility will be attached to any officer for the premature opening of a bid not properly addressed and identified. At the time fixed for the opening of bids, the bids will be read aloud.

## **B-17 DISQUALIFICATION OF BIDS**

More than one bid from an individual, firm, partnership, corporation or association under the same or different names will not be considered. Reasonable grounds for believing that a Bidder is interested in more than one proposal for the same work will cause the rejection of **all** proposals in which such Bidders are believed to be interested.

Any or all proposals will be rejected if there is reason to believe that collusion exists among the Bidders and no participants in such collusion will be considered in future proposals for the same work.

The Owner reserves the right to accept or reject any or all proposals received and reserves the right to make an award with or without further discussion of the proposals submitted or accept minor informalities or irregularities in the best interest of the State of Florida, which are considered a matter of form and not substance, and the correction or waiver of which is not prejudicial to other proposers. Minor irregularities are defined as those that will not have an adverse effect on the Department's interest and will not affect the price of the proposal by giving a proposer an advantage or benefit not enjoyed by all other proposers. It is understood the proposal will become a part of the Department's official file, without obligation to the Department. Proposals may be rejected if found to be irregular or not in conformance with the requirements and instructions contained herein. A proposal may be found to be irregular or non-responsive by reasons that include, but are not limited to failure to utilize or complete in their entirety prescribed forms, conditional proposals, incomplete proposals, ambiguous proposals, and improper, missing and/or undated signatures. Bids not complete with Bid Bonds, (when applicable), List of Subcontractors, or addenda not acknowledged will not be read aloud. The Official announces the deficiency causing the bid to be non-responsive and its disqualification thereby. The disqualified proposal will be impounded and not returned.

Falsification of any entry made on the contractor's bid proposal will be deemed a material bid deviation and will be grounds for rejection.

Any and all bid proposals may be rejected if determined to be non-responsive (does not conform in all material aspects to the invitation to bid or request for proposals) or non-responsible (firm is not deemed capable in all respects to perform fully the contract requirements and the integrity and reliability to assure good faith performance).

## **B-18 REJECTION OF BIDS**

The Owner reserves the right to reject any and all bids under any of the circumstances prescribed in Rule 60D-5.0071, Florida Administrative Code, and to negotiate the contract in accordance with Rules 60D-5.00, 60D-5.0082, and 60D-5.0091, Florida Administrative Code, if the low qualified bid exceeds the project construction budget.

## **B-19 NOTICE AND PROTEST PROCEDURES**

### **A. Notification:**

1. Bid Solicitation: The Owner shall provide notice of its decision or intended decision concerning a bid solicitation as provided in the advertising for bids and distribution of bidding documents.
2. Contract Award: On contracts within Levels 2, 3, 4 & 5, the notice of a decision or intended decision on contract award or bid rejection shall be given by posting electronically on the My Florida Market Place (MFMP) Vendor Bid System (VBS), or by posting in the same manner in which the bid solicitation was announced by the Contract Management Branch of the DMA.

### **B. Protest:**

1. Any person who is affected adversely by the Owner's decision or intended decision shall file with the Owner a notice of protest in writing within 72 hours, excluding Saturday, Sunday and State legal holidays, after receipt of the bidding documents if the protest is directed toward the bidding documents or after the notice of the Owner's decision or intended decision

on contract award or bid rejection if the protest is directed toward contract award or bid rejection.

2. Thereafter a formal written protest by petition in compliance with Section 120.57(3), Florida Statutes, and Rule 28-110, Florida Administrative Code, must be filed with the Owner within ten (10) days after the date the notice of protest was filed.
3. Failure to file a timely notice of protest or failure to file a timely formal written protest petition shall constitute a waiver of protest proceedings. Any protest filed prior to posting of the bid tabulation or receipt of the notice of the agency decision or intended decision will be considered abandoned unless renewed within the time limit provided for protests.
4. The Agency and the Commission on Minority Economic and Business Development is hereby granted standing to protest, pursuant to s. 287.0945, in a timely manner, any contract award in competitive bidding for contractual services and construction contracts that fail to include minority business enterprise participation, if any responding Bidder has demonstrated the ability to achieve any level of participation, or any contract award for commodities where, a reasonable and economical opportunity to reserve a contract statewide or district level, for minority participation was not executed or, and agency failed to adopt applicable preference for minority participation. Any low Bidder with no participation may be presumed not in "good faith." All Bidders will be notified of the minority participation goal by addendum.

C. Owner Action:

1. Upon receipt of a notice of protest that has been timely filed, the Owner shall delay the contract award process until the subject of the protest is resolved by mutual agreement between the parties or by final Owner action, unless the Owner sets forth in writing particular facts and circumstances which require the continuation of the bid solicitation process or the contract award process without delay to avoid an immediate and serious danger to public health, safety, or welfare; provided, however, that if the petition is not filed within the time stated above, the contract award process may continue as if the notice of protest had not been filed.
2. Upon receipt of the formal written protest petition which has been timely filed, the Owner shall attempt to resolve the protest by mutual agreement between the parties within 7 days, excluding Saturday, Sunday and legal State holidays.
3. If the protest is not resolved by mutual agreement within said seven (7) days, and if no disputed issue of material fact is involved, the Owner may designate a Hearing Officer who shall conduct an informal proceeding pursuant to Section 120.57(2), Florida Statutes, and Rule 60Q-2.014, Florida Administrative Code. The qualifications of such designated Hearing Officer shall be: 1 a member in good standing of The Florida Bar; or 2. a person knowledgeable by virtue of practical experience of the procedures relating to soliciting and evaluating bids for state contracts. Notice of informal proceedings shall be given no less than three days prior to the proceeding. The proceeding may be held before the Owner.
4. If there is a disputed issue of material fact, the protest shall be referred to the Division of Administrative Hearings of Department of Administration, State of Florida, for proceedings under section 120.57(1).

**B-20 DETERMINATION OF SUCCESSFUL BIDDER**

- A. All projects except where competitive bidding is waived under the provisions of Rule 60D-5.008, Florida Administrative Code, will be publicly bid in accordance with the provisions herein. Award of contract will be made to the lowest responsive responsible Bidder, determined in accordance with the provisions herein and meeting the requirements of the bidding documents, that submits the lowest valid bid for the work. The lowest bid will be determined as follows:
  1. The lowest bid will be the bid from the responsive responsible Bidder that has submitted the lowest price for the base bid or the base bid plus the additive alternates or less the deductive alternates chosen by the Agency to be included in or excluded from the proposed contract, taken in numerical order listed in the bid documents. The order of the alternates may be selected by the Agency in any sequence so long as such acceptance out of order does not alter the designation of the low Bidder.
  2. On projects whose bidding documents provide for evaluation of the bids based on first cost and life cycle cost and performance criteria, the lowest bid will be the bid by the firm whose bid products are determined to yield the lowest total cost in accordance with the criteria set forth in the bidding documents.

**B-21 NOTICE TO SECURE PERMITS AND PAY FOR UTILITY CONNECTIONS; SCHEDULE OF VALUES; NOTICE TO PROCEED TO MOBILIZE ON SITE AND TO PROCEED WITH CONSTRUCTION; TIME OF COMPLETION AND LIQUIDATED DAMAGES**

- A. The contract will be issued to the Contractor after all signatures have been acquired. At that time, the Contractor will be given a Notice to Secure Permits for required permits from all agencies with jurisdiction over the area in which the project is located; and to pay, at the Contractor's cost, the required connection fees from all agencies supplying utilities to the project.

The Contractor is allowed thirty (30) calendar days from the issuance of the Notice to Secure Permits to obtain the required permits and utility connections before construction can begin. Special permits, such as tree removal, Water Management District, Department of Environmental Regulation, septic tank, etc., may be necessary before construction can begin. If additional time is required, the Contractor will request approval of a time extension for good cause for the purpose of obtaining any permit required prior to commencing construction on the site.

The Contractor is obligated to obtain and pay for a building permit from the local authority for construction of this facility. In the case of plumbing, electrical, other internal system permits and connection permits, the Contractor is obligated to obtain such permits and pay such fees.

The Contractor shall determine the permits and fees required by any entity having jurisdiction over any part of the project and shall include the cost of all such permits in his bid proposal.

- B. The Contractor shall, within ten (10) calendar days from date of Notice to Secure Permits letter, submit to the Architect-Engineer and Project Manager, for review and approval, three copies of a Schedule of Contract Values which will reflect the estimated cost of each subdivision of work of each specification section, further detailed by subcontractor item, and utilizing the Construction Specification's Institute "Master Format Broad Scope Section Numbers". The value of each item shall include a true proportionate amount of the Contractor's overhead and profit. The sum of all such scheduled values shall equal the Contract Sum as evidenced by the Agreement.
- C. Upon paying for all required utility connections (not limited to but including telephone, data, electric, water and sewer) and securing the Building Permit, the Contractor shall provide a copy of any and all Permits required and receipts showing payments to the Architect-Engineer and the Owner. The Notice to Proceed to Mobilize on Site and to Proceed with Construction will then be issued by the Owner. The work to be performed under this contract shall be commenced within ten (10) calendar days after date of Notice to Proceed to Mobilize on Site and to Proceed with Construction, shall be substantially completed within ~~450~~ calendar days after the date of this Notice to Proceed, and shall be finally completed within ~~30~~ calendar days after the date of substantial completion. It is the Contractor's responsibility to ensure the Certificate of Occupancy from the authority having jurisdiction is provided to Owner prior to substantial completion.
- D. Inasmuch as failure to complete the project within the time fixed above will result in substantial injury to the Owner, and as damages arising from such failure cannot be calculated with any degree of certainty, it is hereby agreed that if the project is not substantially completed, according to the definition of "Substantial Completion" in Section B-1 hereinabove, or within such further time, if any, as in accordance with the provisions of the Contract Documents shall be allowed for such substantial completion, the Contractor shall pay to Owner as liquidated damages for such delay, and not as a penalty, any and all actual costs and/or losses incurred by the Owner, as the result of the delay, for each and every calendar day elapsing between the date fixed for substantial completion above and the date such substantial completion shall have been fully accomplished. Said liquidated damages shall be payable in addition to any other excess expenses or costs payable by the Contractor to the Owner under the provisions of AIA Article 14 of the General Conditions, and shall not exclude the recovery of damages by the Owner under other provisions of the Contract Documents, except for Contractor's delay. This provision of liquidated damages for delay shall in no manner affect the Owner's right to terminate the contract as provided in Article 14 of the General Conditions or elsewhere in the Contract Documents. The Owner's exercise of the right to terminate shall not release the Contractor from his obligation to pay said liquidated damages in the amounts as provided for above.

The Owner is entitled to completion of the project within the time fixed above or within such further time, if any, as may be allowed in accordance with the provisions of the contract. In the event of termination of the contract by the Owner prior to completion as provided in Article 14.2 of the General Conditions or elsewhere in the Contract Documents, the Contractor shall be liable to the Owner for the expenses for additional managerial and administrative services provided in said Article 14 and also for the per diem liquidated damages as agreed to above.

1. For each day he is in arrears in his work at the time of said termination as determined by the Architect-Engineer, and
2. For each day of thirty (30) additional calendar days hereby stipulated and agreed to be the time it will require the Owner to affect another contract for completion of the project and for resumption of work thereon.

Provided, however, that the sum of 1 and 2 above shall not exceed the number of days beyond the original agreed completion date, or any extension thereof as herein provided, reasonably required for completion of the project.

It is further agreed that the Owner may deduct from the balance retained by the Owner, under the provisions above, the liquidated damages stipulated therein for delay or termination, as the case may be, or such portions thereof as the said retained balance will cover.

#### **B-22 APPRENTICES**

If the Contractor employs apprentices on the project, the behavior of the Contractor and the Owner shall be governed by the provisions of Chapter 446, Florida Statutes, and by applicable standards and policies governing apprentice programs and agreements established by the Division of Workforce Development of the Department of Education, State of Florida. The Contractor will include a provision similar to the foregoing sentence in each subcontract.

The Contractor shall have the option of listing all available job vacancies with the local Job Service Florida office in order to take advantage of local pools of unemployed qualified construction personnel.

SECTION C  
CONDITIONS OF THE CONTRACT

**C-1 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND**

On projects where the Contract Sum exceeds \$100,000, the Contractor shall furnish the Owner with a 100% Performance Bond and 100% Labor and Material Payment Bond written by a Surety Company acceptable to the Owner and authorized to do business in the State of Florida and signed by a Florida Licensed Resident Agent. Contractor is required to furnish replacement bonds in the event of cancellation of the original Performance Bond and Labor and Material Payment Bond. Form of bond shall be as shown on forms Exhibits 7 and 8.

The cost of all Performance Bonds and Labor and Material Payment Bonds shall be borne by the Contractor. The Bonds shall be accompanied by a duly authenticated or certified document, in duplicate, evidencing that the person executing the Bonds on behalf of the Surety had the authority to do so on that date of the Bond. In the usual case, conferring of that authority has occurred prior to the date of the Bond, and the document showing the date of appointment and enumeration of powers of the person executing the Bond is accompanied by a certification that the appointment and powers have not been revoked and remain in effect. The date of that certification shall be dated the same date as the Bonds and the Bonds shall be dated the same date as the Agreement. The Bonds must also be recorded in the same County of the project location.

**C-2 EXECUTION OF AGREEMENT AND BONDS**

Agreement between Owner and Contractor

The Contractor shall execute all required forms of the Agreement and return within ten (10) calendar days of their receipt. Failure to return all forms correctly executed within ten (10) calendar days of receipt, without written extension by the Owner otherwise, shall constitute an irregularity and deemed grounds, at the Owner's option, for rejection and forfeiture of the Bid Deposit or at the Owner's option, for the deduction on a day-for-day basis from the time allotted for completion of the work under Section B-21.

If the Contractor is a firm or company owned by an individual, the Agreement shall be executed in the name of the firm or company by the manual signature of the individual or sole proprietor.

If the Contractor is a partnership, the Agreement shall be executed in the name of the partnership by the manual signature of partner or partners.

If the Contractor is a corporation, the Agreement shall be executed in the name of the corporation and shall bear the corporate seal. It may be signed for the corporation by the president and attested by the corporate secretary; if signed for the corporation by any other officer than the president, the signature of such officer signing shall be attested by the secretary, and the executed Agreement shall be accompanied by a duly authenticated document bearing the seal of the corporation, quoting the section of the by-laws of the corporation authorizing the Board of Directors to designate such officer and copy of the resolution designating and authorizing him to execute on behalf of the corporation. That document must contain a statement that the authority is in effect on the date of the execution of the Agreement, and may not be dated earlier than the date of the execution of the Agreement. The same officer may not execute the Agreement and authenticate the document of authority.

Performance Bond & Labor and Material Payment Bond

These bonds shall be executed on behalf of the Contractor in the same manner and by the same person who executed the Agreement. A Notice to Proceed will **not** be issued to the Contractor until all bonds have been received and approved by the Contract Management Branch.

**C-3 CONTRACTOR'S INSURANCE**

The Contractor shall not commence any work in connection with this Agreement until he has obtained certain types of the following types of insurance and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved. All insurance policies shall be with insurers qualified and doing business in Florida through an authorized licensed Florida Resident Agent, and shall include:

### Worker's Compensation Insurance

The Contractor shall take out and maintain during the life of this Agreement, Worker's Compensation Insurance for all of his employees connected with the work of this project and, in case any work is sublet, the Contractor shall require the subcontractor similarly to provide Worker's Compensation Insurance for all of the latter's employees unless such employees are covered by the protection afforded by the Contractor. Such insurance shall comply fully with the Florida Worker's compensation law. In case any class of employees engaged in hazardous work under this contract at the site of the project is not protected under the Worker's Compensation statute, the Contractor shall provide, and cause each subcontractor to provide, adequate insurance satisfactory to the Owner, for the protection of his employees not otherwise protected.

### Contractor's Public Liability and Property Damage Insurance

The Contractor shall take out and maintain during the life of this Agreement Comprehensive General Liability and Comprehensive Automobile Liability Insurance as shall protect him from claims for damage for personal injury, including accidental death, as well as claims for property damages which may arise from operating under this Agreement whether such operations are by himself or by anyone directly or indirectly employed by him, and the amount of such insurance shall be the minimum limits as follows:

- (1) Contractor's Comprehensive General Liability Coverages, Bodily Injury & Property Damage:  
\$300,000.00 Each Occurrence, Combined Single Limit
- (2) Automobile Liability Coverages, Bodily Injury & Property Damage:  
\$100,000.00 Each Occurrence, Combined Single Limit

Insuring clause for both BODILY INJURY AND PROPERTY DAMAGE shall be amended to provide coverage on an OCCURRENCE BASIS.

### Subcontractor's Public Liability and Property Damage Insurance

The Contractor shall require each of his subcontractors to procure and maintain during the life of this subcontract, insurance of the type specified above or insure the activities of his subcontractors in his policy, as specified above.

### Owner's and Contractor's Protective Liability Insurance

The Contractor shall procure and furnish an Owner's and Contractor's Protective Liability Insurance Policy with the following minimum limits:

- (1) Bodily Injury & Property Damage Liability:  
\$300,000.00 Each Occurrence, Combined Single Limit

### "XCU" (Explosion, Collapse, Underground Damage)

The Contractor's Liability Policy shall include and provide "XCU" coverage for those classifications in which they are applicable.

### Broad Form Property Damage Coverage, Products and Completed Operations Coverages

The Contractor's Liability Policy shall include and provide for Broad Form Property Damage Coverage, Products and Completed Operations Coverage.

### Contractual Liability-Work Contracts

The Contractor's Liability Policy shall include Contractual Liability Coverage designed to protect the Contractor for contractual liabilities assumed by the Contractor in the performance of this Contract.

### Indemnification Rider

To the fullest extent permitted by law, the Contractor's Liability Policy shall indemnify and hold harmless the Owner from and against claims, damages, losses and expenses, including but not limited to attorneys fees arising out of or resulting from negligent performance of the work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including loss of use resulting therefrom, caused in whole or in part by negligent acts or omissions of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by the Owner. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to the Owner.

### Builder's Risk Coverage

The Contractor shall secure and maintain during the life of this Contract a "Builder's Risk Policy", All Risks Form, and issued on a completed valued basis. Installation Floaters and other Inland Marine Forms may be utilized where applicable and are in the best interest of the State of Florida.

### Asbestos-Abatement Contractors Liability Insurance Pollution Endorsement

The asbestos-abatement Contractor shall procure a pollution endorsement to his public liability insurance, against claim or claims expenses arising from the abatement project, as required by Section 255.56 of the Florida Statutes. The coverage by the endorsement may be of the Claims-Made type.

### Loss Deductible Clause

The State of Florida shall be exempt from, and in no way be liable for any sums of money, which may represent a deductible in any insurance policy. The payment of such deductible shall be the sole responsibility of the General Contractor and/or subcontractor providing such insurance.

### Certificate of Insurance

The Owner shall be furnished proof of coverage of the above required insurance. Said proof shall be submitted on a form approved by the Department of Insurance (See Exhibit 2). Said certificate of insurance forms shall be completed, signed by the authorized licensed Florida Resident Agent and returned to the office of the Owner. These certificates shall be dated and show:

- (1) The name of the insured contractor, the specific job by name and number, the name of the insurer, the number of the policy, its effective date, and its termination date.
- (2) Statement that the Insured will mail notice to the Owner at least thirty (30) calendar days prior to any material changes in provisions or cancellation of the policy.
- (3) Certificate of Insurance shall be in the form as approved by Insurance Standards Office (ISO) and such Certificate shall clearly state all the coverage's required in this Section.
- (4) Certificate of Insurance shall state that the Owner and Agent are listed as additional insured on all appropriate policies.
- (5) Copy of the endorsement or additional insured rider to the General Liability Policy.

### **C-4 PROGRESS SCHEDULE FOR PROJECTS WITH CONSTRUCTION COST BELOW \$2,000,000.00**

Within twenty (20) calendar days after the date of the Owner's issuance of a Notice to Proceed, the Contractor shall prepare and submit to the Architect-Engineer a construction schedule in quadruplicate graphically depicting the activities contemplated to occur as a necessary incident to performance of the work required to complete the Project, showing the sequence in which the Contractor proposes for each such activity to occur and the duration (dates of commencement and completion, respectively) of each such activity.

At least once each month, the Architect-Engineer will determine whether the construction schedule developed and submitted by the Contractor meets the requirements stated above and whether the progress of the work complies with the Contractor's schedule.

The Contractor shall provide an up-dated schedule with each request for partial payment. Failure of the Contractor to develop and submit a construction schedule as aforesaid shall be sufficient grounds for the Architect-Engineer to find the Contractor in substantial default and certify to the Owner that sufficient cause exists to terminate the contract or to withhold any payment.

Following development and submittal of the construction schedule as aforesaid, the Contractor shall, at the end of each calendar month occurring thereafter during the period of time required to finally complete the subject project, or at such earlier intervals as circumstances may require, update and/or revise the construction schedule to show the actual progress of the work performed and the occurrence of all events which have affected the progress of performance of the work already performed or will affect the progress of performance of the work yet to be performed in contrast with the planned progress of performance of such work, as depicted on the original construction schedule and all updates and/or revisions thereto as reflected in the updated and/or revised construction schedule last submitted prior to submittal of each such monthly update and revision. Each such update and/or



revision to the construction schedule shall be submitted to the Architect-Engineer in duplicate. Failure of the Contractor to update, revise and submit the Construction Schedule as aforesaid shall be sufficient grounds for the Architect-Engineer to find the Contractor in substantial default and certify to the Owner that sufficient cause exists to terminate the Contract or to withhold payment to the Contractor until a schedule or schedule update acceptable to the Architect-Engineer is submitted.

The Contractor shall have the option of scheduling a substantial completion date occurring earlier than the date established by the Contract Documents for substantial completion; provided, however, in such event, such earlier substantial completion date will be recognized by the Owner only as a matter of convenience to the Contractor and shall not change the date for substantial completion established by the Contract Documents or be otherwise binding on the Owner or anyone under the Owner's control; and provided further, however, in such event, should events occur during performance of the work necessary to complete the subject project which would justify the granting to the Contractor of an extension of the Contract Time pursuant to the provisions of Article 8 of the AIA General Conditions which form a part of the Contract Documents, the Contractor shall be entitled to receive only such an extension of Contract Time as is determined by the Architect-Engineer to be due the Contractor as follows:

- (1) In the event the currently approved Contractor's schedule indicates completion ahead of the contractually established date for substantial completion, the time extension to the contract shall only be determined, when the total time directly affecting the critical path of the schedule is added to the end date of the schedule thereby making a new end date beyond the contractual completion date. The time extension will only be for the time between the currently approved contractual completion date and the new schedule end date.
- (2) In the event the currently approved Contractor's schedule indicates completion at or after the contractually established date for substantial completion, the time extension shall only be added to the contractually established date for the substantial completion and shall be determined by the Architect-Engineer as the portion of delay time directly affecting the critical path of the current approved contract schedule.

#### **C-5 CONSTRUCTION SCHEDULE AND REQUIREMENTS FOR OVERTIME WORK FOR PROJECTS WITH CONSTRUCTION COSTS IN EXCESS OF \$2,000,000.00**

Within thirty (30) days after the date of the Owner's issuance of a Notice to Proceed, the Contractor shall prepare and submit to the Architect-Engineer a construction schedule in quadruplicate graphically depicting the activities contemplated to occur as a necessary incident to performance of the work required to complete the project, showing the sequence in which the Contractor proposes for each such activity to occur and the duration (dates of commencement and completion, respectively) of each such activity. An example of an acceptable form of such a construction schedule is contained in Appendix A of the Corps of Engineers' Regulation ER 1-1-11 entitled "Network Analysis System", a copy of which is available to the Contractor from the Architect/Engineer, upon request. Other forms of construction schedules, such as "Timeline", "Primavera", "Project Workbench", or "Super Project", which provide the same kind of information and employ the same basic principles as illustrated in Appendix A of the Corps of Engineers' Regulation ER 1-1-11 will be acceptable to the Owner if used by the Contractor; provided, however, that the Architect-Engineer shall determine whether the construction schedule developed and submitted by the Contractor meets the requirements stated above and such determination shall be binding on the Contractor. Failure of the Contractor to develop and submit a construction schedule as aforesaid shall be sufficient grounds for the Architect-Engineer to find the Contractor in substantial default and certify to the Owner that sufficient cause exists to terminate the contract or to withhold any payment.

Following development and submittal of the construction schedule as aforesaid, the Contractor shall, at the end of each calendar month occurring thereafter during the period of time required to finally complete the subject project, or at such earlier intervals as circumstances may require, update and/or revise the construction schedule to show the actual progress of the work performed and the occurrence of all events which have affected the progress of performance of the work already performed or will affect the progress of the performance of the work yet to be performed in contrast with the planned progress of performance of such work, as depicted on the original construction schedule and all updates and/or revisions thereto as reflected in the updated and/or revised construction schedule last submitted prior to submittal of each such monthly update and revision. Each such update and/or revision to the construction schedule shall be submitted to the Architect/Engineer in duplicate. Failure of the Contractor to update, revise, and submit the construction schedule as aforesaid shall be sufficient grounds for the Architect-Engineer to find the Contractor in substantial default and certify to the Owner that sufficient cause exists to terminate the Contract or to withhold payment to the Contractor until a schedule or schedule update acceptable to the Architect-Engineer is submitted.

The Contractor shall have the option of scheduling a substantial completion date occurring earlier than the date established by the Contract Documents for substantial completion; provided, however, in such event, such earlier substantial completion date will be recognized by the Owner only as a matter of convenience to the Contractor and shall not change the date for substantial completion established by the Contract Documents or be otherwise binding on the Owner or anyone under the Owner's control;

and provided further, however, in such event, should events occur during performance of the work necessary to complete the subject project which would justify the granting to the Contractor of an extension of the contract time pursuant to the provisions of Article 8 of the AIA General Conditions which form a part of the Contract Documents, the Contractor shall be entitled to receive only such an extension of contract time as is determined by the Architect-Engineer to be due the Contractor as follows:

- (1) In the event the currently approved Contractor's schedule indicates completion ahead of the contractually established date for substantial completion, the time extension to the contract shall only be determined, when the total time directly affecting the critical path of the schedule is added to the end date of the schedule thereby making a new end date beyond the contractual completion date. The time extension will only be or the time between the currently approved contractual completion date and the new schedule end date.
- (2) In the event the currently approved contractor's schedule indicates completion at or after the contractually established date for substantial completion, the time extension shall only be added to the contractually established date for substantial completion and shall be determined by the Architect-Engineer as the portion of delay time directly affecting the critical path of the current approved contract schedule.

#### **C-6 VERIFICATION OF OWNER'S SURVEY DATA**

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

#### **C-7 CONSTRUCTION FACILITIES**

##### Sanitary Provisions

The Contractor shall provide and maintain in a neat and sanitary condition such accommodations for the use of his employees as may be necessary to comply with regulations of the County or the Department of Health and Rehabilitative Services. No nuisance will be permitted.

##### Temporary Wiring

The Contractor shall meet all safety requirements of the National Electric Code, Florida Department of Commerce, Bureau of Worker's Compensation or local requirements. In addition, all wire shall be so sized that it is not over-loaded according to the National Electric Code, and any wire used shall be fused to adequately protect that wire according to the Code referred to.

The Contractor shall have an adequate number of outlets and each outlet shall be properly and clearly labeled with the maximum voltage and fuse protection.

Where temporary lighting is used, outlet shall consist of weatherproof socket insulated and provided with a locking type wire guard.

All devices shall be properly grounded.

##### Storage and Work Areas

Prior to the start of the operations the Contractor shall make arrangements with the Architect-Engineer's field representative and the Owner's representative for the assignment of storage and work areas. Storage site shall be established during the pre-construction meeting. During construction the Contractor shall maintain the areas in a neat condition.

##### Contractor's Field Offices

If project needs require, trailers may be used for field offices, but their use as living quarters for personnel shall be limited to one staff member such as a night watchman or a superintendent.

##### Underground Utilities

The Contractor shall meet all requirements of the United States Department of Labor Occupational Safety and Health Administration (OSHA) in the performance of work related to excavations for underground utilities, foundations and other subsurface work. The contractor shall conduct thorough training in OSHA standards and requirements on a continuing and regular basis throughout the execution of such work. Additional instructions regarding Construction Facilities are set forth in the

Section entitled "Special Conditions".

### **C-8 PROJECT DRAWINGS-COPIES FURNISHED TO CONTRACTORS**

The Architect-Engineer will provide the Contractor with ten (10) sets of drawings and specifications upon contract award. The Architect-Engineer will also provide all CAD files necessary for completing As-Built drawings once the contract time has reached sixty (60) days prior to substantial completion of the project as indicated on the Notice To Proceed (plus any additional days granted by formal Change Order). If additional sets are required by the Contractor, they will be furnished upon request for the cost of printing and handling.

### **C-9 PROJECT DRAWINGS-CHANGES**

The Contractor shall immediately indicate plainly and conspicuously on the field set of drawings and at appropriate paragraphs in the Specifications Manual, all changes or corrections made by Addenda and Change Orders as they are issued.

### **C-10 INSPECTIONS - ALL PROJECTS**

All projects will require detailed code compliance inspections by the local authorities with jurisdiction over the area in which the project is located at the contractor's expense. The disciplines normally include, but are not necessarily limited to, structural, mechanical, electrical, plumbing and general building. The contractor shall make all permits, drawings, specifications, previous inspection reports, and change documents available to Code Inspectors. The contractor shall provide a copy of each inspection report to the Architect/Engineer in a timely fashion.

#### **OTHER INSPECTIONS**

1. The Department of Business and Professional Regulation has responsibility for elevator inspections.
2. The State Fire Marshal has responsibility for inspecting facilities in accordance with the Uniform Fire Safety Standards.
3. The Architect-Engineer will have responsibilities, relative to inspections.
4. The Owner and/or Using Agency representatives may also perform inspections at their discretion.
5. There may be other inspections required as specified elsewhere.

The Contractor has responsibilities relative to all types of inspections and is responsible for contacting all of the inspecting entities to determine his responsibilities. All of these inspecting entities have unique and separate responsibilities. One inspection from an entity will **not** substitute for an inspection from another entity.

### **C-11 SHOP DRAWINGS**

Shop drawings shall be submitted for manufactured or fabricated materials as called for in the separate specification sections. Drawings shall be fully identified by project name, project number, location, supplier's name, date, drawing number, specifications section reference, etc. The Contractor shall submit, with such promptness as to cause no delay in his work, or in that or any other Contractor, four (4) copies (in addition to those copies necessary for his own requirements) of all shop drawings, and schedules, required for the work of the various trades, to the Architect-Engineer for approval. Digital copies of submittals may be used for the review process in lieu of hard copies ONLY when approved by the Architect-Engineer and Owner. The Contractor shall make no deviation from the approved drawings, and the changes made thereto by the Architect-Engineer, if any.

It shall be the responsibility of the Contractor to properly schedule the submission of shop drawings for approval to allow adequate time for checking of drawings, manufacture and shipment of items to job site in sufficient time to prevent delay in Progress Schedule.

It shall also be the responsibility of the Contractor to coordinate the preparation of shop drawings of items, which will be furnished by more than one manufacturer but are designed to interface when installed. Shop drawings submitted to the Architect-Engineer for his approval shall first be checked and approved by the Contractor, the prima facie evidence of which shall be a "checked" stamp marked "Approved", or "Approved as Noted" on each copy of each shop drawing, placed thereon by the Contractor. Shop drawings received without the Contractor's "checked" stamp will be cause for immediate return without further

action. Each drawing correctly submitted will be checked by the Architect-Engineer and marked by him in one of the following ways:

- (1) Approved as drawn.
- (2) Approved as noted.
- (3) Returned for correction.
- (4) Not approved.

#### Submission and Approval of Shop Drawing & Sample Schedule

If and when required by the Architect-Engineer, the Contractor shall prepare and submit in triplicate to the Architect-Engineer a completely itemized Schedule of Shop Drawings, brochures and other descriptive literature, listing each and all such items as required under these specifications, which schedule shall indicate for each required item:

- (1) Identification as to pertinent Specification Division.
- (2) Item(s) involved.
- (3) Name of pertinent subcontractor or supplier and the name of pertinent manufacturer.
- (4) Schedule date of delivery of pertinent items to the project.

The subcontractors for all phases of the Contract shall submit through the General Contractor complete brochures covering all materials and/or equipment proposed for use in the execution of the work as required by their respective Divisions of the Specifications. These brochures shall be indexed and properly cross referenced to the plans and specifications for easy identification.

All shop drawings, setting drawings, material brochures, samples and/or color selection materials, which are required and are not included in the foregoing shall be submitted via the General Contractor. Insofar as is possible or practical, all shop drawings or descriptive literature of equipment for the mechanical or electrical trades shall be submitted in a complete brochure for each trade as soon as possible after Notice to Proceed is executed.

The Owner will not grant time extension based on delays due to improper scheduling of work; and the Owner, at his discretion, may withhold progress payments until such time as these requirements are fully satisfied.

#### **C-12 REFERENCE TO A.S.T.M. OR FEDERAL SPECIFICATIONS**

Where reference is made to the Standard Specifications of the American Society for Testing and Materials (A.S.T.M.): "United States Government Federal Specifications, or to other standard specifications of Associated Manufacturer's Organizations, or trades, in connection with the required quality of materials, methods, etc., then the applicable specifications shall be of the latest revised edition effective as of the date bids are opened by the Owner, unless otherwise expressly provided in the Contract Documents".

#### **C-13 MANUFACTURER'S SPECIFICATIONS**

Where the name of a concern or manufacturer is mentioned on drawings or in specifications in reference to his required service or product, and no qualifications or specification of such is included, then the material gauges, details of manufacture, finish, etc., shall be in accordance with his standard practice, direction or specifications. The Contractor shall be responsible for any infringement of patents, royalties, or copyrights, which may be incurred thereby.

#### **C-14 APPROVAL OF MATERIALS**

A list of all materials, equipment, etc., together with manufacturer's drawings and catalog information shall be submitted to the Architect-Engineer for approval prior to ordering material or equipment but not later than forty-five (45) calendar days after receipt of Notice to Proceed to Mobilize on Site and Proceed with Construction. Information submitted shall show the capacity, operating conditions and all engineering data and descriptive information necessary for comparison and to enable the Architect-Engineer to determine whether same meets specifications. The Architect-Engineer's approval will not relieve the Contractor of the responsibility for performance of any terms of the Agreement.

If the submittals reflect any changes from the plans or specifications, these changes should be clearly indicated by the Contractor.

## **C-15 SUBSTITUTIONS**

Substitutions for a specified system, product or material may be requested of the Architect-Engineer and the Architect-Engineer's written approval must be obtained before substitutions will be allowed. All requests for substitutions should be submitted within forty-five (45) days after award of Contract. Substitutions requested after this date may receive no consideration.

In making requests for substitutions the Contractor shall list the particular system, product, or material he wishes to substitute, the justification for such a request, and the amount he will add or deduct from the contract sum if the substitution is authorized by the Owner and approved by the Architect-Engineer.

If no addition or deduction to the Base Bid is allowed by the Contractor for such substitution, it shall be so stated on the request. Request submitted shall include any and all adjustments of that and any other work affected thereby.

## **C-16 CONSTRUCTION CLIMATE CONTROL**

It shall be the responsibility of the Contractor to provide at his expense, the power, fuel and equipment necessary to maintain climatic conditions and humidity when specified, required for work in progress, or required to protect materials, finishes, equipment or systems installed until the final acceptance of the project by the Owner.

## **C-17 AS-BUILT DRAWINGS**

During the progress of the work, the Contractor shall require the plumbing, air conditioning, heating, ventilating, elevator, and electrical subcontractors to record on their field sets of drawings the exact locations, as installed, of all conduit, pipe and duct lines whether concealed or exposed which were not installed exactly as shown on the contract drawings. The Contractor shall also record all drawing revisions that have been authorized by change order that affect wall or partition locations, door and window locations and other template changes. The exact routing of conduit runs shall be shown on these drawings.

Contractor will provide two (2) CD-ROMs containing As-Built Drawings. Each CD shall contain one (1) set using AutoCAD 2006 (or newer), by Autodesk and one (1) set in PDF format. Each drawing shall be noted "As Built" and shall bear the date, name, and contact information of the subcontractors that performed the work. As-Built drawings shall include only information describing the as-built condition of the project and be clear of all additional information, including lines, shading, clouds, etc, that were not constructed and are not required to depict the as-built condition of the project.

The Contractor shall review the completed As-Built drawings and ascertain that all data furnished on the drawings are accurate and truly represent the work as actually installed. When manholes, boxes, underground conduits, plumbing, hot or chilled water lines, inverts, etc. are involved as part of the work, the Contractor shall furnish true elevations and locations, all properly referenced by using the original bench mark used for the institution or for this project. The CD-ROMS shall be submitted to the Architect-Engineer when completed, together with two sets of black-line prints for certification and forwarding to the Owner, at the time of final completion.

## **C-18 GUARANTEES AND OPERATING INSTRUCTIONS**

If applicable, at Owner's option, the Contractor shall provide full cooperation to the Owner in the production of video tape instructions for the operation and maintenance of all HVAC, fire alarm, sprinkler, irrigation, computer and other systems essential to efficient utilization of the building grounds. The Contractor will perform the actual taping, editing and production of such instructional tapes. Cooperation of the on-site representative of the Contractor shall be the responsibility of the Contractor, whose representatives are to coordinate instructional activities with the Owner and its personnel or agents.

All work performed by the Contractor in completing the subject project shall be guaranteed by the Contractor against all defects resulting from the use of materials, equipment and workmanship for a period of one year from the date of Substantial Completion of the project.

If, within any guarantee period, repairs or changes are required in connection with the guarantee work, which in the opinion of the Architect-Engineer is rendered necessary as a result of the use of materials, equipment or workmanship which are defective or inferior or not in accordance with the terms of the Contract, the Contractor shall, promptly upon receipt of notice from the Owner and without expense to the Owner, proceed to:

***Place in satisfactory condition in every particular all of such guaranteed work, correct all defects therein and; make good all damages to the structure or site or equipment or contents thereof, which, in the opinion of the Architect-Engineer, is the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract and; make good any work or materials or the equipment and contents of structures or site disturbed in fulfilling any such guarantee.***

If the Contractor, after receipt of any such written notice, fails within seventy-two (72) hours to commence at the job site with performance of the work necessary to remedy all defects in the work described in such notice so as to provide the Owner with the subject project completed in accordance with all requirements of the Contract Documents, or fails to complete the performance of such remedial work within a reasonable time after commencing same, the Owner shall be entitled to have such defective work remedied on the account of the Contractor and his Surety, in which event, the Contractor and his Surety shall be fully liable for all costs and expenses reasonably incurred by the Owner in having such defective work remedied.

The Contractor shall be responsible for collecting, identifying, indexing, and collating the following materials from the sub-contractors, and will deliver two (2) copies and three (3) electronic disk copies of the finished document to the Architect-Engineer for checking of correctness no later than the date of substantial completion of the project. Each copy will be indexed and ordered per example provided in the contracting workbook. Each hard copy will be bound in white D-ring binders of appropriate size.

Complete equipment diagrams, operating instructions, maintenance manuals, parts lists, wiring diagrams, pneumatic and/or electrical control diagrams, test and balance reports, inspection reports, guarantees and warranties addressed to the State Agency for which the construction is being performed, as applicable, for each and every piece of Fixed Equipment furnished under this contract to be supplied in a ring binder, hard-cover book, properly indexed for ready reference. Also, specific information regarding manufacturer's name and address, nearest distributor and service representative's name, address, office and home phone numbers, make and model numbers, operating design and characteristics, etc., will be required. All information submitted shall be updated to reflect existing conditions.

Subsequent to the time of Substantial Completion and receipt of As-Builts, Operations and Maintenance Books but prior to the date of Final Acceptance, the Contractor and/or subcontractor shall provide a competent and experienced person (or persons) thoroughly familiar with the work for a reasonable period of time to instruct the State Agency personnel in operation and maintenance of equipment and control systems.

This instruction will include normal start-up, run, stop, and emergency operations, location and operation of all controls, alarms and alarm systems, etc. The instruction will include tracing the system in the field and on the diagrams in the instruction booklets so that operating personnel will be thoroughly familiar with both the system and the data supplied.

### **C-19 CLEANING**

Entire area within scope of this work shall be completely cleaned, including all window glass, hardware, plumbing fixtures, electrical fixtures, tile work, etc., and shall be kept clean for the completion of this job. Replace all broken or defective glass within these areas. At the point in time of Substantial Completion, air conditioning filters shall be replaced, and fixed grills, and permanent filters shall be cleaned. Copies of all records of recycling and waste disposal shall be submitted to the CFMO Environmental Office.

### **C-20 FINAL PAYMENT**

In accordance with FS 255.073 and FS 215.422, the Owner shall pay or cause to be paid to the Contractor, the entire unpaid balance of the then Contract Sum, less the amount of any sums which continue to be retained to satisfy the cost of performing any change in the Work which is the subject of any claim or dispute and which has not yet been satisfactorily performed by the Contractor, provided that the parties have not otherwise stipulated in the Certificate of Substantial Completion, and provided further that the Work has been satisfactorily completed, the Contractor's obligations under the Contract have been fully performed, and a final Certificate for Payment has been issued by the Architect-Engineer (See Section C-34, Progress Payments).

The Contractor's application for final payment shall be accompanied by the following:

- 1) Pay Request (3 copies with original signatures and original seals) noted as Final (Exhibit 10).
- 2) Final Schedule of Contract Values (Exhibit 11).
- 3) Consent of Surety to Make Final Payment (Signed & Sealed) (Exhibit 18)

- 4) Power of Attorney from Surety for Release of Final Payment (Signed, Sealed, and dated same as Consent of Surety) (Exhibit 19)
- 5) Contractor's Affidavit of Contract Completion (Exhibit 12)
- 6) A/E Certificate of Contract Completion (Exhibit 12a)
- 7) Final Release of Liens & Claims (Exhibit 9) from each subcontractor/supplier who has filed a Notice to Owner
- 8) Contractor's Guarantee of Construction for one (1) year from the date of Substantial Completion.
- 9) Copy of the Approval by the Architect-Engineer and the transmittal to the State of Florida, Department of Military Affairs of Manuals, Shop Drawings, As-Builts (2 sets CD-ROMS as specified in Section C-17 and 2 sets of Black-Line Prints), Brochures, Warranties, and list of subcontractors including telephone numbers and addresses.
- 10) Verification that State Agency personnel have been trained in the operation of their new equipment for each system; HVAC, Controls, Fire Alarm, etc. (i.e. submittal of Attendance Lists).
- 11) Fully executed Roof Warranty (if applicable) in the name of The State of Florida, Department of Military Affairs. Warranty must be executed by Contractor and manufacturer.
- 12) Other special warranties as required by specifications, in the name of the State of Florida, Department of Military Affairs.

### **C-21 PUBLIC NOTICE**

Immediately following receipt of Notice to Proceed to Mobilize on Site and Proceed with Construction as prescribed in Section B-21 hereinabove, the Contractor shall post a notice in the following form in a conspicuous place on the project site:

"Notice is hereby made to all those concerned and affected that (Contractor's Name) is performing (Project Number, Name and Location).

All parties furnishing labor, materials and/or equipment to said project are to provide notice of such in writing by certified mail to State of Florida, Department of Military Affairs, 2305 State Road 207, St. Augustine, Florida 32085 within twenty (20) calendar days of first providing such labor, materials and/or equipment."

### **C-22 INCLUSION OF AIA DOCUMENT A-201**

The General Conditions of the Contract for Construction, American Institute of Architects Document A-201, 2007 Edition, as modified, shall apply to and form a part of this Section as if written in full herein.

### **C-23 SCOPE**

The following Sections C-24 through C-32 set forth modifications and additions to the General Conditions described above.

### **C-24 ARTICLE 2, OWNER**

Article 2.1.2 – NOT APPLICABLE

Article 2.2.1 – NOT APPLICABLE

### **C-25 ARTICLE 3, CONTRACTOR**

Article 3.3.2 - Add the following: "Should the Architect-Engineer find any person(s) employed on the project incompetent, unfit or otherwise objectionable for his duties and so certifies the facts to the Contractor, the Contractor shall immediately cause the employee to be dismissed and said employee shall not be re-employed on this project without written consent of the Architect-Engineer."

Article 3.8.1 - Add the following: "If directed by the Architect-Engineer the Contractor shall solicit not less than three bids for the item(s), the cost of which is provided for by a specified allowance sum. The Contractor shall purchase the item(s) from one of the three Bidders as directed by the Architect-Engineer."

Article 3.10.1 – NOT APPLICABLE. Reference Sections C-4 and C-5 for progress scheduling.

Article 3.14.1 - Add the following: "All cutting, fitting and patching work shall blend in and be plumb and square. The quality of materials used shall be the same or surpass those used in the adjacent existing construction."

#### **C-26 ARTICLE 4 ARCHITECT**

Article 4.1.1 - Delete in its entirety and replace with the following: "The Architect-Engineer is the design professional identified in the Owner-Contractor Agreement. Throughout the contract documents, the Architect-Engineer is referred to as if singular in number and masculine in gender. The terms Architect and Architect-Engineer mean the Architect-Engineer or his authorized representative."

Article 4.2.5. Add the following: "The authorized representatives and agents of the Architect-Engineer, Owner, and the United States Federal Agencies providing monies in the form of grant-funds or loans and such other persons as the Owner may designate shall have access to and be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, other relevant data and records wherever they are in preparation and progress. The Contractor shall provide proper facilities for such access, inspections and, when required, exact duplicate copies of the aforementioned data shall be furnished."

#### **C-27 ARTICLE 5, SUBCONTRACTORS**

Article 5.2.4 - Add the following: "The Contractor shall not remove or replace subcontractors listed in his bid subsequent to the lists being made public at the bid opening, except upon good cause shown and only when approved in writing by the Owner."

#### **C-28 ARTICLE 7, CHANGES IN THE WORK**

Omit all references to "Construction Change Directive".

#### **C-29 ARTICLE 8, TIME**

Article 8.3.1 - Delete the words "or by delay authorized by the Owner pending mediation and arbitration."

Article 8.3.3 – NOT APPLICABLE

#### **C-30 ARTICLE 9, PAYMENTS AND COMPLETION**

Article 9.3.1.1 – NOT APPLICABLE

Article 9.7 – NOT APPLICABLE. Reference Section C-36 for Progress Payments

Article 9.9.1 - Delete the words "provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project."

#### **C-31 ARTICLE 11, INSURANCE AND BONDS**

Articles 11.2 through 11.3 - Delete in their entirety and insert in their place:

Article 11.2.1, Owner's Liability Insurance - The Contractor shall be responsible for purchasing and maintaining an Owner's Protective Liability Insurance Policy with minimum limits as described in Section C-3 Contractor's Insurance.

Article 11.3.1, Property Insurance - The Contractor shall purchase and maintain property insurance upon the entire work at the site of the full insurable value thereof.

Article 11.3.2 - Any insured loss is to be adjusted with the Owner and made payable to the Owner as trustee for the insured, as their interests may appear.

Article 11.3.3 - If the Contractor requests in writing that insurance for special hazards are included in the property insurance policy, the Owner shall permit the Contractor to purchase such insurance, but the cost thereof shall be paid for by the Contractor.

Article 11.3.4 - The Owner and Contractor waive all rights against each other for damages caused by fire or other perils to the extent covered by insurance provided under Article 11.3.1, except such rights as they may have to the proceeds of such insurance held by the Contractor as trustee. The Contractor shall require similar waivers by subcontractors and sub-subcontractors.



Article 11.3.5 - If required in writing by any party in interest, the Contractor, as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of his duties. He shall deposit in a separate account any money so received, and he shall distribute it in accordance with such agreement as the parties in interest may reach. If after such loss no special agreement is made, replacement of damaged work shall be covered by an appropriate change order.

Article 11.3.6 - The Owner, as trustee shall have power to adjust and settle any loss with the insurers.

Article 11.3.7 - If the Owner finds it necessary to occupy or use a portion or portions of the work prior to Substantial Completion thereof, such occupancy shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance once have consented by endorsement to the policy or policies. This insurance shall not be cancelled or lapsed on account of such partial occupancy. Consent of the Contractor and the insurance company or companies to such occupancy or use shall not be unreasonably withheld.

Article 11.3.8 - Loss of Use Insurance - The Owner, at his option, may purchase and maintain such insurance as will insure him against loss of use of his property due to fire or other hazards, however caused.

### **C-32 ARTICLE 13, MISCELLANEOUS PROVISIONS**

Article 13.5.1 - Delete in last sentence: "The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded.", and add;

"The Architect-Engineer shall designate the tests which shall be made, and the Contractor shall not obligate the Owner for tests without the Architect-Engineer's approval.

#### Testing Costs Paid For by the Contractor

Certain tests of materials, equipment and systems are required as part of the contract and shall be paid for by the Contractor. These are specifically named in the technical specifications and the types of tests are as follows:

- 1) Where tests are required by the technical specifications for materials, methods or equipment, the Contractor shall pay the cost of initial tests to prove qualities and determine conformance with specification requirements, e.g., mill tests on cement and steel; load testing of piling; sieve analysis and calorimetric tests on sand; strength tests for determining proportions of materials or concrete, moisture content and sound transmission tests of concrete blocks, etc;
- 2) If substitute materials or equipment are proposed by the Contractor, he shall pay the cost of all tests which may be necessary to satisfy the Architect-Engineer that specification requirements are satisfied;
- 3) If materials or workmanship are used which fail to meet specification requirements the Contractor shall pay the costs of all coring or other tests deemed necessary by the Architect-Engineer to determine the safety or suitability of the material or element;
- 4) The Contractor shall pay for all testing costs, including but not limited to; power, fuel, equipment and systems for proper operation such as electrical, plumbing, heating ventilation, air conditioning, elevator, dumbwaiters and conveyors, etc.

#### Testing Costs Borne by the Owner

All other tests performed at the direction of the Architect-Engineer or the Owner shall be paid for by the Owner, except to the extent that the costs of performing such tests are otherwise chargeable to the Contractor under provisions of the Contract Documents."

Article 13.6 – NOT APPLICABLE

Article 13.7 – NOT APPLICABLE

## **C-33 CHANGES IN THE WORK, DELAYS & EXTENSIONS OF TIME, CLAIMS**

### **CHANGES IN THE WORK**

During the course of the Contractor's performance of the work necessary to complete the subject Project, certain events may occur which have the effect of changing the conditions under which the work is to be performed as specified and described in the Bidding Documents, and/or the nature and extent of the work as specified and described in the Bidding Documents. The occurrence of such events may cause the Contractor to incur greater or less cost and expense to perform the work required to complete the subject Project than planned to be incurred in the Contractor's successful bid, in which event the Contractor or the Owner shall respectively be entitled to either an increase or decrease in the Contract Sum, whichever is the case, to the extent such greater or less cost and expense results, and in which event the party entitled to the benefit of any such adjustment to the Contract Sum shall, within twenty-one (21) calendar days from the first occurrence of such event(s), present written demand on a Proposed Change Order Summary Form (Exhibit 16) therefore on the other party through the Owner. Should the Contractor and Owner be unable to settle and dispose of such demand within thirty (30) calendar days from the date any such claim is presented, upon terms and conditions mutually agreeable to the Contractor and the Owner, then such demand shall be referred to the Owner for determination, which determination shall be final and binding upon the Contractor, unless appealed in accordance with applicable provisions of the Contract Documents, and if the Owner, upon considering any such demand, determines that the Contract Sum should be increased or decreased, the determination of the amount of any such increase or decrease in the Contract Sum shall be governed and controlled by strict adherence to the following described guidelines and limitations, and neither the Contractor or the Owner shall be entitled to receive any monetary consideration beyond that which is authorized herein below.

All adjustments to the Contract Sum resulting from a change in the work shall be determined by the measure of actual or estimated as the case may be, out-of-pocket costs and expenses incurred or spared by the Contractor for labor, materials, equipment, and equipment rental, plus overhead and profit thereon, for performing the changed work.

- A. Labor costs shall be inclusive of all direct job site cost for estimation, laying out, mechanics' wages and laborers' wages, together with all payroll taxes, payroll assessments, and insurance premiums paid for such labor.
- B. All material costs, equipment costs and equipment rental costs shall be trade discount rates, plus State Sales Tax, where applicable.
- C. Overhead and profit shall be inclusive of all project management, project administration, superintendence, project coordination, project scheduling and other administrative support functions and services, whether performed on the job site or off the job site and general support equipment. Overhead and profit shall be determined as follows:
  1. Overhead and profit shall be calculated at the rate of 15% of the Contractor's labor, material, equipment and equipment rental costs, incurred or spared, as measured under the preceding paragraphs for changes in the work performed by the officers, employees or subsidiaries of the Contractor.
  2. Overhead and profit shall be calculated at the rate of 7 1/2 percent of the Contractor's sub-contractors' actual labor, material, equipment and equipment rental costs, incurred or spared, as measured under the preceding paragraphs, plus 15% of all such costs, as overhead and profit to the Contractor's subcontractors, for all changes in the work performed by the officers, employees or subsidiaries of the Contractor's sub-contractors.
- D. In addition to the foregoing, all adjustments to the Contract Sum resulting from a change in the work shall include all out-of-pocket expenses, incurred or spared, in performing the changes in the work for:
  1. Paying the premiums required to obtain Performance Bonds and Labor and Material Payment Bonds called for by the Contract Documents;
  2. Paying the fee(s) required for licenses or permits called for by changes in the work;
  3. Paying for delivery of materials or equipment to the job site;
  4. Paying for storage of materials or equipment before use thereof in performing changes in the work, and
  5. Paying for testing required by the changes in the work.

- E. In the event Contractor demands an adjustment in the Contract Sum, such demand shall be accompanied by paid receipts or other such written evidence satisfactory to the Owner itemizing the costs and expenses incurred as a result of the event(s) constituting the changes in the work on a Proposed Change Order Summary Form (Exhibit 16).

#### DELAYS & EXTENSIONS OF TIME

Article 8.3.3 of the AIA General Conditions is not applicable and Contractor's remedies for delays in the progress of the Work, or for changes in the Work, shall be limited to those provided in this Section. The contractor's exclusive remedy for delays in performance of the contract caused by events beyond its control shall be a claim for equitable adjustment in the contract time; provided, however, inasmuch as the parties expressly agree that overhead cost incurred by Contractor for delays in performing the work cannot be determined with any degree of certainty, it is hereby agreed that in the event the Contractor is delayed in the progress of the Work after Notice to Proceed to Mobilize on Site and to Proceed with Construction for causes beyond its control and attributable only to acts or omissions of Owner, Contractor shall be entitled to compensation for overhead cost and profit either (a) as a fixed percentage of the actual cost of the change in the Work, if the delay results from a change in the Work, as calculated in Section C, "Conditions of the Contract", or (b) if the delay results from other than a change in the Work, at an amount for each day of delay calculated by dividing an amount equal to a percentage of the original contract sum determined on the graph enclosed as Exhibit 13 by the number of calendar days of the original contract time.

In the event of a change in the Work, Contractor's claim for adjustments in contract sum are limited exclusively to its actual costs for such changes plus fixed percentages for overhead, additional profit and bond costs, as specified in herein.

The forgoing remedies for delays and changes in the Work are to the exclusion of, and thus eliminate, the total cost concept [(that is, computing Contractor's additional costs for changes in Work or the costs of a delay in the progress of the Work by comparing Contractor's total actual costs with its original estimate, see McDevitt & Street Company v. Department of Management Services State of Florida, 377 So.2d 191, (Fla. 1st-DCA 1979)] as the method of determining Contractor's costs associated with a change in the Work or with delay in the progress of the Work.

No provision of this contract shall be construed as a waiver of sovereign immunity by the Owner.

#### CLAIMS AND DISPUTES

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money and extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the party making the claim.

No provision of the Contract Documents makes or is intended to make provision for recovery by Contractor of damages for delay or for breach of contract. All claims, disputes or controversies under this contract shall be determined and settled as provided in Section C-39 hereinafter. No claim for breach of contract shall be submitted, determined or settled under Section C-39 hereinafter.

A. TIME LIMITS ON CLAIMS -- Claims by either party must be made within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. An additional Claim made after the initial Claim has been implemented by Change Order will not be considered unless submitted in a timely manner.

B. CONTINUING CONTRACT PERFORMANCE --Pending final resolution of a Claim unless otherwise agreed in writing the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

#### C-34 PROGRESS PAYMENTS

- A. Contractor should note that the Client Agency is the Agency that will occupy and use the project upon substantial completion, and that all or a portion of the funding for this project may have been appropriated by the State Legislature or furnished by Federal Grant to the Client Agency and that payment to the Contractor may be made by the Client Agency based on approval of each payment by the Owner.

Thirty (30) calendar days shall be allowed for the Owner's inspection and approval of the goods and services for which any Application for Payment is made.

The Owner will at intervals pay or cause to be paid to the Contractor as follows:

### PAYMENTS TO CONTRACTOR

Pursuant to FS 255.073 and FS 215.422

#### B. Progress Payments against Contract Sum:

Based upon Application for Payment submitted to the Architect-Engineer by the Contractor and Certificates of Payment issued by the Architect-Engineer and accepted by the Owner, the Owner shall make progress payments to the Contractor against the account of the Contract Sum in accordance with the following:

Upon Owner's receipt and acceptance of a certificate of payment, the Owner has five (5) working days to inspect and approve the goods and services, unless otherwise specified herein. The Owner has twenty (20) days to deliver an approved request for payment to the Department of Financial Services. The twenty (20) days are measured from the latter of the date the invoice is received or the goods or services are received, inspected and approved.

The Owner shall pay, or cause to be paid to the Contractor, 90% of the portion of the contract sum properly allocable to labor, materials and equipment incorporated into the work, and 90% of that portion of the contract sum properly allocable to materials and equipment suitably stored at the site or at a bonded warehouse agreed upon in writing by all parties, less the aggregate of previous payments. Ten percent (10%) retainage is held by Owner until work has been completed and all final documentation has been delivered satisfactorily to Project Manager.

If a payment is not available within forty (40) days; a separate interest penalty as established pursuant to Section 215.422, Florida Statutes, shall be due and payable, in addition to the invoice amount, to the Vendor. Interest penalties of less than one (1) dollar shall not be enforced unless the Vendor requests payment. Invoices which have to be returned to a Vendor because of Vendor preparation errors shall result in a delay in the payment. The invoice payment requirements do not start until a properly completed invoice is provided to the Department.

1. The Contractor shall promptly pay each Subcontractor in accordance with Section 287.0585, Florida Statutes, upon receipt of payment from the Owner out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's work.
2. The Architect-Engineer may, on request at his discretion, furnish to a Subcontractor, if practical, information regarding the percentages of completion of the amount applied for by the Contractor and the action taken thereon by the Architect-Engineer on account of Work done by such Subcontractor.
3. Neither the Owner nor the Architect-Engineer shall have any obligation to pay or to see to the payment of any monies to any Subcontractor except as may otherwise be required by law.
4. No Certificate for a progress payment, nor any progress payment, nor any partial or entire use of occupancy of the project by the Owner, shall constitute an acceptance of any work not in accordance with the Contract Documents.

#### C. The Contractor shall request such compensation by submitting:

1. A properly completed Application for Progress Payment on the form FNG 4012E (Exhibit 10).
2. A properly completed Contractor's Minority Business Enterprises Status Report of Partial Payment (Exhibit 15). This form must be submitted even if no minorities were utilized.
3. A Schedule of Contract Values for FNG 4015E (Exhibit 11) as described below.

The Contractor shall, within ten (10) calendar days from date of Notice to Secure Permits letter, submit to the Architect-Engineer and Project Manager for review and approval three copies of a Schedule of Contract Values which will reflect the estimated cost of each subdivision of work of each specification section, further detailed by subcontractor item, and utilizing the Construction Specification's Institute "Master Format Broad Scope Section Numbers". The value of each

item shall include a true proportionate amount of the Contractor's overhead and profit. The sum of all such scheduled values shall equal the Contract Sum as evidenced by the Agreement.

The approved Schedule of Contract Values will accompany and support the Contractor's periodic Applications for Payment and shall indicate the value of suitably stored material as well as labor performed and materials incorporated into the work for each subdivision of the schedule during the period for which the requisition is prepared.

The Schedule of Contract Values form enclosed as Exhibit 11 will be utilized to present this and other pertinent information which will facilitate the checking and processing by the Owner's representatives of the Contractor's Application for Payment.

4. Waiver and Release of Lien Upon Progress Payment from each subcontractor, dated and notarized.

### **C-35 EXCLUSION OF OWNER FROM LIABILITY**

Notwithstanding any other provision of the Contract Documents, should the Contractor sustain loss or be damaged by act or omission of a separate Contractor, the Owner shall not be liable for any such loss or damage and the Contractor shall not be entitled to obtain any monetary relief from the Owner to compensate for any such loss or damage, but shall be limited to such recovery as is otherwise available at law from persons and/or entities other than the Owner.

### **C-36 DUTIES OF ARCHITECT-ENGINEER'S REPRESENTATIVE (If one is authorized by the Owner)**

- A. The Duties of the Architect-Engineer's Representative(s) shall include but not be limited to the following:
  1. Assist the Contractor in obtaining interpretation of the Contract Documents from the Architect-Engineer.
  2. Conduct daily on-site observations for determining conformance to the Contract Documents in regard to work, materials, equipment, etc.
  3. Request additional details and/or information from the Architect-Engineer when needed by the Contractor.
  4. Evaluate suggestions and/or modifications submitted by the Contractor and transmit these to the Architect-Engineer with recommendations.
  5. Anticipate problems, which may create delays and problems in construction and report these to the Contractor and Architect-Engineer for solution.
  6. Maintain official relationship only with the General Contractor Job Superintendent(s) and communicate problems to him regardless of which sub-contractor(s) work is involved.
  7. Attend all required construction conferences and participate actively in discussions of the project.
  8. When authorized by the Architect-Engineer conduct tests and inspections as required by the Contract Documents and record results of such tests and inspections.
  9. Maintain a daily log of project activity including but not limited to: hours on the job site, weather conditions, daily construction activity, number of men in each trade on the site, general observations, written and verbal directives to Contractor and visits of governmental officials.
  10. If, upon inspections or observations, work is found not to be in accordance with Contract Documents, advise the Architect-Engineer verbally and in writing. Consult with the Architect-Engineer for further directions if the Contractor does not correct work as directed by the Architect-Engineer.
  11. Check that tests and inspections to be performed by others, in addition to those performed by Architect-Engineer's Representatives and/or the Architect-Engineer, are actually performed; in accordance with the Contract Documents.
  12. When requested, accompany all State and or Federal officials on inspections of construction and record the inspection in the log.

13. Cooperate with Owner's Project Director or Inspectors and provide them with all requested information about the project.
14. Maintain in an orderly manner, files of correspondence, reports of job conferences, shop drawings and samples, copies of contract documents, change orders, addenda, supplementary drawings, and job log.
15. Review requisitions for payment submitted by the Contractor and transmit to the Architect-Engineer with recommendations.
16. Participate in the inspections of construction with the Architect-Engineer and Owner's Project Director at regular intervals and at Substantial Completion and provide Architect-Engineer with information as to work which is not complete, defective, or not in accordance with Contract Documents.
17. Refer all communications from State Agencies to the Owner's Project Director and to the Architect-Engineer.
18. Copy the Owner's Project Manager on all correspondence related to the project.
19. Review plans, specifications and shop drawings on a regular basis. Be alert to errors and omissions on the Contract Documents and construction problems before they occur and advise the Architect-Engineer when discovered.
20. Advise Contractor and Architect-Engineer of work being performed with unapproved shop drawings or without shop drawings when such shop drawings are required by specifications.
21. Check materials and equipment delivered to the job site against specifications, approved samples, shop drawings and related correspondence. If in conflict, advise Contractor and/or Architect-Engineer.
22. Check that Contractor is maintaining a record of notated drawings of As-Built conditions, when As-Built drawings are specified to be provided.
23. When necessary, act as liaison between the Contractor and the State Agency who will occupy the project in the coordination of the State Agency's requirements to the Contractor(s) schedule.

B. The Architect-Engineer's Representative is **not** authorized to do the following:

1. Authorize deviations from the Contract Documents (unless approved by Architect-Engineer).
2. Expedite the work for the Contractor(s).
3. Advise the Contractor on building techniques or scheduling.
4. Approve Shop Drawings.
5. Issue Certificate for Payment.
6. Approve substitutions.
7. Interpret the Contract Documents except when obviously clear.

C. The Architect-Engineer's Representative should **not**:

1. Get involved in disputes or problems between subcontractor and subcontractor.
2. Get involved in disputes or problems between General Contractor and subcontractor.
3. Offer gratuitous advice to Contractor or subcontractors on how to perform the work whether solicited from Contractors or not.
4. Communicate with State Agency's representative in any official way except as noted in Item A-23 above.

5. Make vague and unclear log entries as to the acceptability of the Contractor's work. If log entries are deemed unacceptable and not corrected properly and in a timely way, the condition should be entered into the job log clearly as a statement made with follow-up written communication to the Architect-Engineer.
6. Order a work stoppage except in extreme emergencies or except under conditions authorized by the Architect-Engineer only.

**C-37 DUTIES OF THE OWNER'S STATE CONSTRUCTION REPRESENTATIVE (If one is authorized by the Owner)**

**NOTE: This Representative is NOT a State Building Code Inspector**

- A. The duties of the Owner's State Construction Representative shall include but not be limited to the following:
1. Be present at the site at all times when construction is being performed and conduct daily on-site observations for determining conformance to the Contract Documents in regard to work, materials, equipment, etc.
  2. Anticipate problems, which may create delays and problems in construction, and report these to the Owner's Project Director for solution.
  3. Attend all construction conferences.
  4. When authorized by the Owner's Project Director, conduct inspections as required by the Contract Documents and record results of such inspections.
  5. Maintain a daily log of project activity including but not limited to: hours on the job site, weather conditions, daily construction activity, number of men in each trade on the site, general observations, written and verbal directives to the Contractor and visits of governmental officials and the Architect-Engineer.
  6. If, upon inspection or observations, work is believed not to be in accordance with Contract Documents, advise the Owner's Project Director verbally and in writing.
  7. Check that tests and inspections to be performed by others, in addition to those performed by Architect-Engineer's Representative and/or the Architect Engineer, are actually performed in accordance with the Contract Documents.
  8. When requested, accompany all State and/or Federal officials on inspections of construction and record the inspection in the log.
  9. Cooperate with the Owner's Project Director and provide them with all requested information about the project that he can provide or direct them to the Architect-Engineer for assistance where appropriate.
  10. Maintain in an orderly manner, files of correspondence, reports of job conferences, shop drawings and samples, copies of contract documents, change orders, addenda, supplementary drawings and job log.
  11. Review requisitions for payment submitted by the Contractor via the Architect-Engineer and transmit to the Owner's Project Director with recommendations.
  12. Participate in the inspections of construction with the Owner's Project Director at regular intervals and at substantial completion and provide the Owner's Project Director with information as to work which he feels is not complete, defective, or not in accordance with Contract Documents.
  13. Refer all communications from State Agency that will occupy the project to the Owner's Project Director.
  14. Copy the Owner's Project Director on all correspondence related to the Project.
  15. Review plans, specifications and shop drawings on a regular basis. Be alert to errors and omissions on the Contract Documents and construction problems before they occur and advise the Owner's Project Director when he feels problems exist.

16. Advise the Owner's Project Director when he observes work being performed with unapproved shop drawings or without shop drawings when such shop drawings are required by specifications.
17. Check materials and equipment delivered to the job site against specifications, approved samples, shop drawings and related correspondence. If believed to be in conflict, advise the Owner's Project Director.
18. Check that Contractor is maintaining record notated drawings of as-built conditions, when as-built drawings are specified to be provided.

B. The Owner's State Construction Representative is **not** authorized to do the following:

1. Authorize deviations from the Contract Documents.
2. Expedite the work for the Contractor.
3. Advise the Contractor on building techniques or scheduling.
4. Approve Shop Drawings.
5. Issued Certificate for Payment.
6. Approve Substitutions.
7. Interpret the Contract Documents for the Contractor.

C. The Owner's State Construction Representative should **not**:

1. Get involved in disputes or problems between subcontractor and subcontractor.
2. Get involved in disputes or problems between General Contractor and subcontractor.
3. Offer gratuitous advice to Contractor and subcontractors on how to perform the work whether solicited from Contractors or not.
4. Communicate with State Agency's representative in any official way.
5. Make vague and unclear log entries as to the acceptability of the Contractor's work. If log entries are deemed unacceptable and not corrected properly and in a timely way, the conditions should be entered into the job log clearly as a statement made with follow-up written communications to the Owner's Project Director.
6. Order a work stoppage except in extreme emergencies affecting Life Safety.

### **C-38 PROHIBITED MATERIALS - ASBESTOS**

Per Section 255.40, Florida Statutes, the use of asbestos or asbestos-based fiber materials is prohibited in any buildings, construction of which is commenced after September 30, 1983, which is financed with public funds or is constructed for the express purpose of being leased to any governmental entity.

### **C-39 CLAIMS AND DISPUTES**

The provisions of Chapter 28-106, Florida Administrative Code to the extent not inconsistent with this Article are referred to and adopted by reference and shall govern procedures for claims.

Under the terms of this Agreement, the Contractor shall not have any right to compensation other than, or in addition to, that provided by this Agreement, to satisfy any claim for costs, liabilities or debts of any kind whatever resulting from any act or omission attributable to the Owner unless the Contractor has provided notice as required by Section C-35 and unless the claim therefore is delivered to the Owner. All such claims shall be set forth in a petition stating:



1. Name and business address of the claimant,
2. A concise statement of the ultimate facts, including the statement of all disputed issues of material fact, upon which the claim is based.
3. A concise statement of the provisions of the contract together with any federal, state and local laws, ordinances or code requirements or customary practices and usages in the industry asserted to be applicable to the questions presented by the claim and a demand for the specific relief believed to be due the claimant, and
4. The date of the occurrence of the event giving rise to the claim and the date and manner of Contractor's compliance with the notice requirements of Section C-33.

Within thirty (30) calendar days from the date any such claim is received, the Owner shall deliver to the Contractor its written determination on the claim. Unless the Owner's determination is agreed to by the Contractor and a consent order adopting the determination is entered within thirty (30) days of receipt of the Owner's determination, the Owner shall designate a hearing officer who shall conduct a proceeding in accordance with Chapter 28-106, F.A.C.

The Contractor shall carry on the Work and maintain the progress schedule during any administrative proceeding unless otherwise agreed by the Contractor and the Owner in writing.

The venue for all civil and administrative actions against the department shall be in Leon County, unless otherwise agreed by the parties.

#### **C-40 INTEREST PROVISIONS**

Any monies not paid when due to either party under this Agreement shall not bear interest except as may be required by Section 215.422, Florida Statutes.

#### **C-41 HARMONY**

Contractor is advised and hereby agrees that he will exert every reasonable and diligent effort to assure that all labor employed by Contractor and his subcontractors for work on the project shall work in harmony with and be compatible with all other labor being used by building and construction contractors now or hereafter on the site of the project.

Contractor further agrees that this provision will be included in all subcontracts of the subcontractor as well as in the Contractor's own contract; provided, however, that this provision shall not be interpreted or enforced so as to deny or abridge, on account of membership or non-membership in any labor union or labor organization, the right of any person to work as guaranteed by Article 1, Section 6 of the Florida Constitution.

#### **C-42 CONTRACTOR'S REPRESENTATION**

The Contractor represents and warrants that the information provided by the Contractor on Owner's Form DBC-5085 "Experience Questionnaire and Contractor's Financial Statement" (Exhibit 3), which was submitted by the Contractor to qualify for award of this contract, and is hereby made a part of this Agreement by reference, is true, accurate and correct. The Contractor understands and agrees that materially inaccurate information may result in termination of this contract at the Owner's option.

#### **C-43 CONTRACTOR'S WORK FORCE**

The Contractor agrees to perform no less than 15% of the project construction work utilizing his own employees. The percentage shall be calculated on the basis of the cost of materials and labor utilized by the prime Contractor's own forces in relation to the original contract amount.

#### **C-44 CONTRACTOR'S SUPERVISION OF PROJECT**

The Contractor must provide, as a minimum, field (on-site) supervision (through a named superintendent) of each of the general, concrete forming and placement, masonry, mechanical, plumbing, electrical and roofing trades, either through the use of his employees, or in the instance of mechanical, plumbing and electrical trades through the use of employees of the subcontractor as shown in Items 55 and 56 of the Documents entitled "Experience Questionnaire and Contractor's Financial Statement", and

Item (2)(b)II Supervisor, as required in Rule 60D-5.004 displayed in Paragraph B-2 of the Specifications. These Documents by reference form part of this Agreement. The Contractor shall not change or deviate from these principal and supervisory personnel without the written consent of the Owner.

#### **C-45 TERMINATION FOR CAUSE OR MUTUAL AGREEMENT**

This Agreement may be terminated by either party upon seven (7) days' notice by mutual agreement, or should one party fail substantially to perform in accordance with its terms through no fault of the other. Also, this Agreement may be unilaterally terminated by the Owner for refusal by the Contractor to allow public access to all documents, papers, letters, or other material subject to the provisions of Chapter 119, Florida Statutes, and made or received by the Contractor in conjunction with this Agreement. In the event of termination, due to the fault of others than the Contractor, the Contractor shall be paid for services performed to termination date, including reimbursements then due plus terminal expense.

#### **C-46 TERMINATION FOR CONVENIENCE**

The performance of work under this contract may be terminated by the Owner in accordance with this clause in whole, or from time to time in part, whenever the Owner shall determine that such termination is in the best interest of the Owner. Upon termination, the Contractor shall be entitled to payment and profit for work completed to the time of termination only. The percentage of completion shall be determined by the Architect-Engineer, based upon the approved Schedule of Values.

#### **C-47 CONTRACTOR PAYMENT RIGHTS**

If a payment is not available within forty (40) days of receipt of an approved pay request, a separate interest penalty as established pursuant to Section 215.422, Florida Statutes, shall be due and payable, in addition to the invoice amount, to the Vendor. Interest penalties of less than one (1) dollar shall not be enforced unless the Vendor requests payment. Pay Requests which have to be returned to a Contractor because of Contractor preparation errors will result in a delay in the payment. The Pay Request payment requirements do not start until a properly completed Pay Request is provided to the Owner, and has been approved and stamped as received.

#### **C-48 PUBLIC ENTITY CRIME INFORMATION STATEMENT**

A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, for Category Two for a period of 36 months from the date of being placed on the convicted vendor list.

#### **C-49 DISCRIMINATION, DENIAL OR REVOCATION FOR THE RIGHT TO TRANSACT BUSINESS WITH PUBLIC ENTITIES**

An entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity.

#### **C-50 UNAUTHORIZED ALIENS**

The Department shall consider the employment by any contractor of unauthorized aliens a violation of section 274(e) of the Immigration and Nationalization Act. Such violation shall be cause for unilateral cancellation of this contract.

Unauthorized Aliens Checks Through E-Verify System:

*Pursuant to the State of Florida, Office of the Governor, Executive Order Number 11-02 entered on January 4, 2011, Contractor will utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of: (a) all persons employed during the term of the Contract by Contractor to perform employment duties within Florida within 3 business days after the date of hire; and (b) all persons (including subcontractors) assigned by Contractor to perform work*

*pursuant to the Contract with the Department within 90 calendar days after the date the Contract is executed or within 30 days after such persons are assigned to perform work pursuant to the Contract, whichever is later.*

#### **C-51 ELECTRONIC MAIL CAPABILITIES**

The Contractor must have electronic mail capabilities through the World Wide Web. It is the intention of the Department of Military Affairs to use electronic communication for all projects whenever possible. The Contractor shall provide their electronic mail address and the name of a contact person responsible for their electronic communications.

#### **C-52 ASSIGNMENT**

For and in recognition of good and valuable consideration, receipt of which is hereby acknowledged, the Contractor hereby conveys, sells, assigns and transfers to the State of Florida all rights, title and interest in and to all causes to action it may now or hereafter acquire under the antitrust laws of the United States and the State of Florida for price fixing, relating to the particular goods or services purchased or acquired by the State of Florida pursuant to this Agreement.

#### **C-53 BUILDINGS PLANS EXEMPTION POLICY**

Pursuant to Section 119.071(3)(b), Florida Statutes, all building plans, blueprints, schematic drawings, and diagrams, including draft, preliminary, and final formats, which depict the internal layout and structural elements of a building, arena, stadium, water treatment facility, or other structure owned or operated by an agency are exempt from inspection or disclosure under Florida's Sunshine laws. The Architect-Engineer/Contractor agrees to protect and ensure the confidentiality of such documents under its custody or control in conformance with the requirements of Section 119.071(3), Florida Statutes, and all applicable laws. At a minimum, all such documents shall be prominently marked, directly or on an attached cover page, with the following statement: "***All plans contained herein are confidential and exempt from public inspection or disclosure pursuant to Section 119.071(3)(b), Florida Statutes.***" Any violation of this paragraph or Chapter 119, Florida Statutes, may result in immediate termination of the contract by Owner.

#### **C-54 CONTRACTOR ENVIRONMENTAL AWARENESS TRAINING**

Contractor supervisors and all subcontractor supervisors managing projects at FLARNG facilities and properties must show completion of the Contractor Environmental Awareness Training prior to beginning any work. The training is completed by logging into <http://flarngecatts.com> and registering as a contractor or subcontractor using the new user login password: flarnge (all lowercase). Once the training is complete a certificate of completion can be printed as proof of completion. These certificates and the FLARNGs' Environmental Policy must be posted at the work site for all supervisors working onsite. It will be the responsibility of the contractor and subcontractor to insure that all construction personnel working onsite have been made aware of the FLARNGs' Environmental Policy.

SECTION D  
SPECIAL CONDITIONS

**D-1 ARCHITECT-ENGINEER'S FIELD OFFICE**

If required by Project constraints, Contractor shall provide and maintain a watertight office at the project for the exclusive use of the Architect-Engineer and his representatives, not less than 12' x 12' in size, one room with at least one window in each exterior wall and an independent outside entrance door fitted with hardware and lock, artificial light, a bench with one drawer, a blueprint rack, a heater and a window air conditioner. This office and equipment shall become the property of the Contractor upon completion of the contract.

**D-2 VOICE/DATA/FAX**

If required by Project constraints, voice/data/fax capability shall be installed in the Architect-Engineer's field office, at the contractor's expense, and it shall remain until the full completion of the project. Charges for long distance calls shall be paid for by the person making the calls. All other charges in connection with the telephone shall be paid for by the Contractor.

**D-3 WATER**

Water necessary for construction of the building and testing its plumbing and mechanical systems shall be furnished by the Contractor. He shall make all connections, install a meter, take out and pay for all permits necessary, do all piping and clear away all evidence of same after the job is completed; as well as pay for usage of water.

**D-4 ELECTRICITY**

All electricity for light and power necessary for the construction of the building and testing of its electrical and mechanical systems shall be paid for by the Contractor. He shall make all necessary arrangements for this service and perform the work required at contractor expenses; as well as pay for usage of electricity.

**D-5 PROJECT SIGN**

A sign shall be erected at the site by the Contractor and shall consist of 4' X 8' X 3/4" exterior grade plywood mounted on 4" x 4" wood posts (pressure treated.), located in a prominent location approved by the Architect-Engineer and Owner. Sign shall conform to the design as illustrated on enclosed Exhibit 14.

**D-6 PRE-CONSTRUCTION CONFERENCE**

Prior to starting construction, the Owner's Contract Manager will arrange a meeting with the Project Manager, Architect-Engineer, Occupant Representative that will occupy the project, General Contractor, Federal Representatives if involved, Bureau of Apprenticeship and other interested parties. The purpose of this meeting shall be to discuss requirements and responsibilities of the various parties involved with the objective of expeditious handling of the construction contract. The Owner's Contract Manager will chair this meeting.

**D-7 SITE SECURITY**

The Contractor shall pay for and be responsible to secure the site and the project against theft, vandalism, fire, and for public safety at all times (24 hours per day) from Notice to Proceed until Substantial Completion.

**D-8 FLORIDA STATUTE 119.0701, FREEDOM OF INFORMATION ACT**

**IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT: DEPARTMENT OF MILITARY AFFAIRS, CONSTRUCTION & FACILITY MANAGEMENT OFFICE, CONTRACT MANAGEMENT BRANCH, 2305 STATE ROAD 207, ST. AUGUSTINE, FL 32086, (904) 827-8544 OR (904) 823-0256, OR E-MAIL: [NG.FL.FLARNG.LIST.CFMO-CONTRACTING@MAIL.MIL](mailto:NG.FL.FLARNG.LIST.CFMO-CONTRACTING@MAIL.MIL)**

**D-9 TEMPORARY FACILITIES** (This needs to be added when it is a FARP project 10/3/14; revised January 2016)

The Florida Armory Revitalization Program (FARP) normally requires dislocation of the **Armory Full Time Staff (FTS)** in one of two ways: The FTS dislocates to a **Temporary Trailer or Building** located on the Armory property or they are dislocated to a **rental facility** away from the Armory.

**The following will address the procedures to be followed when the FTS will be dislocated into a Temporary Trailer or Building on the Armory property.**

1. All voice and data circuits and electronic devices will be totally relocated from the Armory into the Temporary facility normally located within 300 feet of the Armory.
2. Based on the following procedures, the General Contractor (GC) must prepare FARP bid documents to cover all expenses required to set up the Temporary facility to fully accommodate the reception of FLARNG Voice and Data services equal in quality as currently existing in the Armory. This will include all expenses to **initially establish** voice and data service into the Temporary facility and to **relocate** the same back into the Armory at the completion of the project.
3. Both moves will require close co-ordination between the **GC, G6, CFMO, and the Telephone Company.**
4. In preparation, the GC will contract a qualified IT vendor with **Registered Communication Distribution Designer (RCDD) certification** to assure that the following is completed **IAW G6 Standards, BICSI and NEC guidelines:**
5. Unless a conduit is already in place, **the GC will install a 2" PVC conduit, with pull string,** between the Telephone Company Cable Connection Point and the Temporary facility. There are two (2) issues to consider when installing the 2" conduit:
  1. If the existing Telephone Company (often referred to as the LEC, Local Exchange Carrier) Demarcation in the Armory is to be demolished and relocated in another part of the building, the GC will need to install the conduit between the Temporary Facility and the Telephone Company Service Cable Pedestal. This Pedestal is usually located somewhere around the Armory proper line. The Telephone Company usually prefers to install their own cable when they arrive on the site to activate the Service Order.
  2. If the TC Demarc in the Armory will not be disturbed during the renovation, the G6 Technician Team can handle the transfer of service to the Temporary Facility, providing the GC has properly completed all of the preparation requirements listed below:
    - A. In preparation, the GC will install the 2" Conduit between the TC Demarc in the Armory.
    - B. Install the temporary service cables (copper and/or fiber) in the conduit. **Copper cables will be terminated in Building Entrance Protectors (BEP) fully populated with protector modules** and fiber cables in **12 port Fiber Distribution Panels (FDP) with LC connectors.** Minimum size of cables will be **6X24 DB Copper Telephone and 6 fiber Tight Buffered, 50/125 Multi-Mode FOC.**
    - C. In the Temporary facility, install a 4' x 4' x 3/4" fire rated plywood Backboard (BB) in close proximity to a

- 120 volt, 20 AMP, AC duplex outlet (see drawing).
- D. Prepare the BB with cable termination hardware, **BEP, FDP, CAT6 Patch Panels, Connecting Blocks, Grounding Bus Bar** etc. These components may be rack or wall mounted as required by quantity. If wall mounting is used, a shelf must be included to support the Electronics. **Ground all components.**
  - E. At least two (2) CAT6 cables must be installed between the CAT6 rated Patch Panel (PP) at the Backboard or Equipment Rack and each Wall Outlet.
  - F. RJ45 female jacks will be connected to both ends of the (2) CAT6 cables. One end will connect to the PP and the other at the Wall Outlet Faceplates.

**6.** When the Telephone Company must be hired to handle the transfer, G6 will initiate the Communications Service Authorization (CSA) to have them relocate their point of demarcation from the Armory to the Temporary facility. **G6 will need 45 days lead time to set up the transfer with Telephone Co.**

**7.** On the day of relocation, the following must be scheduled to take place at the same time:

A. The Telephone Company will disconnect service from the Armory and relocate the service by way of the temporary cables (copper and/or fiber) to the termination points on the BB. This will become their temporary point of demarcation. Upon completion, the T1 for Data/VOIP service and the Land Lines for Analog service will appear in the Temporary facility on the BEP and/or FDP.

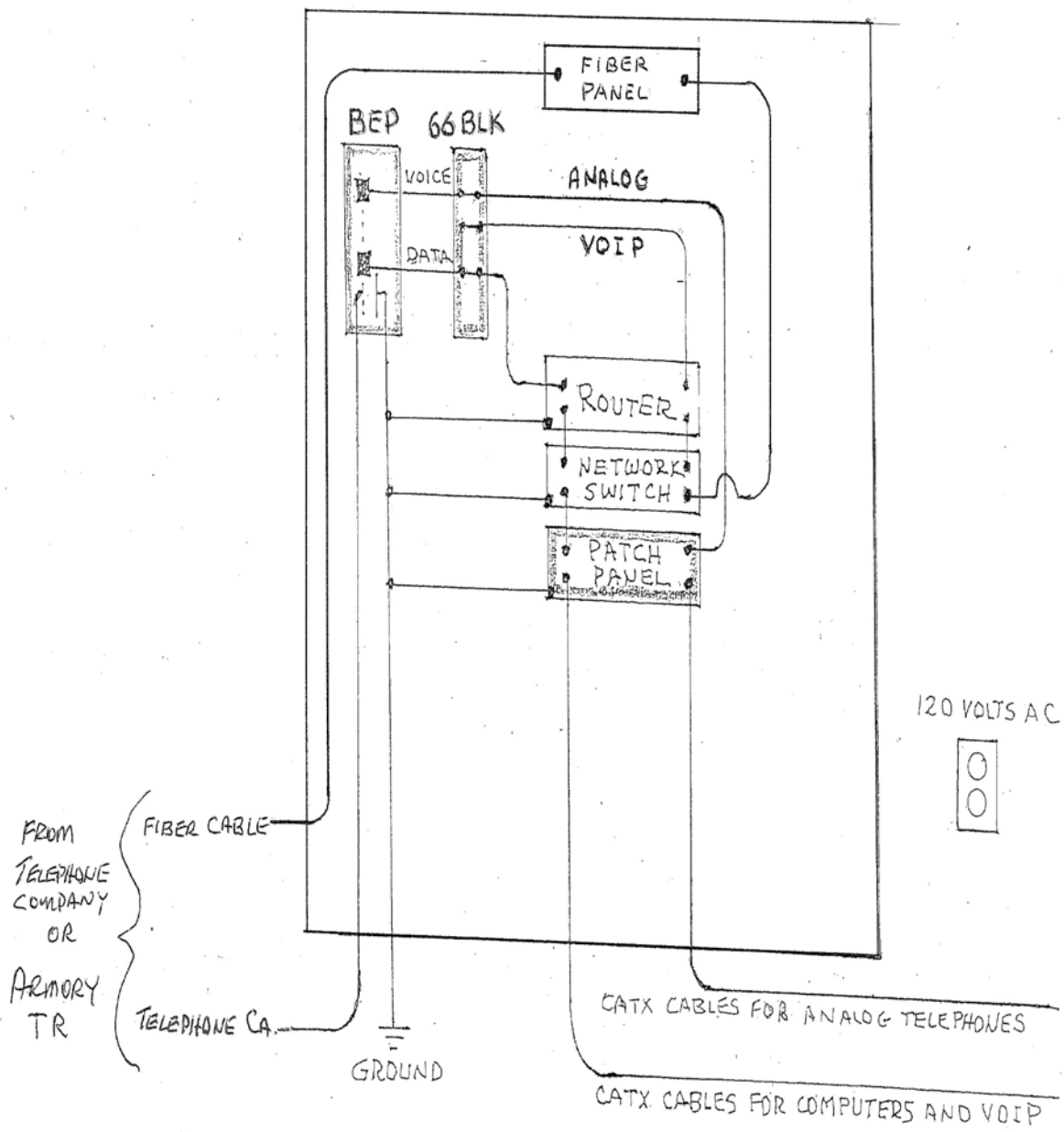
B. G6 will schedule a Network and TeleCom Technician to be on site to relocate the Router and Network Switch from the Armory to the BB and re-establish network and voice connectivity.

C. A complete test will be performed by all responsible parties to verify that the Temporary voice and data service is fully established.

**8.** The same procedures will be followed at the completion of the project to relocate voice and data service back into the Armory.

**9. When the Telephone Company is involved, there will be two (2) service transfers as much as 9 to 12 months apart. The Telephone Company will bill G6 for each service transfer. G6 will pay the bill and send CFMO documentation for total reimbursement of each transfer separately.**

TYPICAL TEMPORARY COMMUNICATIONS BACKBOARD  
 DURING FARP ACTIVITY  
 REVISED FOR JANUARY 2014



**EXHIBIT 1**  
**INVITATION TO BID**

DATE: \_\_\_\_\_

COMPANY NAME: \_\_\_\_\_

EMAIL ADDRESS: \_\_\_\_\_

E-MAIL CONTACT: \_\_\_\_\_

POC TELEPHONE NO.: \_\_\_\_\_

PROPOSALS ARE REQUESTED FROM QUALIFIED LICENSED GENERAL/BUILDING CONTRACTORS BY THE State of Florida, Department of Military Affairs HEREINAFTER REFERRED TO AS OWNER, FOR CONSTRUCTION OF:

PROJECT NUMBER: \_\_\_\_\_

PROJECT NAME & LOCATION: \_\_\_\_\_

POTENTIAL RESPONDENTS TO THE SOLICITATION ARE ENCOURAGED TO CAREFULLY REVIEW ALL THE MATERIALS CONTAINED HEREIN AND PREPARE RESPONSES ACCORDINGLY.

FOR: (Project Description) \_\_\_\_\_

Building must meet Florida Building Code, State Fire Marshall, local Authorities Having Jurisdiction and Area Water Management requirements, and any other permits and fees required by other county, local or state authorities.

Regulatory permitting to include the preparation, submittal, payment and review coordination of the Water Management District, Environmental Resource Permit (including permit fees), Florida Department of Environmental Protection (FDEP) Notice of Intent (including filing fees), Clay County Review Permit Fee.

Prior to contract award, the Department reserves the right to perform or have performed, an on-site review of the proposer's facilities and qualifications. This review will serve to verify data and representations submitted by the proposer and may be used to determine whether the proposer has an adequate, qualified, and experienced staff, and can provide overall management facilities. The review may also serve to verify whether the proposer has financial capability adequate to meet the contract requirements. Should the Department determine that the bid/proposal has material misrepresentations or that the size or nature of the proposer's facilities or the number of experienced personnel (including technical staff) are not adequate to ensure satisfactory contract performance, the Department has the right to reject the bid/proposal).

The respondent shall warrant that it has not employed or retained any company or person, other than a bona fide employee working solely for the respondent to solicit or secure the award for this project and that it has not paid or agreed to pay any person, company corporation, individual or firm other than a bona fide employee working solely for the respondent any fee, commission, percentage, gift or other consideration contingent upon or resulting from the award.

The respondent shall warrant that it presently has no interest and shall not acquire any interest which would conflict in any manner or degree with the performance of services required.

The respondent will comply with all applicable federal, state and local rules and regulations in providing services to the Department under this solicitation if awarded.

**PUBLIC ENTITY CRIME INFORMATION STATEMENT:** A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity



in excess of the threshold amount provided in Section 287.017, for Category Two for a period of 36 months from the date of being placed on the convicted vendor list.

The STATE OF FLORIDA requires all Contractors to implement a drug free workplace program as defined in 287.087, Florida Statutes.

**DISCRIMINATION; DENIAL OR REVOCATION FOR THE RIGHT TO TRANSACT BUSINESS WITH PUBLIC ENTITIES:** An entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity.

**BID SECURITY:** Bids/Proposals in total excess of \$100,000.00, the bidder must provide with bid, a good faith deposit in the amount of 5% of the bid by way of a bid bond from a surety insurer authorized to do business in the STATE OF FLORIDA as surety or a certified check or cashier's check accompanying the bid.

**PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND'S** are required from any persons or parties entering into a formal contract with the STATE OF FLORIDA for contracts in total excess of \$100,000.00 for construction, additions, renovations, repairs, or demolition of any public building pursuant to Florida Statute 255.05(1)(a).

**CONTRACTOR INSURANCE:** The contractor must provide the owner with proof of insurance within 10 days of contract award. NO work may commence in connection with the contract until he has obtained all insurance as specified in the Non-Technical Specifications Level III, Section C-4 or the Non-Technical Specifications Level IV & V, Section C-3 and such insurance has been approved by the Owner, nor shall the contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved by owner. All insurance policies shall be with insurers qualified and doing business in Florida through an authorized licensed Florida Resident Agent. The insurance requirements shall be completed in a timely manner in order not to delay the construction schedule.

**All questions regarding this procurement will be accepted in writing via facsimile or email to** Department of Military Affairs - CFMO, Attention: Contracting Branch: Facsimile: (904) 823-0189 or Email Address: [cfmocontracting@ng.army.mil](mailto:cfmocontracting@ng.army.mil).

Any questions from proposers concerning this solicitation shall be submitted in writing, identifying the submitter, to the Contracting Branch listed above at the address specified above by email or by facsimile no later than the date specified below. E-mail inquiries are preferred; however a hard copy or facsimile is acceptable.

**INFORMATION WILL NOT BE AVAILABLE BY TELEPHONE.** All information received through any oral communication shall not be binding on the Department of Military Affairs and shall not be relied upon by a Bidder.

Pursuant to Section 287.057(26), Florida Statutes, Respondents to this solicitation of persons acting on their behalf may not contact, between the release of the solicitation and the end of the 72-hour period following the agency posting the notice of intended award, excluding Saturdays, Sundays, and state holidays, any employee or officer of the executive or legislative branch concerning any aspect of this solicitation, except in writing to the procurement officer or as provided in the solicitation documents. Violation of this provision may be grounds for rejecting a response.

All questions and answers/changes to the solicitation will be provided in Addenda Form and posted on the DMS Vendor Bid System (VBS). It is the prospective contractor's responsibility to check periodically for any information updates, to the solicitation, which is posted to the VBS. The Department of Military Affairs bears no responsibility for any delays, or resulting impacts, associated with a prospective contractor's failure to obtain information made available through the DMS Vendor Bid System.

**CONFLICT OF INTEREST:** This solicitation is subject to chapter 112 of the Florida Statutes. Respondents shall disclose with their response the name of any officer, director, employee or other agent who is also an employee of the State. Respondents shall also disclose the name of any State employee who owns, directly or indirectly an interest of five percent (5%) or more in the respondent or its affiliates.

**MANDATORY SITE VISIT AND PRE-BID MEETING:**

**DATE AND TIME:** Local Time

**PLACE:** (Facility address/location)

All General Contractors interested in bidding on this project are required to attend this pre-bid meeting. Subcontractor participation is highly encouraged. No later dates for site visits will be scheduled.

**SEALED BIDS WILL BE RECEIVED, PUBLICLY OPENED AND READ ALOUD ON:**

**DATE AND TIME:** local time

**PLACE:** Robert F. Ensslin, Jr, National Guard Armory, 2305 State Road 207, St. Augustine, Florida 32086. (Drill Hall Floor)

**MARK ENVELOPES:** SEALED BID-DO NOT OPEN for Project Number/Name\_\_\_\_\_, \_\_\_\_\_, Department of Military Affairs, Robert F. Ensslin National Guard Armory, 2305 State Road 207, Room 421, St. Augustine, Florida 32086, Attn: Contracting Department.

**BIDS/RESPONSES TRANSMITTED ELECTRONICALLY WILL NOT BE CONSIDERED. BIDS/RESPONSES RECEIVED AT THE LOCATION DESIGNATED AFTER THE EXACT TIME SPECIFIED FOR RECEIPT WILL NOT BE CONSIDERED.**

**Bids submitted via courier or mail must be delivered to the above address, please do not send Sealed Bids to the project location or any other Department of Military Affairs location. The Department of Military Affairs will not assume receipt of any sealed bid unless delivered to the address and room listed in this solicitation.**

**BID/PROPOSAL:** All responses must be submitted in a sealed package and shall be clearly marked on the outside of package with the above information. Department of Military Affairs is not responsible for the opening of any solicitation package which is not properly marked. Bids will be time stamped on the official time clock upon delivery. It is the respondent's responsibility to assure its response is submitted in the place and time indicated in this solicitation. Also, all responses must be in full accordance with the requirements of the Drawings, Specifications, Bidding Conditions and Contractual Conditions, and Non-Technical Specifications, which have been prepared by the Engineer as listed, and may be obtained as follows:

ARCHITECT-ENGINEER: POC Name

TELEPHONE: \_\_\_\_\_ Fax \_\_\_\_\_

EMAIL ADDRESS: (POC email address)

Make all checks or money orders payable to: \_\_\_\_\_. No credit cards are accepted.

FULL SETS of drawings and specifications may be purchased by payment of the printing and handling cost at the rate of \$\_\_\_\_\_.00 per set, or \$\_\_\_\_\_ for CD, NON-REFUNDABLE, or may be available for purchase upon request at the Pre-Bid Meeting.

Note:

1. General Contractors are limited to 2 sets only.
2. Only Full Sets of documents will be issued.
3. Shipping Costs for Documents is not included in the above deposit price.
4. Documents will not be available in electronic format.

**FINAL QUESTIONS FROM BIDDERS:** Local Time

Any questions from proposers concerning this solicitation shall be submitted in writing, identifying the submitter, to the contacts listed by email or fax only.

**Questions submitted after this date will not be answered. All technical questions regarding this procurement will be accepted via email ONLY to \_\_\_\_\_. All questions will be answered in addendum form. Addenda will be sent to all parties on A/E plan holders list and Pre-Bid Meeting Sign-In sheet as well as published in the Vendor Bid System.**

**CONTRACT AWARD:** Contract award will be given to the lowest responsive and responsible bidder. The lowest bid will be the bid from the responsive bidder that has submitted the lowest price for the base bid or the base bid plus the additive alternates or less the deductive alternates chosen by the Agency to be included in or excluded from the proposed contract, taken in numerical order listed in the bid documents. The order of the alternates may be selected by the Agency in any sequence so long as such acceptance out of order does not alter the designation of the low bidder. Failure to file a protest within the time prescribed in Section 120.57(3), Florida Statutes, shall constitute a waiver of proceedings under Chapter 120, Florida Statutes. If no protest is filed, the contract will be awarded to the qualified, responsible and responsive low bidder in accordance with Chapter 60D-5 by the Owner.

**INABILITY TO POST ELECTRONICALLY:** If the Department is unable to post (due to technical difficulties) as defined above, the Department will notify all proposers via the Point of Contact and electronic address provided to the Department by the proposer at the Mandatory Pre-Bid meeting. Notice will be posted as defined above once the technical difficulties have been rectified; however, the official posting time will be that time at which the last proposer was electronically notified.

**MINORITY PROGRAM:** Minority Business Enterprises (MBE) are encouraged to participate in this Invitation to Bid. Utilization of MBE participation is highly encouraged from all Bidders. MBE's must be certified by the Office of Supplier Diversity.

**CLARIFICATIONS/REVISIONS:** Before award, the Owner reserves the right to seek clarifications or request any information deemed necessary for proper evaluation of submissions from all respondents deemed eligible before Contract award. Failure to provide requested information may result in rejection of the response.

The Department reserves the right to accept or reject any or all proposals received and reserves the right to make an award with or without further discussion of the proposals submitted or accept minor informalities or irregularities in the best interest of the State of Florida, which are considered a matter of form and not substance, and the correction or waiver of which is not prejudicial to other proposers. Minor irregularities are defined as those that will not have an adverse effect on the Department's interest and will not affect the price of the proposal by giving a proposer an advantage or benefit not enjoyed by all other proposers. It is understood the proposal will become a part of the Department's official file, without obligation to the Department. Proposals may be rejected if found to be irregular or not in conformance with the requirements and instructions contained herein. A proposal may be found to be irregular or non-responsive by reasons that include, but are not limited to failure to utilize or complete in their entirety prescribed forms, conditional proposals, incomplete proposals, ambiguous proposals, and improper, missing and/or undated signatures.

The State of Florida, Department of Military Affairs, objects to and shall not consider any additional terms or conditions submitted by a respondent, including any appearing in documents attached as part of a respondent's response. In submitting its response, a respondent agrees that any additional terms or conditions; whether submitted intentionally or inadvertently, shall have no force or effect. Failure to comply with terms and conditions, including those specifying information that must be submitted with a response, shall be grounds for rejecting a response.

The State of Florida, through the Department of Management Services, has instituted MyFloridaMarketPlace, a statewide e-procurement system. Pursuant to rule 60A-1.032(1), Florida Administrative Code, this contract shall be exempt from the one percent (1%) transaction fee. Prior to entering into a contract with the State of Florida, Department of Military Affairs, the selected contractor must be registered with the Florida Department of Management Services (DMS) MyFloridaMarketPlace Vendor Registration System. Information about the registration process is available, and registration must be completed at the MyFloridaMarketPlace website (link available under BUSINESS at ([www.myflorida.com](http://www.myflorida.com))). Prospective contractors who do not have Internet access may request assistance from the MyFloridaMarketPlace Customer Service at (866) 352-3776.

The Level 3 Non-Technical Specifications are considered to be applicable to this solicitation and award of contract when made and are made a part hereof.

The State of Florida's performance and obligation to pay under this contract is contingent upon availability of funding and an annual appropriation by the Legislature.

For the purposes of this solicitation, the terms proposer, respondent, offerer and contractor/vendor are used interchangeably and mean a person(s) or firm(s) submitting a response to this solicitation, including joint ventures.

The employment of unauthorized aliens by any contractor/vendor is considered a violation of Section 274A(e) of the Immigration and Nationality Act. If a contractor/vendor employs unauthorized aliens, such violation shall be cause for rejection of bid/unilateral cancellation of a contract if awarded.

Order Number 11-02: E-verify System: Department of Homeland Security:

*Pursuant to the State of Florida, Office of the Governor, Executive Order Number 11-02 entered on January 4, 2011, Contractors will utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of: (a) all persons employed during the term of the Contract by Contractor to perform employment duties within Florida within 3 business days after the date of hire; and (b) all persons (including subcontractors) assigned by Contractor to perform work pursuant to the Contract with the Department within 90 calendar days after the date the Contract is executed or within 30 days after such persons are assigned to perform work pursuant to the Contract, whichever is later.*

Department of Financial Services has (DFS) scheduled several webinars for vendors to educate them on the time-sensitive actions they need to take before October 2011 in order to receive further payments from the state. Take advantage of an upcoming DF S Electronic W-9 webinar. State of Florida vendors must register and complete an electronic Substitute Form W-9 in preparation for the 3 percent Federal withholding law that takes effect January 1, 2012. The Internal Revenue Service (IRS) receives and validates the information vendors provide on the Form W-9. Vendors must submit valid information to DFS prior to October 2011 or vendors will not receive further payments from the state. Learn more and register for a webinar at <http://www.myfloridacfo.com/aadir/SubstituteFormW9.htm>

NO VERBAL STATEMENTS MADE BY ANY STATE OF FLORIDA EMPLOYEE OR AGENCY REPRESENTATIVE WILL OPERATE TO SUPERSEDE INFORMATION PUBLISHED IN THIS SOLICITATION. ONLY WRITTEN ADDENDUMS ISSUED BY THE DEPARTMENT OF MILITARY AFFAIRS CONSTRUCTION AND FACILITY MANAGEMENT OFFICE OR ITS REPRESENTATIVES WILL OPERATE TO ALTER OR OTHERWISE AMEND THIS SOLICITATION.

EXHIBIT 2

<b><u>ACORD</u> CERTIFICATE OF LIABILITY INSURANCE</b>					DATE (MM/DD/YY) <b>Current Date</b>	
PRODUCER <b>Abc Insurance</b> <b>6789 Surety Street</b> <b>City, State Zip</b>			THIS CERTIFICATE ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.			
INSURED <b>Def Contractors</b> <b>12345 Building Way</b> <b>Anytown, FL 30000</b>			<b>INSURERS AFFORDING COVERAGE</b>			
			INSURER A: <b>Worldwide Insurance Co.</b>			
			INSURER B:			
			INSURER C:			
			INSURER D:			
			INSURER E:			
<b>COVERAGES SAMPLE COPY / SAMPLE COPY / SAMPLE COPY</b>						
THE POLICES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.						
INS LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXP DATE (MM/DD/YY)	LIMITS	
	<b>GENERAL LIABILITY</b> <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> Blanket Additional Insured <input checked="" type="checkbox"/> Contractual Liability GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC				EACH OCCURRENCE	<b>\$ 1,000,000</b>
					FIRE DAMAGE (any 1 fire)	<b>\$ 300,000</b>
					MED EXP (any 1 person)	<b>\$ 10,000</b>
					PERSONAL & ADV INJURY	<b>\$ 1,000,000</b>
					GENERAL AGGREGATE	<b>\$ 2,000,000</b>
					PRODUCTS - COMP/OP AGG	<b>\$ 2,000,000</b>
					DAMAGE TO PREMISES (ea occur)	
	<b>AUTOMOBILE LIABILITY</b> <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input checked="" type="checkbox"/> NON OWNED AUTOS <input type="checkbox"/> _____ <input type="checkbox"/> _____				COMBINED SINGLE LIMIT (Ea Accident)	<b>\$ 100,000</b>
					BODILY INJURY (per person)	<b>\$</b>
					BODILY INJURY (per accident)	<b>\$</b>
					PROPERTY DAMAGE (Per accident)	<b>\$</b>
	<b>GARAGE LIABILITY</b> <input type="checkbox"/> ANY AUTO <input type="checkbox"/> _____				AUTO ONLY - EA ACCIDENT	<b>\$</b>
					OTHER THAN AUTO ONLY	EA ACC \$ AGG \$
	<b>EXCESS/UMBRELLA LIABILITY</b> <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE  <input type="checkbox"/> DEDUCTIBLE <input type="checkbox"/> RETENTION \$ _____				EACH OCCURRENCE	<b>\$1,000,000</b>
					AGGREGATE	<b>\$1,000,000</b>
						<b>\$</b>
						<b>\$</b>
						<b>\$</b>
	<b>WORKER'S COMPENSATION AND EMPLOYER'S LIABILITY</b> ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED?  If yes, describe under SPECIAL CONDITIONS below OTHER <b>Owners and Contractors Protective Liability</b>				<input checked="" type="checkbox"/> WC Statutory Limits <input type="checkbox"/> Other	
					E.L. EACH ACCIDENT	<b>\$ As Law Req's</b>
					E.L. DISEASE -EA EMPLOYEE	<b>\$ As Law Req's</b>
					E.L. DISEASE -POLICY LIMIT	<b>\$ As Law Req's</b>
						<b>\$1,000,000 each occurrence</b> <b>\$2,000,000 per aggregate</b>
DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS: <b>CFMO Project # _____ for _____ (Project Name)</b> <b>State of Florida, Department of Military Affairs is named as additional insured. All policies include a waiver of Subrogation in favor of the additional insured.</b>						
CERTIFICATE HOLDER <b>State of Florida</b> <b>Department of Military Affairs</b> <b>Construction &amp; Facility Management Office</b> <b>2305 State Road 207</b> <b>St. Augustine, Florida 32086</b>			CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE <b>ALFRED JONES</b>			

**EXHIBIT 3**

**OWNER'S INSTRUCTIONS FOR  
EXPERIENCE QUESTIONNAIRE AND CONTRACTOR'S FINANCIAL STATEMENT**

The information listed in the Experience Questionnaire and Contractor's Financial Statement Forms is required to be filed with soliciting agencies prior to award of any contract. In order to expedite the processing of contracts, please complete the enclosed forms in accordance with these instructions.

The bidder is required to complete all the attached forms. If the bidder is a Joint Venture, then each Corporation, Partnership or Individual that is a party to the Joint Venture must complete, individually, each form.

All references to "fiscal year" in this questionnaire will mean the fiscal year of the bidder filing this form.

**Heading**

Project Title - Indicate title of project as shown in the specifications.

Location - Project location as shown in the specifications.

**Sections 1 & 2**

Trades or Trades Being Bid

Insert in box(es) on Page 1 the code number(s) listed below which represent the trade(s) for which you are qualified to bid:

<u>Trade</u>	<u>Code Number</u>
Building Construction	1
Electrical	2
Elevator	3
Food Service	4
Heating, Ventilating & Air Conditioning	5
Laboratory Equipment	6
Landscaping	7
Plumbing	8
Power Plants (Boilers, Equipment & Piping)	9
Refrigeration	10
Roofing	11
Sanitary (Sewage Treatment Plants, Pumping Stations, etc.)	12
Other _____	13

**Sections 3-53**

Complete in accordance with form. NOTE: SECTION "A" Financial Statement - Do not attach current company financial statement if dated over 90 days from date of this submittal. See letter "Attesting to liquid assets" Section number 64 (complete only if needed). \*In accordance with Florida Administrative Code (FAC) 60D-5.004 Bidder's Qualification Requirements and Procedures, Paragraph (2)(a)4(b)1e, "The value of liquid assets must be no less than one-twentieth of the amount of the base bid".

Liquid assets shall include cash, stocks, bonds, pre-paid expenses and receivables, but shall not include the value of the equipment."

**Section 54**

Under "c", list previous business name or names and the number of years you have done business under these names within the past 10 years.

**Section 55**

From your present payroll indicate the number of individuals in each category in the "Current" column. Estimate the maximum and minimum number of employees over the previous 3 fiscal years in each category.

**Sections 56-64**

Complete in accordance with form.

Section 63

- 1) In Section 62, Column C insert "S" if a subcontractor or "P" if a prime contractor. The balance of section to be completed in accordance with form.
- 2) Billings for 3 fiscal years - insert year and amount.
- 3) Work in progress at the end of the past 3 fiscal years - same as above.

Section 64. Complete in accordance with form.

If additional space is required, please attach supplementary pages.

DBC-5085 CFMO Revised April 2010

ADDITIONAL QUALIFICATION REQUIREMENTS

The following must be included with packet

1. Copy of Florida State Contractor License.
2. Corporate Charter Number. See Item #7
3. Proof of Contractor's active office within 300 road miles of project. (Map Quest or like)
4. Contractor agreement to perform no less than 15% of project work itself, on company letterhead.
5. Resumes of experience for Project Manager and Project Superintendent.
6. At least three references with current contact name/numbers of projects completed within last 5 years.

**EXHIBIT 3 CONTINUED**

**OWNER'S  
EXPERIENCE QUESTIONNAIRE  
AND  
CONTRACTOR'S FINANCIAL STATEMENT**

Project Title \_\_\_\_\_  
\_\_\_\_\_

Location \_\_\_\_\_  
\_\_\_\_\_

Insert code number of trade or trades for which you are qualified to bid on the basis of previous experience in accordance with attached detailed instructions, each in its respective box below:

1.

2.

3. Is your organization currently pre-qualified with any governmental agency? \_\_\_\_\_ If so, please list.

4. Have you, in the previous five years, been denied a contract award on which you submitted the low bid in competitive bidding, or been refused prequalification?

If so, please list and describe \_\_\_\_\_  
\_\_\_\_\_

5. Have you, in the previous five years, ever not been able to achieve substantial or final completion within the number of contract specified calendar days?

If so, please list, provide Owner's POC with phone number, and describe project and problems encountered \_\_\_\_\_  
\_\_\_\_\_

6. Submitted by \_\_\_\_\_

Address \_\_\_\_\_

Date \_\_\_\_\_

7. (Check below)

A Corporation ( ) Corporate Charter Number

A Co-partnership ( )

An Individual ( )

A Joint Venture ( )

The contractor acknowledges that this Experience Questionnaire and Financial Statement is made for the express purpose of introducing the Owner to whom it is submitted to award a contract to the contractor. Further, the contractor acknowledges that the agency may at its discretion, by which means the Owner may choose, determine the truth and accuracy of all statements made by the contractor herein.



**EXHIBIT 3 CONTINUED**

SECTION "A". FINANCIAL STATEMENT  
 Reflecting financial position as of close of most recent operating year

As of \_\_\_\_\_  
 (Date)

ASSETS

8. CASH\* \$ \_\_\_\_\_

ACCOUNTS RECEIVABLE

9. From Government Contracts Completed \_\_\_\_\_

10. From Non-Government Contracts Completed \_\_\_\_\_

11. Claims included in 8 and 9 not yet approved or in litigation \$ \_\_\_\_\_

12. From Government Contracts in Process \_\_\_\_\_

13. From Non-Government Contracts in Process \_\_\_\_\_

14. Claims included in 11 and 12 not yet approved or in litigation \_\_\_\_\_

15. Retainage included in 11 and 12 \_\_\_\_\_

16. Other\*\* (list) \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

NOTES RECEIVABLE

17. Due within 90 days\*\* \_\_\_\_\_

18. Due after 90 days\*\* \_\_\_\_\_

INVESTMENTS

19. Listed securities - present market value \_\_\_\_\_

20. Unlisted securities - present value \_\_\_\_\_

BID DEPOSITS

21. Recoverable within 90 days \_\_\_\_\_

22. Recoverable after 90 days \_\_\_\_\_

ACCRUED INTEREST

23. Receivable on notes \_\_\_\_\_

24. Receivable on Investments \_\_\_\_\_

25. Other (list) \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

26. REAL ESTATE (BOOK VALUE OR MARKET, WHICHEVER IS LESS) \_\_\_\_\_

27. INVENTORIES (NOT INCLUDED IN RECEIVABLE BILLING AND AT PRESENT VALUE) \_\_\_\_\_

28. EQUIPMENT-NET BOOK VALUE (SUPPLY LIST BY COST, DEPRECIATION, NET BOOK VALUE) \_\_\_\_\_

OTHER ASSETS

29. Contract Costs in excess of Billings \$ \_\_\_\_\_

30. Cash Surrender Value of Life Insurance \_\_\_\_\_

31. Receivables from Officers and Employees \_\_\_\_\_

32. Other (list) \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**EXHIBIT 3 CONTINUED**

33. TOTAL ASSETS \$ \_\_\_\_\_  
 \*Do not include deposits for bids or other Guarantees  
 \*\*Do not include receivables from officers and employees

ACCOUNTS PAYABLE

34. Due within 1 year \_\_\_\_\_  
 35. Due after 1 year \_\_\_\_\_

NOTES PAYABLE

36. Due within 1 year \_\_\_\_\_  
 37. Due after 1 year \_\_\_\_\_  
 38. Officers and Employees \_\_\_\_\_

39. TAXES PAYABLE \_\_\_\_\_

40. ACCRUED AND ACTUAL PAYROLL PAYABLE \_\_\_\_\_

41. MORTGAGES PAYABLE \_\_\_\_\_

OTHER LIABILITIES

42. Federal Income Tax Provision \_\_\_\_\_  
 43. Deferred Income \_\_\_\_\_  
 44. Other (list) \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

NET WORTH

45. (If individual proprietorship or partnership) \_\_\_\_\_

CAPITAL STOCK

46. Common Issued and Outstanding \_\_\_\_\_  
 47. Preferred Issued and Outstanding \_\_\_\_\_  
 48. Treasury Stock \$ \_\_\_\_\_

CAPITAL SURPLUS

49. Earned Surplus Prior Years \_\_\_\_\_  
 50. Earned Surplus Current Year \_\_\_\_\_

51. TOTAL LIABILITIES AND NET WORTH \$ \_\_\_\_\_

NOTE: IF ADDITIONAL SPACE IS REQUIRED, PLEASE NOTE AND ATTACH SCHEDULE TO STATEMENT

52. Dated this \_\_\_\_\_ of \_\_\_\_\_, \_\_\_\_\_  
                   day                                  month                                  year

\_\_\_\_\_  
 Name of Organization

By: \_\_\_\_\_  
                   Title

FEIN: \_\_\_\_\_

**EXHIBIT 3 CONTINUED**

**SECTION 'B'. EXPERIENCE QUESTIONNAIRE**

53. If a Corporation, answer this:

Date of incorporation \_\_\_\_\_

In what State \_\_\_\_\_

Name of Officers:

President \_\_\_\_\_

Vice President \_\_\_\_\_

Vice President \_\_\_\_\_

Secretary \_\_\_\_\_

Treasure \_\_\_\_\_

If a Partnership or Individual Proprietorship, answer this:

Date of organization \_\_\_\_\_

If a partnership, state whether partnership is general, limited association \_\_\_\_\_

Name and Address of Partners:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

54. a. How many years has your organization been in the construction business? \_\_\_\_\_

b. How many years under your present business name? \_\_\_\_\_

c. How many years under previous business name? (List other names)

\_\_\_\_\_

\_\_\_\_\_

**SUBSIDIARY OR AFFILIATED COMPANIES  
IN WHICH PRINCIPALS HAVE FINANCIAL INTEREST**

NAME AND ADDRESS OF SUBSIDIARY  
OR AFFILIATED COMPANIES

EXPLAIN IN DETAIL THE  
PRINCIPAL'S INTEREST IN THIS  
COMPANY AND NATURE OF BUSINESS

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**EXHIBIT 3 CONTINUED**

NUMBER OF FULL TIME PERSONNEL WITHIN YOUR ORGANIZATION

	<u>Current</u>	<u>Maximum</u>	<u>Minimum</u>
55. a. Clerical Personnel	_____	_____	_____
b. Engineers & Architects	_____	_____	_____
c. Supervisors, Foremen, or Superintendents	_____	_____	_____
d. Skilled Employees including Technicians	_____	_____	_____
e. Unskilled Employees	_____	_____	_____
f. Estimators	_____	_____	_____
g. Total number of full time personnel	_____	_____	_____

56. WHAT IS THE CONSTRUCTION EXPERIENCE OF THE PRINCIPALS AND SUPERVISORY PERSONNEL OF YOUR ORGANIZATION? (Asterisk any personnel likely to be assigned to project being bid.)

PRINCIPAL'S NAME	TITLE	YEARS OF CONSTRUCTION EXPERIENCE	IN WHAT CAPACITY AND WITH WHOM
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

57. SUPERVISORY PERSONNEL	TITLE	YEARS OF CONSTRUCTION EXPERIENCE	IN WHAT CAPACITY AND WITH WHOM
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

58. Within the previous three fiscal years has your organization or predecessor organizations ever failed to complete a project? If so, state name of organization and reason thereof.

---



---

59. Within the previous three fiscal years has your organization been involved in litigation? \_\_\_\_\_. If so, please list and explain nature and current status.

---

**EXHIBIT 3 Continued**

60. List all contracts completed by your organization in the previous 3 fiscal years. (If more than 10, list the 10 most recently completed.)  
 Projects MUST be listed in spaces below. Additional information may be attached if desired.

Name of Owner	A Name, Location & Description of Project	B Type of Work	Name of Design Architect and/or Design Engineer	C. Original Contract Price	Completion Dates:		
				D. Final Contract Price	E. Original	F. Revised	G. Actual

**EXHIBIT 3 CONTINUED**

With reference to all contracts completed by your organization in the previous fiscal years, as listed on Page 6, answer the following questions:

61. Explain differences in original contract price and in completion dates, if any.

62. Were there any liquidated damages, penalties, liens, defaults or cancellations imposed or filed against your organization?

If so, list the name and location of the project, as shown in Column A, explain.

**EXHIBIT 3 CONTINUED**

STATUS OF UNCOMPLETED CONTRACTS

As of \_\_\_\_\_  
(DATE)

63. Give full information about all of your present contracts. In Column C insert "S" if a subcontractor or "P" if a prime contractor, whether in progress or awarded but not yet begun; and regardless of with whom contracted.

A	B	C	D	E
Project Description Location & Owner	Design Architect And/Or Design Engineer	Total Amount of Your Contract (Or Subcontract)	Amount In Column C Sublet To Others	Uncompleted Amount of Contract
Total				

COMPLETE THE FOLLOWING:

Net Total Billings for Previous 3 Fiscal years:

Average Backlog for Previous 3 Fiscal Years: (Estimated total value of uncompleted work on outstanding contract)

Year	Dollar Amount
_____	\$ _____
_____	\$ _____
_____	\$ _____

Year	Dollar Amount
_____	\$ _____
_____	\$ _____
_____	\$ _____

COMPANY LETTERHEAD

64. Attesting to liquid assets.

DATE

RE: PROJECT TITLE AND NUMBER

"I hereby certify that the liquid assets of this firm have not decreased by more than ten percent in the time that has passed between the closing period of the financial statement attached, and the date on which our submittal was provided"

-S-

CORPORATE OFFICER'S SIGNATURE



EXHIBIT 4

PROPOSAL FORM

SUBMIT ORIGINAL PROPOSAL FORM IN DUPLICATE ON CONTRACTOR'S LETTERHEAD AND INCLUDE BUSINESS NAME, ADDRESS, FEDERAL ID NUMBER, TELEPHONE, FACSIMILE AND SIGNATURE

Note: NO conditional, incomplete, unsigned, undated, ambiguous, or improper bids/proposals will be accepted.

DATE: \_\_\_\_\_

TIME: \_\_\_\_\_

TO: State of Florida, Department of Military Affairs  
Attention: Construction & Facility Management Office (Contract Management Branch)  
2305 State Road 207  
Saint Augustine, Florida 32086

Gentlemen:

The undersigned, hereinafter called "Bidder" having visited the site of the proposed project and familiarized himself with the local conditions, nature, and extent of the work, and having examined carefully any drawings or specifications, the Form of Agreement, and other Contract Documents with the Bond Requirements, therein, proposes to furnish all labor, materials, equipment, and other items, facilities, and services for the proper execution and completion of Project Number \_\_\_\_\_, \_\_\_\_\_, in full accordance with any drawings and specifications prepared by \_\_\_\_\_, in full accordance with the advertisement for bids, Instruction to Bidders, Agreement, and all other documents relating thereto on file in the Construction & Facility Management Office (CFMO) and if awarded the contract, to complete the said work within the time limit specified for the following bid price:

Base Bid: \$ \_\_\_\_\_

With foregoing as a Base Bid, the following costs of alternate proposals are submitted in accordance with the drawings and specifications.

Add/Alt 1 \_\_\_\_\_ Price \_\_\_\_\_  
Add/Alt 2 \_\_\_\_\_ Price \_\_\_\_\_  
Add/Alt 3 \_\_\_\_\_ Price \_\_\_\_\_

Enclosed is certified check, cashier's check, treasurer's check, bank draft, or Bid Bond in the amount of not less than five percent of the Bid, payable to the Owner as a guarantee for the purpose set out in Instructions to Bidders. (If the bid amount is equal to or less than \$100,000 this sentence should be left out).

MARK ENVELOPES: ATTN: SEALED BID for Project Number \_\_\_\_\_ ,

ADDRESSED TO: Department of Military Affairs, ATTN: CFMO-Contract Management Branch,  
2305 State Road 207, St. Augustine, Florida 32086

The Bidder hereby agrees that:

a. The above proposal shall remain in full force and effect for a period of 40 calendar days after the time of the opening of this proposal and that the Bidder will not revoke or cancel this proposal or withdraw from the competition within the said 40 calendar days.

b. In the event the contract is awarded to this Bidder, he will abide by and fulfill all requirements as specified in the Non-Technical Specifications provided with the Invitation to Bid.

c. In the event the contract is awarded to this Bidder, he will enter into a formal written Agreement with the Owner in accordance with the accepted bid within 10 calendar days after said contract is submitted to him and, (if requirement is not deleted per Section C-2 of the Conditions of the Contract), will furnish to the Owner a Contract Performance Bond and a Labor and Material Payment Bond with good and sufficient sureties, satisfactory to the Owner, in the amount of 100% of the accepted bid, the form of which is shown by Exhibits 7 and 8 of the Conditions of the Contract and terms of which shall fully comply with Section 255.05, Florida Statutes. The Bidder further agrees that in the event of the Bidder's default or breach of any of the agreements of this proposal, the said bid deposit shall be forfeited as liquidated damages.

d. In the event the contract is awarded to this Bidder, he will not commence any work in connection with the contract until he has obtained all insurance as specified in the Non-Technical Specifications, and such insurance has been approved by the Owner, nor shall the contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved by Owner. All insurance policies shall be with insurers qualified to do business in Florida through an authorized licensed Florida Resident Agent. The insurance requirements shall be completed in a timely manner in order not to delay the construction schedule.

e. In the event the contract is awarded to this Bidder, he will (if requested by Owner) complete and submit a preliminary and final Bid Breakout Form supplied by the Department of Military Affairs, Construction & Facility Management Office.

Acknowledgement is hereby made that this proposal includes required permit fees as directed in the Non-Technical Specifications.

Acknowledgement is hereby made of receipt of the following addenda issued during the bidding period.

Addendum No. _____	Dated _____
Addendum No. _____	Dated _____
Addendum No. _____	Dated _____

Florida Construction Industries Licensing Board Certification.

\_\_\_\_\_  
(Name of Holder)

\_\_\_\_\_  
(Certificate No.)

In witness whereof, the Bidder has hereunto set his signature and affixed his seal this \_\_\_\_\_ day of \_\_\_\_\_  
(Month) (Year)

(SEAL)

By: \_\_\_\_\_

Address: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_

Company: \_\_\_\_\_

Telephone No.: \_\_\_\_\_

Tax ID No.: \_\_\_\_\_

Facsimile No.: \_\_\_\_\_

E-mail: \_\_\_\_\_

**EXHIBIT 5**  
**LIST OF SUBCONTRACTORS**

(To be submitted in duplicate on the Bidder's letterhead and attached to Contractor's proposal.)

**DATE:** \_\_\_\_\_

**THIS LIST IS ATTACHED TO, AND IS AN INTEGRAL PART OF THE BID SUBMITTED BY:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**FOR THE CONSTRUCTION OF: PROJECT NUMBER:**

**PROJECT NAME & LOCATION:** \_\_\_\_\_.

THE UNDERSIGNED, HEREINAFTER CALLED "BIDDER", LISTS BELOW THE NAME OF EACH SUBCONTRACTOR WHO WILL PERFORM THE PHASES OF THE WORK INDICATED. FAILURE OF THE BIDDER TO SUPPLY SUFFICIENT INFORMATION TO ALLOW VERIFICATION OF THE CORPORATE AND DISCIPLINE LICENSE STATUS OF THE SUBCONTRACTOR MAY DEEM THE BID AS BEING NON-RESPONSIVE.

<u>SUBCONTRACT</u>	<u>NAME OF SUBCONTRACTOR</u>	
1.	_____ (Name)	
	_____ (Telephone No.)	_____ (Federal Identification No.)
2.	_____ (Name)	
	_____ (Telephone No.)	_____ (Federal Identification No.)
3.	_____ (Name)	
	_____ (Telephone No.)	_____ (Federal Identification No.)
4.	_____ (Name)	
	_____ (Telephone No.)	_____ (Federal Identification No.)
5.	_____ (Name)	
	_____ (Telephone No.)	_____ (Federal Identification No.)

By \_\_\_\_\_  
(Signature)

EXHIBIT 6

AGREEMENT BETWEEN OWNER AND CONTRACTOR

This Agreement between Owner and Contractor made this \_\_\_\_\_ day of \_\_\_\_\_ in the year Two Thousand Eleven.

MCCA Number: 0
Project Number 0 Project Location: 0
Project Name: 0
AMSCO: 0 FUNDING: 0

BY AND BETWEEN: The Department of Military Affairs (DMA), 2305 State Road 207, St. Augustine, FL 32086, hereinafter called the OWNER, and

Contractor Name: 0
Address: 0
POC: 0 FEIN: 0
Phone/Fax: 0 Email: 0

hereinafter called the CONTRACTOR. The Owner and Contractor agree as set forth below:

ARTICLE 1. THE CONTRACT DOCUMENTS - The Contract Documents consist of the Agreement, the Contractor's proposal, conditions of the Contract (General, Supplementary and other conditions), Specifications, Drawings, all Addenda issued prior to execution of the Agreement, the Non-Technical Specifications as provided, and all Modifications to the above, issued subsequent thereto. These form the Contract, and all are as fully a part of the Contract as if attached to this Agreement or repeated herein. An emumeration of the specifications, drawings, and addenda is as follows:

Specifications and Drawings prepared By: 0
Address: 0
POC: 0 Phone/Fax 0
Email: 0

Addenda:

In the event of conflict in the provisions of said Contract Documents, the provisions of the basic Agreement which immediately precedes the signatures of the Parties shall control over the Specifications, the General Conditions and Supplementary General Conditions; and the Supplementary General Conditions shall control over the General conditions of said Stardard Form A201 of the American Institute of Architects.

ARTICLE 2. THE WORK - The Contractor shall perform all work required by the Contract Documents for items as specified in the Scope of Work. No alteration of the original scope shall be accepted in the Bidder's proposal unless approved in writing by the DMA.

ARTICLE 3. CONTRACT SUM - The Owner shall pay the Contractor for the performance of the work, subject to additions and deductions by Change Order as provided in the Conditions of the Contract, in current funds, the

Contract Sum: 0
Contract Amount: \$0.00
Days in Contract: 0

ARTICLE 4. FUNDING - The State of Florida's performance and obligation to pay under this contract is contingent upon availability of funding and an annual appropriation by the State Legislature.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first written above.

CONTRACTOR APPROVED:
By
Corporate President's Signature Date Signed
ATTEST:
By
Corporate Secretary's Signature Date Signed
AS WITNESSED:
By
Witness' Signature Date Signed
CORPORATE SEAL:
OWNER APPROVED:
By
Owner's Signature Date Signed
AS WITNESSED:
By
Witness' Signature Date Signed
APPROVED AS TO FORM AND LEGALITY
By
Office of the General Counsel Date Signed

EXHIBIT 7

PERFORMANCE BOND  
THIS BOND IS ISSUED SIMULTANEOUSLY WITH LABOR AND MATERIAL  
PAYMENT BOND IN FAVOR OF THE OWNER CONDITIONED ON THE FULL AND FAITHFUL  
PERFORMANCE OF THE CONTRACT

KNOW ALL MEN BY THESE PRESENT THAT:

as Principal, hereinafter called Contractor, and,

as Surety, hereinafter called Surety, are held and firmly bound unto the (State Agency's Name) as Obligee, hereinafter called Owner, in the amount of

for the payment whereof Contractor and each individual named Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement, dated \_\_\_\_\_, entered into a contract with the Owner for \_\_\_\_\_, Project Number \_\_\_\_\_ in accordance with Drawings and Specifications prepared by \_\_\_\_\_ which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract and all obligations thereunder, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the surety may promptly remedy the default, in accordance with Section 255.05, Florida Statutes, or shall promptly

- 1) Complete the Contract in accordance with its terms and conditions, or 2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a Contract between such bidder and Owner, and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract price", as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner. The time within which the Owner can institute an action on this bond against the Surety or Contractor or shall be determined by the pertinent Florida Statutes.

SIGNED AND SEALED THIS (Date)

\_\_\_\_\_  
(Signature of Witness)

\_\_\_\_\_  
(Signature of Contractor) (Seal)

\_\_\_\_\_  
(Signature of Witness)

\_\_\_\_\_  
(Signature of Attorney-In-Fact) (Seal)

\_\_\_\_\_  
(Type Name)

\_\_\_\_\_  
(Signature of Witness)

\_\_\_\_\_  
(Signature of Florida Resident Agent) (Seal)

\_\_\_\_\_  
(Type Name & Social Security Number)

Power of Attorney attached hereto.

## EXHIBIT 7 CONTINUED

### NOTES CONCERNING SURETY AND EXECUTION

#### A. SURETY COMPANY REQUIREMENTS

To be acceptable to the Owner, A Surety Company shall comply with all of the requirements of Article B-12 of the Conditions of the Contract.

#### B. EXECUTION OF BOND

1. Enter the Surety Company's name and address on each copy of the Bond in the space provided.
2. Enter the date shown on page 1 of the Agreement in the space provided on each copy of the Bond.
3. Enter the date of execution on each copy of the Bond in the space provided. This date must be the same as the date shown on the Agreement.
4. Have each copy of the Bond signed by the same person that signed the Agreement on behalf of the Contractor. Type in that person's name and title in the place provided on each copy of the Bond, and have one other individual witness that person's signature on each copy of the Bond. Also, have the Contractor's Corporate Seal affixed to each copy of the Bond beside that person's signature (No Facsimiles are acceptable).
5. Have each copy of the Bond signed by the person authorized to sign on behalf of the Surety Company. Type in that person's name in the place provided on each copy of the Bond, and have one other individual witness that person's signature on each copy of the Bond. Also, have the Surety Company's Corporate Seal affixed to each copy of the Bond beside that person's signature (No Facsimiles are acceptable).
6. Have each copy of the Bond signed by a Florida Resident Agent (Reference Chapters 624.425 and 624.426 of the Florida Statutes). Type in that person's name and Social Security number in the place provided on each copy of the Bond and have one other individual witness that person's signature on each copy of the Bond. This may be the same person indicated in B.5 above, if this person is a Florida Resident Agent and is also authorized to sign on behalf of the Surety Company as Attorney-In-Fact.
7. Each copy of the Bond must have a Power of Attorney attached indicating that the person in B.5 above is authorized to sign on behalf of the Surety Company.
8. Each copy of the Power of Attorney must have the Surety Company's Corporate Seal and a Notary Seal either manually affixed or they may utilize facsimile reproductions of the same.
9. If the date of execution of the Power of Attorney is not the same as the date shown on the Agreement, then the Power of Attorney must be certified to still be in effect on the date shown on page 1 of the Agreement.
10. If the Bond is being backed by the Small Business Administration, then a certified true and correct copy of the Surety Bond Guarantee Agreement, SBA Form 990, must be attached to each copy of the Bond.

EXHIBIT 8

LABOR AND MATERIAL PAYMENT BOND
THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE
OWNER CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT

KNOW ALL MEN BY THESE PRESENTS: that

as Principal, hereinafter called Contractor, and,

as Surety, hereinafter called Surety, are held and firmly bound unto the (State Agency's Name) as Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the amount of

for the payment whereof Contractor and each individual named Surety bind themselves, their heirs, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated \_\_\_\_\_, entered into a contract with Owner for \_\_\_\_\_, Project Number \_\_\_\_\_ in accordance with drawings and Specifications prepared by \_\_\_\_\_ which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

THE CONDITIONS OF THIS BOND ARE AS FOLLOWS:

- 1. Contractor shall promptly make all payments owing when due to all persons who are defined in Section 713.01, Florida Statutes, whose claims derive directly or indirectly from the prosecution of the work provided for in the contract, then this bond is void; otherwise, it remains in full force and effect.
2. Each said claimant shall have a right of action against the Contractor and Surety for the amount due him. No such action shall subject the Obligee to any cost, expense, loss or damage, and Contractor shall promptly pay Obligee for the full measure of all cost, expense, loss, damage, and attorneys fees sustained by Obligee as a result of any default by Contractor under the contract.
3. Pursuant to Section 255.05, Florida Statutes, a claimant, except a laborer, who is not in privity with the Contractor and who has not received payment for his labor, materials, equipment or supplies shall, within forty five (45) days after beginning to furnish labor, materials, equipment or supplies for the prosecution of the work furnish the Contractor with a notice that he intends to look to the bond for protection. A claimant who is not in privity with the Contractor and who has not received payment for his labor, materials, equipment or supplies shall, within ninety (90) days after completing performance of the labor or after completing delivery of the materials, equipment or supplies, deliver to the Contractor and to the Surety written notice of the performance of the labor or delivery of the materials, equipment or supplies and of the nonpayment. No action for the labor, materials, equipment or supplies may be instituted against the Contractor or the Surety after one year from the date performance of the labor is completed or delivery of the materials, equipment or supplies is completed.
4. An action against the Surety or the Contractor or both, may be brought in the county in which the public building or public work is being constructed or repaired or in any other place authorized by the provisions of Chapter 47, Florida Statutes.
5. The amount of this bond shall be changed only to the extent that the Contract Sum is changed in accord with applicable provisions of the Contract for Construction.
6. Neither any change in or under the contract documents, nor any compliance or noncompliance with any formalities provided in the contract or the change shall relieve the Surety of its obligations under this bond.
7. This bond incorporates by reference all the requirements of Section 255.05, Florida Statutes, including, but not limited to, all notice and time limitation provisions therein. This bond shall be construed and deemed a statutory bond issued pursuant to Section 255.05, Florida Statutes, and not a common law bond.

SIGNED AND SEALED THIS (Date)

(Signature of Witness)

(Signature of Contractor) (Seal)

(Signature of Witness)

(Signature of Attorney-In-Fact) (Seal)

(Type Name)

(Signature of Witness)

(Signature of Florida Resident Agent) (Seal)

(Type Name & Social Security Number)

Power of Attorney attached hereto.



## EXHIBIT 8 CONTINUED

### NOTES CONCERNING SURETY AND EXECUTION

#### A. SURETY COMPANY REQUIREMENTS

To be acceptable to the Owner, A Surety Company shall comply with all of the requirements of Article B-12 of the Conditions of the Contract.

#### B. EXECUTION OF BOND

1. Enter the Surety Company's name and address on each copy of the Bond in the space provided.
2. Enter the date shown on page 1 of the Agreement in the space provided on each copy of the Bond.
3. Enter the date of execution on each copy of the Bond in the space provided. This date must be the same as the date shown on the Agreement.
4. Have each copy of the Bond signed by the same person that signed the Agreement on behalf of the Contractor. Type in that person's name and title in the place provided on each copy of the Bond, and have one other individual witness that person's signature on each copy of the Bond. Also, have the Contractor's Corporate Seal affixed to each copy of the Bond beside that person's signature (No Facsimiles are acceptable).
5. Have each copy of the Bond signed by the person authorized to sign on behalf of the Surety Company. Type in that person's name in the place provided on each copy of the Bond, and have one other individual witness that person's signature on each copy of the Bond. Also, have the Surety Company's Corporate Seal affixed to each copy of the Bond beside that person's signature (No Facsimiles are acceptable).
6. Have each copy of the Bond signed by a Florida Resident Agent (Reference Chapters 624.425 and 624.426 of the Florida Statutes). Type in that person's name and Social Security number in the place provided on each copy of the Bond and have one other individual witness that person's signature on each copy of the Bond. This may be the same person indicated in B.5 above, if this person is a Florida Resident Agent and is also authorized to sign on behalf of the Surety Company as Attorney-In-Fact.
7. Each copy of the Bond must have a Power of Attorney attached indicating that the person in B.5 above is authorized to sign on behalf of the Surety Company.
8. Each copy of the Power of Attorney must have the Surety Company's Corporate Seal and a Notary Seal either manually affixed or they may utilize facsimile reproductions of the same.
9. If the date of execution of the Power of Attorney is not the same as the date shown on the Agreement, then the Power of Attorney must be certified to still be in effect on the date shown on page 1 of the Agreement.
10. If the Bond is being backed by the Small Business Administration, then a certified true and correct copy of the Surety Bond Guarantee Agreement, SBA Form 990, must be attached to each copy of the Bond.

**EXHIBIT 9**

**WAIVER AND RELEASE OF LIEN UPON FINAL PAYMENT**

Contract Number:

Date of Contract Award:

Project No.:

Project Title:

The Undersigned lienor, in consideration of the sum of \$ \_\_\_\_\_, hereby waives and releases its lien and right to claim a lien for labor, services, or material furnished to \_\_\_\_\_ (contractor or sub-contractor) \_\_\_\_\_ and/or \_\_\_\_\_ (Owner or contractor) \_\_\_\_\_ on the Job as described below:

Project Title  
Project Location

**IN WITNESS WHEREOF, this release has been executed this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_.**

Company Name: \_\_\_\_\_

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

\_\_\_\_\_  
(First Witness Signature)

\_\_\_\_\_  
(Second Witness Signature)

**CERTIFICATE**

I, \_\_\_\_\_, certify that I am the \_\_\_\_\_ of the  
(Type Name of Certifier below) (Position)  
corporation named as contractor in the foregoing release; that \_\_\_\_\_ who signed  
(Contractor above)  
said release on behalf of the contractor was then \_\_\_\_\_ of said corporation; that  
(Title)  
said release was duly signed for and in behalf of said corporation by authority of its governing body and is within the  
scope of its corporate powers.

Corporate Seal or

Notary Seal

\_\_\_\_\_  
(Signature)

**EXHIBIT 10**

Department Of Military Affairs  
Construction & Facility Management Office  
**CERTIFICATE OF PARTIAL PAYMENT**

CFMO Transmittal No.: \_\_\_\_\_

Contractor Name: 0 \_\_\_\_\_  
 Contractor Address: 0 \_\_\_\_\_  
 POC / Telephone Number: 0 \_\_\_\_\_  
 Facsimile Number: 0 \_\_\_\_\_  
 State Project Number: 0 \_\_\_\_\_  
 Federal Project Number: N/A \_\_\_\_\_

Pay Request No: \_\_\_\_\_  
 For Period Ending: \_\_\_\_\_  
 Project Name: 0 \_\_\_\_\_  
 FEIN Number: 0 \_\_\_\_\_  
 Notice to Proceed Date: \_\_\_\_\_  
 Substantial Completion Date: \_\_\_\_\_  
 Final Completion Date: \_\_\_\_\_

	ADDITIONS \$	DEDUCTIONS \$
Change Orders approved In previous months by Owner -- TOTAL		
Subsequent Change Orders for this month		
<u>Number</u> <u>Approved (Date)</u>		
_____		
_____		
<b>TOTALS</b>	\$0.00	\$0.00
Net Change by Change Orders \$	\$0.00	

Original Contract Sum .....	\$0.00
Change Orders (Net) .....	\$0.00
Contract Sum to Date .....	\$0.00
Completed To Date .....	
Materials Stored .....	
Total Completed & Stored .....	\$0.00
Total Retainage 10% .....	\$0.00
Total Earned Less Retainage .....	\$0.00
Less Previous Certificates .....	
Less Material Purchased	
Directly By Owner .....	\$0.00
<b>TOTAL THIS CERTIFICATE ..</b>	<b>\$0.00</b>
Balance To Finish Incl. Retainage ..	\$0.00
Retainage REFUND Requested ...	

**SHOW INDIVIDUAL MBE PAYMENTS SEPARATELY ON CONTRACTOR'S MINORITY BUSINESS ENTERPRISES STATUS REPORT OF PARTIAL PAYMENT**      TOTAL AMOUNT PAID THIS CERTIFICATE TO MBE SUBCONTRACTORS **\$0.00**

**CERTIFICATION BY THE CONTRACTOR:** According to the best of my knowledge and belief, I certify that all items and amounts shown on the face of this application are true and correct, that all work has been performed and material supplied in full accordance with the terms and conditions of the Contract, and that all materialmen, laborers and subcontractors, as defined in Chapter 713.01, Florida Statutes, have been paid the amounts due them out of any previous payments made to the contractor by the Owner. Further, I agree to promptly pay each materialman, laborer and subcontractor, as defined in Chapter 713.01, Florida Statutes, upon receipt of payment from the Owner, out of the amount paid to me on account of such materialman's, laborer's or subcontractor's work, the amount to which said materialman, laborer and subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to myself on account of such materialman's, laborer's and subcontractor's work.

Signature \_\_\_\_\_ Printed Name, Title \_\_\_\_\_ Date \_\_\_\_\_

**CERTIFICATION BY THE ARCHITECT/ENGINEER:** I certify that I have checked and verified this Partial Payment Application; that to the best of my knowledge and belief, the above application is a true and correct statement of the value of the work performed and the materials suitably stored on the site; that all work and materials included in this Certificate have been inspected by me or by my authorized assistants; that all work has been performed and material supplied in full accordance with the terms of this Contract; and I approved for payment the amount noted above.

Signature \_\_\_\_\_ Printed Name, Company \_\_\_\_\_ Date \_\_\_\_\_

I certify by evidence of my signature below the above information is true and correct; the goods and services have been satisfactorily received and payment is now due. I understand that the office of the State Chief Financial Officer reserves the right to require additional documentation and/or to conduct periodic post-audits of any agreements.

**APPROVED FOR PAYMENT - SERVICES RECEIVED**

Project Manager: \_\_\_\_\_ 0  
 Directorate: \_\_\_\_\_ 0  
 Telephone Number: \_\_\_\_\_ 0  
 Date: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Amount Certified: \_\_\_\_\_

Contract Manager Name (Printed) 0 Telephone Number 0  
 Contract Manager Signature \_\_\_\_\_ Date \_\_\_\_\_  
 FNG Form 4012-E, JUL 10

DMA use only--REPLACES FORM DBC 5025, ENG 93 and AIA Document G702





**EXHIBIT 12  
STATE OF FLORIDA  
Department Of Military Affairs  
Construction & Facility Management Office**

**CONTRACTOR'S AFFIDAVIT OF CONTRACT COMPLETION**

PROJECT NO: \_\_\_\_\_ PROJECT MANAGER: \_\_\_\_\_  
PROJECT NAME: \_\_\_\_\_  
CONTRACTOR: \_\_\_\_\_  
CONTRACT DATE: \_\_\_\_\_ CONTRACT AMOUNT: \_\_\_\_\_

**CONTRACTOR'S AFFIDAVIT**

I solemnly swear and affirm; that the work under the above named contract and all amendments thereto have been completed in accordance with the requirements of said contract; that all costs incurred for equipment, materials, labor, and services against the project have been paid; that no liens have been attached against the project; that no suits are pending by reason of work on the project under the contract; that all Workmen's Compensation claims are covered by Workmen's Compensation insurance as required by law; that all public liability claims are adequately covered by insurance, and that the Contractor shall save, protect, defend, indemnify, and hold the Owners harmless from and against any and all claims which arise as a direct or indirect result of any transaction, event or occurrence related to performance of the work completed under said contract.

Company: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

Company Seal

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

The foregoing instrument was acknowledged before me this (date), \_\_\_\_\_, by

\_\_\_\_\_ of \_\_\_\_\_  
(name & title of officer or agent) (name of corporation acknowledging)

a \_\_\_\_\_ Corporation, on behalf of the corporation. He/She is personally  
(state/place incorporated)

known to me or has produced \_\_\_\_\_ as identification.

\_\_\_\_\_  
(type of identification)

\_\_\_\_\_  
(Signature of person taking acknowledgment)

\_\_\_\_\_  
(Name typed printed or stamped)

\_\_\_\_\_  
(Title or Vendor)

**EXHIBIT 12a**  
**A/E CERTIFICATE OF CONTRACT COMPLETION**

PROJECT NO: \_\_\_\_\_  
 PROJECT TITLE: \_\_\_\_\_  
 CONTRACTOR: \_\_\_\_\_  
 CONTRACT DATE: \_\_\_\_\_ DATE OF FINAL COMPLETION: \_\_\_\_\_

**CERTIFICATE OF ARCHITECT/ENGINEER**

I CERTIFY: That the work under the above contract has been satisfactorily completed on the date set forth in accordance with the terms of the contract; that the contractor has submitted his sworn affidavit as evidence that he has paid all labor, materials and other charges against the project in accordance with the terms of the contract.

A/E Firm Name: \_\_\_\_\_ Date \_\_\_\_\_  
 By \_\_\_\_\_

TO BE COMPLETED BY ARCHITECT/ENGINEER  
 THROUGH THE SUBSTANTIAL COMPLETION PHASE

	<u>DATE</u>	<u>DAYS</u>	
1. Notice to Proceed (N.T.P.)	_____	_____	
2. Time Specified in Original Contract for Substantial Completion (S.C.)	<u>XXXXXXX</u>	_____	Liquidated Damages to be completed by the Dept. of Military Affairs
3. Extension Granted by Change Orders (Days Between Original Contract S.C. and Final Contract S.C.)	<u>XXXXXXX</u>	_____	
4. Total Days Allowable to Substantial Completion (Add Lines 2 and 3)	<u>XXXXXXX</u>	_____	
5. Project Substantially Completed as Certified by A/E (Total Days from N.T.P. through Date certified by A/E)	_____	_____	
6. Substantial Completion Overrun (Subtract Line 4 from 5 and Enter Overrun)	_____	_____	@\$ Per Day=\$

THROUGH THE FINAL COMPLETION PHASE

1. Time Specified in Contract, Between Substantial & Final Completion	<u>XXXXXXX</u>	_____	
2. Extensions Granted by Change Orders (Days Between S.C. & Final Completion)	<u>XXXXXXX</u>	_____	
3. Total Days Allowable Between Substantial & Final Completion (Add Lines 1 & 2)	<u>XXXXXXX</u>	_____	
4. Date Actually Completed and Total Days Between Actual S.C. & Date Certified by A/E as Actually being Finally Completed.	_____	_____	
5. Final Completion Overrun (Subtract Line 3 & 4 and Enter Overrun)	<u>XXXXXXX</u>	_____	@\$ Per Day=\$

TOTAL LIQUIDATED DAMAGES \$ \_\_\_\_\_

Project Director \_\_\_\_\_ Date \_\_\_\_\_  
 Project Development Manager \_\_\_\_\_ Date \_\_\_\_\_

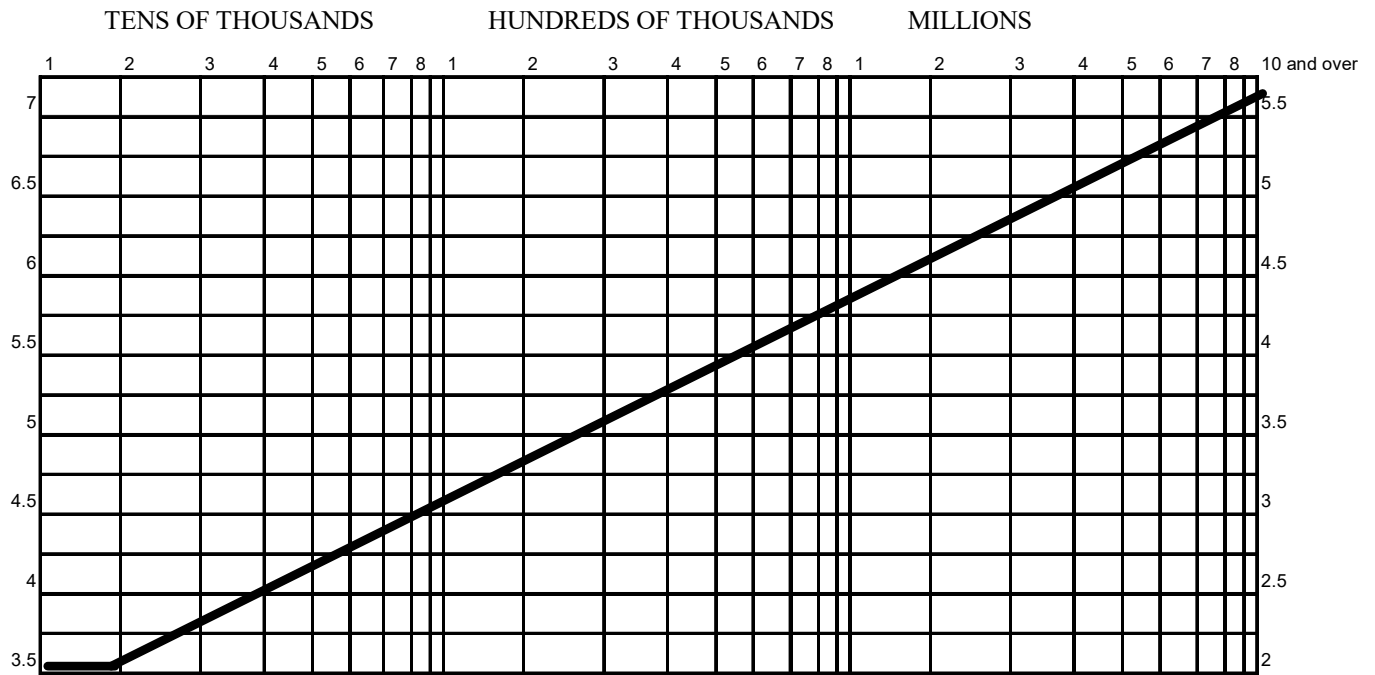
**EXHIBIT 13**

PERCENTAGE FACTOR TO BE USED IN SECTION C-35(6) OF THE CONSTRUCTION CONTRACT CONDITIONS

The following graph lists dollar amounts, percentages and types of construction. The proper percentage shall be used to determine compensation for (b), in Section C-33 on the "Conditions of the Contract", "Changes in the Work".

In order to select the proper percentage, the user should find the estimated construction amount on the top horizontal scale, drop to the sloped line, and read horizontally the applicable percentage on either the right hand or left hand vertical scale, depending on the type of construction project.

AMOUNT IN DOLLARS OF CONTRACT CONSTRUCTION COST



Percentage for:  
 New Construction  
 Additions,  
 Renovations,  
 Engineering Projects

Percentage for  
 Repairs,  
 Interior Projects



**EXHIBIT 14**

(PROJECT NUMBER)

(NAME OF PROJECT)

(NAME OF INSTITUTION)

STATE OF FLORIDA

BEING CONSTRUCTED BY  
FLORIDA DEPARTMENT OF MILITARY AFFAIRS

RICK SCOTT  
GOVERNOR

CONSTRUCTION AND FACILITY MANAGEMENT OFFICE  
COLONEL R. DWAYNE JARRIEL

FOR

FLORIDA DEPARTMENT OF MILITARY AFFAIRS

(NAME OF ARCHITECT-ENGINEER)

(NAME OF CONTRACTOR)

**EXHIBIT 15**

**CONTRACTOR'S Status Report of Minority & Disabled Veteran's Business Enterprise  
Report of Partial Payment**

**EXHIBIT 15**

Contractor's Name: \_\_\_\_\_ CFMO Project Name: \_\_\_\_\_  
 Address: \_\_\_\_\_ CFMO Project No.: \_\_\_\_\_  
 City, State and Zip: \_\_\_\_\_ Date: \_\_\_\_\_  
 Contract Amount: \$0.00 Draw Amount: \_\_\_\_\_  
 MBE Participation Amount: \_\_\_\_\_ MBE % \_\_\_\_\_ Draw Request #: \_\_\_\_\_  
 DV Participation Amount: \_\_\_\_\_ DV % \_\_\_\_\_

<b>Minority Business Enterprise (MBE)</b>									
Full Name of Minority Business Enterprise:	Description of Trade or Service	MBE Status	State Certified	MBE Contract Amount	Amount Paid to MBE	Total Paid This Contract	Contract Balance	Project Type	
		Hispanic Woman African American Asian/Other	MBE Yes/No	Amount	This Draw	To Date	Due	Local Government or State Project	
<b>TOTALS</b>								\$	

\*\* Certified MBE: H - African American I - Hispanic J - Asian/Hawaiian K - Native American M - American Woman W - Service Disabled Veteran Business  
 Non-Certified MBE: N - African American O - Hispanic P - Asian/Hawaiian Q - Native American R - American Women Y - Service-Disabled Veteran Business

<b>Service Disabled Veteran's (DV) Business Enterprise</b>									
*Service Disabled Veteran's Business Enterprise	Description of Trade or Service	Certified DV Business (Yes or NO)	Non-Certified DV Business	DV Contract Amount	Amount Paid to DV	Total Paid on This Contract	Contract Balance	Project Type	
		"W"	MBE Yes/No	Amount \$	This Draw	To Date	Due	Local Government or State Project	
<b>TOTALS</b>								\$	

Include this form with DMA FNG 4013E

\*Include all subcontractors and material handlers.  
 MBE Form dtd 4/2011

**EXHIBIT 16**

<b>Contractor Name</b>		<sup>1</sup> Proposed Change Order #:	
Address			
POC		<sup>2</sup> C/O Date:	
Phone:	Fax:		
<sup>3</sup> C/O Title:		Project No.:	
Project Name:		Architect (A/E):	
CFMO POC: <sup>A</sup>		A/E POC:	
Address:	2305 State Road 207 St. Augustine, FL 32086	Address:	
Phone:		Phone:	
Fax:	(904) 823-0189	Fax:	
<u>Item</u>	<u>Description</u>	<u><sup>5</sup> Net Amount</u>	
0001	<sup>4</sup> Additional Charge For: (List credit allowances here--if applicable)  See attached subcontractor back-up documentation for reference <sup>B</sup>		
0002	General/Prime Contractors Overhead & Profit		
<b>TOTAL:</b>			
<sup>7</sup> Additional Days Requested by Contractor:		Days Approved by CFMO:	
<b>SIGNATURES:</b>			
Contractor Recommendation		<sup>8</sup> Title	<sup>9</sup> Date
A/E Recommendation (if required by CFMO)		Title	Date
CFMO Project Manager Approval		Title	Date
<b>FUNDING:</b>	RM Approval:	Source:	
Account:		Org Code:	

## EXHIBIT 16 CONTINUED

### INSTRUCTIONS FOR ENG FORM 4016-E

1. Enter Proposed Change Order Number (kept in sequential order by General/Prime Contractors).
2. Date Change Order is being submitted to A/E or CFMO for recommendation and approval.
3. Enter Title for Change Order (i.e., Unforeseen Conditions, Under Ground Stumps, Dishwasher Hood, etc.)
4. Below Additional Charge For: Describe the change being requested in summary, list the RFI number associated with change, list any credit allowances, and include any subcontractor mark-up.
5. Enter "NET" amount for Change Order Request.
6. Enter additional days general contractor is requesting to be granted for this change.
7. Type in Title of the authorized signer from General/Prime Contractor's company.
8. Enter date of General/Prime Contractors signature.
9. Forward this Change Order Request Summary to either the A/E or the CFMO Project Manager.

#### NOTES:

<sup>A</sup> Questions regarding this form can be directed to your CFMO Project Manager or the CFMO Business Management Section at (904) 823-0255 or (904) 823-0256.

<sup>B</sup> Attach all back-up documentation for this Change Order Request in an orderly and understandable format to ensure timely processing.

**Exhibit 17**

State of Florida / Department Of Military Affairs  
Construction & Facility Management Office

**ESTIMATED PAYMENT DRAW SCHEDULE**

(Form is to be completed by Contractor and submitted to CFMO Project Manager within 10 days of Pre-Construction Meeting date)

Contractor Name:	<u>0</u>	Funding Type:	<u>0</u>
Contractor Address:	<u>0</u>	Acctg or CAT Code:	<u>0</u>
City, State, Zip	<u>0</u>	Org Code:	<u>0</u>
Point of Contact:	<u>0</u>	MCCA Number:	<u>0</u>
Facsimile Number:	<u>0</u>	Contract Term:	<u>0</u>
		Contract Amount:	<u>\$0.00</u>
State Project Number:	<u>0</u>	Notice to Proceed Date:	<u>                    </u>
Federal Project Number:	<u>0</u>	Substantial Completion Date:	<u>                    </u>
CFMO Project Manager:	<u>0</u>	Final Completion Date:	<u>                    </u>

Draw #	Month	Year	Est. Monthly Draw Amount
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			

Contractor Signature \_\_\_\_\_ Printed Name, Title \_\_\_\_\_ Date \_\_\_\_\_

DATE STAMPED RECEIVED:



ROUTING

CFMO Proj. Mgr. \_\_\_\_\_  
 Resource Mgmt. \_\_\_\_\_  
 USPFO \_\_\_\_\_  
 SQM \_\_\_\_\_

FNG Form 4020, OCT 06

EXHIBIT 18  
SAMPLE

**CONSENT OF SURETY  
TO FINAL PAYMENT**

Conforms with the American Institute of  
Architects, AIA Document G707

BOND NO.

OWNER   
ARCHITECT   
CONTRACTOR   
SURETY   
OTHER

TO OWNER: STATE OF FLORIDA ARCHITECT'S PROJECT NO.:  
*(Name and address)* DEPARTMENT OF MILITARY AFFAIRS  
CONSTRUCTION & FACILITY MANAGEMENT OFFICE  
P. O. Box 1008 CONTRACT FOR:  
St. Augustine, FL 32085-1008 PROJECT: CONTRACT DATED:  
*(Name and address)*

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the  
*(Insert name and address of Surety)*

HARTFORD FIRE INSURANCE COMPANY  
Hartford Plaza  
Hartford, CT 06115

on bond of  
*(Insert name and address of Contractor)*

, SURETY,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any  
of its obligations to  
*(Insert name and address of Owner)*

STATE OF FLORIDA  
DEPARTMENT OF MILITARY AFFAIRS  
CONSTRUCTION & FACILITY MANAGEMENT  
OFFICE  
P. O. Box 1008  
St. Augustine, FL 32085-1008

as set forth in said Surety's bond.

, OWNER,

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date: April 7, 2011  
*(Insert in writing the month followed by the numeric date and year.)*

HARTFORD FIRE INSURANCE COMPANY  
*(Surety)*

*(Signature of authorized representative)*

Attest:  
(Seal): \_\_\_\_\_  
1, Witness

Tom S. Lobrano, IV, Attorney-In-Fact  
*(Printed name and title)*

EXHIBIT 19  
SAMPLE

# POWER OF ATTORNEY

Direct Inquiries/Claims to:

THE HARTFORD  
BOND, T-4  
P.O. BOX 2103, 690 ASYLUM AVENUE  
HARTFORD, CONNECTICUT 06115  
call: 888-266-3488 or fax: 860-757-5835

KNOW ALL PERSONS BY THESE PRESENTS THAT:

Agency Code: 21-222192

- Hartford Fire Insurance Company, a corporation duly organized under the laws of the State of Connecticut
- Hartford Casualty Insurance Company, a corporation duly organized under the laws of the State of Indiana
- Hartford Accident and Indemnity Company, a corporation duly organized under the laws of the State of Connecticut
- Hartford Underwriters Insurance Company, a corporation duly organized under the laws of the State of Connecticut
- Twin City Fire Insurance Company, a corporation duly organized under the laws of the State of Indiana
- Hartford Insurance Company of Illinois, a corporation duly organized under the laws of the State of Illinois
- Hartford Insurance Company of the Midwest, a corporation duly organized under the laws of the State of Indiana
- Hartford Insurance Company of the Southeast, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, up to the amount of unlimited:

James C. Congelio, Tom S. Loblano III, Tom S. Loblano IV, James N. Congelio  
of  
Jacksonville, FL

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by , and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on January 22, 2004 the Companies have caused these presents to be signed by its Assistant Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.



*Scott Sadowsky*

Scott Sadowsky, Assistant Secretary

*M. Ross Fisher*

M. Ross Fisher, Assistant Vice President

STATE OF CONNECTICUT }  
COUNTY OF HARTFORD } ss. Hartford

On this 3<sup>rd</sup> day of March, 2008, before me personally came M. Ross Fisher, to me known, who being by me duly sworn, did depose and say: that he resides in the County of Hartford, State of Connecticut; that he is the Assistant Vice President of the Companies, the corporations described in and which executed the above instrument; that he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that he signed his name thereto by like authority.



CERTIFICATE

*Scott E. Paseka*

Scott E. Paseka  
Notary Public  
My Commission Expires October 31, 2012

I, the undersigned, Assistant Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of **April 7, 2011**. Signed and sealed at the City of Hartford.



*Gary W. Stumper*

Gary W. Stumper, Assistant Vice President

**EXHIBIT 20**

WAIVER AND RELEASE OF LIEN UPON PROGRESS PAYMENT

The undersigned lienor, in consideration of the sum of \_\_\_\_\_, hereby waives and releases its lien and right to claim a lien for labor, services or materials furnished through \_\_\_\_ (date) \_\_\_\_\_ to \_\_\_\_ (contractor) \_\_\_\_\_ on the job of \_\_\_\_ (job title) \_\_\_\_\_ to the following described property:

(Project name) \_\_\_\_\_  
(Project location) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This waiver and release does not cover any retention or labor, services or materials furnished after the date specified.

DATED on \_\_\_\_\_

Lienor's Name \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

By \_\_\_\_\_  
Printed Name \_\_\_\_\_  
Title \_\_\_\_\_

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

BEFORE ME, the undersigned officer, personally appeared \_\_\_\_\_ as \_\_\_\_\_ of \_\_\_\_\_, who is personally known to me or presented \_\_\_\_\_ as identification, and who did \_\_\_\_\_ take an oath, and who is known to be the person described in and who executed the foregoing instrument, and acknowledged to and before me that he/she executed said instrument in the capacity and for the purposes therein expressed.

Signature of Notary: \_\_\_\_\_

Commission Expiration Date: \_\_\_\_\_



## 011100 SUMMARY OF WORK

### PART I – GENERAL

#### 1.01 DESCRIPTION OF THE WORK

- A. Work generally consists of maintenance and repairs at (6) of the existing buildings at the Combined Support and Maintenance Shop (CSMS) facility including resealing all exterior wall and roof joints; replacing selected interior finishes, cabinets and toilet partitions; selected structural repairs; replacing selected HVAC systems and oil-water separator; providing new industrial propeller fans; providing new LED site lighting and interior lighting and other miscellaneous repairs, replacements, and improvements.
- B. User Occupancy: User will occupy the CSMS facility during construction. Contractor's construction manager and the CSMS facility manager shall jointly prepare and regularly update a 3-week look-ahead work schedule that will allow each party to efficiently perform their respective responsibilities to the maximum extent.
- C. Site Security Requirements: Contractor shall be responsible for providing, on company letterhead, current listings of all company and subcontractors employees who will be working on site. For Contractor's employees, provide name and telephone number. For subcontractors' employees, provide name and telephone number of:
- Subcontractor
  - Project Manager
  - Site Supervisor
  - Foreman
- For all other employees, provide name and US drivers' license number. Additional information will be available at the project pre-bid meeting or by contacting Mrs. Chism, Administrative Assistant to the Chief of Police, Camp Blanding Military Police Department at (904) 682-3566.

End of Section

## SECTION 012310 ADDITIVE BID ITEMS

### PART I - GENERAL

#### 1.01 SCOPE

- A. The bid items listed below affect the scope of the work of this project.
- B. Bidder shall include a separate price for each bid item in the Proposal.
- C. Failure to do so may be sufficient cause to reject the Proposal.

#### 1.02 BASE BID

- A. The Base Bid shall be a lump sum price for the entire project as required by the contract documents, but not including work indicated or specified to be provided under any of the Bid Items described below. All work not specifically included in the bid items below shall be included in the Base Bid.

#### 1.03 ADDITIVE BID ITEMS

- A. Bid Item No. 1: Interior LED lighting – Building 4100.  
This bid item shall be a lump sum price to be added to the Base Bid to furnish all labor and material required by the contract documents to provide new interior LED lighting and controls in Building 4100.
- B. Bid Item No. 2: Interior LED lighting – Buildings 4104 and 4109.  
This bid item shall be a lump sum price to be added to the Base Bid to furnish all labor and material required by the contract documents to provide new interior LED lighting and controls in Buildings 4104 and 4109.
- C. Bid Item No. 3: Interior LED lighting – Building 4105.  
This bid item shall be a lump sum price to be added to the Base Bid to furnish all labor and material required by the contract documents to provide new interior LED lighting and controls in Building 4105.
- D. Bid Item No. 4: Interior LED lighting – Buildings 4106 and 4114.  
This bid item shall be a lump sum price to be added to the Base Bid to furnish all labor and material required by the contract documents to provide new interior LED lighting and controls in Buildings 4106 and 4114.
- E. Bid Item No.5: Fire alarm system replacement – Buildings 4100, 4104, 4105, 4106 and 4114.  
This bid item shall be a lump sum price to be added to the Base Bid to furnish all labor and material required by the contract documents to replace the fire alarm system complete
- F. Bid Item No. 6: Enlarge door opening 443 – Building 4106.  
This bid item shall be a lump sum price to be added to the Base Bid to furnish all labor and material required by the contract documents to enlarge the existing door opening connecting rooms 443 and 444 in Building 4106.

- G Bid Item No. 7: Oil-Water Separator.  
This bid item shall be a lump sum price to be added to the Base Bid to furnish all labor and material required by the contract documents to replace the existing oil-water separator.
- H. Bid item No. 8: Miscellaneous.  
This bid item shall be a lump sum price to be added to the Base Bid to furnish all labor and material required by the contract documents to provide the following:
- Repaint existing hollow metal doors – Building 4100.
  - Replace vinyl strip curtains – Building 4100.
  - Replace vinyl composition tile and base - Building 4105.
  - Pressure wash exterior walls; reseal gutter joints; repair damaged downspouts and replace damaged/missing splash blocks – Typical all (6) Buildings

End of Section

**PART 1 - GENERAL****1.01 SCOPE**

- A. This section includes administrative and procedural requirements for submittals required for performance of the Work.
- B. Related Work Specified Elsewhere:
  - 1. Section 017700; Project Closeout.
  - 2. Section 017800; Project Record Documents.

**1.02 SUBMITTAL PROCEDURES**

- A. Coordination: Coordinate preparation and processing of submittals with construction schedule. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  - 1. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
  - 2. Submit all finishes submittals at one time to facilitate color coordination.
- B. Processing: Allow two weeks for initial review. If resubmittal is necessary, process the same as the initial submittal. No extension of contract time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
- C. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the project, Owner's project number, and the name and address of the entity that prepared each submittal on the label or title block.
- D. Submittal Transmittal: Transmit each submittal from the Contractor to the Architect using a transmittal form. The Architect will not accept submittals received from sources other than the Contractor. Indicate relevant specifications section(s) on each transmittal.
- E. The Contractor shall thoroughly review all submittals for accuracy and completeness prior to submission to the Architect. All submittals shall bear the Contractor's stamp, signature of reviewer, and date of review. Submittals received without the Contractor's stamp or which have obviously received cursory review (as evidenced by inaccuracies or incompleteness) will be returned without further action by the Architect.

**1.03 SCHEDULE OF VALUES**

- A. Submit the Schedule of Values to the Architect at the earliest possible date but no later than 14 days before the date scheduled for submittal of the initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents and drawing notes as a guide to establish the format for the Schedule of Values. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued

evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several applicable line items.

#### **1.04 APPLICATIONS FOR PAYMENT**

- A. Payment-Application Forms: Use form as approved by the Owner.
- B. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Architect will return incomplete applications without action.
  - 1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
  - 2. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application.
- C. Transmittal: Submit signed and notarized original copies of each Application for Payment to the Architect in sufficient quantity as required by the Owner plus one copy for the Architect. One copy shall be complete, including waivers of lien and similar attachments, when required.
- D. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens from subcontractors, sub-subcontractors and suppliers that have provide Notice to Owner of Intent to File Lien for the construction period covered by the previous application.
  - 1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit final or full waivers.
  - 3. The Owner reserves the right to designate which entitles involved in the Work must submit waivers.
- E. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to the Owner.

#### **1.05 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit within 30 days after the date established for commencement of the Work".
  - 1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values".
  - 2. Secure time commitments for performing critical elements for the Work from parties involved.
- B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.
- C. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

## 1.06 SUBMITTAL SCHEDULE

- A. After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for submittal of the Contractor's Construction Schedule. Provide the following information:
1. Scheduled date for the first submittal.
  2. Related Section number.
  3. Name of the subcontractor.
  4. Description of the part of the Work covered.
  5. Scheduled date for resubmittal.
  6. Scheduled date for the Architect's final release or approval.
- B. Distribution: Following response to the initial submittal, print and distribute copies of the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
- C. Schedule Updating: Revise the schedule after each meeting or activity where revisions been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

## 1.07 PRE-CONSTRUCTION SUBMITTALS

- A. Submit the following for approval prior to commencing the work.
1. Surety Letter of Intent to Issue Required Bonds.
  2. Certificates of Insurance.
  3. List of all Subcontractors.
  4. Estimated Schedule of Progress of Construction.
  5. Schedule of Values.
  6. Copy of all Required Building Permits

## 1.08 SUBMITTALS DURING CONSTRUCTION

- A. Refer to individual specification sections and drawing notes for specific documentation to be submitted during construction.

## 1.09 SUBMITTALS PRIOR TO FINAL PAYMENT

- A. Submit the following for approval prior to final payment.
1. Submit one set of originals for the following items:
    - a. Complete set of record drawings.
  2. Submit three copies with original signature for the following items:
    - a. Application for Final Payment.
    - b. Final Schedule of Contract Values.
  3. Submit three copies of the following documents. Index, tabulate, and bind in new black three-ring binders:
    - a. Consent of Surety to make Final Payment (notarized).
    - b. Power of Attorney from Surety for Release of Final Payment.
    - c. Contractor's Certificate of Contract Completion.
    - c. Satisfactory evidence that the entire work has received final approval of all governing authorities.
    - d. Release of Lien from each Sub-Contractor who has filed Notices to

- Owner.
  - e. Contractor's Guarantee of Construction for One (1) year from the date of Substantial Completion.
  - f. Miscellaneous additional warranties and guarantees as required by project specifications in the name of the Owner.
  - g. List of Sub-Contractors including telephone numbers and addresses.
  - h. Certificate of Occupancy.
4. Submit three copies of the following documents:
- a. Equipment operation and maintenance instructions.

#### **1.10 CHANGE ORDER AND PROPOSALS**

- A. Owner-Initiated Proposal Requests: The Architect will issue a detailed description of Proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time.
  - 1. Within 2 weeks of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Architect for the Owner's review. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made.
- B. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.
  - 1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change including cost.
- C. Proposed Request Form: Use AIA Document G709 for Change Order Proposal Requests.
- D. Allowance Adjustment: For allowance-cost adjustment, base each Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place.
- E. Construction Change Directive: When the Owner and the Contractor disagree on the terms of the Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G714. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
- F. Documentation: Maintain detailed records on a time and a material basis of work required by the Construction Change Directive. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
- G. Upon the Owner's approval of a Proposal Request, the Architect will issue a Change Order for signatures of the Owner and the Contractor on AIA Form G701.

#### **1.11 SUBSTITUTIONS**

- A. Substitution Request Submittal: Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for Change-order proposals. Identify the product or the fabrication or

installation method to be replaced in each request. Include related Specifications Section and Drawing numbers.

- B. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
1. Product Data, including Drawings and descriptions of products and fabrication and installation procedures. Provide samples on request.
  2. Cost information, including a proposal of the net change, if any in the Contract Sum.
  3. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
- C. Conditions: The Architect will receive and consider the Contractor's request for Substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action.
1. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.
  2. Extensive revisions to the Contract Documents are not required.
  3. The request is timely, fully documented, and properly submitted.
  4. The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
- D. The requested substitution offers the Owner a substantial advantage, in cost, time, or other considerations, after deducting compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.
- E. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

## 1.12 SHOP DRAWINGS

- A. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as a basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
- B. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
1. Contractor's approval stamp and signature.
  2. Dimensions.
  3. Identification of products and materials.
  4. Compliance with specified standards.
  5. Notation of coordination requirements.
  6. Notation of dimensions established by field measurement.



- C. Submittal: Submit 1 copy of each required shop drawing in electronic PDF format.
  - 1. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

#### 1.14 PRODUCT DATA

- A. Collect Product Data into single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves. Mark each copy to show applicable choices and options. Include the following information:
  - 1. Contractor's approval stamp and signature.
  - 2. Manufacturer's printed recommendations.
  - 3. Compliance with specified standards.
  - 4. Notation of dimensions verified by field measurement.
  - 5. Notation of coordination requirements.
- B. Submittals: Submit one copy of each submittal in electronic PDF format. Do not permit use of unmarked copies of Product Data in connection with construction.

#### 1.15 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that show approximate limits of the variations.
- B. Preliminary Submittals: Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices.
- C. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 3 sets. The Architect will return one set marked with action taken.
  - 1. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.

#### 1.16 QUALITY ASSUARANCE SUBMITTALS

- A. Certifications: Where other sections of the specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from a manufacturer certifying compliance with the requirements.

#### 1.17 ARCHITECT'S ACTION

- A. Shop Drawings are prepared by the contractor, his subcontractor, and his suppliers. Compliance with specified characteristics is the Contractor's responsibility. Approval does not relieve the Contractor of his responsibility for errors and omissions in the shop drawings or compliance with the Contract Documents

- B. Action Stamp: The Architect will mark submittals appropriately to indicate the action taken, as follows:
1. "No Exception Taken".
  2. "Make Corrections Noted".
  3. "Revise and Resubmit".
  4. "Rejected".
  5. Do not use, or allow others to use, submittals marked "Revise and Resubmit" or "Rejected" at the Project Site or elsewhere where Work is in progress.
- C. Unsolicited Submittals: The Architect will return unsolicited submittals to the sender without action.

End of Section

## **SECTION 014100 REGULATORY REQUIREMENTS AND STANDARDS**

### **PART 1: GENERAL**

#### **1.01 GOVERNING BUILDING CODES.**

- A. In general, the applicable building codes for this project are as follows:
  - 1. Florida Building Code Sixth Edition (2017), Building.
  - 2. Florida Fire Protection Code, Sixth Edition
  - 3. Florida Building Code Sixth Edition (2017), Mechanical.
  - 4. Florida Code Sixth Edition (2017), Plumbing.
  - 5. National Electric Code (NFPA 70), 2014 edition.
- B. Refer to individual specification sections for other specific applicable codes and standards.

#### **1.02 INDUSTRY STANDARDS**

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
  - 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.
- B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirements. Refer uncertainties and requirements that are different but apparently equal to the Architect for a decision before proceeding.

#### **1.03 CONTRACT DOCUMENTS**

- A. Relationship of Documents: Items of work may be shown only on the Drawings or only in the Specifications. Regardless of where shown, provide each item complete with all necessary labor, materials, equipment and incidentals. In the absence of specific instructions or specifications, workmanship and materials of equal quality to that specified elsewhere in these documents, or approved by the Architect, shall be employed. Where conflicting requirements occur, comply with them most stringent.
- B. Responsibility: Requirements expressed in the Specifications and other Contract Documents shall be performed by the Contractor unless specifically noted otherwise.

End of Section

PART 1: GENERAL**1.01 PURPOSE**

- A. This section provides direction for the establishment and maintenance of:
  - 1. Temporary Utilities
  - 2. Barriers
  - 3. Temporary Controls
  - 4. Project Safety

**1.02 DURATION**

- A. All facilities required herein shall be provided by the Contractor and maintained for the duration of the project or as may be specifically required.

**1.03 TEMPORARY UTILITIES**

- A. Drinking Water: Provide cool water with dispensing facilities.
- B. Construction Water: Owner's available water will be provided. Water will be provided at the nearest point of connection. Contractor shall be responsible for making the connection, extending the water for construction and testing activities as needed, removing all temporary hoses/piping and restoring the connection point(s) to its prior condition when all work is complete.
- C. Toilet Facilities: The Contractor shall be responsible for providing temporary facilities and shall not use the Owner's facilities.
- D. Electric Power
  - 1. Owner's available power will be provided. Power will be available at the nearest point of connection. Contractor shall be responsible for making the connection and for extending the conductors safely to his site of operations.
  - 2. Should damage occur to the Owner's system, the Contractor shall bear the cost of repair.
  - 3. Power requirements in excess of the Owner's capacity to provide them shall be provided by the Contractor.
- E. Telephone: The Contractor shall provide a telephone located in the Construction Office for all local calls made by anyone connected with the work.

**1.04 BARRIERS**

- A. Provide barriers as either needed or required and comply with applicable governmental requirements for barricade lighting, marking, flagmen, etc., to protect work, property and persons.
- B. Use adequate and appropriate safety barriers, such as fencing, to keep unauthorized persons from entering the construction area(s).

## **1.05 TEMPORARY CONTROLS**

- A. Environmental Requirements: Comply with all regulations for the reduction of pollution, water conservation and the preservation of soil, etc. that may be in effect and required by law.
- B. Noise Control: Construction noise shall be minimized.
- C. Debris Control: Keep premises clean and free from accumulation of debris and rubbish. Provide trash and debris receptacles. Do not bury debris or rubbish on site.

## **1.06 PROJECT SAFETY**

- A. Comply with all applicable governmental and insurance company requirements relative to construction and project safety.
- B. The Superintendent shall be on the site during all working hours.
- C. The Superintendent shall be trained in project safety and designated the Contractor's Safety Director.
- D. See General Conditions and Supplementary Conditions.

End of Section

PART 1 - GENERAL**1.01 PURPOSE**

- A. This section describes Contractor responsibilities for the Project or Contract closeout, specifically adjustment and cleaning, record drawings and maintenance manuals, substantial completion, release of lien, consent of surety to final payment, inspection certificates, bonds and guarantees and application for final payment.

**1.02 ADJUSTMENT AND CLEANING**

- A. Protect work until commencing preparations for final inspection.
- B. Hauled all debris from the site and disposed of in compliance with governmental regulations. **No debris shall be buried on site.**
- C. Prior to the final inspection, the Contractor shall perform and complete the following.
1. Repair or replace defective products or areas damaged by the Contractor.
  2. Clean all exposed or semi-exposed surfaces, which have been soiled as a result of the work effort (even though previously cleaned).
  3. Remove all stains, spots, marks and dirt from finished surfaces. Clean in accordance with the manufacturer's written instructions.
  4. Replace mechanical equipment filters; adjust all finish hardware and schedule service instruction conferences with the Owner just prior to final inspection.
- D. Cleaning: Cleaning shall include, but not be limited to, the following:
1. Removal of product protective coverings and labels. Do not remove UL, FM or other permanent labels or placards necessary for life-safety operations or to establish Construction Documents compliance.
  2. Removal of all debris from the site. Debris shall not be buried on the site. Debris shall be disposed of according to government requirements.
  3. Other cleaning as required:
    - a. Dry or wet vacuum cleaning.
    - b. Cleaning of inside glazed surfaces and outside glazed surfaces if soiled by the work of this Contract.
    - c. Cleaning required by various specification sections with particular attention to instructions and specific requirements.
- E. Adjustment: shall include, but not be limited to the following:
1. Adjustment of products, assemblies, equipment, hardware, components, etc., to achieve an installation that operates smoothly, correctly and as intended.
  2. Adjustment as required by various sections of the Specifications.

### **1.03 RECORD DOCUMENTS AND MAINTENANCE MANUALS**

- A. Maintenance Manuals:
  - 1. Submit to the Architect for approval.
  - 2. Manuals shall contain maintenance and record documents as provided for by the Specifications.
  - 3. Final payment will be withheld until the Owner receives approved manuals.
- B. Record Documents:
  - 1. Submit the Job Set of documents indicating "as-built" conditions to the Architect for approval. See Section 01780, Project Record Documents. Final payment will be withheld until the Owner receives completed record Documents.
- C. Deviations from the above requirements will not be accepted without prior written approval. Failure to comply will result in final payment being withheld.

### **1.04 SUBSTANTIAL COMPLETION**

- A. Provide the Architect with a written notification of project completion and request an inspection tour of the project. At this time the Contractor shall present to the Architect his punch list of uncompleted items.
- B. The Contractor, Architect and Owner shall be present for the inspection.
- C. The Architect will prepare a Certificate of Substantial Completion based on the results of the inspection. Attached thereto will be a list of items, "punch list", requiring additional Contractor attention and/or resolution.
- D. The Certificate shall be executed by all parties. A time limit for the completion of all items shall be 30 days.
- E. At the end of the allotted time, a final inspection shall be held.
- F. The Owner will complete any items remaining incomplete and the cost of the work charged against the Contractor's retainage.

### **1.05 RELEASE OF LIEN OR CLAIM**

- A. Along with his Application for Final Payment, submit a sworn statement that all work has been completed and that all bills for labor, materials and Sub-contractor's work have been paid in full.
- B. Submit sworn statements from each of his Sub-contractors, material or labor suppliers that they too have completed all work and that all bills for labor, materials and their Sub-contractor's work have been paid in full.
- C. Make sworn statements on the Owner's standard Release of Lien form.

### **1.06 CONSENT OF SURETY TO FINAL PAYMENT**

- A. Along with Application for Final Payment, provide a Consent of Surety to Final

Payment. Consent of Surety may be made on AIA Standard Form G707 or on a letter from the surety company.

**1.07 INSPECTION CERTIFICATES**

- A. Upon completion of the Project and before applying for Final Payment, have all work as applicable, inspected by proper authorities as required by the Specifications and all applicable codes, laws and ordinances.
- B. Submit all inspection certificates with Application for Final Payment.

**1.08 BONDS AND GUARANTEES**

- A. The Contractor's "one year" Guarantee shall commence on the date of Substantial Completion.
- B. Submit all Bonds and Guarantees with Application for Final Payment.

**1.09 APPLICATION FOR FINAL PAYMENT**

- A. Submit the Final Certificate and Application for Payment with the required Release of Lien statements, Contractor's Guarantee and Consent of Surety to Final Payment.
- B. The Application shall be marked "FINAL" and shall account for all Change Orders, including any liquidated and actual damages that may have been assessed for late completion.
- C. Refer to Section 013300; Submittals for other documents to be submitted with Final Certificate and Application for Payment.

End of Section



**PART 1 - GENERAL****1.01 PURPOSE**

- A. This section provides Contractor guidance for the creation, preparation and maintenance of "Job Set" Records Documents (Record Document's), Final Record Documents and Visitor's Log.

**1.02 QUALITY ASSURANCE**

- A. The Contractor shall delegate the responsibility for the maintenance of Record Documents and the Visitor's Log to one person on his staff as approved by the Architect. The Contractor shall insure the accuracy of Record Document's and shall thoroughly coordinate all changes and make adequate and proper entries.
- B. Timeliness of Entries: Make all entries within a reasonable amount of time (24 hours) after receipt of information or the need for an entry arises.

**1.03 SUBMITTALS**

- A. The Architect's approval of current Job Set Record Document's will be a prerequisite to his approval of the Contractor's monthly Applications for Payment.
- B. The Architect's approval of the Final Record Document's will be a prerequisite to his approval of the Contractor's Application for Final Payment.

**1.04 PROTECTION OF RECORD DOCUMENT'S**

- A. Take precautions to protect Record Document's from deterioration, loss or damage.
- B. Conserve, as necessary, the "Job Set" until the completion of work and the transfer of information from the "Job Set" to the "Final Record Documents".

**1.05 "JOB SET" RECORD DOCUMENTS**

- A. Identification: Upon receipt of the set of documents to be used as the job set, identify each of the documents with the title, "Record Documents - Job Set".
- B. Preservation: Devise a suitable method for protecting the "Job Set" from anticipated user wear. Use the "Job Set" only for the entry of new data and the Architect's review. Maintain the "Job Set" at the project work site.
- C. Making Entries: Use an erasable colored pencil. Clearly describe the change by note or by graphic line. Date all entries. Highlight the change by the use of a "cloud" around the area(s) affected. Use different colors for overlapping changes.
- D. Other Entries: Indicate any Architect directed changes by note; i.e., "Architect directed change". Contractor or Owner originated changes and inadvertent errors that are approved by the Architect shall be clearly indicated by note.

- E. Schematic Layout Conversion: Most mechanical, electrical and plumbing drawings are schematic in nature and not intended to portray precise physical layout of location. Final physical layout is determined by the Contractor and may be different from that shown on the Drawings. Future modifications or maintenance will require accurate, final, physical arrangement information. The contractor shall annotate the "Job Set" Record Document's to show:
1. Plan Location: Dimension layout of mechanical/electrical runs to within 1 inch of the centerline of each run.
  2. Identification: Identify the item by accurate not showing size, material and function; i.e., "4 inch case iron drain", "1/2 inch copper water", etc. Show the vertical (height) location by symbol or note; i.e., "in ceiling plenum", "exposed ceiling mounted", "under slab", etc. Make identifications sufficiently descriptive so that they may be easily related to the Specifications.

#### **1.06 CHANGES SUBSEQUENT TO ACCEPTANCE**

- A. The Contractor's responsibility for recording changes ends upon acceptance of the Work by the Owner. However, changes resulting from replacements, repairs and alterations required as a result of the Contractor guarantee work shall be recorded.

#### **1.07 VISITOR'S LOG**

- A. Maintain a log to record visits by the Architect, his consultants and all visitors including Owner's representatives and inspectors.
- B. The log shall become the official record of all job visits and shall show, date, time or arrival, time of departure, person's name and entity represented.
- C. Furnish a copy of the log to the Architect.

#### **1.08 CONTRACTOR'S PROJECT RELATED DOCUMENTS**

- A. All documents shall be made available to the Owner upon request.

End of Section

## **SECTION 064116 PLASTIC LAMINATE-CLAD CABINETS AND HARDWARE**

### **PART I - GENERAL**

#### **1.01 DESCRIPTION**

- A. Work Included:
  - 1. Custom cabinets.
  - 2. Plastic laminate.
  - 3. Counter top.
  - 4. Cabinet hardware and accessories.
  
- B. Related Work Specified Elsewhere:
  - 1. Sealant: Section 079200 Joint Sealant.

#### **1.02 QUALITY ASSURANCE**

- A. Standards:
  - 1. "Quality Standards" of Architectural Woodwork Institute (AWI) apply and by reference are made a part of this specification.
  - 2. Any reference to Premium, Custom, or Economy grade is as defined in AWI "Quality Standards".
  - 3. Where quality grade of any item is not specified provide Custom grade.
  
- B. Cabinet manufacturer shall be a member in good standing of the American Woodwork Institute.

#### **1.03 SUBMITTALS**

- A. Shop drawings: Submit shop drawings on all items of architectural woodwork.
  
- B. Brochures: Submit manufacturer's descriptive literature of specialty items not made by cabinet manufacturer.
  
- C. Samples: Submit full range of matte finish plastic laminate standard colors, patterns and edge banding.

#### **1.04 FIELD DIMENSIONS**

- A. Cabinet manufacturer is responsible for details and dimensions not controlled by job conditions.
  
- B. Indicate on shop drawings all required field measurements to be provided or verified by Contractor.
  
- C. Coordinate with Contractor to establish and maintain these field dimensions.

#### **1.05 PRODUCT HANDLING**

- A. Do not deliver cabinets until building and storage area is sufficiently dry so as to avoid damage by excessive changes in moisture.
  
- B. Deliver, store and handle millwork in manner to prevent damage and deterioration.

## **1.06 COORDINATION**

- A. Coordinate with plumbing, mechanical, electrical, and other trades for rough-in work and installation of adjacent and associated components.

## **PART II - PRODUCTS**

### **2.01 PLASTIC LAMINATE-CLAD CABINETS:**

- A. Grade: Custom.
- B. Type of construction: Frameless.
- C. Door and drawer front style: Flush overlay.
- D. High-pressure decorative laminate: NEMA LD3.
  - 1. Acceptable manufacturers: Formica, Nevamar and Wilsonart.
- E. Laminate cladding for exposed surfaces:
  - 1. Horizontal and vertical surfaces: .050-inch thick.
  - 2. Edges: PVC continuous banding, 3mm thick.
- F. Laminate cladding for semi-exposed surfaces:
  - 1. Cabinet and drawer linings and shelves: .028-inch thickness.
  - 2. Edges: PVC continuous banding, 3mm.
- G. Laminate backing for concealed surfaces: .020-inch thick, white.
- H. Drawer construction: Fabricate with exposed fronts fastened to sub-front with mounting screws from drawer interior.
  - 1. Drawer sides and back: Solid hardwood lumber, ½-inch.
  - 2. Drawer bottoms: Hardwood plywood, ¼-inch.
- I. Dust panels: ¼-inch plywood above compartments and drawers unless directly under Counter top.
- j. Laminate colors and patterns: To be selected by Architect.

### **2.02 COUNTER TOP**

- A. Grade: Premium.
- B. Core thickness: ¾-inch with 1 1/2 –inches thick front, back and side edges.
- C. Provide 4-inches high back splash where countertop abuts wall.
- D. Finish: High-pressure decorative laminate, NEMA LD3.
  - 1. Exposed surfaces and edges: .050-inch thick.
- E. Shop cut opening to receive sink using template to provide accurately sized opening.
- F. Fabricate in one piece ready for scribing and installation.

### **2.03 WOOD MATERIALS**

- A. Core material: Exterior hardwood veneer plywood, select grade, ¾-inch – unless noted otherwise.

- B. Blocking, edging, hanger strips and supports:
  - 1. Solid wood, kiln dried.
  - 2. Species: Fir or popular.
- C. AWI Grade: Custom unless noted otherwise.

#### **2.04 CABINET HARDWARE AND ACCESSORIES**

- A. Comply with Builders Hardware Manufacturers Association (BHMA) standards.
- B. Acceptable manufacturers: Accuride, Julius Blum, Knape & Vogt, Rockwood, Stanley; subject to compliance with requirements.
- C. Frameless concealed hinges (European type): 100 degree of opening, self-closing, A156.9, B01602.
- D. Back-mounted pulls: Solid brass, 1-inch minimum finger clearance, 4 inches long, 5/16-inch in diameter, A156.9 B02011.
- E. Adjustable shelf standards and supports: A156.9, B04071, mortised, with shelf rests, B04081.
- F. Drawer slides: A156.9, side mounted, full-extension, zinc-plated, steel ball-bearing grade 1 HD-100 slides.
- G. Door and drawer silencers: A156.16, L03011.
- H. Exposed hardware finish: Bright chrome, BHMA 625 for brass or bronze base; BHMA 651 for steel base
- I. Concealed hardware finish: Manufacturer's standard finish subject to compliance with BHMA product class requirements.

#### **2.05 MISCELLANEOUS MATERIALS**

- A. Anchors: Select stainless steel fasteners, type and size required for each substrate, for secure anchorage.
- B. Adhesive for bonding plastic laminate: Unpigmented contact cement.
- C. Adhesive for bonding edges: Hot-melt adhesive.

#### **2.06 CABINET FABRICATION**

- A. Fabrication workmanship: AWI Custom grade, unless noted otherwise.
- B. Pressure treatment:
  - 1. For materials adjacent to concrete masonry, treat with preservative, using standard 3-minute immersion treatment.
  - 2. Retreat all surfaces exposed by sawing, planing, or boring with a liberal brush application of same solution or by re-immersing.
- C. Shop-assemble cabinets for delivery in units for easy handling and to permit passage through building openings.

- D. Install hinges, standards and drawer slides in shop. Ship other finish hardware items loose for installation on site.

### **PART III - EXECUTION**

#### **3.01 INSPECTION**

- A. Verify all grounds, shims, stripping and blocking to secure and in place to support cabinets.
- B. Do not install until all defects are corrected.

#### **3.02 INSTALLATION**

- A. Cabinets and counter top:
  1. Install cabinets plumb and level.
  2. Shim as necessary with concealed shims.
  3. Accurately scribe and closely fit all filler strips and trim strips to irregularities of adjacent surfaces.
  4. Securely anchor cabinets directly to substrate with fasteners required for secure anchorage.
  5. Install remaining loose shipped hardware items.
  6. Seal all joints around counter tops with mildew resistant silicone sealant.
  7. After installation, wipe finished surfaces to remove marks of handling and leave in an unimpaired condition.

#### **3.03 ADJUSTMENT AND CLEANING**

- A. Adjust all hardware to center doors and drawers in openings and provide proper operation.
- B. Accurately align drawer and doors to provide even spacing and uniform appearance.
- C. Repair or replace damaged or defective material.
- D. Clean all exposed and semi-exposed surfaces and protect cabinets from damage or deterioration until project completion.

End of Section

## **SECTION 079200**

## **JOINT SEALANTS**

### **PART I - GENERAL**

#### **1.01 DESCRIPTION**

- A. Work Included:
  - 1. Liquid sealants.
  - 2. Sealant accessories.

#### **1.02 QUALITY ASSURANCE**

- A. Applicator qualifications: Minimum 5 year experience.
- B. Compatibility: Verify sealants used are compatible with joint substrates.
- C.. Joint Tolerance: Comply with manufacturer's joint width/depth ratios.

#### **1.03 SUBMITTALS:**

- A. Manufacturer's Literature:
  - 1. Product data sheets including primers where required.
  - 2. Recommendations for surface preparation and sealant installation.
  - 3. Certificate that materials meet or exceed requirements of specifications.
  - 4. Verification that materials submitted are compatible with adjacent products.
- B. Color Samples: Manufacturer's standard color charts for color selection by Architect.

#### **1.04 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Delivery: Deliver materials to project site in unopened, original sealed containers with manufacturer's labels intact.
- B. Storage and handling:
  - 1. In accordance with manufacturer's recommendations.
  - 2. Insure that materials are kept clean and dry.
  - 3. Exercise proper precautions concerning shelf life, temperature, humidity, and all other factors to insure fitness of material when installed.

#### **1.05 WARRANTY**

- A. Provide 2-year warranty.
- B. Warranty: Replace or repair sealants which leak or fail because of loss of cohesion or adhesion, or do not cure, at no cost to Owner.

### **PART II - PRODUCTS**

## **2.01 SEALANTS**

- A. Silicone sealant: One-component, ultra-low modulus, non-staining, neutral-cure sealant conforming to ASTM C 920, type S, grade NS, class 100/50, for use T, NT, M, A, new and remedial construction. Available source: Dow Corning, 790 Silicone Building Sealant.
- B. Silicone roof patch: Standalone, UV stable, class A fire-rated, moisture-cured, flashing grade, 100% silicone elastomeric roof patching material designed for new and remedial construction exposed to permanent ponding water. Available source: Gaco Western, GacoPatch.
- C. Epoxy resin adhesive: Two-component, high-modulus, low-viscosity, self-mixing, high strength epoxy-resin adhesive conforming to ASTM C 881, type I, grade 3, class B/C, formulated for repair of existing exterior and interior, non-load bearing masonry wall cracks. Available source: Sika, Sikadur Crack Fix.
- D. Latex caulking compound: One-component, mildew-resistant, paintable, non-staining, acrylic latex or siliconized acrylic latex sealant conforming to ASTM C 834, type OP, grade NF, for general purpose interior joint caulking. Available source: Pecora Corporation, AC-20.
- E. Acoustical sealant: One-component, non-sag, non-staining, water-based sealant conforming to ASTM C 919, gun grade, for sealing concealed joints of moderate movement. Available source: Pecora Corporation, AIS-919.

## **2.02 ACCESSORIES.**

- A. Joint cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- C. Cylindrical backing material: Type recommended by sealant manufacturer conforming to ASTM C 1300 and compatible with respective sealant.
- D. Bond breaker tape: Polymer tape compatible with joint sealant and adjacent surfaces and recommended by sealant manufacturer.

## **PART III - EXECUTION**

### **3.01 PREPARATION.**

- A. Route out existing cracks to a uniform 1/4-inch, vee-notched width. Clean, prep and fill cracks to achieve required epoxy resin profile according to epoxy resin manufacturer's recommendations.
- B. Remove existing ponding water and clean and prep existing gutter joints to receive joint patching material according to manufacturer's recommendations.



- C. Cut out and remove existing joint materials and clean, prep and fill joint to achieve required sealant profile according to sealant manufacturer's recommendations.

### **3.02 INSTALLATION.**

- A. Prime substrate and install sealant material in accordance with manufacturer's instructions and ASTM C 1193 applicable recommendations.
- B. Mask adjacent surfaces to prevent staining or damage by contact with primer or sealant.
- C. Tool joints concave unless noted otherwise.
- D. Maintain weep holes at thru-wall flashings and window sills. Reopen previously closed weep holes.
- E. Produce uniform sealant cross-sectional shapes, free of air pockets, foreign material, ridges and sags that allow optimum sealant performance.

### **3.03 CLEANING**

- A. Remove masking tape immediately after tooling without disturbing sealant material.
- B. Remove excess sealant from surfaces while still uncured.

End of Section

## **SECTION 090190    REPAINTING**

### **PART I - GENERAL**

#### **1.01    DESCRIPTION**

- A.    Work Included:
  - 1.    Repainting selected existing exterior surfaces.
  - 2.    Painting selected unpainted surfaces.
  
- B.    Related Work Specified Elsewhere:
  - 1.    Caulking: Section 079200; Joint Sealers.

#### **1.02    QUALITY ASSURANCE.**

- A.    Applicator qualifications: Minimum of 3 years of experience painting commercial/industrial facilities of comparable scope.
  
- B.    Spray application shall not be permitted without written authorization of the facility manager.
  
- C.    Field quality control: Select an appropriate room, space or area to prepare a “mock-up” of each typical interior painting application for approval as an acceptable project standard of work.

#### **1.03    SUBMITTALS**

- A.    Schedule: Complete list of materials to be furnished and surfaces on which they will be used.
  
- B.    Product data: Detailed data sheets for each product listed in schedule.
  
- C.    Color samples: Manufacturer's color chips or color charts for color selection.

#### **1.04    DELIVERY, STORAGE AND HANDLING**

- A.    Store materials in tightly covered containers, with labels legible and intact, in well-ventilated areas with ambient temperatures not less than 45 degrees F.
  - 1.    Maintain containers in clean condition, free of foreign materials and residue.
  - 2.    Remove rags and waste daily.

#### **1.05    JOB CONDITIONS**

- A.    Environmental requirements:
  - 1.    Comply with manufacturer's recommendations regarding environmental conditions that limits when painting systems can be applied.
  - 2.    Do not apply finish in areas where dust is being generated.
  
- B.    Protection: Cover or otherwise protect finished work of other trades and surfaces not scheduled to be painted.

## PART II - PRODUCTS

### **2.01 MANUFACTURERS**

- A. Basis of design: Products manufactured by the Sherwin Williams (S-W) Company unless otherwise noted.
- B. Acceptable manufacturers: Benjamin Moore, Dulux Paints, PPG Industries, Inc.; subject to compliance requirements.

### **2.02 MATERIALS**

- A. Select primary products of painting system from a single manufacturer.
- B. Provide "best grade" or "first line" products of a reputable manufacturer for secondary products not specified by name or specification reference and required for job.

### **2.03 COLORS**

- A. Match color chips selected by Architect/Engineer.
- B. Limit exterior colors to two, exclusive of trim.
- C. Limit interior wall colors to six.

### **2.04 MIXING AND TINTING**

- A. Deliver paint materials ready mixed to job site.
- B. Accomplish job mixing and job tinting only when acceptable to Architect.
- C. Use tinting colors recommended by manufacturer for specific type of finish.

## PART III - EXECUTION

### **3.01 INSPECTION**

- A. Examine surfaces scheduled to receive paint materials for conditions that will adversely affect execution, permanence and quality of work which cannot be restored to an acceptable condition by surface preparation.
- B. Do not proceed with surface preparation or coating until conditions are suitable.

### **3.02 PREPARATION**

- A. Prior to surface preparation and painting activities, remove, mask, or protect wall/ceiling-mounted fixtures, devices, and accessories; refinished items and adjacent equipment/furnishings not scheduled to be painted.

- B. Clean, prep, and prime surfaces to be painted in accordance with product manufacturer's recommendations for each type of substrate and application.
- C. Caulk all interior joints prior to applying finish coats.

### **3.03 APPLICATION**

- A. Apply paint material in accordance with product manufacturer's recommendation for each type of substrate and application.
- B. Apply initial coat only when surface moisture content is within required limits. Verify with electronic moisture meter.
- C. Apply each successive coat at recommended rate of application to achieve required dry film thickness.
- D. Comply with recommended drying time between successive coats.
- E. Sand and dust between coats to provide a uniform appearance free of visible defects.
- F. Finish coats shall be free of streaks, runs, voids and pin holes with clean, sharp edges without visible overlaps.
- G. Reinstall all items removed prior to painting.

### **3.04 CLEANING**

- A. Touch up and restore damaged finish.
- B. Remove spilled, splashed, or spattered paint from all surfaces.
- C. Do not mar surface finish of item being cleaned.

### **3.05 PAINTING SCHEDULE**

- A. Refer to the building Refinish Schedules shown on the drawings for location of:
  - 1. Previously painted surfaces to be repainted.
  - 2. New surfaces to be painted.
- B. Primer:
  - 1. Recommended by paint manufacturer for each existing condition and application.
  - 2. In lieu of primer, apply moisture resistant coating in strict accordance with coating manufacturer's instructions – see Building 4106 Refinish Schedule.
- C. Exterior finish coats:
  - 1. Metal: (2) coats DTM Acrylic Coating Semi-gloss, B66-200 Series.
- D. Interior finish coats:

1. Concrete masonry units:
  - a. Walls: (2) coats ProMar 200 Zero VOC Latex Eggshell, B20-2600 Series
  - b. Wainscot: (2) coats Water Based Catalyzed Epoxy Semi-gloss, B73-300Series.
2. Gypsum board:
  - a. Walls: (2) coats ProMar 200 Zero VOC Latex Eggshell, B20-2600 Series
  - b. Ceilings: (2) coats ProMar 200 Zero VOC Latex Flat, B30-W02651.
3. Metal: (2) coats DTM Acrylic Coating Semi-gloss, B66-200 Series.

End of Section

**PART I - GENERAL****1.01 DESCRIPTION**

- A. Work Included:
  - 1. Non-fire rated suspended metal grid systems complete with wall trim.
  - 2. Acoustical units.
- B. Related Work Specified Elsewhere:
  - 1. Air conditioning devices within ceiling system: Section 233700; Air Distribution Equipment.
  - 2. Lighting fixtures within ceiling system: Section 265113; Interior Lighting.
- C. Tolerances:
  - 1. Suspension system components, hangers, and fastening devices supporting light fixtures, ceiling grilles and acoustical units: Maximum deflection 1/360 of span.
  - 2. Finished acoustical ceiling system: Level within 1/8 inch in 12 feet.

**1.02 SUBMITTALS**

- A. Samples:
  - 1. Submit 6-inch square sample of each type of acoustical material.
  - 2. Submit one 12-inch long sample of each suspension system member and moldings.
- B. Manufacturer's literature:
  - 1. Recommendation for installation of suspension system.
  - 2. Descriptive product data.

**1.03 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials in original, unopened, protective packaging, with manufacturer's labels indicating brand name, pattern, size and thickness as applicable, legible and intact.
- B. Store materials in original protective packaging to prevent soiling, physical damage, or wetting.

**1.04 ENVIRONMENTAL CONDITIONS**

- A. Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead mechanical work is completed, tested and approved, unless otherwise approved by Architect.
- B. Permit wet work to dry prior to commencement of installation.
- C. Maintain uniform temperatures of 60 degrees F (minimum) and humidity of 45 percent to 55 percent prior to, during, and after installation, unless otherwise approved by Architect.

## PART II - PRODUCTS

### **2.01 SUSPENSION SYSTEM**

- A. Exposed suspension system components: Manufacturer's non-fire rated, standard suspended grid system, fabricated from aluminum extrusions, conforming to ASTM C 635 Intermediate Duty System and matching existing suspended exposed tee grid system.
- B. Acceptable manufacturers: Armstrong World Industries, Inc., Chicago Metallic Corp., Donn Products, Inc., USG Interiors, Inc.; subject to compliance with requirements.
- C. Accessories: Provide hanger wire, inserts, fasteners, edge moldings and trim as required to complete and complement suspended ceiling grid system.

### **2.02 ACOUSTICAL CEILING TILE**

- A. Type: Non-combustible mineral fiber tile, 2 inches x 2 inches x  $\frac{3}{4}$ -inch, to match existing ceiling tile (Cirrus Tegular: Armstrong World Industries, Inc.).
- B. Acceptable manufacturers: Armstrong World Industries, Inc., Celotex Corp., USG Interiors, Inc.; subject to compliance with requirements.

## PART III - EXECUTION

### **3.01 INSTALLATION**

- A. Install acoustical ceiling systems in accordance with ASTM C 636 and manufacturer's recommendations to produce finished ceiling true to lines and levels and free from warped, soiled, or damaged grid or acoustical units.
- B. Install ceiling systems in manner capable of supporting all superimposed loads within tolerances specified.
- C. Install after major above ceiling work is complete.
- D. Coordinate location of hangers with other work.
- E. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest adjacent hangers and related suspension system carrying members as required to span from support to support.
- F. Supply hangers or inserts for installation to respective trades in ample time and with clear instructions for correct placement.
- G. Secure system hangers to structural framing members.
- H. Do not secure hangers to metal deck or joist bridging.
- I. Wall molding:
  - 1. Install wall molding at intersection of suspended ceiling and vertical surfaces.

2. Set flush with grid members.
- J. Acoustical ceiling tile:
1. Install in level plane in straight-line courses.
  2. Place materials to bear all around on suspension members.
  3. Minimum width of border tile: One-half tile dimension.
  4. Provide matching tegular edge where tile is cut to fit.
  5. Install ceiling tile surrounding recessed lighting fixtures with hold-down clips to prevent movement or displacement of units.
- K. Reusable existing ceiling tile: Remove enough reusable matching ceiling tile as needed, from selected room(s) to be determined, to replace miscellaneous existing stained/damaged ceiling tile throughout each building. Replace all the ceiling tile in the respective room(s) with new acoustical ceiling tile.

### **3.02 ADJUSTMENTS AND CLEANING**

- A. Adjust any sags or twists, which develop in ceiling systems to provide a uniform appearance, free of irregularities.
- B. Clean exposed surfaces of acoustical ceilings and suspension members. Comply with manufacturer's instructions for cleaning and touch-up of minor finish damage.
- C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

### **3.03 EXTRA MATERIAL**

- A. Furnish Owner (2) cartons of each type of acoustical ceiling tile installed. Clearly identify contents of each carton.

End of Section



**PART I - GENERAL****1.01 DESCRIPTION**

- A. Work included:
  - 1. Vinyl composition tile (VCT) flooring.
  - 2. Rubber base.
  - 3. Self-leveling floor fill.

**1.02 REFERENCES**

- A. American Society for Testing Materials (ASTM)
  - E648 Test Method for Critical Radiant Flux of Floor Covering Systems Using Radiant Heat Energy Source
  - E662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials
  - F1066 Vinyl Composition Tile
- B. Federal Specification (Fed. Spec.):
  - SS-W-40 Wall Base: Rubber and Vinyl Plastic

**1.03 QUALITY ASSURANCE**

- A. Conform to following:
  - 1. Flooring Radiant Panel Test: Critical Radiant Flux (CRF) of 0.45 watts/cm<sup>2</sup> in accordance with ASTM E 648.
  - 2. Smoke Obscuration NBS Smoke: Less than 450 in accordance with ASTM E 662.

**1.04 SUBMITTALS:**

- A. Samples:
  - 1. Vinyl composition tile: Submit samples of manufacturer's standard colors and patterns for selection by Architect.
  - 2. Submit samples of manufacturer's standard colors for rubber base, reducer strips and feature strips for selection by Architect.
- B. Manufacturer's literature:
  - 1. Product data: Provide data on specified products describing physical characteristics, sizes, and colors available.
  - 2. Installation Instructions: Recommended installation instructions including special procedures and perimeter conditions requiring special attention.
  - 3. Maintenance data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

**1.05 PRODUCT DELIVERY AND STORAGE**

- A. Deliver materials to project site in manufacturer's original, unopened containers with labels indicating brand names, colors and patterns, and quality designations legible and intact.

- B. Store and protect accepted material in accordance with manufacturer's directions and recommendations.

## **1.06 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain temperature in space to receive flooring between 70 degrees F. and 90 degrees F. for not less than 24 hours before, during, and 48 hours after installation.
- B. Maintain minimum temperature of 55 degrees F. after flooring is installed except as specified above.

## **PART II - PRODUCTS**

### **2.01 FLOOR COVERING MATERIALS:**

- A. Vinyl composition tile:
  - 1. Conform to ASTM F 1066, Class 2 (through pattern).
  - 2. Smooth surface with marbleized or variegated pattern.
  - 3. Size: 12 inches by 12 inches by 1/8 inch thick.
  - 4. Color: As selected by Architect.
- B. Acceptable manufacturers: Armstrong World Industries, Inc., Azrock Floor Products, Mannington Mills, Inc., Tarkett; subject to compliance requirements.

### **2.02 ACCESSORIES**

- A. Rubber base:
  - 1. Conform to FS SS-W-40, Type II, with matching end stops and preformed or molded corners.
  - 2. Height: 4 inches.
  - 3. Thickness; 1/8- inch.
  - 4. Style: Standard top-set cove.
  - 5. Color: As selected by Architect.
- B. Provide tapered edge strip and feature strips as required to complete and complement vinyl composition tile flooring.
- C. Acceptable manufacturers: Johnsonite, Mercer, Roppe, Tarkett;; subject to compliance with requirements.
- D. Self-leveling floor fill: Hydraulic cement-based, quick-setting, self-leveling floor underlayment designed to level irregular, sloping concrete floor slabs. Available source: CTS Cement Manufacturing Corp., Concrete Levelor.
- E. Primers and adhesives: Waterproof and of types recommended by resilient flooring manufacturer for existing conditions and specific material to be installed.
- F. Sealer and wax: Type recommended by resilient flooring manufacturer for material type and location.

## **PART III - EXECUTION**

### 3.01 INSPECTION OF SURFACES

- A. Verify floor surfaces are smooth and flat with maximum variation of 1/4 inch in 10 feet.
- B. Verify concrete floors are dry (maximum 7 percent moisture content) and exhibit negative alkalinity, carbonization or dusting.
- C. Do not proceed with installation of resilient flooring until defects have been corrected.
- D. Starting work indicates acceptance of substrate surface.

### 3.02 PREPARATION

- A. Floor Leveling:
  - 1. Remove bumps and ridges and level uneven, sloping concrete floors with self-leveling floor fill, prior to installing resilient flooring materials.
  - 2. Clean floor, prime and apply floor fill in accordance with manufacturer's recommendations for existing conditions.
  - 3. Trowel and float floor fill to provide a smooth, flat, hard surface.
  - 4. Prohibit traffic until filler is cured.
- B. Remove dirt, oil, grease, or other foreign matter from surfaces to receive floor covering materials.

### 3.03 INSTALLATION

- A. Application of adhesives:
  - 1. Mix and apply in accordance with manufacturer's instructions.
  - 2. Provide safety precautions during mixing and application as recommended by adhesive manufacturer.
  - 3. Apply uniformly over surface.
    - a. Cover only that amount of area that can be covered by flooring material within recommended working time of adhesive.
    - b. Remove any adhesive that dries or films over.
    - c. Do not soil walls, bases, or adjacent areas with adhesives.
    - d. Promptly remove any spillage.
  - 4. Apply adhesives with notches trowel or other suitable tool.
  - 5. Clean trowel and rework notches as necessary to insure proper application of adhesive.
- B. Flooring:
  - 1. General:
    - a. Terminate resilient flooring in door openings where adjacent floor finish is dissimilar.
    - b. Install 1-inch feature strips centered under door where dissimilar floor finish is of equal thickness.
    - c. Install reducer strips centered under door where unprotected or exposed edges of resilient flooring terminate.
    - d. Scribe flooring to walls, columns, cabinets and other appurtenances to produce tight joints.

2. Floor Tile:
  - a. Open floor tile cartons, enough to cover each area, and mix tile to insure shade variations do not occur within any one area.
  - b. Install minimum border tile width of one-half full size with pattern grain alternating with adjacent tile to produce a basket weave pattern.
  - c. Cut border tile neatly and accurately to abutting surfaces.
  
3. Base:
  - a. Install base around perimeter of room or space and at toe-space of cabinets.
  - b. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
  - c. Miter internal corners.
  - d. Provide preformed or pre-molded exterior corners.
  - e. Install end stops at unprotected or exposed edges where base terminates.
  - f. Install base on solid backing.
  - g. Adherer tightly to wall and floor surfaces.
  - h. Scribe and fit to door frames and other construction.
  - i. Install straight and level to variation of plus or minus 1/8 inch over 10 feet.

#### **3.04 PROTECTION AND CLEAN UP**

- A. Protect floor tile from foot traffic for 48 hours after installation.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's recommendations.

#### **3.05 EXTRA MATERIAL**

- A. Furnish Owner (1) box of floor tile for each color and pattern installed. Clearly identify contents of each box.

End of Section

## **SECTION 102115 TOILET COMPARTMENTS AND ACCESSORIES**

### **PART I - GENERAL**

#### **1.01 DESCRIPTION**

- A. Work Included:
  - 1. Floor mounted overhead-braced toilet compartments.
  - 2. Urinal screens.
  - 3. Toilet accessories.

#### **1.02 SUBMITTAL.**

- A. Product data: Provide manufacturer's data sheets for each product used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- B. Shop drawings: Provide layout drawings and installation details with location and type hardware required.
- C. Samples: Provide color and hardware samples representing actual products, color, pattern and finish.

#### **1.03 DELIVERY, STORAGE AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation..

### **PART II - PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Basis of design: Scranton Products: Hiny Hiders solid partitions.
- B. Acceptable manufacturers: Bradley Corp., Global Partitions Corp.; subject to compliance with requirements.

#### **2.02 MATERIALS**

- A. Plastic panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent and graffiti-resistant surface.
- B. Aluminum extrusions: ASTM B221, 6463-T5 alloy and temper.
- C. Stainless steel castings: ASTM A167, type 304.
- D. Zinc aluminum magnesium copper alloy (Zamac): ASTM B 86.

#### **2.03 TOILET COMPARTMENTS**

Style: Floor mounted overhead-braced toilet compartments.

- B Doors, panels and pilasters: 1-inch thick with all edges rounded to a radius. Size to match existing.
- C Pilaster shoes: 3 inches high, type 304, 20 gauge stainless steel; secured to pilasters with stainless steel tamper resistant fasteners.
- D Headrail: Heavy-duty extruded aluminum, anti-grip design, clear anodized finish; secured to head brackets and pilasters with stainless steel tamper resistant fasteners.
- E Headrail brackets: 20 gauge stainless steel, satin finish; secured to wall with stainless steel tamper resistant fasteners.
- F Wall brackets: Heavy duty, stirrup type, stainless steel, double eared; secured to wall, panels and pilasters with stainless tamper resistant fasteners.
- G Door hardware:
  - 1. Vault hinges: Heavy duty, die cast aluminum alloy (zamac) with brushed chrome finish, vault hinges with wrap around flanges, gravity-acting nylon cams and stainless pins; secured to doors and pilasters with stainless steel tamper resistant fasteners.
  - 2. Latch and keeper: Heavy duty, stainless steel, satin finish latch with combination rubber faced door strike and keeper; secured to door and pilaster with stainless steel tamper resistant fasteners.
  - 3. Coat hook and bumper: Heavy duty, combination stainless steel hook and rubber tipped bumper; sized to prevent in-swinging door from hitting compartment-mounted accessories; secured with stainless steel tamper resistant fasteners.
  - 4. Door pull: Heavy duty pull, aluminum alloy (zamac) with brushed chrome finish.
  - 5. Provide second door pull and door stop for out-swinging doors to handicapped accessible toilet compartments
  - 6. Provide door sizes, hardware and mounting heights that comply with regulatory requirements for handicapped accessible toilet compartments.

### **2.03 URINAL SCREENS**

- A. Style: Wall hung urinal screens.
- B. Construction: Match toilet compartment panel construction.
- C. Size: Match size of existing urinal screen panels (24 inches x 42 inches –verify).
- D. Wall brackets: Same brackets and fasteners used for securing toilet compartment panels to wall.

## **PART III - EXECUTION**

### **3.01 PREPARATION**

- A. Prior to removal, take complete and accurate measurements of existing toilet

compartment and urinal screen dimensions, layouts and fastener locations.

- . B. Report any conditions that would adversely affect installation of compartments and screens.

### **3.02 INSTALLATION**

- A. Comply with manufacturer's written installation instructions.
- B. Install compartment and screen units in a rigid, straight, plumb and level manner conforming to the former panel layout.
- C. Locate brackets over former fastener locations and securely anchor with type of fasteners best suited for existing conditions.
- D. No evidence of cutting, drilling or patching shall be visible upon completion of work.
- E. Adjust doors, panels and clearances to provide uniform alignment and appearance.
- F. Adjust and lubricate hardware for proper operation. Set hinges to hold open in-swinging doors approximately 30 degrees and return out-swinging doors to fully closed position.
- G. Clean all finished surfaces and leave free of imperfections.

End of Section

**Article I. 220000 COMMON REQUIREMENTS FOR PLUMBING WORK**

**PART 1 - GENERAL**

**1.01 SCOPE OF DIVISION**

- A. Work Description: Work shall include all materials, equipment and labor necessary for a complete and functioning plumbing installation in accordance with local and state codes, and contract drawings and specifications. Work shall be understood to include all work specified in DIVISION 22, PLUMBING, of the specifications.
- B. Regulations, Codes, Standards and Ordinances:
  - 1. Florida Building Code – Building, 2017 Edition.
  - 2. Florida Building Code – Plumbing, 2017 Edition.
  - 3. National Fire Protection Code, Life Safety Code, NFPA-101, 2015 Edition.
- C. Refer to other Divisions for continuation of exterior work and allied work.
- D. Obtain and pay for all required plumbing permits, fees and inspections.

**1.02 DRAWINGS**

- A. Architectural and structural drawings take precedence over plumbing drawings with reference to the building construction. Plumbing drawings are diagrammatic and indicate the general arrangement and extent of work. Architectural drawings indicate more exactly the desired relationship between diffusers, registers, lighting fixtures, equipment, electric panels and devices, plumbing fixtures, and other items which remain exposed in the completed building.
- B. Exact locations and arrangements of materials and equipment shall be determined, with the approval of the Engineer, as work progresses to conform in the best possible manner with the surroundings and with the adjoining work or other trades.
- C. Where locations of equipment, devices or fixtures are controlled by architectural features, establish such locations by referring to dimensions on Architectural (A-series) drawings and not by scaling drawings.

**1.03 COORDINATION OF WORK**

- A. Coordinate all work, prior to installation, with work of other trades and with architectural and structural features to preclude interference between the works of different trades and to insure necessary clearances at crossovers and equipment. Work requiring necessarily fixed locations (e.g.; piping with required slopes, lighting fixtures and diffusers in ceilings, etc.) takes precedence over work not requiring such fixed locations and shall establish permissible routing of services associated with the latter.



- B. Should work be performed without adequate coordination so that interference occurs between works of different trades, the Contractor shall eliminate such interference by requiring necessary rework by the trades involved. Such rework shall meet express approval of the Engineer and shall be performed at no addition to contract amount.

1.04 **DISCREPANCIES**

- A. Refer to DIVISION 01 - GENERAL REQUIREMENTS.
- B. Refer all discrepancies in writing to the Engineer for resolution.

1.05 **SUBMITTALS**

- A. **Material List:** Within twenty (20) days of award of contract, submit to Engineer for approval a complete list of materials to be provided for the plumbing work. The list shall include supplier's names and manufacturer's names and number or series for each item on list. Items not shown on said list shall be construed to be as specified on drawings or in specifications.
- B. **Product Submittals:** Submit to Engineer for approval, before commencing work, manufacturers data for all plumbing materials and equipment to be provided under this contract. Data shall clearly show compliance with specifications and scheduled data on drawings. In addition, submit drawings or diagrams, dimensioned and in correct scale, requested by Engineer or specified in individual sections, to clarify the work intended or to show its relationship to adjacent work or work of other trades. Contractor is responsible for any delays in job progress occurring directly or indirectly from late submissions. Submittals shall clearly show the following:
  - 1. Technical and descriptive data in detail equal to or greater than the data given in the item specification. Indicate all characteristics, special modifications and features. Where performance and characteristic data is shown on the drawings or specified, submitted data shall be provided in sufficient detail that shows that the item is equal to that specified and shown.
  - 2. All exceptions to, or deviations from, the Contract Documents.
  - 3. **Stamp:** Indicate on each submittal that Contractor has checked that it complies with the drawings and specifications by affixing a stamp indicating the following: Date, specification page and section, drawing note indicating that manufacturer is as specified or that manufacturer is submitted to be approved as "or equal" by the Engineer, and signature of person reviewing the submittal.
- C. **Samples:** Submit to Engineer for approval samples of materials as indicated elsewhere in these specifications. Samples shall duplicate materials, workmanship, and finish of products intended for installation.

## 1.06 **RECORD DRAWINGS**

- A. Refer to DIVISION 01 - GENERAL REQUIREMENTS.
- B. Contractor shall provide neatly annotated drawing prints showing all changes and deviations made in the installation of the work to the Engineer.
- C. The Engineer will make the indicated changes to the original CAD Plumbing drawings, will label and date them as "RECORD DRAWINGS", and provide them in CAD form to the Architect or Owner upon completion.

## 1.07 **GUARANTY (WARRANTY)**

- A. Contractor shall warranty all mechanical work under this Division for a period of one year from the date of beneficial occupancy by the Owner.
- B. This warranty shall include both materials and labor required to repair or replace any defective material or equipment.

## PART 2 - PRODUCTS

### 2.01 **MATERIALS AND EQUIPMENT**

- A. All materials and equipment shall be new and without blemish or defect. Equipment and materials shall be products which meet the requirements of these drawings and specifications. Where acceptance is contingent upon having the product examined, tested and certified by a recognized testing laboratory, the product shall be so examined, tested and certified, with documentation included in the product submittal. Where no special indication as to the type or quality of material or equipment is indicated, a first class standard article shall be furnished.
- B. All equipment of one type specified in one section of these specifications, shall be the products of one manufacturer, unless specifically indicated otherwise. Substituted equipment or optional equipment where permitted and approved, must conform to space requirements. Substitutions of plumbing equipment for that shown on the schedules or designated by model number in the specifications will not be considered if the item is not a regular cataloged item shown in the current catalog of the manufacturer. Any substituted equipment that cannot meet space requirements, whether approved or not, shall be replaced at the Contractor's expense. Any modifications of related systems as a result of substitutions shall be made at the Contractor's expense.
- C. The approval of submittals does not assure that the Engineer, or any Owner's Representative, attests to the dimensional accuracy or dimensional suitability of the material or equipment involved, the sufficiency of the quantity of the material or items of equipment involved, or the mechanical performance of equipment. Approval of submittals does not invalidate the plans and specifications if in conflict, unless a letter requesting such change is submitted and specific approval is provided on the Engineer's letterhead.

- D. Operating conditions and capacities must be as follows:
1. No overloading
  2. No operation at conditions outside of maximum and minimum limits recommended by the manufacturer and approved by the Engineer.
  3. Compatible with all systems.
  4. Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance.
- E. Unless otherwise specified, all equipment and materials furnished must be as follows:
1. Recommended by the manufacturer for the application.
  2. Installed in accord with the manufacturer's recommendations for the application.
- F. It is the intent of these specifications that wherever a manufacturer of a product is specified as the "Basis of Design", and the terms "other approved" or "or approved equal" or "equal" are used, a substituted item must conform in all respects to the specified item. The above terms are implied wherever practical and the quality of performance and equipment is not jeopardized. These terms are not restricted to the names in the specifications since the intent is to achieve a broad spectrum of interested bidders and vendors. Where the term "Acceptable" is used, only those manufacturers and/or products listed as "acceptable" may be submitted.

## 2.02 REJECTED WORK

- A. Any work rejected by Engineer because it does not conform to specifications shall be removed immediately and replaced properly.

## 2.03 SLEEVES

- A. General: Lay out work and set sleeves in new or existing construction so there shall be a minimum of cutting, drilling and patching. All sleeves not used during construction period shall be sealed. Unused penetrations or sleeves through fire rated barriers shall be sealed to prevent a passage of smoke or heat using an underwriters Laboratories approved method rated at least equal to the barrier penetrated. Submit proposed method with proof of UL approval with other submittals.
- B. Pipe Sleeves:
1. Walls and Partitions:
    - a. Exterior Walls (Above Grade): Sleeves shall be mild steel pipe or plastic sleeves built into wall, partition or beam, sized to pass pipe and covering, leaving a clear space of 1/4-inch minimum between

covering and sleeve. Penetrations of fire rated barriers shall have mild steel sleeves.

- b. Exterior Walls (Below Grade): Sleeves with nominal 1/4-inch x 3-inch center flange (water stop) around the outside to be imbedded in the wall, constructed of cast iron, schedule 40 steel hot dipped galvanized after fabrication, or thermo-plastic designed for this application.
- c. Interior Walls: Sleeves shall be mild steel pipe or plastic sleeves built into wall, partition or beam, sized to pass pipe and covering, leaving a clear space of 1/4-inch minimum between covering and sleeve. Penetrations of fire rated barriers shall have mild steel pipe sleeves.
- d. Floors (Above Grade): Sleeves shall be 14 gauge galvanized sheet steel or plastic, set before floor is poured, sized to pass pipe and covering, leaving a clear space of 1/4-inch between covering and sleeve, and shall extend 1/2-inch above finished floor. Penetrations of fire rated barriers shall have mild steel pipe sleeves.

C. Sealing of Sleeves:

- 1. Sleeves Below Grade: Caulk annular space between pipe and sleeve using oakum and poured lead both sides minimum one inch to make wall penetration water tight. Specialty products, such as Thunderline's "Link-Seal", may be used.
- 2. Sleeves Above grade: Openings around pipes, duct, etc., passing through sleeves shall be made draft free and vermin-proof by packing solidly with mineral wool or fiberglass. Sleeves in exterior walls shall have outside surface of packing sealed with a weatherproof non-hardening sealant.
- 3. Sleeves through Fire Rated Barriers: Openings around pipes, etc., through fire rated barriers shall be sealed using a UL approved method rated at least equal to the wall or floor being penetrated.

2.04 **FLOOR, WALL AND CEILING PLATES OR ESCUTCHEONS, IN EXPOSED AREAS**

- A. Provide escutcheons or fabricated plates or collars at each location where pipe or duct passes through a finished surface. Escutcheons for flush sleeves shall be equal to Benton & Caldwell No. 3A chromium plated brass; for sleeves extending above floor shall be equal to Benton Caldwell No. 36 chrome plated brass.
- B. Collars or plates for larger diameter insulated pipe shall be fabricated of 18 gauge galvanized copper hearing sheet steel, secured to structure and neatly fitted around pipe.

2.05 **ACCESS DOORS**

- A. Provide as necessary for access to concealed valves, cleanouts, unions, expansion joints, dampers, coils, junction boxes, etc., where no other means of access is shown or specified.
- B. Door shall be manufactured by the Milcor division of Inland-Ryerson, or acceptable equal, type as follows:

Door Location	Door type
Drywall	Style "DW"
Masonry or tile	Style "M-Stainless"
Acoustical tile	Style "AT"
Plaster	Style "K"
Fire-rated walls	Style "Fire Rated"

- C. Each door shall be equipped with two flush, screwdriver operated, cam latches as a minimum. Hinged doors shall be provided unless location limits operation. Doors, other than Style "M", shall be finished to match adjacent surface. Door sizes shall be applicable to the access required for normal service.

2.06 **ELECTRICAL**

- A. General: Unless specifically specified otherwise, motors, starters, and control devices shall be furnished under the Section of specifications that covers the driven equipment.
- B. All electrical power wiring, conduits, and connections shall be provided under the Electrical Division.
- C. All control and interlock wiring, and conduit, shall be provided by Mechanical Division in accordance with the Electrical Division of the specifications.
- D. Contractor furnishing driven equipment shall coordinate wiring diagrams with contract requirements and shall furnish coordinated wiring diagrams for installation.
- E. Motors: Unless specifically noted otherwise in the Section covering the driven equipment (or the equipment drives), motors shall comply with the following:
  - 1. Three Phase: NEMA design B, three-phase, squirrel cage induction type designed for 1800 rpm synchronous speed for operation in 40 degrees C ambient at 1.15 service factor at constant speed on the scheduled voltage. Motors shall be insulated with Class B insulation material and shall be cast iron, drip proof, horizontal foot mounted type with ball bearings. Two speed motors shall be provided as scheduled and shall be two winding type. Motors shall be high-efficiency type.
  - 2. Single Phase: Squirrel cage induction type designed for 1800 rpm synchronous speed for operation in 40 degree C ambient at 1.15 service factor at constant speed on the scheduled voltage. Motors shall be insulated with Class B insulation materials and shall be two winding

capacitor start type with steel enclosure, drip proof, horizontal foot mount and ball bearings.

3. **Scheduled Horsepowers:** The horsepowers scheduled or specified are those nominal sized estimated to be required by the equipment when operation at specified duties and efficiencies. In the case of pumps, these horsepowers are non-overloading and may also include provisions for future planned impeller changes. If the actual horsepower for the equipment furnished differs from that specified or shown on the drawings, it shall be the Contractor's responsibility to insure that proper size feeders, breakers, starters, etc. are provided at no change in contract price.
4. **Outdoor Ambient Conditions:** Motors located in outside ambient conditions shall be Totally Enclosed Fan Cooled (TEFC) designed for 50 C ambient conditions.
5. **Motor Efficiency Requirements:**

Motor HP	Standard Eff	Hi Eff ODP
0.5	71.0	-
0.75	76.8	-
1.0	79.0	82.5
1.5	79.0	84.0
2.0	80.7	84.0
3.0	81.5	86.5
5.0	84.0	87.5
7.5	82.9	88.5
10.0	85.6	89.5
15.0	89.5	91.0
20.0	87.5	91.0
25.0	87.1	91.7
30.0	88.3	92.4
40.0	90.2	93.0

6. **Starters:** Shall be provided as work of the Plumbing Division and shall meet the requirements of the Electrical section entitled "Starters" if provided. Refer to the Section entitled "Variable Frequency Drives", if provided, for additional information on electric motors for that service.

## 2.07 **BELT DRIVES**

- A. Equip each motor driven machine (not direct connected) with V-belt drive. Belts shall be of correct cross section to fit properly in sheave grooves and shall be carefully matched for each drive. Sheaves shall be cast iron or steel, bored to fit properly on shafts and secured with keys of proper size. The rating of each drive shall be as recommended by manufacturer for service but shall be at least 1.5 times nameplate rating of motor.

- B. Fan Belt Drives: Variable and adjustable pitch sheaves shall be selected so that required fan RPM will be obtained with sheave set approximately in mid-position. Fans shall have drives in accord with the following table:

Output (Horsepower)	Fan Speed Motor (RPM)	Sheave Type
0 to 10	Up to 1800	Variable Pitch
15 and up	Up to 1800	Fixed Pitch
0 to 3	1801 and up	Variable Pitch
15 and up	1801 and up	Fixed Pitch

- C. Speed adjustment: Adjust fan speed as necessary to obtain proper design air flow with fan in its installed location. Fans which are to have fixed pitch drives may be first fitted with variable pitch drives until proper speed adjustment is made and then may be fitted with proper fixed pitch drive size, or alternate sizes of fixed pitch drives may be used until proper fan speed is obtained. Provide all drives necessary to obtain proper fan speed needed to deliver necessary air quantity.
- D. Vibration: Field vibration levels will not be acceptable if the maximum vibration velocity or displacement measurement exceeds the following values (when measurements are taken at the bearing supports of the driven equipment using a vibration analyzer with the filter set at the operating fan speed):

Fan Speed (RPM)	Maximum Vibration Level
800 or Less displacement	5 Mills (0.127 mm) max.
801 and Greater velocity	0.20 in/sec. (5mm/s) max.

## 2.08 BELT AND COUPLING GUARDS

- A. Each belt drive shall be equipped with a guard. Guards shall be constructed of substantial sheet metal #18 U.S. standard gauge or heavier. Braces or supports must not "bridge" sound and vibration isolators. Guards shall be designed with adequate provision for movement of motor required to adjust belt tension. Means shall also be provided to permit oiling, use of speed counters, and other maintenance and testing operations with guard in place.
- B. All direct drive equipment shall have coupling guards in compliance with OSHA requirements.

## 2.09 DIAGRAMS, NAMEPLATES AND LABELS

- A. Each major component of equipment shall have the manufacture's name, address and catalog number on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be accepted.
- B. In areas having equipment, valves and control devices, provide single line diagrams in Operation and Maintenance manuals. The diagrams shall give name, number designation, and location of each piece of equipment, valve, and control device.

- C. All pieces of equipment, valves, starters, disconnects, and all control instruments and apparatus shall be identified with 1/16 inch thick black laminated plastic nameplate with 3/16 inch high white laminated letters. Similar and like equipment shall be designated with numerical suffix (example: VALVE, V-1). The nameplate identification shall coincide with items appearing on diagrams. Colors and sizes may be changed to conform to an existing Owner's Identification System.
- D. All labels shall be securely affixed to equipment, or to supporting surfaces adjacent to small equipment.

#### 2.010 **PAINTING AND MARKING**

- A. **Painting:** Painting of equipment and pipe (insulated or uninsulated) is specified under the "PAINTING" Division of these specifications.
- B. Touch-up of shop coat shall be performed under section furnishing equipment.
- C. Refer to the requirements of the Section IDENTIFICATION OF PIPING in the Mechanical Division if included.

#### 2.011 **HOUSEKEEPING PADS**

- A. Provide six inch (6") high reinforced concrete (#10 mesh with 1-1/2" top cover) housekeeping pad for each piece of floor or grade-mounted equipment, unless shown otherwise on the drawings.
- B. The housekeeping pad shall extend six inches (6") beyond the equipment in all directions and shall be continuous beneath the base, unless shown otherwise on the drawings.
- C. Pads shall have chamfered edges and shall be poured and finished smooth and level to insure proper and continuous support for the equipment base bearing surfaces.
- D. Provide embedded anchor bolts to suit equipment base and grout all bearing surfaces true prior to securing base to housekeeping pad. Isolate equipment base from pad with 1/8" thick neoprene material.

### PART 3 - INSTALLATION

#### 3.01 **INSTALLATION AND WORKMANSHIP**

- A. The work shall be performed by qualified mechanics and all materials, apparatus and equipment shall be installed in neat, workmanlike manner. Any material, apparatus or equipment which, in the opinion of the Engineer, is improperly installed shall be removed and reinstalled in an approved manner at no additional cost to the Owner.
- B. The work shall be coordinated with the work of other trades. Where the work is dependent upon work of other trades or work already in place, such other work and work in place shall be examined and shall be in proper condition and state of completion before continuing the installation.



### 3.02 **STORAGE OF MATERIALS**

- A. Use of site for storage of materials shall be in accordance with the DIVISION 01 – GENERAL REQUIREMENTS, and such other provisions of these Contract Documents that may limit or restrict use of the project site.
- B. The Contractor shall protect all materials and equipment from the time of receipt until the time of building acceptance by the Owner. Material and equipment shall be protected at all times from physical damage and from the effects of weather and humidity. Materials and equipment that are to be installed indoors should be stored indoors if possible. Coordinate the installation of the material and equipment with related work and finishing of adjacent surfaces to prevent damage to the equipment or adjacent finishes. Replace or repair to the Engineer's satisfaction any damaged equipment

### 3.03 **EXCAVATION AND BACKFILL**

- A. Refer to DIVISION 02 – EXISTING CONDITIONS, and DIVISION 23 – MECHANICAL SITEWORK if provided.
- B. Provide as necessary to accomplish work specified. Perform in accordance with applicable State and Local codes and accepted good practice.

### 3.04 **PROTECTION OF WORK UNTIL FINAL ACCEPTANCE**

- A. Contractor shall protect all materials and equipment from physical damage, the entrance of dirt and construction debris, and the effects of weather, from the time of installation until final acceptance.
- B. Any materials and equipment that has been damaged shall be repaired to "as new" condition, or replaced at the direction of the Engineer. Where minor damage occurs to factory, damaged finishes may be touched up with factory-provided finishing materials. If, in the opinion of the Engineer the damage is excessive, factory finish shall be replaced to "new" condition.

### 3.05 **TEST**

- A. General: All systems shall be inspected, tested, given a trial run, and demonstrated to Engineer's and Owners satisfaction that they are complete, operational, and ready for use.
- B. Plumbing Waste and Soil Lines: Shall be inspected and tested in accordance with local codes.
- C. Piping; unless required otherwise by code or other divisions of specifications, pressure piping shall be tested at pressure of one hundred fifty percent (150%) of normal working pressure. Contractor shall valve off or otherwise isolate all equipment from piping pressure test so as to prevent damage to the equipment.
- D. Specialty systems shall be tested as described in their individual Sections of the specifications.

3.06 **INSTRUCTION AND MAINTENANCE MANUALS**

- A. Refer to the Section entitled OPERATION AND MAINTENANCE MANUALS.
- B. Refer to individual specifications Sections for specific instruction requirements.

3.07 **ACCEPTANCE**

- A. Prior to requesting final inspection:
  - 1. Complete all work required by drawings and specifications.
  - 2. Provide test and balance report to Engineer at least two (2) days prior to time of final inspection.
  - 3. Contractor shall furnish necessary mechanics, furnish test instruments and equipment as required to make necessary adjustments, and to assist with the final inspection.
- B. Acceptance will be made by Engineer on the basis of tests and inspection of project.

End of Section

**Article I      220700      THERMAL INSULATION**

**PART 1 - GENERAL**

**1.01    SCOPE**

- A.    Provide labor and materials to insulate equipment, piping, and miscellaneous items in the piping systems as indicated on the drawings and specified herein.

**1.02    RELATION TO OTHER WORK**

- A.    Refer to the Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.
- B.    No insulation adhesives, materials or finishes shall be applied until the item to be insulated has been completely installed, tested and proved tight.

**1.03    SUBMITTALS**

- A.    Submittals shall contain complete descriptive and engineering data, including flame spread and smoke developed ratings (ASTM E84 test method), on all materials and adhesives.
- B.    Where finishes, covers, or jackets are specified, provide complete data on same.
- C.    Submittals shall contain specified information on product: density, conductivity, conductance, or resistance as required establishing conformance with the specified values or materials.
- D.    Where compliance with an industry, society, or association standard is specified or indicated, certification of such compliance shall be included in the submittal.

**1.04    STORAGE OF MATERIALS**

- A.    Insulation, adhesives, and finishes may be stored at the site provided that they are stored in such a manner as to protect them from damage. Use of the site shall comply with the General Conditions and such other provisions of the Contract Documents as may limit or restrict said use.
- B.    Do not store flammable materials within the building.
- C.    Do not store fiberglass insulation within the building until it has been "dried in". If no other dry space is available and this insulation must be installed or stored before the building is "dried in" and completely enclosed, provide polyethylene film cover wrap for protection.

## **1.05 INDUSTRY STANDARDS**

- A. All materials and adhesives used on piping systems shall conform to the requirements of NFPA 90A as to flame spread and smoke developed ratings.
- B. All products shall bear labels indicating their compliance with the requirements of NFPA 90A as to the flame spread and smoke developed ratings.

## **1.06 MANUFACTURER**

- A. Manufacturers are indicated in "Basis of Design" to establish the quality and performance standards of the desired material.
- B. Other manufacturers whose products are equal in all respects to those specified may be submitted for approval. "Equal in all respects" shall be determined by the Engineer.

## PART 2 - MATERIALS

### **2.01 INSULATING MATERIALS**

- A. Preformed Glass Fiber Pipe Insulation with All Purpose Self-Sealing Jacket:
  - 1. Uniform construction of long glass fibers bonded in resin, with factory applied jacket.
  - 2. Thermal conductivity "k" factor at 75°F of 0.25 or less.
  - 3. Water vapor permeability of 0.02 perm/inch or less.
  - 4. Fire/smoke rating of 25/50 or less.
  - 5. Suitable for piping temperatures up to 500°F.
  - 6. Basis of Design: John Manville "Micro-Lok" with AP-T Plus jacket.
- B. Removable Insulation Blankets:
  - 1. Provide removable insulation blankets fabricated to fit the configuration of the item being insulated, i.e., pump, valve, etc. The blankets must fit with no resulting gaps or compression of the insulation in order to maintain their insulating effectiveness. All materials shall be temperature resistant to 500°F minimum.
  - 2. Insulating filler: Glass fiber, matted, 10 lbs/cu.ft. density, conforming to MIL-1-16411 Type 11, or Alumina Silica Refractory fiber matting.
  - 3. Hot/Cold Face Enclosure Material: Alpha Style C911-3259 silicone impregnated glass fiber fabric, 17.5 oz./sq.yd. total weight, 24% of which is silicone.

4. Fasteners: Velcro one inch (1") wide straps permanently sewn to blanket with opposing securement flap sewn in the appropriate location.
5. Basis of Design: "The M.A.C. Group"

## **2.02 ADHESIVES, MASTICS, SEALANTS, AND COATINGS**

### **A. Adhesives:**

1. Fiberglass Insulation to Metal: Quick setting, non-flammable, fire resistive adhesive serviceable from -20°F to 180°F, fire/smoke rating of 25/50 or less.
  - a. Basis of Design: Fosters 85-20.
2. Elastomeric Insulation Adhesive: Note flammability and safety precautions necessary with this adhesive. Do not store this adhesive inside the building. Shall have dried film composite fire/smoke rating of 25/50 or less.
  - a. Basis of Design: Armstrong 520 Adhesive.

### **B. Mastics:**

1. For elastomeric insulation: Breathing type mastic coating, tough, durable, fire-resistive, for use with 10 x 10 glass fabric mesh.
  - a. Basis of Design: Childers AK-CRYL CP-9.
2. For Insulated Ductwork: General purpose asbestos free high solids water-based mastic designed for trowel/glove or brush/spray application. Serviceable from -20°F to 200°F; Fire/smoke rating of 25/50 or less; maximum permeability of 3.0 perm inch; non-flammable and non-toxic; UL and USDA compliant.
  - a. Basis of Design: Foster "SEALFAS G-P-M" 35-00 / 45-00.

### **C. Sealants:**

1. Cellular Glass Vapor Barrier Sealant: Butyl based non-hardening vapor barrier sealant, serviceable from -70°F to 180°F, specifically designed for use with cellular glass. Water and weather resistant, water permeability of 0.01 perm inch or less.
  - a. Basis of Design: Pittseal 444N.
2. Vapor Barrier Sealant: Fast setting, water resistant adhesive-sealant designed for bonding two impermeable surfaces. Non-flammable in wet state. Serviceable from -20°F to 200°F. Fire/smoke rating of 25/50 or less.

- a. Basis of Design: Foster's 85-75 Contact Bond Cement.
- D. Coatings and Fabrics:
- 1. Cellular Glass Bore Coating: Factory applied vinyl base anti-abrasive compound specifically designed for use with cellular glass insulation.
    - a. Basis of Design:
  - 2. Cellular Glass Coating and Joint Sealant: Acrylic latex water base, highly flexible, fire resistive coating, serviceable from -30°F to 180°F, permeability of 0.4 perm inch, Fire/Smoke rating of 25/50 or less.
    - a. Basis of Design: Pittcote 404.
  - 3. Cellular Glass Coating: Asphalt based coating, serviceable from -40°F to 200°F, with permeability of 0.4 perm inch.
    - a. Basis of Design: Pittsburgh Corning "Pittcote 300" (for outdoor use only).
  - 4. Fabric: Polyester mesh fabric. 0.125 inch mesh opening, high tensile strength.
    - a. Basis of Design: Pittsburgh Corning Fabric 79.

## 2.03 FINISHES

- A. Elastomeric Weather-Resistant Insulation Finish: Note flammability and safety precautions necessary with this finish. Do not store this finish inside of the building. Shall have dried film composite fire/smoke rating of 25/50 or less.
  - 1. Basis of Design: Armstrong Armaflex finish.
- B. Thermal Insulation Coating: Tough, washable, abrasive resistant, non-flammable coating for thermal insulation not requiring an external vapor barrier. Serviceability from 0°F to 180°F. Fire-smoke rating of 25/50 or less.
  - 1. Basis of Design: Foster's 30-36 Coating.
- C. Pipe Jacketing: Aluminum jacketing, 0.016 inches thick, type 3003 alloy, H-14 temper, circumferentially corrugated, with a continuously laminated moisture barrier of one mil polyethylene film and a protective layer of 40 lb. virgin paper.
  - 1. Basis of Design: Childers Products Co. "Corrolon".
- D. Pipe Fitting Covers: Aluminum fitting covers, 0.20 inches minimum thickness, type 3003 alloy, H-14 temper prefabricated fitting covers with baked epoxy moisture barrier for pipe sizes through 24". Field fabricate fitting covers for pipe

sizes larger than 24" using 0.020 inches thick aluminum roll jacketing with laminated polyethylene/kraft moisture barrier.

1. Basis of Design: Childers Products "Ell-Jacs", "Gore Ell-Jacs", "Tee-Jacs", "End-Caps", "Beveled Collars", "Valve Fitting Covers", and "Flange Jacs".
- E. Flexible Insulation Jacket for Below Grade Use: Prefabricated laminate containing a 10x10 asphalt impregnated glass fabric and a one mill thick aluminum foil sandwiched between three layers of bituminous mastic. The exposed (outer) surface shall be coated with a plastic film and the inner surface with a release paper. Total thickness shall be not less than 125 mils.
1. Basis of Design: Pittsburgh Corning "PITTWRAP" (heat seal).
- F. Flexible, non-metallic Insulation Jacket for Below Grade Use on Chilled Water Piping: Self-sealing non-metallic sheet material not requiring torch or heater, 50 mil thickness, composed of polymer-modified bituminous compound reinforced with glass fabric and a one mil thick aluminum top surface film, used for protection of above ground cellular glass insulation systems.
1. Basis of Design: Pittsburgh Corning "PITTWRAP CW Plus".

## **2.04 MISCELLANEOUS MATERIALS**

- A. Tape: No tape is approved for this project for the fastening of sections of insulation. Tape matching the insulation jacket may be used to seal minor jacket punctures.
- B. Wire: 16 gauge dead soft copper or 16 gauge stainless steel.
- C. Screws: Aluminum pan head type "A", slotted, #8 by 1/2 inch.

## **PART 3 - INSTALLATION**

### **3.01 GENERAL**

- A. The insulation of a particular item shall be considered as an insulation system. All components of this system, including adhesives mastics, sealants, coatings, and finishes, shall be as recommended by the insulation manufacturer as compatible for use with his insulation.
- B. The installation of the insulation system shall be in accordance with the insulation manufacturer's recommendations.

### **3.02 DOMESTIC WATER AND HOT WATER RECIRCULATING PIPING**

- A. Insulate all hot water and hot water recirculating pipe, valves, and fittings with 1" thick, three and one-half (3-1/2) pound density fiberglass insulation with longitudinal seams lapped and butt joints covered with three inch-wide strip. All

joints to be stapled with outward cinch staples and set with vapor barrier adhesive. All fittings, etc., to be mitered and covered with glass fab and mastic. Leave pipe bare one foot each side of aquastats.

- B. Insulate all cold water pipe, valves, and fittings located outside of the building thermal envelope (but in areas protected from weather exposure) with 1" thick, three and one-half (3-1/2) pound density fiberglass insulation with longitudinal seams lapped and butt joints covered with three inch-wide strip. All joints to be stapled with outward cinch staples and set with vapor barrier adhesive. All fittings, etc., to be mitered and covered with glass fab and mastic.

### **3.03 INSULATION FIT**

- A. Where insulation is applied to pipe or equipment, it shall be installed with all joints fitted to eliminate voids.
- B. Voids shall not be filled with joint sealant, but shall be eliminated by refitting or replacing insulation.

### **3.04 PROTECTION OF WORK**

- A. Protect all finishes and vapor barrier seals from damage prior to final acceptance and make repairs to damaged finishes or vapor barriers immediately.
- B. Protect adjacent surfaces from damage or spillage during installation and cleanup any spillage or spatters of adhesives or finishes immediately.

End of Section



**Article I. 221100 POTABLE WATER PIPE, VALVES AND FITTINGS**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Provide potable water piping systems complete as indicated on the drawings.
- B. Drawing scales prohibit the indication of all offsets, fittings, sleeves, and similar items; however, these items shall be provided to form a complete and properly installed system at no additional cost to the Owner.
- C. Contractor may use either the copper or the plastic piping systems specified, provided it is in compliance with all codes and ordinances. Plastic piping in return air plenums must be manufactured, tested, and approved for such use.

**1.02 RELATION TO OTHER WORK**

- A. Refer to Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.
- B. Refer to the Section entitled HANGERS AND SUPPORTS. Piping systems requiring fixed locations and slopes shall have priority over those which do not have these requirements.
- C. Refer to the Section entitled THERMAL INSULATION in the MECHANICAL DIVISION.

**1.03 SUBMITTALS**

- A. Refer to Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.

**1.04 MANUFACTURER**

- A. Items used as a basis of design to set standards of quality and design are indicated where used. Unless otherwise stated, products of other manufacturers which equal or exceed the quality and design of the indicated item(s) may be submitted for approval.
- B. Manufacturers listed as "Acceptable" in addition to the basis of design shall limit the acceptable manufacturers to those listed.

**PART 2 - MATERIAL AND EQUIPMENT**

**2.01 PIPE - BELOW GRADE**

- A. Hard drawn copper, Type K, ASTM B 88.

- B. Chlorinated Polyvinyl Chloride (CPVC) plastic pipe, ASTM D 2846, ASTM F 441, NSF Std. 14.

## **2.02 PIPE-ABOVE GRADE**

- A. Hard drawn copper, Type L, ASTM B 88.
- B. Chlorinated Polyvinyl Chloride (CPVC) plastic pipe, ASTM D 2846, ASTM F 441, NSF Std 14.

## **2.03 FITTINGS**

- A. Pipe Below Grade: Copper: Wrought copper, solder joint, pressure type, schedule 80, ANSI B16.22.
- B. Above Grade: Copper: Wrought copper, solder joint, pressure type, ANSI B16.22.
- C. CPVC: CPVC Socket Type, ASTM D 2846, ASTM F 439, NSF Std.14.

## **2.04 SOLDER**

- A. Lead Free Composition 95.5% tin, 4% copper, 0.5% silver, Engelhard "Silvabrite 100".
- B. Lead Free Composition Sb5 (95% tin, 5% antimony).
- C. Sil Fos.

## **2.05 WALL, FLOOR, AND CEILING ESCUTCHEON PLATES**

- A. Chromium plated brass, split, spring lock type, and or chromium plated brass, one piece, non-adjustable.

## **2.06 DIELECTRIC ISOLATORS**

- A. EPCO insulated unions or companion flanges or F.H. Mahoney Type E, Series 15, flange insulation sets with appropriate flanges. Coupling type isolators are not acceptable.

## **2.07 SHOCK ARRESTERS**

- A. Shall be manufactured, tested and certified in accordance with PDI-WH201. Provide ball valve between system and shock arrester. Acceptable Josam; Wade; Zurn; or Smith.

## 2.08 RELIEF VALVES

- A. ASME rated, size and setting as indicated on drawings.

## 2.09 VALVES

- A. General: Valve numbers indicated are to set standard of quality and design.
- B. Ball Valves (2" and Smaller): Bronze body, stainless steel ball and stem, teflon seats and rings, and threaded ends. Where valve is located in an insulated line, provide extended tee handle with memory stop. Acceptable: Watts No. B-6800-SS-VT, Apollo #82-100.
- C. Ball valves (2-1/2" to 4"): Bronze body, stainless steel ball and stem Teflon seats and rings, and flanged ends. Where valve is located in an insulated line, provide extended tee handle with memory stop. Acceptable: Watts No. B-6000-SS-04.
- D. Globe Valves: Solder joint, bronze body, union bonnet, composition disc, 300 lb. WOG. Acceptable: Crane No. 1707-AS, NIBCO S-413-B or Hammond IB 912.
- E. Check Valves: Solder joint, swing check, screwed cap, bronze disc, Y pattern, 125 lb. SWP, 200 lb. WOG. Acceptable: Crane No. 1707S, NIBCO S-413-B or Hammond IB 912.
- F. Hose Bibb: Acorn Series 8121 with 3/4" hose threads, integral vacuum breaker, and vandal-proof lock-shield with key handle, polished chrome plated finish. Acceptable: Woodford, NIBCO.
- G. Butterfly Valves:
  - 1. Pattern: Valves for dead end service shall be of the threaded lug body type (at connections to equipment and system expansion points where portions of piping must be removed for service or access). Valves for in line service may be wafer or threaded lug body type. All valves shall have extended necks for insulation clearance.
  - 2. Body: Cast iron.
  - 3. Disc: Bronze or semi-steel with welded nickel edge, 416 stainless steel shaft, bronze bearings and Hycar seals.
  - 4. Seat: Hycar bonded to a backup ring which, on lug body valves, shall have metal seat retaining ring for positive dead end shut-off under load. All valves shall be capable of bubble tight shut-off at pressure differentials of 175 psig.
  - 5. Operators:
    - a. Valves 2" Through 6": Shall have infinite position lever with memory stop.

- b. Valves 8" and Larger: Shall have gear type operators with: chain wheel, hand wheel, or crank type operating mechanisms as indicated on the drawings.
  - c. Provide stem extensions (in addition to insulation clearance extension specified hereinbefore) as required to place operators in an easily accessible location free of interference with adjacent piping, equipment, structure, and the like.
6. Acceptable: Dezurik Figure 632.
- H. Electric Emergency Shutoff Valves: Ball Valve, spring return, with ISIMET low wattage electric solenoid actuator having Normally Closed (NC) action (valve closes on loss of power).

## **2.010 BACKFLOW PREVENTER**

- A. Shall be a reduced pressure type, consisting of two independently operated, spring loaded poppet type check valves arranged in tandem with a protective zone of reduced pressure between them. This zone is controlled by a mechanically independent diaphragm-actuated relief valve that depends solely on hydraulic line pressures for operation.
- B. Drain Assembly: Provide vented elbow for small backflow prevention devices and air gap drain connectors for large backflow prevention devices.
- C. Acceptable: Hersey Aergap Model FRP II sizes 3/4 inch to 2 inch and Model 6CM sizes 2-1/2 inch to 10 inch.

## **PART 3 - INSTALLATION**

### **3.01 GENERAL**

- A. Piping shall be run parallel to the walls and ceilings in a neat and workmanlike manner and shall be offset as required to avoid interference with the structural or architectural features and the work of other trades.
- B. Piping shall be installed with provisions for expansion both horizontally and vertically in all long runs including runouts from risers.
- C. Completely encase buried copper tubing and cast ductile iron piping with polyethylene tube or sheet material in accordance with AWWA C-105.
- D. Insulated Piping: Hangers shall be oversized to allow insulation to be run continuously through the hanger. Supports shall have insulation material sized to meet insulation thickness and have adequate support strength.

### **3.02 JOINTS AND CONNECTIONS**

- A. General: Joints and connections shall be made permanently air, gas, and water tight.
- B. Solder joints: Cut pipe square using pipe cutting tool which does not crimp the pipe. Remove all burrs using pipe reamer and taking care not to flare the pipe end. Thoroughly clean the outside of the pipe and the interior of the valves and fittings using a fine sand cloth. Apply non-corrosive paste flux to the cleaned surfaces immediately and apply solder and heat in accordance with manufacturer's instructions to complete joint. Use care not to damage valves and follow the valve manufacturer's installation instructions explicitly.
- C. Socket Joints: Cut piping square using pipe cutting tool. Remove all burrs using a pipe reamer or file. Thoroughly clean outside of pipe and inside of fittings with solvent. Apply cement in accordance with manufacturer's recommendations.
- D. Equipment Connections:
  - 1. General: connections to equipment shall be made in accordance with details on the drawings and the equipment manufacturer's installation instructions.
  - 2. Where incompatible piping materials come in contact, except for use of valves, isolate the two materials using dielectric isolators.
  - 3. Provide roughing materials and connect equipment under other sections of the specifications or by the Owner as indicated on the drawings, in the schedules, and as specified.
  - 4. 2 Inches and Smaller: Shall be made with unions.
  - 5. 2-1/2 Inches and Larger: Shall be made with flanges.

### **3.03 VALVES**

- A. All valves, stops, pressure regulators and similar items shall be installed in an easily accessible location.
- B. Provide access panels for all concealed valves.
- C. Classroom Electric Emergency Shutoff Valves shall be installed above the ceiling at the location of the manual valve shutoff panel upstream of the manual shutoff valve shown on the drawings. Coordinate with Electric Emergency Control Panel provided by the Electrical Division.

### **3.04 SHOCK ARRESTERS**

- A. Provide as indicated on the drawings.

- B. Provide ahead of all solenoid valves.

### **3.05 SERVICE CONNECTIONS**

- A. Make application to proper authority and obtain water connections.
- B. The Contractor shall include the cost of all components as per the General Conditions including meter and tap fees.

### **3.06 TEST**

- A. Test piping systems prior to the application of any insulation and prior to their being rendered inaccessible by the progress of the work.
- B. Pressure test the potable water piping at one hundred fifty percent (150%) of working pressure.
- C. The system shall hold the pressure for such time as required to indicate its integrity to the satisfaction of the Engineer but in no case less than one hour.

### **3.07 CLEANING**

- A. The pipe, valves, and fittings shall be kept clean and protected from the entrance of dirt, non-potable water, and construction debris during the installation process.
- B. The system shall be thoroughly flushed and then sterilized.

### **3.08 STERILIZATION**

- A. All potable water piping shall be disinfected with a mixture containing not less than 0.6 pound of high-test (70% available chlorine) calcium hypochlorite, or 2 pounds of chlorinated lime to each 1000 gallons of water to provide not less than 50 ppm of available chlorine.
- B. The mixture shall be injected into the system and retained for not less than 12 hours.
- C. The system shall then be drained, flushed with potable water and placed in service.
- D. Upon completion of the sterilization process the contractor shall take samples for three consecutive days to the local health department for testing. The contractor shall pay for the testing and provide reports of the testing results to the Engineer.

END OF SECTION

**Article I      221300      SOIL, WASTE, VENT, AND DRAIN PIPING SYSTEMS**

**PART 1 - GENERAL**

**1.01      SCOPE**

- A.      Provide soil, waste, vent, and drain piping systems complete as indicated on drawings.
- B.      Drawing scales prohibit the indication of all offsets, fittings, sleeves, and similar items; however, these deviations shall be provided as work of this section at no additional cost to Owner.
  - 1.      Contractor may use either the cast iron or the plastic piping systems specified, provided it is in compliance with all codes and ordinances. Plastic piping is not permitted in return air plenums unless specifically approved for that purpose.

**1.02      RELATION TO OTHER WORK**

- A.      Refer to Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.
- B.      Refer to Section entitled HANGERS AND SUPPORTS.
- C.      Piping systems requiring fixed locations and slopes shall take priority over those which do not have both requirements.

**1.03      SUBMITTALS**

- A.      Refer to Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.

**1.04      MANUFACTURER**

- A.      Where a specific manufacturer's product is listed as the basis of design, it is to set the level of design and quality of the item to be furnished. Equal products of other manufacturers may be submitted for approval.
- B.      Where specific manufacturers/or products are listed as "Acceptable", only selections from those listed products will be approved.

**PART 2 - MATERIAL AND EQUIPMENT**

**2.01      PIPE - BELOW GRADE**

- A.      Cast iron soil pipe, hub and spigot pattern, No-hub pattern, service weight, coated with coal-tar pitch varnish. Each piece of pipe shall be marked with weight and manufacturer's name and identification mark of Cast Iron Soil Pipe Institute, signifying compliance with ASTM A 74 or ASTM A 888, and CISPI 301. Coupling joints shall comply with ASTM C564 and CISPI 310.

- B. Polyvinyl Chloride (PVC) pipe, ASTM D 2665.

## 2.02 **PIPE - ABOVE GRADE**

- A. Cast iron soil pipe, no-hub pattern, service weight, coated with coal-tar pitch varnish. Each piece of pipe shall be marked with weight and manufacturer's name and identification mark of Cast Iron Soil Pipe Institute, signifying compliance with ASTM A 888 and CISPI 301. Coupling joints shall comply with ASTM C564 and CISPI 310.
- B. Polyvinyl Chloride (PVC) pipe, ASTM D 2665.

## 2.03 **FITTINGS**

- A. Cast iron soil pipe, hub and spigot and/or no-hub pattern, service weight, coated with coal-tar pitch varnish, each fitting be marked with weight and manufacturer's name and identification mark of Cast Iron Soil Pipe Institute, signifying compliance with ASTM A 74, ASTM A 888, and CISPI 301. Coupling joints shall comply with ASTM C564 and CISPI 310.
- B. Polyvinyl Chloride (PVC) pipe: socket weld fittings, ASTM D 2665.

## 2.04 **PIPING SPECIALTIES**

- A. Lead:
  - 1. Sheet: Weight not less than four (4) pounds per square foot, conforming to Fed. Spec. QQ-L-201, Grade A.
  - 2. Solvent: Polyvinyl Chloride (PVC) solvent, ASTM D 2665.

## 2.05 **CLEANOUTS**

- A. Floor Cleanouts:
  - 1. Cast Iron with anchor flange and adjustable height housing, polished nickel bronze rim, scoriated floor plate with "CO" cast into the top surface, designed with countersunk screws for flush installation. Basis of Design: J.R. Smith 4000 Series.
- B. Wall Cleanouts:
  - 1. Brass plug with round stainless steel secured access cover. Basis of Design: J.R. Smith Figure 4422
  - 2. Brass plug with square nickel-bronze frame and secured smooth stainless steel access cover. Basis of design: J.R. Smith Figure 4435



3. Exterior cleanouts:
  - a. Cast iron cleanout ferrule with anchor flange, outlet for push joint or no-hub connection, and countersunk brass cleanout plug.  
Basis of Design: J.R. Smith Figure 4280

### PART 3 - INSTALLATION

#### 3.01 **GENERAL**

- A. Horizontal piping shall be run in practical alignment at a uniform slope of not less than one-quarter inch (1/4") per foot for three inch (3") pipes and smaller, and one-eighth inch (1/8") per foot for four inch (4") pipes and larger.

#### 3.02 **EXCAVATION AND BACKFILL**

- A. Provide in accordance with Division 2, SITE WORK, and in compliance with local plumbing codes.

#### 3.03 **SUPPORT**

- A. Provide support in accordance with local codes, but not less than as follows:
  1. Horizontal Piping:
    - a. Cast Iron Pipe: Support at intervals not exceeding ten feet (10') for hub and spigot pipe sections, on all horizontal soil, waste, drain and vent piping. Support at each turn and each fitting, and each connection.
    - b. Polyvinyl Chloride (PVC) Pipe: Support pipe at not more than five feet (5') wide intervals.
  2. Vertical Piping: Secure piping at sufficiently close intervals to maintain alignment and support weight of the pipe and its contents. Support all stacks at their base and at regular intervals in the risers. Where structural elements are not available for support, secure pipe in its proper position by means of adequate bracing fastened to pipe.
  3. Hangers shall be placed not more than eighteen inches (18") from each joint in run of pipe.
  4. Support terminal ends of all runs or branches and each change of direction or alignment with an approved hanger.
  5. Firmly secure all closest bends installed above grade.

### 3.04 JOINTS AND CONNECTIONS

- A. General: Joints and connections shall be made permanently air, gas, and water tight.
- B. Cast Iron Hub and Spigot Joints: Insert the spigot into hub after carefully cleaning both. Insert an oakum strand into joint sufficiently long to make three (3) turns around pipe and of a diameter that can be pressed into the joint by hand. Drive the oakum to the bottom of joint using a yarning iron, then pack solidly and evenly using a packing iron and hammer. Insert additional strands of oakum sufficient to fill the joint to within one-half inch (1/2") of the top and then pack with hammer and packing iron to form a uniform surface one inch (1") below top of the hub. Pour molten lead into the joint until it arches slightly above top of the hub. Allow lead to cool and drive it down at quarter points using a caulking iron. Caulk the joint on the inside and outside edges using one pound ball peen hammer and appropriate caulking irons.
- C. Cast Iron No-Hub Joints:
  - 1. Place neoprene sealing sleeve on end of one pipe and stainless steel shield and clamp assembly on the end of the other pipe. Firmly seat pipe ends against the integrally molded shoulder of the neoprene sleeve. Slide the shield and clamps into position over sleeve and tighten the stainless steel clamps alternately and firmly to approximately forty-eight inch-pounds of torque.
  - 2. Provide thrust restraints on storm drain piping where change in direction exceeds 45 degree bends.
- D. Socket Joints: Cut piping square using pipe cutting tool. Remove all burrs using a pipe reamer or file. Thoroughly clean outside of pipe and inside of fittings with approved solvent. Apply approved cement and fit joints in accordance with pipe, fitting and cement manufacturer's recommendations.
- E. Equipment Connections:
  - 1. General: Connections to equipment shall be made in accordance with details on the drawings and the equipment manufacturer's installation instructions. Where incompatible piping materials come in contact, except for use of valves, isolate the two materials using dielectric isolators. Provide roughing materials and connect equipment under other sections of the specifications or by the Owner as indicated on the drawings, in the schedules, and as specified.
  - 2. 2 Inches and Smaller: Shall be made with unions.
  - 3. 2-1/2 Inches and Larger: Shall be made with flanges.

3.05 **FLASHINGS**

- A. Provide proper flashing for pipes passing through roofing.
- B. Flashings shall be of sheet lead with flanges not less than eighteen inches (18") square and with tubular sections extending over top of the vent and turned into top approximately one inch (1").
- C. Vent extension shall stand approximately one foot (1') above roof.
- D. Provide for expansion where lead turns into pipe.

3.06 **TEST**

- A. Test piping systems prior to application of any insulation and prior to their being rendered inaccessible by the progress of the work.
- B. All soil, waste, vent, and drain piping shall be inspected and tested in accordance with local codes.
- C. Before the installation of fixtures, cap the ends of each system, fill the piping with water to the highest point, and allow to stand until a thorough inspection has been made. After the plumbing fixtures have been set and their traps filled with water, subject the entire sanitary system to a final air pressure test of not more than 1.0 inch of water column and a smoke or peppermint test. Perform the air and smoke test with an approved smoke testing machine which must shown a clear passage of smoke and air throughout the entire system. The entire system must be proven absolutely tight under such test.

End of Section

**Article I      221321      OIL/WATER SEPARATOR AND OIL STORAGE TANK**

**PART 1 - GENERAL**

**1.01      SCOPE**

- A.      Provide factory fabricated oil/water separator and waste oil tank assembly as noted herein. System shall be operation at completion of the installation since this is an active facility and the system needs to be operational in a timely manner.
- B.      Drawing scales do not permit the indication of all offsets, fittings, sleeves and similar items; however, these items shall be provided as work of this division at no additional cost to the Owner.

**1.02      RELATION TO OTHER WORK**

- A.      Refer to the Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.
- B.      Piping systems requiring fixed locations and slopes shall have priority over those which do not have both requirements.

**1.03      SUBMITTALS**

- A.      Refer to Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.

**1.04      MANUFACTURER**

- A.      Where a specific manufacturer's product is listed as the basis of design, it is to set the level of design and quality of the item to be furnished. Equal products of other manufacturers may be submitted for approval.
- B.      Where specific manufacturers/or products are listed as "Acceptable", only selections from those listed products will be approved.

**PART 2 - MATERIAL AND EQUIPMENT**

**2.01      OIL/WATER INTERCEPTOR**

- A.      Furnish and install, factory fabricated, high-efficiency oil/water separator. The factory-assembled units shall be designed for above ground installation on a concrete pad. Oily water, which is collected in an in-ground surge pit system, shall be transferred to the separator. The oil/water separator shall be fabricated from mild steel and shall be coated on the inside and outside with a durable, corrosion-resistant, two-part bitumastic coating. "V" bottom solids collector in the inlet chamber, flow control on the inlet, hinged top, pre-piped drainage manifold assembly with valves to control the drainage from each compartment, an adjustable oil draw-off port, inlet and outlet ports, and an internal water storage

compartment. The separator shall incorporate a high-efficiency, multi-stage design with automatic gravity decanting and include multiple continuous skimming with adjustable primary, secondary and final skimmers utilizing water as a carrier in the skimming operation and be designed to prevent accumulation of oil in the separating chambers.

1. Manufacturer: Jay R. Smith Manufacturing Co; ULTRACEPT Model 8625-03M.
2. Threaded Connections; Inlet, Outlet, and Waste-Oil Outlet.
3. Heater Kit Model ULTRACEPT Model 8610 HK – The heater kit shall be 3,000 watts at 120/240/1/60 with an adjustable thermostat and factory installed on the interceptor for field wiring.

**B. Oil Interceptor Capacity and Characteristics**

1. Flow Capacity – 25 GPM.
2. Overall Dimensions – 84 inches x 48 inches x 48 inches
3. Inlet Pipe Size – 2 inches, 43.82 inches centerline of inlet to floor.
4. Inlet and Outlet Pipe Size – 2 inches, 30 inches centerline of outlet to the floor.
5. Waste Oil Outlet Pipe Size – 1-1/2 inches, 26.19 inches centerline of outlet to floor.
6. Trapped Outlet Required – Integral
7. Internal Waste Oil Storage Capacity – 29 gallons,

**2.02 OIL SEPARATOR STORAGE TANK**

- A. Manufacturer – Jay R. Smith Model 05t-250
- B. Tank shall be fabricated of 12 gauge mild steel with factory applied epoxy-polyamide paint.
- C. Inlet and Outlet Connections – Install as indicated on Drawings
- D. Mechanical liquid level site gauge

## PART 3 - INSTALLATION

### 3.01 **GENERAL**

- A. Refer to the Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK. Complete systems shall be installed as indicated on drawings. Drawing scales prohibit the indication of all off-sets, fittings, etc.; however, these deviations shall be installed at no extra cost to Owner.

### 3.02 **INSTALLATION**

- A. Install pipe, oil/water separator and waste oil tanks according to manufacturer's written instructions. Set level and plumb.
- B. Make piping connections between interceptor, waste oil tank and piping systems.

### 3.03 **DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate and maintain system.

### 3.04 **CLEANING**

- A. Clean interior and exterior of interceptor and waste oil tank assembly before turning over to the owner.

**END OF SECTION**

**Article I      221500      COMPRESSED AIR PIPING SYSTEMS**

**PART 1 - GENERAL**

**1.01      SCOPE**

- A.      Provide compressed air piping system complete as indicated on the drawings and specified herein.
- B.      Drawing scales do not permit the indication of all offsets, fittings, sleeves and similar items; however, these items shall be provided as work of this division at no additional cost to the Owner.
- C.      Systems are designed for not more than 125 psig.

**1.02      RELATION TO OTHER WORK**

- A.      Refer to the Section entitled COMMON REQUIREMENTS FOR MECHANICAL WORK.
- B.      Refer to the Section entitled HANGERS AND SUPPORTS.
- C.      Piping systems requiring fixed locations and slopes shall have priority over those which do not have both requirements.

**1.03      SUBMITTALS**

- A.      Refer to Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.

**1.04      MANUFACTURER**

- A.      Where a specific manufacturer's product is listed as the basis of design, it is to set the level of design and quality of the item to be furnished. Equal products of other manufacturers may be submitted for approval.
- B.      Where specific manufacturers/or products are listed as "Acceptable", only selections from those listed products will be approved.

**PART 2 - MATERIAL AND EQUIPMENT**

**2.01      PIPE**

- A.      Black steel galvanized, continuous weld under 2 inches and seamless 2 inches and above, standard weight (Schedule 40 through 10 inches IPS), conforming to ASTM Std. Spec. A53.

## 2.02 **FITTINGS; SCREWED**

- A. Malleable iron, galvanized, 150 and 300 lb., ASTM A-47. Unions shall be 250 lb. minimum ground joint type. All couplings, regardless of size shall be taper tapped; i.e., couplings 2 inches and smaller shipped with pipe are not acceptable for use in the piping system.

## 2.03 **DIELECTRIC ISOLATORS**

- A. Unions: For pipe sizes two inches and under EPCO insulated unions with screw or solder joint connections to suit pipe and equipment.
- B. Flanges: For pipe sizes two and one-half inches and over; Pilco Products flange insulation sets with phenolic retainer, nitrile rubber seal element, polyethylene sleeves and double washer sets.

## 2.04 **VALVES**

- A. General: Valve numbers indicated are to set standard of quality and design. Valves manufactured by other first line manufacturers may be submitted for approval.
- B. Gate Valves 2 Inches and Smaller: NRS, screwed, bronze body, screwed bonnet, wedge disc, 125 lb. SWP, 200 lb WOG. Acceptable: Crane No. 438 or NIBCO No. T-113.
- C. Square Head Cocks: Semi-steel, lubricated type, with bolted cover or gland, full port, and Teflon coated plug, 20 lb. WOG. Valves shall have position indicated dial and shall be screwed 2 inches and smaller. Provide two spare lubricant sticks for each valve. Acceptable: Rockwell Fig. 142.

## 2.05 **MANUAL DRAIN/FILTER**

- A. Inline type constructed of die cast zinc with porous bronze filter element, polycarbonate transparent shatter-proof bowl with slotted metal bowl guard. Acceptable: Lincoln Model 600108 with G9767 guard.

## 2.06 **AUTOMATIC DRAIN/FILTER**

- A. Inline float actuated type constructed of die cast zinc with porous bronze filter element, metal bowl, and enclosed cell float with stainless steel trim. Acceptable: Lincoln Model 600113A.

## 2.07 **AUTOMATIC DRAIN TRAP**

- A. Semi-steel body, stainless steel float, stainless steel head, stainless steel seats, and stainless steel mechanisms. Acceptable: Sarco Model FA-150.



## 2.08 **REGULATOR**

- A. Constructed of die-cast zinc with stainless steel strainer and renewable brass seat. Diaphragm and disc shall be oil resistant Buna N and regulator shall be provided with threaded inlet, and gauge ports and suitable for 400 psi inlet pressure. Outlet pressure shall be as indicated on the drawings. Acceptable: Lincoln Model 600013 main.

## 2.09 **GAUGES**

- A. Range 0 to 200 psig, two inch diameter, 1/4 inch NPT male center back connection, black enameled case. Acceptable: Lincoln 600401.

## 2.010 **HOSE**

- A. Working pressure 300 lbs., burst pressure 1300 lbs., 1/4 inch inside diameter, 5/8 inch outside diameter, 1/4 inch NPT male connections (both ends). Acceptable: Lincoln Type 72 number 72360.

## 2.011 **AIR COUPLER**

- A. Heavy duty quick connect type with spring loaded internal check valve and resilient seat, 1/4 inch NPT female connection. Acceptable: Lincoln Number 815.

## 2.012 **COUPLER NIPPLE**

- A. Heavy duty long stem type to match coupler, 1/4 inch NPT female for connection to hose. Acceptable: Lincoln Number 11661.

## PART 3 - INSTALLATION

### 3.01 **GENERAL**

- A. Refer to the Section entitled COMMON REQUIREMENTS FOR MECHANICAL WORK. Complete systems shall be installed as indicated on drawings. Drawing scales prohibit the indication of all off-sets, fittings, etc.; however, these deviations shall be installed at no extra cost to Owner. Piping shall be offset as required with vents and/or drains installed at high and low points. Piping systems shall be complete with all supply and drain piping, valves, fittings and specialty items required for a complete and operable system. Risers shall be located to prevent interference with other trades. Piping shall run parallel to the walls and ceilings in a neat and workmanlike manner. Install piping with pitch as indicate, without sags, traps, or pockets between supports. Thoroughly clean interior of piping before erection and exterior after erection.

3.02 **JOINTS AND CONNECTIONS**

- A. General: Joints and connections shall be made permanently air, gas, and water tight.
- B. Screwed Joints: Shall be used on black pipe two inches and smaller except where noted on schedules and where flanged connections to equipment or valves are required and on all galvanized piping. Companion flanges shall be faced and drilled American Standard. Making of threaded joints shall include reaming the pipe, cutting a complete thread with sharp dies properly centered, the application of oil graphite lubricant on male thread only.

3.03 **EXCAVATION AND BACKFILL**

- A. Provide in accordance with Division 2, SITE WORK, and in compliance with local plumbing codes.

3.04 **DRAINING**

- A. Install manual and automatic traps and drains where indicated on drawings for removal of water from system. Copper tubing may be used for drain lines.

3.05 **REGULATORS**

- A. Install where shown on drawings.

3.06 **TEST**

- A. Test piping system at 175 psig using compressed air and correct any leaks by remaking joint involved. The system shall hold the pressure for such time as required to indicate its integrity to the satisfaction of the Engineer but in no case less than one hour. Tanks and equipment shall be isolated from the piping system before testing to prevent damage.

**END OF SECTION**

**Article I      221721      LUBRICATION SYSTEM**

**PART 1 - GENERAL**

**1.01      SCOPE**

- A.      Provide new products to refurbish an existing five item lubrication system. The facility is in operation and the work shall be coordinated and scheduled for minimal downtime. System shall be operation at completion of the installation since this is an active facility and the system needs to be operational in a timely manner.
- B.      Drawing scales do not permit the indication of all offsets, fittings, sleeves and similar items; however, these items shall be provided as work of this division at no additional cost to the Owner.

**1.02      LUBRICATION SYSTEM**

- A.      Lubrication system refurbishment includes the following:
  - 1.      Dispensing pumps.
  - 2.      Dispensing reels.
  - 3.      Connecting Hoses
  - 4.      Dispensing Hoses
  - 5.      Miscellaneous appurtenances.

**1.03      RELATION TO OTHER WORK**

- A.      Refer to the Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.

**1.04      QUALITY ASSURANCE**

- A.      Material, apparatus, equipment and installation required for the work included in the section shall be designed to comply with and shall be installed in accordance with the requirements of the Local and State Building and Plumbing Codes and Ordinances, of all legally constituted Public Authorities having jurisdiction, including State and County Laws, Rules and Regulations of the National board of Fire Underwriters and the American Society for Testing Materials.

**1.05      SUBMITTALS**

- A.      Refer to Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.

## 1.06 **MANUFACTURER**

- A. Where a specific manufacturer's product is listed as the basis of design, it is to set the level of design and quality of the item to be furnished. Equal products of other manufacturers may be submitted for approval.
- B. Where specific manufacturers/or products are listed as "Acceptable", only selections from those listed products will be approved.

## PART 2 - MATERIAL AND EQUIPMENT

### 2.01 **APPROVED MANUFACTURES**

- A. The following manufacturers are approved for use subject to the detailed requirements of the Drawings and these specifications.
  - 1. Graco – These products are existing within the facility
  - 2. Alemite
  - 3. Lincoln

### 2.02 **LUBRICATION EQUIPMENT**

- A. All lubrication equipment is to be from single-source manufacturers. Equipment bid as "equal to", but not listed "as approved" by the Architect/Engineer, must be approved at least 30 days before bid opening.
- B. System includes the following fluids:
  - 1. Grease lubricant
  - 2. 10W engine oil
  - 3. 90W gear oil
  - 4. 15W-40 engine oil

### 2.03 **LUBRICATION PUMPS**

- A. General Information
  - 1. Each 75:1 ratio pump system to include: pump package, air regulator with gauge
  - 2. Each 6:1 ratio pump system to include: pump, wall-mount bracket, suction kit for 55 gallon drum, thermal relief kit.

3. Each 1:1 ratio double diaphragm pump system to include: pump, filter/oiler/regulator, suction kit for 55 gallon drum, wall-mount bracket, thermal relief kit.

B. Pumps

1. 400 lb, 75:1 – Chassis Grease Pump: 400lb. Drum length air powered pump system, 75:1 ratio, high pressure, double acting shovel pump, 4-1/4 inch diameter air motor with 4 inch stroke. The air motor, motor valves and lower pump are to be the “in-line” design. Included with the pump shall be an elevator, inductor, base, 72-inch x 3/8 inch air hose and a 1/4-inch fluid hose. Pump to have 30 year warranty.
2. 6:1 Motor Oil and Gear Oil Pump: Air powered universal length pump, 6:1 ratio, medium pressure double-ball and double acting pump, 4-1/2 inch diameter air motor with 4 inch stroke. The air motor, air motor valves and lower pump are to be of the “in-line” design. Pump to have 10-year warranty and include external muffler meeting OSHA noise control requirements.
3. Double Diaphragm 1:1 Anti-Freeze Pump: Low pressure air powered double diaphragm pump with 3/4 inch fluid inlet and outlet equipped with Buna-N diaphragms and balls; pump material to be made of aluminum. Pump shall have Underwriters Lab (UL) listing, have restricted air inlet, operate at less that 85 dBA and have a one year warranty.
4. Double Diaphragm 1:1 Waste Oil Pump: Low pressure air powered double diaphragm pump with 3/4 inch fluid inlet and outlet equipped with Buna-N diaphragms and balls; pump material to be made of aluminum. Pump shall have Underwriters Lab (UL) listing, have restricted air inlet, operate at less that 85 dBA and have a one year warranty.

2.04 **LUBRICATION DISPENSING HOSE REELS**

A. General Information

1. Each reel includes the appropriate hose, ball stop to handle application.
2. Each motor, anti-freeze, and gear lube reel to have a shut=off valve at inlet, prior to 24 inch connecting hose.
3. Each chassis grease reel to have a high pressure line shut-off valve at inlet prior to 24 inch connecting hose.

B. Reels

1. Heavy-Duty, Large Capacity Water/Anti-Freeze Reel with 3/8 inch x 50 ft. Hose and Water Bibb: Heavy-duty large capacity spring powered open water/anti-freeze reel, with 3/8 inch x 50 ft. hose, welded and gusseted double pedestal arms, adjustable support arms, 270 degree adjustable

articulating hose guide head, 12-position positive ratchet lock, ball stop, minimum 180 psi hose and 1,800 psi reel rating, and low pressure water bibb. Reel to have 3-year warranty.

2. Heavy-Duty, Large Capacity Oil Reel: Heavy-duty large capacity spring powered open oil reel, with 1/2 inch x 50 ft. hose, welded and gusseted double pedestal arms, adjustable support arms, 270 degree adjustable articulating hose guide head, 12-position positive ratchet lock, ball stop, minimum 1,800 psi reel rating. Electronically metered in-line motor oil dispense valve, meters in pints, quarts or gallons, totalizing, non-drip nozzle, filtered inlet swivel and type approved by California Bureau of Weights and Measures. Reel to have 3-year warranty. Electronic meter to have 2-year warranty.
3. Heavy-Duty, Large Capacity Gear Lube Reel: Heavy-duty large capacity spring powered open gear lube reel, with 1/2 inch x 50 ft. hose, welded and gusseted double pedestal arms, adjustable support arms, 270 degree adjustable articulating hose guide head, 12-position positive ratchet lock, ball stop, minimum 1,800 psi reel rating. Electronically metered in-line motor oil dispense valve, meters in pints, quarts or gallons, totalizing, non-drip nozzle, filtered inlet swivel and type approved by California Bureau of Weights and Measures. Reel to have 3-year warranty. Electronic meter to have 2-year warranty.
4. Heavy-Duty, Large Capacity Grease Reel: Heavy-duty large capacity spring powered open grease reel, with 1/4 inch x 50 ft. hose, welded and gusseted double pedestal arms, adjustable support arms, four replaceable all-weather guides and mounted in a 270 degree adjustable articulating hose guide head, 12-position positive ratchet lock, 3/8 inch fully ported swivel and hub assembly, ball stop, minimum 5,000 psi hose and reel rating. High pressure 1/4 inch dispensing valve with "Z" swivel. Reel to have 3-year warranty.

## 2.05 MISCELLANEOUS APPURTENANCES

- A. Miscellaneous appurtenances include:
  1. Shutoff Valve for Grease Lube.
  2. Shutoff Valve for Gear Lube.
  3. Shutoff Valve for Engine Oil.
  4. Lubricator for Pump Assemblies.
  5. 40 Micron "Y" filter for gear lube and oil.
  6. 138 Micron filter for grease.
  7. Flexible follower plate for 120 lb. grease pump.

8. Water Bibb for anti-freeze reels.
9. Electronic meter for engine oil
10. Electronic meter for gear oil.
11. Control valve for grease.
12. Thermal relief valves on discharge lines of lub and oil air pumps.

### PART 3 - INSTALLATION

#### 3.01 **GENERAL**

- A. Refer to the Section entitled COMMON REQUIREMENTS FOR PLUMBING WORK.
- B. The system exists in a state operation with some operational issues and the work is to replace components that are near the end of their useful life as specified herein. Notify the Architect/Engineer if other issues are found that would compromise future operations.

#### 3.02 **INSTALLATION**

- A. Lubrication Pumps: All existing pumps and air motors are to be turned over to the owner to be used as spare parts for future repairs.
- B. Hose Reels: All existing hose reels become the property of the contractor to be disposed in accordance with EPA standards for the fluids handled.

#### 3.03 **DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate and maintain system.

#### 3.04 **CLEANING**

- A. Clean all locations where work has taken place so that none of the product sources become contaminated.

**END OF SECTION**

**Article I      224200      PLUMBING SPECIALTIES**

**PART 1 - GENERAL**

**1.01    SCOPE**

- A.    Provide the plumbing fixtures and specialty items specified herein, with all necessary parts, fittings and appurtenances, to make a complete and operable plumbing system.
  
- B.    Plumbing Specialties:
  - 1.    Water Closets
  - 2.    Urinals
  - 3.    Lavatories
  - 4.    Sinks
  - 5.    Washing Machine Valve Assemblies
  - 6.    Electric Water Coolers
  - 7.    Showers
  - 8.    Floor Drains
  - 9.    Interceptors and Traps
  - 10.   Hydrants

**1.02    RELATION TO OTHER WORK**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR MECHANICAL WORK.
  
- B.    Refer to Section entitled POTABLE WATER PIPE, VALVES AND FITTINGS.
  
- C.    Refer to Section entitled SOIL, WASTE, VENT AND DRAIN PIPING SYSTEMS.

**1.03    SUBMITTALS**

- A.    Submit data on all fixtures, accessories, and appurtenances.
  
- B.    Where compliance with an industry, society, or association standard is specified, submit proof of such compliance.



## **1.04 MANUFACTURERS**

- A. Fixtures: Acceptable Manufacturers for fixtures are American Standard, Bradley, Briggs, Crane, Eljer, Hydrotech, Kohler, or Toto. Specific manufacturers may be indicated at specific fixtures to suit the overall design and the Owner's preferences.
- B. Plumbing Trim: Acceptable Manufacturers for Plumbing Trim are American Standard, Bradley, Chicago, Crane, Eljer, and Kohler. Faucets shall be manufactured by Bradley, Chicago, or T&S Brass.
- C. Flush Valves shall be manufactured by Sloan Royal or Regal, or Zurn Hydrotek.
- D. Specialty manufacturers used as basis of design are noted with the specification for the specialty.

## **PART 2 - MATERIAL AND EQUIPMENT**

### **2.01 WATER CLOSETS, FLOOR MOUNTED, FLUSH VALVE TYPE, MARK P-1**

- A. Water Closet, Floor Mounted, Mark P-1 – Refer to Plumbing Fixture Schedule.

### **2.02 URINALS, MARK P-2**

- A. Urinal, Wall Hung, Mark P-2 – Refer to Plumbing Fixture Schedule.

### **2.03 LAVATORIES, MARK P-3**

- A. General: Lavatories in public facilities shall comply with the requirements of the Florida Energy Efficiency Code by being equipped with outlet devices which limit the flow of hot water to a maximum of 0.5 GPM; or, except for handicapped fixtures, being equipped with self-closing valves that limit delivery to a maximum of 0.50 gallons of hot water on a non-recirculating system, or 0.25 gallons of hot water on a recirculating system; or, the lavatories shall be equipped with devices which limit outlet temperature to a maximum of 110oF, or water heater thermostats shall be set for 110oF. Lavatories with cold water only to have the cold water piping connected to the hot and cold water connection of the faucet if two handle faucets are specified.
- B. Lavatory, Wall Hung, Mark P-3 – Refer to Plumbing Fixture Schedule.

### **2.04 SINKS, MARK P-4**

- A. Service Sink, Mark P-4 – Refer to Plumbing Fixture Schedule.

### **2.05 WASHING MACHINE BOX, MARK P-5**

- A. Washing machine Box, Mark P-5 – Refer to Plumbing Fixture Schedule.

## **2.06 ELECTRIC WATER COOLERS, MARK P-5**

- A. Free Standing Electric Water Cooler, Mark P-5 – Refer to Plumbing Fixture Schedule.

## **2.07 SHOWERS, MARK P-7**

- A. Shower, Mark P-7 – Refer to Plumbing Fixture Schedule.

## **2.08 FLOOR, HUB, AND ROOF DRAINS**

- A. Toilet Room Floor Drains (FD-1): Wade W-1100G coated cast iron drain with two piece body, reversible clamping collar, 1/2" trap primer tapping, weep holes, bottom outlet no hub or inside caulk, and adjustable 6" diameter nickel bronze strainer. The drain top shall be "NB" finish. Provide deep seal P-traps. Provide square strainer for tile floors and round strainer for other floors.
- B. Equipment Room Floor Drains (FD-2): Wade W-1100STD coated cast iron drain with two piece body, reversible clamping collar, 1/2" trap primer tapping, weep holes, bottom outlet no hub or inside caulk, and adjustable 6" diameter nickel bronze strainer. The drain top shall be "NB" finish. Provide deep seal P-traps. Provide square strainer for tile floors and round strainer for other floors.
- C. Hub Drains (HD-1): Provide field-constructed Hub Drains using 4" cast iron hub and spigot pipe for AHU condensate drainage to storm system.
- D. Acceptable Manufacturers: Smith, Wade, or Zurn.
- E. Trap Primer: Precision #P-2, or equal, where trap primers are not provided with lavatories.

## **2.09 HYDRANTS AND HOSE BIBBS**

- A. Hose Bibb (HB): Woodford Model 24 anti-siphon wall faucet, rough chrome finish, EPDM packing, polycarbonate wheel handle and loose tee key, 3/4" inlet, with Nidel Model 34HF vacuum breaker ASSE Standard approved with 3/4" hose connection.

## **2.010 CLEANOUTS**

- A. Floor Cleanouts:
  - 1. Cast Iron with anchor flange and adjustable height housing, polished nickel bronze rim, scoriated floor plate with "CO" cast into the top surface, designed with countersunk screws for flush installation. Basis of Design: J.R. Smith 4000 Series.

B. Wall Cleanouts:

1. Brass plug with round stainless steel secured access cover. Basis of Design: J.R. Smith Figure 4422
2. Brass plug with square nickel-bronze frame and secured smooth stainless steel access cover. Basis of design: J.R. Smith Figure 4435
3. Exterior cleanouts:
  - a. Cast iron cleanout ferrule with anchor flange, outlet for push joint or no-hub connection, and countersunk brass cleanout plug. Basis of Design: J.R. Smith Figure 4280

PART 3 - INSTALLATION

**3.01 FIXTURES**

- A. Connect to sanitary piping with copper waste arm bends. Flanged type fixture joints shall be made tight by use of molded gasket of graphite, having proper thickness and shape. No putty or cement will be permitted.
- B. Fixtures identified as for the handicapped shall be installed in accordance with the Federal Rules of the American Disabilities Act (ADA), and the Accessibility Requirements Manual of the Department of Community Affairs, Florida Board of Building Codes and Standards. These include, but are not limited to, the following:
  1. Water Closets:
    - a. Seat height at 17 to 19 inches above floor.
    - b. Toilet centerline a minimum of 18" from closest wall, and 42" from the edge of the lavatory.
  2. Urinals: Wall hung type urinal lip shall be mounted to existing waste piping.
  3. Lavatories:
    - a. Lavatory bottom must be a minimum of 28" above the floor, and the rim of the fixture no higher than 34".
    - b. Faucets shall be lever action or push type, and shall require no more than 5 pounds to activate.
    - c. Insulate hot and cold supplies, and drain, to protect handicapped against physical impact and temperature burns, in accordance with ADA art. 4.19.4.

4. Water fountains and coolers:
  - a. Spout height shall be no more than 36" above the floor.
  - b. Water stream shall be no less than a 4" high.
  - c. Unit shall provide clear knee space at least 27" high, 30" wide, and 17" to 19" deep; or, provide 48" by 30" clear space in front of unit parallel to wall.

### **3.02 TRAPS**

- A. Shall be self-cleaning. Unless otherwise indicated, each fixture shall be separately trapped with a water seal trap placed not more than 18 inches from the outlet.
- B. No fixture shall be double trapped.

### **3.03 DRAINS**

- A. On all floor and roof drains provide sheet lead apron cut to fit the flashing clamp and sized to extend 8 inches beyond flash rim of the drain.
- B. On floor drains, provide square strainer for tile floors and round strainer for other floors.

### **3.04 EQUIPMENT**

- A. Install in accordance with manufacturer's recommendations and as indicated on the drawings or specified in this section.
- B. Protect equipment from physical damage, weather, and work of other trades before, during, and after installation.

### **3.05 ELECTRICAL**

- A. All power, control, and interlock wiring shall be run in conduit.
- B. All power wiring and conduit shall be performed as work of the Electrical Division of this specification. Plumbing Contractor shall fully coordinate all electrical power requirements of the plumbing equipment being provided with the Electrical Contractor.
- C. All control interlock wiring and conduit will be provided by Plumbing Division in accordance with the Electrical Division of the specifications.
- D. Water Closets: Provide a building electric power circuit of 120 volts to each toilet room for water closet low-voltage transformers (120v/1ph, 60 Hz to 24 VAC/60 Hz). One transformer can supply up to ten (10) water closets and urinals. Battery powered (4 – AA batteries each).

- E. Urinals: See water closets above. Battery powered (4 – AA batteries each).
- F. Lavatories: Provide a standard GFCI protected outlet for 110/24 VAC plug-in transformers supplied with the lavatories.
- G. Electric Water Coolers: Provide a building electrical power circuit of 120 volts for each water cooler.

### **3.06 HYDRANTS**

- A. Wall Hydrants: Mount wall hydrants at a height of eighteen inches (18") above floor or grade level, unless otherwise indicated.
- B. Wall Hydrant HB for exterior use on outside wall of building.
- C. Protect equipment from physical damage, weather, and work of other trades before, during, and after installation.

End of Section

**Article I      230000      COMMON REQUIREMENTS FOR HVAC WORK**

**PART 1 - GENERAL**

**1.01    SCOPE OF DIVISION**

- A.    Work Description:    Work shall include all materials, equipment and labor necessary for a complete and functioning mechanical installation in accordance with local and state codes, and contract drawings and specifications. Work shall be understood to include all work specified in DIVISION 23, MECHANICAL, of the specifications.
  
- B.    Regulations, Codes, Standards and Ordinances:
  - 1.     Florida Building Code – Building, 2017 Edition.
  - 2.     Florida Building Code – Mechanical, 2017 Edition.
  - 3.     National Fire Protection Code, Standard for Installation of Air Conditioning and Ventilating Systems, NFPA-90A, 2015 Edition.
  - 4.     National Fire Protection Code, Life Safety Code, NFPA-101, 2015 Edition.
  - 5.     American National Standards Institute (ANSI) B 9.1 (Safety Code for Mechanical Refrigeration).
  - 6.     American Refrigeration Institute (ARI) Standards for Refrigeration Apparatus.
  
- C.    Refer to other Divisions for continuation of exterior work and allied work.
  
- D.    Obtain and pay for all required mechanical permits, fees and inspections.

**1.02    DRAWINGS**

- A.    Architectural and structural drawings take precedence over mechanical drawings with reference to the building construction. Mechanical drawings are diagrammatic and indicate the general arrangement and extent of work. Architectural drawings indicate more exactly the desired relationship between diffusers, registers, lighting fixtures, equipment, electric panels and devices, plumbing fixtures, and other items which remain exposed in the completed building.
  
- B.    Exact locations and arrangements of materials and equipment shall be determined, with the approval of the Engineer, as work progresses to conform in the best possible manner with the surroundings and with the adjoining work or other trades.

- C. Where locations of equipment, devices or fixtures are controlled by architectural features, establish such locations by referring to dimensions on Architectural (A-series) drawings and not by scaling drawings.

### **1.03 COORDINATION OF WORK**

- A. Coordinate all work, prior to installation, with work of other trades and with architectural and structural features to preclude interference between the works of different trades and to insure necessary clearances at crossovers and equipment. Work requiring necessarily fixed locations (e.g.; piping with required slopes, lighting fixtures and diffusers in ceilings, etc.) takes precedence over work not requiring such fixed locations and shall establish permissible routing of services associated with the latter.
- B. Should work be performed without adequate coordination so that interference occurs between works of different trades, the Contractor shall eliminate such interference by requiring necessary rework by the trades involved. Such rework shall meet express approval of the Engineer and shall be performed at no addition to contract amount.

### **1.04 DISCREPANCIES**

- A. Refer to DIVISION 01 - GENERAL REQUIREMENTS.
- B. Refer all discrepancies in writing to the Engineer for resolution.

### **1.05 SUBMITTALS**

- A. Material List: Within twenty (20) days of award of contract, submit to Engineer for approval a complete list of materials to be provided for the mechanical work. The list shall include supplier's names and manufacturer's names and number or series for each item on list. Items not shown on said list shall be construed to be as specified on drawings or in specifications.
- B. Product Submittals: Submit to Engineer for approval, before commencing work, manufacturers data for all mechanical materials and equipment to be provided under this contract. Data shall clearly show compliance with specifications and scheduled data on contract drawings. In addition, submit drawings or diagrams, dimensioned and in correct scale, requested by Engineer or specified in individual sections, to clarify the work intended or to show its relationship to adjacent work or work of other trades. Contractor is responsible for any delays in job progress occurring directly or indirectly from late submissions. Submittals shall clearly show the following:
  - 1. Technical and descriptive data in detail equal to or greater than the data given in the item specification. Indicate all characteristics, special modifications, and features. Where performance and characteristic data are shown on the drawings or specified, submitted data shall be provided in sufficient detail that shows that the item is equal to that specified and shown.

2. All exceptions to, or deviations from, the Contract Documents.
  3. Stamp: Indicate on each submittal that Contractor has checked that it complies with the drawings and specifications by affixing a stamp indicating the following: Date, specification page and section, drawing note indicating that manufacturer is as specified or that manufacturer is submitted to be approved as "or equal" by the Engineer, and the signature of person reviewing the submittal.
- C. Samples: Submit to Engineer for approval samples of materials as indicated elsewhere in these specifications. Samples shall duplicate materials, workmanship, and finish of products intended for installation.

#### **1.06 RECORD DRAWINGS**

- A. Refer to DIVISION 01 - GENERAL REQUIREMENTS.
- B. Contractor shall provide neatly annotated drawing prints showing all changes and deviations made in the installation of the work to the Engineer.
- C. The Engineer will make the indicated changes to the original Mechanical CAD drawings, will label and date them as "RECORD DRAWINGS", and provide them in CAD form to the Architect or Owner upon completion.

#### **1.07 GUARANTY (WARRANTY)**

- A. Contractor shall warranty all mechanical work under this Division for a period of one year from the date of beneficial occupancy by the Owner. This warranty shall include both materials and labor required to repair or replace any defective material or equipment.
- B. When refrigerant systems are included in the work of this contract, the Contractor shall provide an additional four year extended warranty beyond the basic one year warranty on the entire refrigerant system(s) which shall include parts, refrigerant and oil, but exclusive of labor. The refrigerant system is defined as all factory or field components in contact with refrigerant.

### **PART 2 - PRODUCTS**

#### **2.01 MATERIALS AND EQUIPMENT**

- A. All materials and equipment shall be new and without blemish or defect. Equipment and materials shall be products which meet the requirements of these drawings and specifications. Where acceptance is contingent upon having the product examined, tested and certified by a recognized testing laboratory, the product shall be so examined, tested and certified, with documentation included in the product submittal. Where no special indication as to the type or quality of material or equipment is indicated, a first class standard article shall be furnished.



- B. All equipment of one type specified in one section of these specifications, shall be the products of one manufacturer, unless specifically indicated otherwise. Substituted equipment or optional equipment where permitted and approved, must conform to space requirements. Substitutions of mechanical equipment for that shown on the schedules or designated by model number in the specifications will not be considered if the item is not a regular cataloged item shown in the current catalog of the manufacturer. Any substituted equipment that cannot meet space requirements, including adequate service space, whether approved or not, shall be replaced at the Contractor's expense. Any modifications of related systems as a result of substitutions shall be made at the Contractor's expense.
- C. The approval of submittals does not assure that the Engineer, or any Owner's Representative, attests to the dimensional accuracy or dimensional suitability of the material or equipment involved, the sufficiency of the quantity of the material or items of equipment involved, or the mechanical performance of equipment. Approval of submittals does not invalidate the plans and specifications if in conflict, unless a letter requesting such change is submitted and specific approval of the conflict is provided on the Engineer's letterhead.
- D. Operating conditions and capacities must be as follows:
1. No overloading
  2. No operation at conditions outside of maximum and minimum limits recommended by the manufacturer and approved by the Engineer.
  3. Compatible with all systems.
  4. Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance.
- E. Unless otherwise specified, all equipment and materials furnished must be as follows:
1. Recommended by the manufacturer for the application.
  2. Installed in accord with the manufacturer's recommendations for the application.
- F. It is the intent of these specifications that wherever a manufacturer of a product is specified as the "Basis of Design", and the terms "other approved" or "or approved equal" or "equal" are used, a substituted item must conform in all respects to the specified item. The above terms are implied wherever practical and the quality of performance and equipment is not jeopardized. These terms are not restricted to the names in the specifications since the intent is to achieve a broad spectrum of interested bidders and vendors. Where the term "Acceptable" is used, only those manufacturers and/or products listed as "acceptable" may be submitted.

## 2.02 REJECTED WORK

- A. Any work rejected by Engineer because it does not conform to specifications shall be removed immediately and replaced properly.

## 2.03 SLEEVES

- A. General: Lay out work and set sleeves in new or existing construction so there shall be a minimum of cutting, drilling and patching. All sleeves not used during construction period shall be sealed. Unused penetrations or sleeves through fire rated barriers shall be sealed to prevent a passage of smoke or heat using an underwriters Laboratories approved method rated at least equal to the barrier penetrated. Submit proposed method with proof of UL approval with other submittals.
- B. Pipe Sleeves:
  - 1. Walls and Partitions:
    - a. Exterior Walls (Above Grade): Sleeves shall be mild steel pipe or plastic sleeves built into wall, partition or beam, sized to pass pipe and covering, leaving a clear space of 1/4-inch minimum between covering and sleeve. Penetrations of fire rated barriers shall have mild steel sleeves. Penetrations of structural beams shall be approved by the Structural Engineer.
    - b. Exterior Walls (Below Grade): Sleeves with nominal 1/4-inch x 3-inch center flange (water stop) around the outside to be imbedded in the wall, constructed of cast iron, schedule 40 steel hot dipped galvanized after fabrication, or thermo-plastic designed for this application..
    - c. Interior Walls: Sleeves shall be mild steel pipe or plastic sleeves built into wall, partition or beam, sized to pass pipe and covering, leaving a clear space of 1/4-inch minimum between covering and sleeve. Penetrations of fire rated barriers shall have mild steel pipe sleeves.
    - d. Floors (Above Grade): Sleeves shall be 14 gauge galvanized sheet steel or plastic, set before floor is poured, sized to pass pipe and covering, leaving a clear space of 1/4-inch between covering and sleeve, and shall extend 1/2-inch above finished floor. Penetrations of fire rated floors shall have mild steel pipe sleeves.
- C. Duct Sleeves: Sleeves or openings sized to pass mechanical ducts and covering shall be of framed construction in roof, wall, or partitions.

D. Sealing of Sleeves:

1. Sleeves Below Grade: Caulk annular space between pipe and sleeve using oakum and poured lead both sides minimum one inch to make wall penetration water tight. Specialty products designed for this purpose, such as Thunderline's "Link-Seal", may be used.
2. Sleeves Above grade: Openings around pipes, duct, etc., passing through sleeves shall be made draft free and vermin-proof by packing solidly with mineral wool or fiberglass. Sleeves in exterior walls shall have outside surface of packing sealed with a weatherproof non-hardening sealant.
3. Sleeves through Fire Rated Barriers: Openings around pipes, etc., through fire rated barriers shall be sealed using a UL approved method rated at least equal to the wall or floor being penetrated.

**2.04 FLOOR, WALL AND CEILING PLATES OR ESCUTCHEONS, IN EXPOSED AREAS**

- A. Provide escutcheons or fabricated plates or collars at each location where pipe or duct passes through a finished surface. Escutcheons for flush sleeves shall be equal to Benton & Caldwell No. 3A chromium plated brass; for sleeves extending above floor shall be equal to Benton Caldwell No. 36 chrome plated brass.
- B. Collars or plates for ducts and larger diameter insulated pipe shall be fabricated of 18 gauge galvanized copper-bearing sheet steel, secured to structure and neatly fitted around duct or pipe.

**2.05 ACCESS DOORS**

- A. Provide as necessary for access to concealed valves, cleanouts, unions, expansion joints, dampers, coils, junction boxes, etc., where no other means of access is shown or specified.
- B. Door shall be manufactured by the Milcor division of Inland-Ryerson, or acceptable equal, type as follows:

Door Location	Door type
Drywall	Style "DW"
Masonry or tile	Style "M-Stainless"
Acoustical tile	Style "AT"
Plaster	Style "K"
Fire-rated walls	Style "Fire Rated"

- C. Each door shall be equipped with two flush, screwdriver operated, cam latches as a minimum. Hinged doors shall be provided unless location limits operation. Doors, except Style "M", shall be finished to match adjacent surface. Door sizes shall be applicable to the access required for normal service.

## 2.06 ELECTRICAL

- A. General: Unless specifically specified otherwise, motors, starters, and control devices shall be furnished under the Section of Mechanical Division specifications that covers driven equipment.
- B. All electrical power wiring, conduits, and connections shall be provided under the Electrical Division.
- C. All control and interlock wiring, and conduit, shall be provided by Mechanical Division in accordance with the Electrical Division of the specifications.
- D. Contractor furnishing driven equipment shall coordinate wiring diagrams with contract requirements and shall furnish coordinated wiring diagrams for equipment installation.
- E. Motors: Unless specifically noted otherwise in the Section covering the driven equipment (or the equipment drives), motors shall comply with the following:
  - 1. Three Phase: NEMA design B, three-phase, squirrel cage induction type designed for 1800 rpm synchronous speed for operation in 40 degrees C ambient at 1.15 service factor at constant speed on the scheduled voltage. Motors shall be insulated with Class B insulation material and shall be cast iron, drip proof, horizontal foot mounted type with ball bearings. Two speed motors shall be provided as scheduled and shall be two winding type. Motors shall be high-efficiency type.
  - 2. Single Phase: Squirrel cage induction type designed for 1800 rpm synchronous speed for operation in 40 degree C ambient at 1.15 service factor at constant speed on the scheduled voltage. Motors shall be insulated with Class B insulation materials and shall be two winding capacitor start type with steel enclosure, drip proof, horizontal foot mount and ball bearings.
  - 3. Scheduled Horsepowers: The horsepowers scheduled or specified are those nominal sized estimated to be required by the equipment when operation at specified duties and efficiencies. In the case of pumps, these horsepowers are non-overloading and may also include provisions for future planned impeller changes. If the actual horsepower for the equipment furnished differs from that specified or shown on the drawings, it shall be the Contractor's responsibility to insure that proper size feeders, breakers, starters, etc. are provided at no change in contract price.
  - 4. Outside Ambient Conditions: Motors located in outside ambient conditions shall be Totally Enclosed Fan Cooled (TEFC) designed for 50 degree C ambient conditions.

5. Motor Efficiency Requirements:

Motor HP	Standard Eff	Hi Eff ODP
0.5	71.0	-
0.75	76.8	-
1.0	79.0	82.5
1.5	79.0	84.0
2.0	80.7	84.0
3.0	81.5	86.5
5.0	84.0	87.5
7.5	82.9	88.5
10.0	85.6	89.5
15.0	89.5	91.0
20.0	87.5	91.0
25.0	87.1	91.7
30.0	88.3	92.4
40.0	90.2	93.0

6. Starters: Shall be provided as work of the Mechanical Division and shall meet the requirements of the Electrical section entitled "Starters" if provided. Refer to the Section entitled "Variable Frequency Drives", if provided, for additional information on electric motors for that service.

**2.07 BELT DRIVES**

- A. Equip each motor driven machine (not direct connected) with V-belt drive. Belts shall be of correct cross section to fit properly in sheave grooves and shall be carefully matched for each drive. Sheaves shall be cast iron or steel, bored to fit properly on shafts and secured with keys of proper size. The rating of each drive shall be as recommended by manufacturer for service but shall be at least 1.5 times nameplate rating of motor.
- B. Fan Belt Drives: Variable and adjustable pitch sheaves shall be selected so that required fan RPM will be obtained with sheave set approximately in mid-position. Fans shall have drives in accord with the following table:

Output (Horsepower)	Fan Speed Motor (RPM)	Sheave Type
0 to 10	Up to 1800	Variable Pitch
15 and up	Up to 1800	Fixed Pitch
0 to 3	1801 and up	Variable Pitch
15 and up	1801 and up	Fixed Pitch

- C. Speed adjustment: Adjust fan speed as necessary to obtain proper design air flow with fan in its installed location. Fans which are to have fixed pitch drives may be first fitted with variable pitch drives until proper speed adjustment is made and then may be fitted with proper fixed pitch drive size, or alternate sizes of fixed pitch drives may be used until proper fan speed is obtained. Provide all

drives necessary to obtain proper fan speed needed to deliver necessary air quantity.

- D. Vibration of Central Station Air handling Units: Field vibration levels will not be acceptable if the maximum vibration velocity or displacement measurement exceeds the following values (when measurements are taken at the bearing supports of central station air handling units using a vibration analyzer with the filter set at the operating fan speed):

Fan Speed (RPM)	Maximum Vibration Level
800 or Less displacement	5 Mills (0.127 mm) max.
801 and Greater velocity	0.20 in/sec. (5mm/s) max.

## **2.08 BELT AND COUPLING GUARDS**

- A. Each belt drive shall be equipped with a guard. Guards shall be constructed of substantial sheet metal of #18 U.S. standard gauge or heavier. Braces or supports must not "bridge" sound and vibration isolators. Guards shall be designed with adequate provision for movement of motor required to adjust belt tension. Means shall also be provided to permit oiling, use of speed counters, and other maintenance and testing operations with guard in place.
- B. All direct drive equipment shall have coupling guards in accordance with OSHA requirements.

## **2.09 DIAGRAMS, NAMEPLATES AND LABELS**

- A. Each major component of equipment shall have the manufacture's name, address and catalog number on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be accepted.
- B. In areas having equipment, valves and control devices, provide single line diagrams in Operation and Maintenance manuals. The diagrams shall give name, number designation, and location of each piece of equipment, valve, and control device.
- C. All pieces of equipment, valves, starters, disconnects, and all control instruments and apparatus shall be identified with 1/16 inch thick black laminated plastic nameplate with 3/16 inch high white laminated letters. Similar and like equipment shall be designated with numerical suffix (example: THERMOSTAT, T-1). The nameplate identification shall coincide with items appearing on diagrams. Colors and sizes may be changed to conform to an existing Owner's Identification System.
- D. All labels shall be securely affixed to equipment, or to supporting surfaces adjacent to small equipment.

## **2.010 PAINTING AND MARKING**

- A. Painting: Painting of equipment, pipe, and ducts (insulated or uninsulated) is specified under the "Painting" Division of these specifications.
- B. Touch-up of shop coat shall be performed under section furnishing equipment.
- C. Refer to the requirements the Section entitled IDENTIFICATION OF PIPING if included.

## **2.011 HOUSEKEEPING PADS**

- A. Provide six inch (6") high reinforced concrete (#10 mesh with 1-1/2" top cover) housekeeping pad for each piece of floor or grade-mounted equipment, unless shown otherwise on the drawings.
- B. The housekeeping pad shall extend six inches (6") beyond the equipment in all directions and shall be continuous beneath the base, unless shown otherwise on the drawings.
- C. Pads shall have chamfered edges and shall be poured and finished smooth and level to insure proper and continuous support for the equipment base bearing surfaces.
- D. Provide embedded anchor bolts to suit equipment base and grout all bearing surfaces true prior to securing base to housekeeping pad. Isolate equipment base from pad with 1/8" thick neoprene material.

## **PART 3 - INSTALLATION**

### **3.01 INSTALLATION AND WORKMANSHIP**

- A. The work shall be performed by qualified mechanics and all materials, apparatus and equipment shall be installed in neat, workmanlike manner. Any material, apparatus or equipment which, in the opinion of the Engineer, is improperly installed shall be removed and reinstalled in an approved manner at no additional cost to the Owner.
- B. The work shall be coordinated with the work of other trades. Where the work is dependent upon work of other trades or work already in place, such other work and work in place shall be examined and shall be in proper condition and state of completion before continuing the installation.

### **3.02 STORAGE OF MATERIALS**

- A. Use of site for storage of materials shall be in accordance with the Refer to DIVISION 01 - GENERAL REQUIREMENTS, and such other provisions of these Contract Documents that may limit or restrict use of the project site.

- B. The Contractor shall protect all materials and equipment from the time of receipt until the time of building acceptance by the Owner. Material and equipment shall be protected at all times from physical damage and from the effects of weather and humidity. Materials and equipment that are to be installed indoors should be stored indoors if possible. Coordinate the installation of the material and equipment with related work and finishing of adjacent surfaces to prevent damage to the equipment or adjacent finishes. Replace or repair to the Engineer's satisfaction any damaged equipment

### **3.03 EXCAVATION AND BACKFILL**

- A. Refer to DIVISION 2 – EXISTING CONDITIONS, and DIVISION 23 - MECHANICAL SITEWORK if provided.
- B. Provide as necessary to accomplish work specified. Perform in accordance with applicable State and Local codes and accepted good practice.

### **3.04 PROTECTION OF WORK UNTIL FINAL ACCEPTANCE**

- A. Contractor shall protect all materials and equipment from damage, the entrance of dirt and construction debris from the time of installation until final acceptance.
- B. Any materials and equipment that has been damaged shall be repaired to "as new" condition, or replaced at the direction of the Engineer. Where minor damages occur to factory finishes, damaged finishes may be touched up with factory-provided finishing materials. If, in the opinion of the Engineer the damage is excessive, factory finish shall be replaced to "new" condition.

### **3.05 TEST**

- A. General: All systems shall be inspected, tested, given a trial run, and demonstrated to Engineer's and Owners satisfaction that they are complete, operational, and ready for use.
- B. Provide all material, equipment, and system tests required in individual Sections of this DIVISION.
- C. Refer to the Section entitled TEST AND BALANCE if included.

### **3.06 INSTRUCTION AND MAINTENANCE MANUALS**

- A. Refer to the Section entitled OPERATION AND MAINTENANCE MANUALS.
- B. Refer to individual Sections for specific instruction requirements.

### **3.07 ACCEPTANCE**

- A. Prior to requesting final inspection:
  - 1. Complete all work required by Contract Drawings and Specifications.



2. Provide Test and Balance report to Engineer at least two (2) days prior to time of final inspection.
3. Contractor shall furnish all necessary mechanics, test instruments, and equipment as required to make necessary equipment field adjustments, and to assist the Engineer with the final inspection.
4. Acceptance will be made by Engineer on the basis of test records and the final inspection of project.

End of Section

**ARTICLE I 230100 OPERATION AND MAINTENANCE MANUALS**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. Provide complete operation and maintenance manuals to the Owner on all equipment and systems.
- B. The manuals shall be bound in hard-back, three ring loose-leaf binders.
- C. Provide separate individual binders for Fire Protection, HVAC, Controls, and Plumbing O&M materials.

**PART 2 - PRODUCTS**

**2.01 MANUAL ORGANIZATION**

- A. Contents:
  - 1. Provide index page(s) of contents.
  - 2. Tab manual with labels for the following:
    - a. Contents
    - b. Contractor Data
    - c. Operating Instructions
    - d. Submittal Data
    - e. Control Diagrams
    - f. TAB Report
    - g. Warranties
    - h. Acknowledgments
- B. Contractor Data:
  - 1. Provide Project name, address, and date of substantial completion.
  - 2. Provide names and addresses of:
    - a. General Contractor
    - b. Mechanical Contractors

- c. Mechanical Subcontractors
- d. Controls Subcontractor
- e. TAB Contractor
- f. Equipment Suppliers

C. Operating Instructions:

- 1. Provide typewritten operating instructions for the Owner.
- 2. Describe how to start or stop each mechanical system or individually controlled piece of equipment.
- 3. Describe how to set the temperature control system for normal operation, emergency shutdown, and normal restart procedures after power failure.
- 4. Describe all caution or warning notices posted on or with the equipment or systems.

D. Submittal Data:

- 1. Provide copy of all approved submittal data, shop drawings, etc., as finally provided on this project.
- 2. Each piece of submittal data should describe material or equipment actually installed on this project.

E. Control Diagrams:

- 1. Provide corrected control diagrams to reflect "As-Built" conditions.

F. TAB Report:

- 1. Provide copy of the final Test and Balance report in the HVAC binder.
- 2. Annotate final report with any changes which occurred since publication of final TAB report.

G. Warranties:

- 1. Provide copy or statement of the general warranty of the Contractor (or Mechanical Subcontractor), including the dates of the warranty period.
- 2. Provide copies of vendor (equipment manufacturer) warranties, specifically including those manufacturers who warranty their product for more than one year.

H. Acknowledgments:

1. Copies of Owner's written acknowledgments of receipt of instructions for operation of equipment or systems.
2. Copies of certificates of inspection by local authorities having jurisdiction.
3. Copies of all permits obtained by Contractor for this project. Permit copies shall clearly show the applicable dates and issuing authority. Include instructions for Owner's requirements to maintain permits in force, or other action that may be required of the Owner to renew, or modify, a permit.

**2.02 QUANTITY**

A. Provide Operation and Maintenance Manuals as follows:

1. Provide three (3) complete manuals for each discipline with information on all equipment of that discipline in the project.
2. One copy of each discipline will be retained by the Mechanical Engineer and the other two are for the Owner's use.

**PART 3 - EXECUTION**

**3.01 DELIVERY**

- A. Submit draft manual to Engineer for approval 30 days prior to beginning of test and balance work.
- B. Provide a HVAC manual and a HVAC Controls manual for use by the Test and Balance Contractor during test and balance work.
- C. Deliver the final manuals to the Engineer prior to submitting application for final payment.

End of Section

**Article I      230593      TEST AND BALANCE**

PART 1 - GENERAL

**1.01    SCOPE**

- A.    Provide the services of a qualified technician to test, balance, and attest the performance of the complete heating and air conditioning system provided as work of this contract, including the following:
  - 1.    Split System Air Conditioning and Heat Pump Units
  - 2.    Dedicated Outdoor Air Conditioning Units
  - 3.    Ductless Split System Heat Pump Units
  - 4.    Fans.
  - 5.    Ductwork and Air Distribution Systems.
  - 6.    Smoke Detectors

**1.02    QUALIFICATIONS**

- A.    The Contractor shall submit the name and qualifications of the test and balance technician within fifteen (15) days after award of the contract.

**1.03    TEST AND BALANCE AGENCY**

- A.    Test and balance agency shall be an independent agency, certified and licensed to perform test and balance services by the Associated Air Balance Council and with all qualified technicians under the direct supervision of an AABC certified Test and Balance Engineer, or:
- B.    Test and balance agency shall be an independent agency, certified and licensed to perform test and balance services by the National Environmental Balancing Bureau with all qualified technicians under the direct supervision of a NEBB certified Testing, Adjusting and Balancing Engineer.

**1.04    RELATION TO OTHER WORK**

- A.    Refer to the Section entitled COMMON REQUIREMENTS FOR HVAC WORK.
- B.    No attempt shall be made to perform test and balance work until the system is complete and operable in all respects. All systems shall be operating during the test and balance procedure.

## **1.05 INDUSTRY STANDARDS**

- A. Associated Air Balance Council National Standards for Field Measurement and Instrumentation, Latest Edition, or:
- B. National Environmental Balancing Bureau Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems, Latest Edition.

## PART 2 - PRODUCTS

### **2.01 TESTING**

- A. Perform all Testing, Balancing, Adjusting, and Data Recording necessary to establish and confirm capacity, quality, and completed status of work.
- B. Advise Engineer of all tests at least seven days prior to testing so that, at his option he may be present.

## PART 3 - EXECUTION

### **3.01 PROCEDURE**

- A. When the mechanical work is in a state of readiness for test and balance work to proceed, the test and balance technician shall proceed with his work. If, upon thus proceeding, the test and balance contractor determines that there are other items of the work which have not been completed to an extent which will allow him to complete test and balance work, then he shall make a detailed written report of these items and shall send written notification to the Contractor of such incomplete work. The Contractor shall then send a copy of this report to the Engineer. The test and balance work shall not proceed until these items are corrected; such correction shall be subject to approval of the Engineer.
- B. After all air distribution devices have been balanced to distribute calculated design indicated air quantities, and if temperatures in any area or any zone is not maintained with 2 degrees, plus or minus, of the zone area which does have the zone temperature control thermostat, then notify Engineer in writing of such conditions, and obtain Engineer's approval to rebalance devices to obtain air quantities other those indicated, so that air temperature in entire zone will be as even as possible, regardless of calculated design air quantities. After obtaining Engineer's written approval to rebalance, perform such necessary rebalancing.
- C. All mechanical systems shall be balanced to optimum performance capabilities of the equipment and the design. This shall be done in accordance with the standards published by the Associated Air Balance Council or the National Environmental Balancing Bureau unless otherwise indicated.
- D. Report: Upon completion of all testing and balancing, and prior to requesting final inspection and acceptance of the project by the Owner, submit one (1)

complete copy of the Test and Balance Report to the Engineer for approval and use in the final inspection.

- E. Final Report: Upon completion of the final inspection and corrections of all discrepancies in the TAB Report, submit three (3) complete copies of the Test and Balance Report to the Engineer. Two copies will be submitted to the Owner, and one copy retained by the Engineer.

### **3.02 AIR DISTRIBUTION SYSTEM TESTING PROCEDURE**

- A. The Air Balance and Testing Agency shall perform the following tests, and balance the system in accordance with the following requirements:
  1. Test and adjust blower rpm to design requirements.
  2. Test and record motor full load amperes.
  3. Make Pitot tube transverse of main supply and obtain design cfm at fans.
  4. Test and record system static pressures, suction and discharge.
  5. Test and adjust system for design cfm recirculated air.
  6. Test and adjust system for design cfm outside air.
  7. Test and record entering air temperatures (db heating and cooling).
  8. Test and record entering air temperatures (wb cooling).
  9. Test and record leaving air temperatures (db heating and cooling).
  10. Test and record leaving air temperatures (wb cooling).
  11. Adjust all main supply and return air ducts to proper design cfm.
  12. Adjust all zones to proper design cfm, supply and return.
  13. Test and adjust each diffuser, grille, and register to within 10% of design requirements.
  14. Identify each diffuser, grille, and register as to location and area.
  15. Identify and list size, type, and manufacturer of diffusers, grilles, registers, and all testing equipment. Use manufacturer's rating on all equipment to make required calculations.
  16. In readings and tests of diffusers, grilles, and registers, include required fpm velocity and test fpm velocity, and required cfm and test cfm after adjustments.

17. In cooperation with the control manufacturer's representative, set adjustments of automatically operated dampers to operate as specified, indicated, and/or noted.
  18. Adjust all diffusers, grilles, and registers to minimize drafts in all areas.
- B. As part of this contract, the Contractor shall make any changes in the pulleys, belts, and dampers, or add any dampers, as required for correct balance as recommended by the Air Balance and Testing Agency, at no additional cost to the Owner.
  - C. Provide differential pressure tests across each smoke detector and record same. Test shall be in accordance with the detector manufacturers recommendations.

End of Section



**Article I      230700      THERMAL INSULATION**

**PART 1 - GENERAL**

**1.01    SCOPE**

- A.    Provide labor and materials to insulate equipment, piping, ductwork and miscellaneous items in the piping and duct systems as indicated on the drawings and specified herein.

**1.02    RELATION TO OTHER WORK**

- A.    Refer to the Section entitled COMMON REQUIREMENTS FOR HVAC WORK.
- B.    No insulation adhesives, materials or finishes shall be applied until the item to be insulated has been completely installed, tested and proved tight.

**1.03    SUBMITTALS**

- A.    Submittals shall contain complete descriptive and engineering data, including flame spread and smoke developed ratings (ASTM E84 test method), on all materials and adhesives.
- B.    Where finishes, covers, or jackets are specified, provide complete data on same.
- C.    Submittals shall contain specified information on product: density, conductivity, conductance, or resistance as required establishing conformance with the specified values or materials.
- D.    Where compliance with an industry, society, or association standard is specified or indicated, certification of such compliance shall be included in the submittal.

**1.04    STORAGE OF MATERIALS**

- A.    Insulation, adhesives, and finishes may be stored at the site provided that they are stored in such a manner as to protect them from damage. Use of the site shall comply with the General Conditions and such other provisions of the Contract Documents as may limit or restrict said use.
- B.    Do not store flammable materials within the building.
- C.    Do not store fiberglass insulation within the building until it has been "dried in". If no other dry space is available and this insulation must be installed or stored before the building is "dried in" and completely enclosed, provide polyethylene film cover wrap for protection.

## **1.05 INDUSTRY STANDARDS**

- A. All materials and adhesives used on piping systems, and in or on ductwork, shall conform to the requirements of NFPA 90A as to flame spread and smoke developed ratings.
- B. All products shall bear labels indicating their compliance with the requirements of NFPA 90A as to the flame spread and smoke developed ratings.

## **1.06 MANUFACTURER**

- A. Manufacturers are indicated in "Basis of Design" to establish the quality and performance standards of the desired material.
- B. Other manufacturers whose products are equal in all respects to those specified may be submitted for approval. "Equal in all respects" shall be determined by the Engineer.

## PART 2 - MATERIALS

### **2.01 INSULATING MATERIALS**

- A. Preformed Cellular Glass Pipe Insulation:
  - 1. Impermeable, non-combustible, inorganic preformed cellular glass rigid pipe insulation.
  - 2. Thermal conductivity "k" factor at 75°F of 0.33 or less.
  - 3. Water vapor permeability of 0.01 perm/inch or less.
  - 4. Fire/smoke rating of 25/50 or less.
  - 5. Suitable for piping temperatures from -400°F to 900°F.
  - 6. Basis of Design: Pittsburgh-Corning "Foamglas"
- B. Cellular Glass Block Insulation:
  - 1. Impermeable, non-combustible, inorganic preformed cellular glass rigid pipe insulation.
  - 2. Thermal conductivity "k" factor at 70°F of 0.33 or less.
  - 3. Water vapor permeability of 0.01 perm/inch or less.
  - 4. Fire/smoke rating of 25/50 or less.
  - 5. Suitable for piping temperatures from -400°F to 900°F.

6. Basis of Design: Pittsburgh-Corning "Foamglas"
- C. Preformed Glass Fiber Pipe Insulation with All Purpose Self-Sealing Jacket:
1. Uniform construction of long glass fibers bonded in resin, with factory applied jacket.
  2. Thermal conductivity "k" factor at 75°F of 0.25 or less.
  3. Water vapor permeability of 0.02 perm/inch or less.
  4. Fire/smoke rating of 25/50 or less.
  5. Suitable for piping temperatures up to 500°F.
  6. Basis of Design: John Manville "Micro-Lok" with AP-T Plus jacket.
- D. Flexible Blanket Fiberglass Duct Insulation:
1. Long glass fibers bonded in resin into a flexible blanket, with factory applied FSK vapor barrier facing.
  2. Thermal conductivity "k" factor at 75°F of 0.25 or less for 1 lb/CF density.
  3. Water vapor permeability of 0.02 perm/inch or less.
  4. Composite fire/smoke rating of 25/50 or less.
  5. Suitable for temperatures up to 250°F.
  6. Facing of aluminum foil / fiberglass yarn mesh / fire resistant Kraft paper.
  7. Basis of Design: John Manville "Microlite", Type 100, with FSK facing.
- E. Non-Flexible Fiberglass Duct Insulation:
1. Long glass fibers bonded in resin into a non-flexible sheet, with factory applied FSK type vapor barrier facing.
  2. Thermal conductivity "k" factor at 75°F of 0.23 or less for 3 lb/cubic foot density.
  3. Water vapor permeability of 0.02 perm/inch or less.
  4. Composite fire/smoke rating of 25/50 or less.
  5. Suitable for temperatures of -20°F up to 150°F.
  6. Type I AP (All Purpose) facing of white kraft paper bonded to aluminum foil, reinforced with fiberglass yarn mesh.

7. Basis of Design: John Manville "800 Series Spin-Glas", Three pound density, Type 814, with all purpose "AP" facing.
- F. Elastomeric Pipe Insulation:
1. Flexible, closed, cell, elastomeric pipe and tube insulation.
  2. Thermal conductivity "k" factor at 75°F of 0.27 or less.
  3. Water vapor permeability of 0.10 perm inch or less.
  4. Fire/smoke rating of 25/50 or less.
  5. Suitable for temperatures from -30°F to 220°F.
  6. Basis of Design: Armstrong "AP Armaflex" pipe insulation.
- G. Elastomeric Sheet Insulation:
1. Flexible, closed cell, elastomeric sheet insulation.
  2. Thermal conductivity "k" factor at 75°F of 0.27 or less.
  3. Water vapor permeability of 0.10 perm inch or less.
  4. Fire/smoke rating of 25/50 or less for 3/4" thickness.
  5. Suitable for temperatures from -30°F to 220°F.
  6. Basis of Design: Armstrong "Armaflex II" sheet insulation.
- H. Removable Insulation Blankets:
1. Provide removable insulation blankets fabricated to fit the configuration of the item being insulated, i.e., pump, valve, etc. The blankets must fit with no resulting gaps or compression of the insulation in order to maintain their insulating effectiveness. All materials shall be temperature resistant to 500°F minimum.
  2. Insulating filler: Glass fiber, matted, 10 lbs/cu.ft. density, conforming to MIL-1-16411 Type 11, or Alumina Silica Refractory fiber matting.
  3. Hot/Cold Face Enclosure Material: Alpha Style C911-3259 silicone impregnated glass fiber fabric, 17.5 oz./sq.yd. total weight, 24% of which is silicone.
  4. Fasteners: Velcro one inch (1") wide straps permanently sewn to blanket with opposing securement flap sewn in the appropriate location.
  5. Basis of Design: "The M.A.C. Group"

## 2.02 ADHESIVES, MASTICS, SEALANTS, AND COATINGS

### A. Adhesives:

1. Fiberglass Insulation to Metal: Quick setting, non-flammable, fire resistive adhesive serviceable from -20°F to 180°F, fire/smoke rating of 25/50 or less.
  - a. Basis of Design: Fosters 85-20.
2. Elastomeric Insulation Adhesive: Note flammability and safety precautions necessary with this adhesive. Do not store this adhesive inside the building. Shall have dried film composite fire/smoke rating of 25/50 or less.
  - a. Basis of Design: Armstrong 520 Adhesive.

### B. Mastics:

1. For elastomeric insulation: Breathing type mastic coating, tough, durable, fire-resistive, for use with 10 x 10 glass fabric mesh.
  - a. Basis of Design: Childers AK-CRYL CP-9.
2. For Insulated Ductwork: General purpose asbestos free high solids water-based mastic designed for trowel/glove or brush/spray application. Serviceable from -20°F to 200°F; Fire/smoke rating of 25/50 or less; maximum permeability of 3.0 perm inch; non-flammable and non-toxic; UI and USDA compliant.
  - a. Basis of Design: Foster "SEALFAS G-P-M" 35-00 / 45-00.

### C. Sealants:

1. Cellular Glass Vapor Barrier Sealant: Butyl based non-hardening vapor barrier sealant, serviceable from -70°F to 180°F, specifically designed for use with cellular glass. Water and weather resistant, water permeability of 0.01 perm inch or less.
  - a. Basis of Design: Pittseal 444N.
2. Vapor Barrier Sealant: Fast setting, water resistant adhesive-sealant designed for bonding two impermeable surfaces. Non-flammable in wet state. Serviceable from -20°F to 200°F. Fire/smoke rating of 25/50 or less.
  - a. Basis of Design: Foster's 85-75 Contact Bond Cement.

D. Coatings and Fabrics:

1. Cellular Glass Bore Coating: Factory applied vinyl base anti-abrasive compound specifically designed for use with cellular glass insulation.
  - a. Basis of Design:
2. Cellular Glass Coating and Joint Sealant: Acrylic latex water base, highly flexible, fire resistive coating, serviceable from -30°F to 180°F, permeability of 0.4 perm inch, Fire/Smoke rating of 25/50 or less.
  - a. Basis of Design: Pittcote 404.
3. Cellular Glass Coating: Asphalt based coating, serviceable from -40°F to 200°F, with permeability of 0.4 perm inch.
  - a. Basis of Design: Pittsburgh Corning "Pittcote 300" (for outdoor use only).
4. Fabric: Polyester mesh fabric. 0.125 inch mesh opening, high tensile strength.
  - a. Basis of Design: Pittsburgh Corning Fabric 79.

**2.03 FINISHES**

- A. Elastomeric Weather-Resistant Insulation Finish: Note flammability and safety precautions necessary with this finish. Do not store this finish inside of the building. Shall have dried film composite fire/smoke rating of 25/50 or less.
  1. Basis of Design: Armstrong Armaflex finish.
- B. Thermal Insulation Coating: Tough, washable, abrasive resistant, non-flammable coating for thermal insulation not requiring an external vapor barrier. Serviceability from 0°F to 180°F. Fire-smoke rating of 25/50 or less.
  1. Basis of Design: Foster's 30-36 Coating.
- C. Pipe Jacketing: Aluminum jacketing, 0.016 inches thick, type 3003 alloy, H-14 temper, circumferentially corrugated, with a continuously laminated moisture barrier of one mil polyethylene film and a protective layer of 40 lb. virgin paper.
  1. Basis of Design: Childers Products Co. "Corrolon".
- D. Pipe Fitting Covers: Aluminum fitting covers, 0.20 inches minimum thickness, type 3003 alloy, H-14 temper prefabricated fitting covers with baked epoxy moisture barrier for pipe sizes through 24". Field fabricate fitting covers for pipe sizes larger than 24" using 0.020 inches thick aluminum roll jacketing with laminated polyethylene/kraft moisture barrier.

1. Basis of Design: Childers Products "Ell-Jacs", "Gore Ell-Jacs", "Tee-Jacs", "End-Caps", "Beveled Collars", "Valve Fitting Covers", and "Flange Jacs".
- E. Flexible Insulation Jacket for Below Grade Use: Prefabricated laminate containing a 10x10 asphalt impregnated glass fabric and a one mill thick aluminum foil sandwiched between three layers of bituminous mastic. The exposed (outer) surface shall be coated with a plastic film and the inner surface with a release paper. Total thickness shall be not less than 125 mils.
1. Basis of Design: Pittsburgh Corning "PITTWRAP" (heat seal).
- F. Flexible, non-metallic Insulation Jacket for Below Grade Use on Chilled Water Piping: Self-sealing non-metallic sheet material not requiring torch or heater, 50 mil thickness, composed of polymer-modified bituminous compound reinforced with glass fabric and a one mil thick aluminum top surface film, used for protection of above ground cellular glass insulation systems.
1. Basis of Design: Pittsburgh Corning "PITTWRAP CW Plus".

## **2.04 MISCELLANEOUS MATERIALS**

- A. Tape: No tape is approved for this project for the fastening of sections of insulation. Tape matching the insulation jacket may be used to seal minor jacket punctures.
- B. Wire: 16 gauge dead soft copper or 16 gauge stainless steel.
- C. Screws: Aluminum pan head type "A", slotted, #8 by 1/2 inch.

## **PART 3 - INSTALLATION**

### **3.01 GENERAL**

- A. The insulation of a particular item shall be considered as an insulation system. All components of this system, including adhesives mastics, sealants, coatings, and finishes, shall be as recommended by the insulation manufacturer as compatible for use with his insulation.
- B. The installation of the insulation system shall be in accordance with the insulation manufacturer's recommendations.

### **3.02 REFRIGERANT PIPING**

- A. Insulate all refrigerant piping with pre-formed elastomeric pipe insulation of the thickness indicated. Insulation located in air plenums shall meet NFPA-90A requirements.

- B. Piping Located Indoors in Conditioned Space:
  - 1. Liquid Lines: No insulation required.
  - 2. Suction Lines: Insulate with 3/4" thick insulation and seal joints with adhesive.
  - 3. Hot gas Lines: Insulate with 3/4" thick insulation and seal joints with adhesive.
  - 4. Finish: Provide finish on all exposed insulation.
- C. Piping Located Outdoors or in Ventilated Areas:
  - 1. Liquid Lines: No insulation required.
  - 2. Suction Lines: Insulate with 3/4" thick insulation, seal joints with adhesive. Cover with aluminum jacket.
    - a. Aluminum Jacket: Cover insulated piping with aluminum jacket and secure to piping with 1/2" aluminum bands. Cover fittings with manufactured fitting covers and secure with 1/2" bands. All jacketing shall shed water.
    - b. Glass fabric and Mastic: Where soft copper piping has been used, provide glass fabric and mastic on sweeping bends. The glass fabric and mastic shall be applied first and shall extend 2" under the aluminum jacket. Provide aluminum jacket on all straight pipe.
- D. Piping Located in Conduit System:
  - 1. Liquid Lines: Insulate with 1/2" thick insulation and seal joints with adhesive.
  - 2. Suction Lines: Insulate with 3/4" thick insulation and seal joints with adhesive.
  - 3. Hot gas Lines: Insulate with 3/4" thick insulation and seal joints with adhesive.
  - 4. Finish: None required within the conduit.

### **3.03 CONDENSATE DRAIN PIPING**

- A. Insulate all copper condensate and cast iron drain piping with 1/2 inch elastomeric pipe insulation.
- B. Seal all joints, seams and punctures with adhesive and finish with elastomeric insulation finish.



### **3.04 DUCTWORK**

- A. Interior Concealed: Insulate all supply ductwork that is not internally insulated, and outside air ductwork, with flexible blanket duct insulation 2" thick. Overlap internal insulation a minimum of one foot and vapor seal raw end as specified herein for joints. Where duct width exceeds twenty four inches (24") the insulation shall be additionally secured to the bottom of the duct using mechanical fasteners spaced one foot (1') on center. Insulation shall be applied with edges tightly butted and all joints and breaks in the vapor barrier sealed using glass fabric and vapor barrier sealant. Insulation shall be applied in conformance with the manufacturer's recommendations, and in compliance with the Florida Energy Code.
- B. Interior Concealed under insulated roof: Insulate all ductwork (supply, return, exhaust, makeup air, and relief air) with flexible blanket duct insulation 2" thick, as for Interior Concealed duct above.
- C. Interior, Exposed: Insulate all supply, return, and outside air ductwork that is not internally insulated with non-flexible fiberglass sheet insulation 1-1/2" thick. Overlap internal insulation a minimum of one foot and vapor seal raw end as specified herein for joints. Adhere duct insulation using a full coverage coat of fiberglass insulation adhesive applied in accordance with the manufacturer's recommendations. Insulation shall be applied with edges tightly butted and all joints and breaks in the vapor barrier sealed using glass fabric and vapor barrier sealant. Insulation shall be applied in conformance with the manufacturer's recommendations, and in compliance with the Florida Energy Code. Heating only supply and return ducts exposed in the heated spaces need not be insulated.
- D. Exterior Exposed to Weather: In addition to any internal fiberglass insulation, insulate as follows: Apply 2" thick polystyrene insulation to exterior surfaces in accordance with insulation manufacturer's recommendations. Taper thickness of insulation applied to top horizontal surfaces from 2" thickness at edges to 2-1/2" thickness at the center or at one edge, to provide a crowned surface so that water will drain off. Provide a glass fabric and mastic finish on the insulation surface. Insulation shall be applied in conformance with the manufacturer's recommendations, and in compliance with the Florida Energy Code. Provide a metal cover over the insulation on the top and the sides. Bottom of side shall extend down past insulation with a hemmed-under drip edge to keep water clear of the insulation. Metal shall be galvanized steel with paint-grip finish, stainless steel, or aluminum. Metal thickness and reinforcement shall equal or exceed the SMACNA guidelines for the covered duct size at six inches (6") wg positive static pressure.

### **3.05 CEILING DIFFUSERS**

- A. Insulate the backs of all ceiling diffusers and other air outlet devices installed in other than return air plenums as specified for ductwork, interior concealed, in the preceding paragraphs.

### **3.06 INSULATION FIT**

- A. Where insulation is applied to pipe or equipment, it shall be installed with all joints fitted to eliminate voids.
- B. Voids shall not be filled with joint sealant, but shall be eliminated by refitting or replacing insulation.

### **3.07 PROTECTION OF WORK**

- A. Protect all finishes and vapor barrier seals from damage prior to final acceptance and make repairs to damaged finishes or vapor barriers immediately.
- B. Protect adjacent surfaces from damage or spillage during installation and cleanup any spillage or spatters of adhesives or finishes immediately.

End of Section

**Article I      231126      FUEL GAS PIPING SYSTEMS**

**PART 1 - GENERAL**

**1.01    SCOPE**

- A.    Provide Natural gas piping systems complete as indicated on drawings and specified herein.
- B.    Drawing scales do not permit the indication of all offsets, fittings, sleeves, and similar items; however, these items shall be provided to form a complete and properly installed system at no additional cost to Owner.
- C.    System shall be complete in all respects and shall comply with applicable provisions of NFPA 54 and 58.

**1.02    RELATION TO OTHER WORK**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR MECHANICAL WORK.
- B.    Refer to the Section entitled HANGERS AND SUPPORTS.
- C.    Piping systems requiring fixed locations and slopes shall have priority over those which do not have these requirements.

**PART 2 - EQUIPMENT**

**2.01    PIPE, EXTERIOR**

- A.    Black steel continuous weld below 2 inch size, and ERW seamless 2 inch and above, Schedule 40, conforming to ASTM A 53, Grade B, or ASTM A 106, Grade B.
- B.    Piping shall have factory applied plastic jacket to prevent corrosion.

**2.02    PIPE, INTERIOR**

- A.    Black steel continuous weld below 2 inch size, and ERW or seamless 2 inch and above, Schedule 40, Conforming to ASTM A 53, Grade B, or ASTM A 106, Grade B.
- B.    Copper tubing, type K or L, conforming to ASTM B 88.

## **2.03 FITTINGS**

- A. Steel Pipe:
  - 1. Two Inch and Larger: Butt welding type scheduled to match adjacent piping.
  - 2. 1-1/2 Inch and Smaller: Socket weld type 300 lb. class.
  - 3. Final connections to equipment shall be screwed.
  - 4. Surface Protection, Exterior: Protect welded pipe joints and fittings from corrosion using heat setting adhesive thermal shrink pipe sleeves sized to provide a minimum of a 2 inch overlap on undamaged plastic pipe coating. Acceptable: Raychem Type TPS.
- B. Copper Tubing:
  - 1. Wrought copper, solder joint, pressure type conforming to ANSI B16.22, soldered or brazed with a material having a melting point above 1000 degrees F.
  - 2. Flared gas tube fittings.

## **2.04 VALVES**

- A. General: Valve numbers indicated are to set standard of quality and design. Valves as manufactured by other first line manufacturers may be submitted for approval.
- B. Service cocks: Semi-steel body, brass plug, WP, 125 lb. WOG in compliance with ANSI Z21.15, 21.21, or B16.33. Acceptable: Rockwell 1092; McDonald SGOB.

## **2.05 DIELECTRIC ISOLATORS**

- A. Unions: For pipe sizes 2 inches and under, EPCO insulated unions with screw of solder joint connection to suit pipe and equipment.
- B. Flanges: For pipe sizes 2-1/2 inches and over, Pilco Products Flange insulation sets with phenolic retainer; neoprene (compatible with gas) seal element; polyethylene sleeves; and double washer sets.

## **2.06 SPECIALTIES**

- A. Building Regulators: Provide individual building regulators which are UL listed for the intended service. Spring regulated self-contained type with high tensile iron body, die cast zinc spring case, die cast aluminum diaphragm casing with all steel parts plated to inhibit corrosion. Orifice, main disc and back disc as well as all regulator parts shall be replaced without removing the valve body from the line. Valve shall be equipped with high pressure shutoff assembly to function

upon excess outlet pressure without discharge to atmosphere. Acceptable: Fisher Series S200, Type S203 size as scheduled.

- B. Strainer: Provide "Y" pattern line strainers ahead of each pressure regulator. Strainers shall be selected for a pressure drop not to exceed 25 per cent of the pressure downstream of the regulator. Cast steel body with 150 lb. flanged end connections. Acceptable: Fisher Governor Type 260B with 304SS screen.

**PART 3 - EXECUTION**

**3.01 GENERAL**

- A. Piping shall be run without traps or pockets and pitched 1 inch in 40 feet to drain back to main.
- B. Piping shall be run parallel to the walls and ceilings in a neat and workmanlike manner and shall be offset as required to avoid interferences with structural features and work of other trades.
- C. Piping shall be installed with provisions for expansion both horizontally and vertically.

**3.02 SURFACE PROTECTION FOR UNDERGROUND PIPE**

- A. Protect welded pipe joints and fittings from corrosion using heat setting adhesive thermal shrink pipe sleeves or tape wrap sized to provide a minimum of two inches (2") overlap on undamaged plastic pipe coating.

**3.03 PIPE SUPPORTS**

- A. Vertical gas piping shall be supported at each floor level, or twenty foot intervals, whichever is smaller.

**3.04 HORIZONTAL GAS PIPING SHALL BE SUPPORTED WITH SUPPORT SPACING NOT TO EXCEED THE FOLLOWING:**

<u>STEEL PIPE</u>		<u>COPPER TUBING</u>	
<u>PIPE SIZE</u>	<u>SPACING</u>	<u>TUBE SIZE (OD)</u>	<u>SPACING</u>
1/2"	6 FT.	3/8" TO 1/2"	4 FT.
3/4" TO 1"	8 FT.	5/8" TO 3/4"	6 FT.
1-1/4" AND UP	10 FT.	7/8" AND UP	8 FT.

### **3.05 JOINTS AND CONNECTIONS**

- A. General: Joints and connections shall be made permanently air, gas, and water tight.
- B. Welded Joints: All pipe 2 inches and larger shall be butt welded. Cut pipe square using pipe cutting tool and carefully ream pipe to remove all burrs. Bevel ends of pipe and, after carefully aligning and setting of proper weld gap, tack weld to secure pipe and fittings in true alignment. Weld shall be of sound metal with tack welds removed in advance of finish weld. All welding shall be performed by welders certified in accordance with ANSI B31.1 with test conducted by an approved testing laboratory. Copy of certification shall be available at job site.
- C. Solder Joints: Cut pipe square using pipe cutting tool which does not crimp the pipe. Remove all burrs using pipe reamer and taking care not to flare the pipe end. Thoroughly clean the outside of the pipe and the interior of the valves and fittings using a fine sand cloth. Apply noncorrosive paste flux to the cleaned surfaces immediately and apply solder and heat in accordance with manufacturer's instructions to complete joint. Use care not to damage valves and follow the valve manufacturer's installation instructions explicitly.
- D. Equipment Connections: Final connections to equipment shall be made with unions or flared gas fittings for pipe sizes 1-1/2 inches and under and with companion flanges for piped 2 inches and larger. Where incompatible piping materials come in contact, except for the use of valves, isolate the two materials using dielectric isolators as specified hereinbefore. Connections to equipment shall be made in accordance with details on drawings and the equipment manufacturer's installation instructions.

### **3.06 VALVES**

- A. All valves, cocks and similar items shall be installed in an easily accessible location.
- B. All valves, locks and similar items shall be clearly identified.

### **3.07 TEST**

- A. Test piping systems, prior to backfill of any trenches, using compressed air at a pressure not less than 150 percent of working pressure. Soap each joint and prove tight.

End of Section

**Article I. 232116 CONDENSATE DRAIN PIPING**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Provide condensate drain piping from cooling coil drain pans and auxiliary drain pans. Drain piping shall be routed to the nearest roof drain or floor drain except as otherwise indicated on the drawings.
- B. Contractors shall use either the copper or PVC systems specified, provided it is in compliance with all codes and ordinances. PVC shall not be used in return air plenums.

**1.02 RELATION TO OTHER WORK**

- A. Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.
- B. Refer to the Section entitled HANGERS AND SUPPORTS.
- C. Refer to the Section entitled THERMAL INSULATION.
- D. Piping systems requiring fixed locations and slopes shall have priority over those which do not have both requirements.

**1.03 SUBMITTALS**

- A. Provide submittals on all materials and equipment to be used in these systems.
- B. Where compliance with an industry, society or association standard is specified or indicated, certification of such compliance shall be submitted.

**PART 2 - MATERIAL**

**2.01 PIPE**

- A. Hard drawn copper, Type L, ASTM B 88.
- B. Polyvinyl Chloride (PVC) conforming to ASTM D 2665.
- C. Refer to the PLUMBING DIVISION for pipe 2 inches or larger.

**2.02 FITTINGS**

- A. Copper: Wrought copper, solder joint, pressure type, ANSI B16.22.
- B. Polyvinyl Chloride (PVC) conforming to ASTM D 2665.

### **2.03 SOLVENT**

- C. Polyvinyl Chloride (PVC) solvent, ASTM D 2665.

### **2.04 CEMENT**

- A. Polyvinyl Chloride (PVC) cement as recommended by PVC pipe manufacturer.

### **2.05 SOLDER**

- A. Lead Free Composition 95.5% tin, 4% copper, 0.5% silver, Engelhard "Silvabrite 100".
- B. Lead Free Composition Sb5 (95% tin, 5% antimony).
- C. Sil Fos.

## **PART 3 - INSTALLATION**

### **3.01 GENERAL**

- A. Piping shall be sloped uniformly toward drain, and provided with trap seal having a depth, in inches, equivalent to the total static pressure of the respective fan system.
- B. Traps shall be assembled using elbows and tees with threaded plugs to permit cleaning of trap and drain line.
- C. Piping shall be installed in a neat and workmanlike manner and shall be not smaller than full size of the equipment drain connection or three-quarters inch (3/4") whichever is larger.

### **3.02 PIPING SYSTEMS**

- A. Underground Piping: PVC or hub and spigot cast iron at Contractor's option. Cast iron or PVC piping shall not rise above building slab more than one foot when changing to a different material.
- B. Above Ground Piping: PVC or copper. Above ground piping in return air plenums must be copper.

### **3.03 JOINTS AND CONNECTIONS**

- A. General: Joints and connections shall be made permanently air, gas, and water tight.
- B. Solder Joints: Cut pipe square using cutting tool which does not crimp pipe. Remove all burrs using pipe reamer and taking care not to flare the pipe end. Thoroughly clean the outside of pipe and the interior of the fittings using a fine sand cloth. Apply noncorrosive paste flux to the cleaned surfaces immediately



and apply solder and heat, in accordance with manufacturer's instructions, to complete joint.

- C. Socket Joints: Cut piping square using pipe cutting tool. Remove all burrs using a pipe reamer or file. Thoroughly clean outside of pipe and inside of fittings with PVC solvent. Apply PVC cement manufacturer's recommendations.
- D. Equipment Connections:
  - 1. General: Connections to equipment shall be made in accordance with details on the drawings and the equipment manufacturer's installation. Where incompatible piping materials come in contact, except for use of valves, isolate the two materials using dielectric isolators. Provide roughing materials and connect equipment under other sections of the specifications or by the Owner as indicated on the drawings, in the schedules, and as specified.
  - 2. 2 Inches and Smaller: Shall be made with unions.
  - 3. 2-1/2 inches and larger shall be made with flanges.

### **3.04 SUPPORT**

- A. Hangers for copper piping systems shall not be placed at greater than the following intervals:
  - 1. Pipe 1 Inch and Smaller: Six foot (6') centers and not more than two feet (2') from a change in direction (offsets, elbows, and tees).
  - 2. Pipe 1-1/4 Inch Through 2-1/2 Inches: Eight foot (8') centers and not more than two feet (2') from a change in direction (offsets, elbows, and tees).
- B. Hangers for PVC piping systems shall not be placed at greater than the following intervals:
  - 3. Pipe 1 Inch and Smaller: Four foot (4') centers and not more than two feet (2') from a change in direction (offsets, elbows, and tees).
  - 4. Pipe 1-1/4 Inch Through 2-1/2 Inches: Five foot (5') centers and not more than two feet (2') from a change in direction (offsets, elbows, and tees).

### **3.05 ROUTING**

- A. Unless otherwise indicated, route pipe discharge as to nearest floor drain, janitor's closet, or as shown on the drawings.
- B. Traps: Provide deep seal P-trap or fabricate P-trap from 1/4 bends to provide a minimum of a 2 inch seal when the air conditioning unit's static pressure is acting on the seal. This is intended to mean 2 inches water seal plus the static pressure

of the unit listed in the AHU schedule. If the unit static pressure is less than 1 inch water then the trap shall be 3 inches deep.

- C. Piping shall be run with slope of 1/4 inch per foot.

### **3.06 PROTECTION OF WORK UNTIL FINAL ACCEPTANCE**

- A. Contractor shall protect the drain piping from damage, the entrance of dirt and construction debris, and shall keep drains open during periods of use from the time of installation until final acceptance.

End of Section

**Article I      232300      REFRIGERANT PIPING AND ACCESSORIES**

PART 1 - GENERAL

**1.01    SCOPE**

- A.    Provide refrigerant piping systems and accessories, complete in all respects, between the outdoor units and the indoor units.
- B.    Drawing scales do not permit the indication of all offsets, fittings, sleeves, and similar items; however, these devices shall be provided as work of this Section at no change in contract price.

**1.02    RELATION TO OTHER WORK**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.
- B.    Refer to the Section entitled THERMAL INSULATION.
- C.    Piping systems requiring fixed locations and slopes shall have priority over those that do not have both requirements.

**1.03    SUBMITTALS**

- A.    Provide submittals on all components of the systems.
- B.    Where compliance with an industry, society, or association standard is specified or indicated, certification of such compliance shall be submitted.

PART 2 - PRODUCTS

**2.01    MATERIALS**

- A.    Pipe:
  - 1.    Hard Copper: Shall be refrigerant grade copper, dehydrated and sealed, seamless, hard drawn, Type L (ACR).
  - 2.    Soft Copper: Shall be refrigerant grade, dehydrated and sealed, soft copper tubing, Type K (ACR).
- B.    Fittings: Refrigerant grade, wrought copper, long radius, solder joint, pressure type conforming to ANSI B16.22, soldered or brazed with a solder material having a melting point above 1000 degrees F.

**2.02    REFRIGERANT SPECIALTIES**

- A.    Refrigerant Filter-Dryer: A full flow, sealed type reversible filter dryer designed for liquid line installation in heat pumps suitable for 500 psig, molded porous core

to remove moisture, acids, oil sludge, and varnish, filter out scale, sludge, carbon, or other foreign matter. Size for less than two (2) psi pressure drop.

**B. Refrigerant Charging Valve.**

1. A refrigerant charging valve shall be located between the receiver or condenser outlet valve and the liquid line dryer.
2. The charging valve shall be of the packed receiver type, and shall be provided with a flare seal cap.

**C. Moisture Indicator/Liquid Indicator.**

1. A combination moisture indicator and liquid line sight glass, of the double port type, shall be installed in the liquid line leaving the receiver, or condenser, upstream of the dryer.
2. Sight glass assembly shall include seal caps.

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

- A. Pipe:** The refrigerant pipe sizes shall comply with the manufacturer's recommendations, but shall not be less than the sizes indicated. Pipe shall be run in accordance the good practice and trapped only where indicated or recommended by the equipment manufacturer.
- B. Refrigerant Specialties:** Refrigerant valves, driers, expansion valves, and similar items shall be provided with the equipment. Where refrigerant access valves are not furnished by the manufacturer, they shall be field provided to enable charging and checking the systems.
- C. Joints and Connections:** All joints and connections shall be made permanently refrigerant tight.
1. **Solder Joints:** Cut tubing square using tubing cutters, with sharp cutting wheels, so as not to crimp the tubing ends. Remove all burrs using a pipe reamer and taking care not to flare the ends of the tube. Thoroughly clean the outside of the pipe and the inside of the fitting using a fine sand cloth. Apply non-corrosive paste flux to the cleaned surfaces immediately and apply silver solder and heat in accordance with manufacturer's instructions. Use care not to damage equipment or refrigerant specialty items when making up joints (protect from excessive heat).
  2. **Below Grade Piping:** Where refrigerant piping must be installed below grade or below floor slabs on grade, piping shall be run in PVC conduit. Piping in conduit shall be soft drawn with no joints below grade.

- D. Hangers and Supports: Isolate copper tubing from contact with any dissimilar metals. Hangers for copper piping systems shall not be placed at greater than the following intervals.
1. Pipe 1 Inch and Smaller: Six foot (6') centers and not more than two feet (2') from a change in direction (offsets and elbows).
  2. Pipe 1-1/4 Inch and Larger: Eight foot (8') centers and not more than two feet (2') from a change in direction (offsets and elbows).

### **3.02 EVACUATION AND CHARGING**

- A. Piping systems shall be evacuated and charged as follows:
1. Charge the system with dry nitrogen and leak test all joints including factory piping within the units. Test pressure to be minimum of 250 psi.
  2. Identify leaks with soap solution. Repair all leaks by disassembling and remaking the joint.
  3. After all leaks are corrected, evacuate the system to an absolute pressure of 29" mercury.
  4. System shall hold this vacuum for two hours with no noticeable rise in pressure.
  5. Charge the system in the manner and with the type and amount of refrigerant recommended by the manufacturer and in accordance with accepted refrigeration practice.

### **3.03 PROTECTION OF WORK**

- A. Protect all refrigerant piping systems from damage prior to final acceptance and make repairs to damaged systems at once, completely evacuating and charging as specified herein.

End of Section

**Article I. 233100 DUCTWORK, LOW & MEDIUM PRESSURE SHEET METAL**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Provide complete low-pressure and medium-pressure sheet metal duct systems as indicated on the drawings and specified herein.
- B. Drawings scales prohibit the indication of all offsets, fittings, and like items; however, these items shall be installed as required for the actual project conditions at no change in contract price.
- C. Definitions:
  - 1. Low-pressure duct is ductwork designed for up to 2"wg of positive (or negative) static pressure.
  - 2. Medium-pressure duct is ductwork designed for static pressures greater than low-pressure duct.
  - 3. Duct size is the dimensions of the free air passage; i.e., a labeled 12"x 6" internally lined duct has a 12"x 6" air passage, is lined with 1" duct liner, and measures 14"x 8" outside (metal duct) dimensions.

**1.02 RELATION TO OTHER WORK**

- A. Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.
- B. Refer to Section entitled THERMAL INSULATION.

**1.03 SUBMITTALS**

- A. Submit complete manufacturers data on all items specified herein, including method(s) of sealing penetrations (both fire and/or smoke rated and non-rated) of partitions, walls, and floors, that will be provided in this project. Submittal data shall be annotated as to where the material, method, or item is intended for use.
- B. The following detailed shop drawings are required as a minimum:
  - 1. Prepare and submit for approval completely detailed and coordinated shop drawings of the supply and return ductwork from each air handling unit through its transitions, bends, and elbows until such ducts are extended beyond the air handling unit equipment area and/or congested area. These shop drawings shall include the work of all other trades proposed for the congested area.
  - 2. When available, the Engineer will provide electronic copies of the drawing(s) in the Engineer's standard computer assisted drawing format,

for the Contractor's use in preparing these shop drawings. Submittal drawings shall be at a scale of 1/4" = 1'-0", or larger.

3. Prepare and submit shop drawings for each type of air inlet and/or discharge, and its connections, fittings, and accessories as it is to be generally installed. This shall be coordinated with the actual equipment and air distribution products to be used on this project.

#### **1.04 REGULATIONS, CODES, STANDARDS, AND ORDINANCES**

- A. Ductwork construction and installation shall conform to the requirements of the SMACNA manual "HVAC Duct Construction Standards, Metal and Flexible (1995)", except where specifically indicated otherwise in the Contract Documents.
- B. Ductwork construction and installation shall comply with NFPA-90A.
- C. Fire damper construction and installation shall comply with UL-555.
- D. Smoke damper construction and installation shall comply with UL-555S.

#### **1.05 MANUFACTURER**

- A. Specific premanufactured items considered in the design of this project have been identified as "Basis of Design".
- B. Equal products of other manufacturers may be submitted for approval unless specifically noted otherwise.

### **PART 2 - PRODUCTS**

#### **2.01 SHEET METAL DUCTWORK**

- A. Low Pressure Ductwork: Systems operating at two inches of water static pressure (2" wg.) or less shall be constructed in accordance with the SMACNA manual for 2" static pressure classification, with the following modifications.
  1. Material: G-90 coated galvanized steel, lock-forming grade, conforming to ASTM A-527.
  2. Cross-breaking or Beading: Blanket-type exterior duct insulation shall not eliminate the requirement for cross-breaking or beading unbraced duct panels.
  3. Sealing: Seal all joints and seams with Class A sealing method and material.
- B. Medium Pressure Ductwork: Systems operating at specific static pressure classes above 2" wg. as indicated by the SMACNA duct pressure class

designations, shall be constructed in accordance with the SMACNA requirements for the applicable pressure class, with the following modifications.

1. All duct work downstream of air handling units serving VAV or fan terminal units shall be considered as medium pressure duct systems, and shall be constructed for not less than the scheduled total static pressure of the fan supplying the duct system, unless noted otherwise.
2. Material: G-90 coated galvanized steel, lock-forming grade, conforming to ASTM A-527.
3. Cross-breaking: Blanket-type exterior duct installation shall not eliminate the requirement for cross-breaking unbraced duct panels.
4. Sealing: All joints and seams shall be sealed with a Class A sealing method and material.

## 2.02 FLEXIBLE DUCTS

- A. Flexible ducts shall consist of a zinc coated spring steel helix permanently bonded to a full interior laminate of fiberglass, aluminum foil, and polyester fabric liner to form the duct core with positive interior air seal. Ducts shall be NFPA 90A, Class 1 (UL 181), rated for not less than 5000 fpm air velocity. Duct shall be rated for an air temperature range of not less than 20°F to 140°F.
  1. Core shall be covered with factory applied one inch, one pound per cubic foot fiberglass insulation with an R value of 6.0 sheathed in a seamless exterior Class 1 fire retardant polyethylene material vapor barrier jacket. Jacket vapor pressure shall be rated at not more than 0.05 perms. Duct shall be rated at not more than 25/50 flame spread/smoke developed per ASTM E-84.
  2. Pressure Ratings: Duct shall have a positive working pressure of not less than 10" wg for sizes 4" through 20" in diameter per UL-181. Duct shall be rated for not less than 6" wg recommended operating positive pressure for 4" through 12", and not less than 4" wg recommended operating positive pressure for 14" through 20", in accordance with ADC FD-R1 Test Code. Negative static pressure shall be not less than ¾" wg.
  3. Duct Main to Flex Duct Connections: Fittings shall be galvanized sheet metal spin-in fittings with quadrant damper and without air scoops, or shall be rectangular-to-round fittings with quadrant dampers. Damper operators shall be extended 2" to clear insulation on insulated ductwork. Duct shall be NFPA 90A, Class 1 (UL 181). Delete the damper for runouts between the supply main and terminal units. Runouts to terminals shall be limited to lengths of two feet (2'-0") unless otherwise noted or shown on the drawings.
- B. Basis of Design: Flexmaster Type 3M-insulated, or equal.



## **2.03 DUCT CONNECTOR SYSTEMS**

- A. Prefabricated duct connector systems for rectangular, round, or oval duct which equal or exceed the SMACNA requirements may, at Contractor's option, be used in the fabrication of the rectangular duct systems of this project.
- B. Basis of Design: Ductmate Industries, Inc., "Ductmate Systems" or equal.

## **2.04 DUCT SYSTEM ACCESSORIES**

- A. General:
  - 1. Provide all necessary duct accessories to assure proper balance, quiet distribution, and minimization of turbulence, noise and pressure drop for all supply, return, exhaust and ventilation air quantities indicated.
  - 2. Accessories shall be recommended by the manufacturer for the application.
- B. Duct Sealer:
  - 1. Water-based fiber-reinforced mastic composition, with no harmful fumes.
  - 2. Adhere to metal, fiberglass ductboard, and flexible duct joint surfaces.
  - 3. UL classified non-flammable, suitable for indoor or outdoor use, suitable for operating temperatures of -20 to +180 °F.
  - 4. Basis of Design: United McGill "UNIMASTIC" HVAC Duct Sealer or equal.
- C. Flexible Duct Connections:
  - 1. Provided where air handlers, fans, blowers, and fan terminals connect to their ductwork.
  - 2. At least 4 inches long connected on each side to metal (either metal ductwork, air handling apparatus, or heavy gauge steel sleeves). Connections shall be rated for static pressure equal or exceeding the rating of the duct in which they are installed.
  - 3. Provide braided copper bonding strap equal to Thompson Lightning Protection, Inc., No. A588.
  - 4. Basis of Design: Ventfabrics, Inc., "Ventglas Metaledge" or equal.
- D. Metal Turning Vanes:
  - 1. Provide in all elbows, bends and tees of all supply air ducts whether or not shown in detail; provide in all elbows, bends and tees of all other

ducts where such ducts convey air at greater than 700 fpm design maximum air velocity.

2. Constructed of aluminum, steel with corrosion resistant coating, or galvanized steel; with adequate rigidity and strength to be completely flutterproof; properly designed; permanently fixed type.
3. Turning vanes shall meet the requirements of SMACNA small single vane schedule for 2" radius, 1-1/2" spacing, and 24 gauge.

E. Extractors:

1. Provide at low-pressure branch duct take-offs.
2. Constructed of aluminum, steel with corrosion resistant coating, or galvanized steel; multivaned; adjustable; properly designed to deflect, proportion and direct the indicated air quantities to the branch duct and/or to the registers, grilles or other outlets without causing objectionable noise or pressure drop.
3. Provided with devices for adjusting and securing the position of these deflectors; these devices shall allow adjustment of the deflectors from outside the completed ductwork without necessity for puncturing or otherwise penetrating ductwork and/or its vapor barrier. Provide minimum of 2" device extensions when used on insulated ducts.
4. Basis of Design: Titus AG-45 or equal.

F. Manual Volume Dampers:

1. Except those specified as being integral with each register, diffuser and other air outlet or inlet device.
2. Provide in the complete low-pressure air distribution system(s) (including ductwork, return air plenums, etc.) to allow complete balancing of the air supply, return, ventilation and exhaust system(s). Provide in medium pressure supply air duct systems where indicated on the drawings.
3. Opposed blade type; constructed of galvanized steel, or steel with a sprayed or dipped aluminum rust-resistant finish; flutterproof; with 8" maximum blade width; fully adjustable, and with locking device.
4. Provide operator so that all damper adjustments can be made from outside the completed ductwork without necessity for puncturing or otherwise penetrating the ductwork and/or its vapor barrier. Provide 2" operating handle extension for insulated ducts.
5. Basis of Design: Ruskin MD-35 or equal.

G. Duct Access Doors, Low Pressure:

1. Provide for:
  - a. Each manual and motorized damper;
  - b. Each fire damper and/or smoke damper;
  - c. At intervals of 20 feet for duct cleanout purposes;
  - d. At other locations where access is necessary.
2. Factory prefabricated double wall insulated type of 24 US gauge galvanized steel (of same or thicker gauge than ductwork panel in which installed, whichever is greater). Single wall type may be used for uninsulated duct systems. Minimum size shall be as large as is compatible with duct size, and to permit proper access.
3. Doors shall be provided with hand-operated adjustable tension catches and shall be completely gasketed around their perimeters. Provide hinged doors, or provide attachment cable or chain for each removable door. Both types may be provided on project to fit the space requirements.
4. Basis of Design – Low Pressure: Ruskin.
  - a. Removable: ADC-14 & ADC-24
  - b. Hinged: ADH-14 & ADH-24

H. Duct Access Doors, Medium Pressure:

1. Provide for each fire damper and/or smoke damper, and at other locations where access and/or pressure relief are necessary. Damper pressure ratings (both positive and negative) shall equal or exceed that of the duct in which they are to be installed.
2. Doors shall be provided with hand-operated adjustable tension catches and shall be completely gasketed around their perimeters. Provide hinged doors, or provide attachment cable or chain for each removable door. Both types may be provided on project to fit the specific requirements of each point of use.
3. Basis of Design:
  - a. Access Only: Ductmate “Sandwich” or “DRI”.
  - b. Negative Pressure Relief: Ruskin ADHP-3.
  - c. Positive Pressure Relief: Ruskin PRD18.

I. Control Grids:

1. Provide at entrances to all rectangular duct diffusers necks.
2. Constructed of aluminum, steel with corrosion resistant coating, or galvanized steel; multivaned; adjustable; properly designed to deflect, proportion and direct the air quantities indicated to the outlet without objectionable noise or pressure drop.
3. Provide with devices for adjusting and securing the position of these control grids; these devices shall allow adjustment of control grids from outside the completed ductwork without necessity for puncturing or otherwise penetrating the ductwork and/or its vapor barrier. Provide 2" minimum operator extension when used on insulated ducts.
4. Basis of Design: Titus Model EG series.

J. Splitters:

1. Provide in low pressure ducts where indicated for adjustment of air volume to the respective branch ducts.
2. Constructed of a least the same gauge galvanized steel as the duct wherein they are used, but not less than twenty-two (22) US gauge; adequately sized to close off air to applicable branches; installed on raised insulated base when used in internally insulated ductwork. Provide 2" operator extension when used in insulated ducts.
3. Splitter blades shall be formed in two thicknesses of metal so that entering edge represents rounded (folded) nose to airflow. Blade length shall be no less than one and one half times the width of the smaller branch served, or twelve inches, whichever is larger, and rigidly attached to pivot rod and operating linkage.
4. Basis of Design for Operating Linkages: Young Regulator Co.

K. Test Openings:

1. Furnish and install gasketed test openings for test equipment (pitot tubes, etc.) on the entering and leaving sides of air handling units and other air handling equipment and heating coils. Provide with threaded caps. Provide 2" extensions where installed in insulated ducts.
2. Basis of Design:
  - a. Young Regulator 1100 or 1101 (for insulated ducts).
  - b. Young Regulator 1110 (for uninsulated ducts).

L. Duct Liner:

1. Duct liner shall be fiberglass with the surface in contact with the moving air stream protected with an acrylic coating system. The duct liner coating shall be formulated with an immobilized EPA-registered antimicrobial agent. Duct liner shall not support microbial growth. Duct liner shall pass the ASTM C 1071 and the ASTM G 21 fungi tests.
2. Thermal conductivity "k" factor at 75 °F of 0.25 or less.
3. Fire/smoke rating of 25/50 or less; complies with NFPA 90A.
4. Suitable for duct operating air temperatures of up to 250 °F, and air velocities of up to 4000 FPM.
5. Thickness shall be 1" unless otherwise noted.
6. Sound Absorption Coefficient not less than 0.65 NCR for 1" thickness.
7. Basis of Design: Johns Manville "Permacote Linacoustic Standard".

M. Fire Dampers:

1. Construction shall be of the clustered blade design, spring actuated, with integral wall sleeve, approved for horizontal or vertical installation.
2. Fusible link shall be UL listed, 165 °F., unless noted otherwise. Damper shall be UL labeled per UL Standard 555.
3. Damper shall be style "B" with factory sleeves for use in rectangular ducts; style "C" with factory sleeves for use in round ducts.
4. Damper shall be at least as large as the net inside dimensions of the duct shown, with a static pressure loss not to exceed 0.04"wg. Submittal data shall demonstrate actual static pressure loss at scheduled CFM.
5. Basis of Design: Ruskin IBD 20, 40, or 60 Integral Sleeve Fire Damper, as required to suit thickness of partition, wall, or floor.

N. Fire and Smoke Dampers:

1. Provide dynamic type combination fire and smoke dampers as follows:
  - a. Up to 1500 fpm: Construction shall be of the parallel blade style, designed for duct velocities up to 1500 FPM, 450 °F., and 2" static pressure.
  - b. Over 1500 fpm: Construction shall be of the airfoil shape, parallel blade style, designed for duct velocities up to 4000 FPM, 450 °F., and 6" static pressure.

2. Fusible link shall be UL listed, 165 °F., unless noted otherwise. Damper shall be UL labeled per UL Standard 555 as a fire damper, and rated per UL Standard 555S as a smoke damper, Class as follows:
    - a. Up to 1500 fpm: Class II, unless noted otherwise.
    - b. Over 1500 fpm: Airfoil Class I, unless noted otherwise.
  3. Damper shall be style "B" with factory sleeves for use in rectangular ducts; style "C" with factory sleeves for use in round ducts.
  4. Damper opening shall be at least as large as the net inside dimensions of the duct shown, with a static pressure loss not to exceed 0.04"wg. Submittal data shall demonstrate actual static pressure loss at scheduled CFM.
  5. Damper actuator shall be UL listed, factory mounted electric two-position type, with end switch package, unless noted otherwise. Actuator shall be 120 volt, 1 phase, unless noted otherwise. End switch shall be rated for both 120 volt and 24 volt power.
  6. Basis of Design: Ruskin FSD Series Combination Fire/Smoke Damper.
- O. Ceiling Fire Dampers:
1. Construction shall be of the butterfly damper style, designed to shield against fire and heat, for installation on ceiling registers and grilles. Damper shall be UL approved for use in UL fire rated ceilings having fire resistance ratings of 3 hours or less.
  2. Fusible link shall be UL listed, 165 °F.
  3. Basis of Design: Ruskin CFD.

## PART 3 - INSTALLATION

### **3.01 GENERAL**

- A. Supply Ductwork:
1. Mains: Sheet metal externally insulated, unless noted otherwise.
  2. Medium Pressure Branches (to terminal units): Externally insulated sheet metal, with not more than 2 feet of insulated flexible ductwork between branch duct and air terminal.
  3. Low Pressure Branches (to individual outlets): Insulated flexible ductwork (up to 6 feet); or a combination of externally insulated sheet metal and not more than 6 feet of insulated flexible ductwork.

- B. Return Air Ductwork:
  - 1. Mains: Sheet metal externally insulated; lined sheet metal where indicated.
  - 2. Branches: Same as supply ductwork branches.
- C. Outside Air Ductwork: Sheet metal externally insulated.
- D. Exhaust Ductwork: Sheet metal, uninsulated and unlined, except where shown specifically lined for sound control.
- E. Flexible Ductwork:
  - 1. Medium Pressure: Flexible ducts shall be connected to medium pressure duct mains using rectangular-to-round 45 degree takeoffs. All joints in the fittings shall be sealed with duct sealant. All connections of flexible ducts to fittings, collars, etc., shall be made with stainless steel draw bands to be air tight.
  - 2. Low Pressure: Flexible ducts shall be connected to low pressure duct mains using spin-in fittings, or rectangular-to-round 45 degree takeoffs, with quadrant dampers. All joints in the fittings shall be sealed with duct sealant. All connections of flexible ducts to fittings, collars, etc., shall be made with nylon draw bands to be air tight. Supply runouts to air distribution devices shall not exceed 6 feet in length.
- F. Construct all ductwork and accessories in accordance with the SMACNA manuals.
- G. Streamline all ductwork to the full extent practical and equip with adequate devices to assure proper balance and quiet distribution of indicated air quantities.
- H. Prior to ductwork fabrication, verify if all ductwork as dimensioned and generally shown will satisfactorily fit allocated spaces. Take precautions to avoid space interference with beams, columns, joists, pipes, lights, conduit, other ducts, equipment, etc. Notify Engineer if any spatial conflicts exist. See paragraph entitled SUBMITTALS.
- I. Carefully correlate all duct connections to air handling units, fans, and terminal units to provide proper connections, elbows and bends which will minimize noise and pressure drop. Provide five feet (5'-0") of straight main trunk duct between unit or terminal and first branch duct takeoff. If an elbow must be placed within this distance of the unit or terminal, then the first branch duct takeoff distance shall be measured through the elbow.
- J. Provide all curved elbows with radius ratios of not less than 1.5 unless noted otherwise. Provide turning vanes per SMACNA Guidelines. Provide all mitered elbows with turning vanes on 2" centers where maximum design air velocity exceeds 700 FPM.

- K. Coordinate any and all dimensions at interfaces of dissimilar type of ductwork and at interfaces of ductwork with equipment so that proper overlaps, interfaces, etc., of insulation and continuity of vapor barriers are maintained.
- L. Install horizontal rigid ductwork as high as practical above suspended ceilings so that movable light fixtures may be relocated without interference to meet any future partition relocation requirements, and to maximize the length of vertical rectangular duct connections to rectangular diffuser necks. Such horizontal ductwork elevation is not required to be more than 24" in height from the finished ceiling to the bottom of the duct.
- M. Protect all ductwork and system accessories from damage during construction until final acceptance of project.

### **3.02 FIELD MEASUREMENT**

- A. Verify routing of ductwork by field measurements prior to ductwork fabrication.
- B. See Paragraph entitled SUBMITTALS regarding mechanical rooms and other obviously congested locations.

### **3.03 HANGERS AND SUPPORTS**

- A. Provide hangers and supports in accordance with the applicable SMACNA manuals.
- B. Wire hangers shall not be used on insulated ducts without insulation shields.
- C. Flexible ducts shall be supported from the structure above at not less than 4' intervals.

### **3.04 INSULATED DUCT**

- A. Where ducts will be insulated, make provisions for neat insulation finish around damper operating quadrants, splitter adjusting clamps, access doors, test ports, and similar devices. Provide 2" extensions for operator handles, test openings, etc.
- B. A metal collar equivalent in depth to insulation thickness and of suitable size to which insulation may be finished shall be mounted on duct.

### **3.05 WALL AND FLOOR OPENINGS**

- A. All openings in non-fire-rated floor slabs and partitions through which ducts pass shall be filled tightly with mineral or glass wool batting, or sealed with UL listed foam sealant.
- B. All openings in fire-rated barriers shall be protected and sealed in an UL approved manner consistent with the fire rating.



- C. All openings in smoke-rated barriers shall be protected and sealed in an UL approved manner consistent with the smoke rating.

### **3.06 CHANGES IN SHAPE OR DIMENSION**

- A. Provide in accordance with the applicable SMACNA manuals.

### **3.07 CHANGES IN DIRECTION**

- A. Changes in direction shall be basically as indicated on the drawings and the following shall apply:
  - 1. Supply duct turns shall be made with 1.5 radius elbows, or with 90° mitered elbows fitted with closely spaced turning vanes designed for maintaining a constant velocity through the elbow.
  - 2. Return and exhaust duct turns of 90° shall be made with mitered elbows, unless 1.5 radius elbows are indicated. Provide turning vanes for mitered elbows with velocities in excess of 700 FPM, and where indicated on drawings.
  - 3. Tees: Use requirements of duct turns.
  - 4. Branch take-offs shall be made with extractors or splitter dampers, as indicated, in square take-offs. Branch take-offs of flexible duct runouts to diffusers shall use spin-in or rectangular-to-round fittings.

### **3.08 DUCT LINER**

- A. Install duct liner in ductwork indicated on drawings as lined ductwork.
- B. Install duct liner in accordance with the SMACNA manual.

### **3.09 FIRE DAMPERS**

- A. Provide fire smoke, and ceiling fire dampers where indicated on the drawings and as required by the authority having jurisdiction.
- B. Install dampers in strict accordance with the UL approved manufacturer's written instructions shipped with each damper.

### **3.010 DUCT SYSTEM ACCESSORIES**

- A. Install duct system accessories in the manner indicated on the drawings, as recommended by the manufacturer of the accessories in published written instructions, and in generally indicated in the SMACNA manual.
- B. Fire dampers, smoke dampers, combination fire/smoke dampers, and ceiling fire dampers shall be installed in accordance with their UL listing requirements. Provide pressure relief type access panels for fire dampers and combination fire/smoke dampers installed in ducts with pressure ratings exceeding six inches

(6") positive or negative. Negative Pressure Relief Panels shall be located on the downstream side of the dampers.

### **3.011 DUCT MOUNTED AIR DISTRIBUTION EQUIPMENT**

- A. Diffuser/register/grille connections to ductwork shall be made for a tight fit with no air leakage noise.
- B. Sheet metal ductwork visible through the registers/grilles shall be painted flat black for a distance not to exceed four feet (4'-0").

### **3.012 DUCT MOUNTED EQUIPMENT AND DEVICES**

- A. Install equipment and devices scheduled for installation on or in the duct systems, but furnished under other Sections or Divisions of the specifications.
- B. Install equipment and devices in the manner indicated on the drawings, as recommended by the manufacturer of the equipment or devices in published written instructions, and as generally indicated in the SMACNA manual.

End of Section

**Article I      233416      LIGHT DUTY IN-LINE EXHAUST FANS**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Provide centrifugal light duty in-line exhaust fans of size, capacity, sound power levels, and electrical characteristics indicated on drawings.

**1.02 RELATION TO OTHER WORK**

- A. Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.

**1.03 SUBMITTALS**

- A. Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK .
- B. Include data on: fan size, fan performance (including rating certification), fan brake horsepower, motor horsepower and electrical characteristics, sound power levels by octave band, and fan accessories.
- C. Data shall take the form of engineering data sheets, clearly depicting specification compliance, and a complete schedule worked up by fan number.

**1.04 CERTIFIED PERFORMANCE**

- A. The exhaust fans shall be AMCA certified as to both sound and performance ratings.
- B. Fans mounted on the exterior roofs or walls of buildings shall be approved by the State of Florida for construction in compliance with the Florida Building Code requirements for the specific Hurricane Code requirements for the area in which the fan is to be installed.

**1.05 MANUFACTURER**

- A. Basis of Design: Cook Gemini: series.
- B. Products of Greenheck Fan and Ventilator Corp, or Acme Engineering and Manufacturing Company, may be submitted for approval provided that they meet the requirements of these specifications and will easily fit available space.

**PART 2 - PRODUCTS**

**2.01 FAN HOUSING**

- A. Fan housing and motor compartment shall be constructed of galvanized steel, lined with fiberglass insulation. Housing shall be finished in baked enamel.

- B. The fan housing shall incorporate an external flange, back draft damper, and duct collar to facilitate discharge duct connection.

## **2.02 FAN WHEEL**

- A. Fan wheel shall be aluminum centrifugal type and shall be statically and dynamically balanced.
- B. Fan wheel shall be keyed to the shaft and locked in place using hollow set screw fasteners.

## **2.03 MOTOR AND STARTER**

- A. Motor shall be resiliently mounted on the exhaust fan assembly, removable as a unit from the housing.
- B. Motors shall have built-in overload protection and permanently lubricated ball bearings.

## **2.04 DISCONNECT SWITCH**

- A. Fan shall have factory installed plug-receptacle type, or SPST switch type disconnect switch.

## **2.05 SOLID STATE SPEED CONTROLLER**

- A. Provide a solid state fan speed controller for each fan.

## **2.06 ROOF OR WALL CAPS**

- A. Provide roof vent cap with base or wall cap as indicated on the drawing, plans, or schedule.
- B. Roof vents and wall caps shall be heavy duty, weather proof type.

## **PART 3 - EXECUTION**

### **3.01 FAN PLACEMENT AND MOUNTING**

- A. Fan location shall be essentially as shown on drawings; however, actual ceiling, roof or wall openings and fan placement shall be verified using field measurements and data relating to the equipment approved for actual installation on this project.
- B. Fans mounted on roofs and/or walls with ductwork penetrating the building envelope shall be installed in accordance with the Florida Building Code requirements for the specific Hurricane Code wind requirements for the area in which the fan is to be installed.
- C. Mount fan and accessories in accordance with manufacturer's instructions.

### **3.02 WIRING**

- A. Power wiring and conduit shall be performed as work of, and shall comply with, the Electrical Division of this specification.
- B. Control and Interlock wiring and conduit shall be performed as work of this Division in accordance with the requirements of the Electrical Division.
- C. Connections between the factory mounted and wired disconnect and the conduit system shall be made using flexible conduit properly installed so as not to transmit fan vibration or noise to the building components.

### **3.03 DUCT CONNECTIONS**

- A. Discharge ducts shall be connected to the fan housing collars using care not to damage backdraft damper.
- B. Provide grounding straps across flexible connections equal to Thompson #588 braided copper bonding straps.

### **3.04 SOLID STATE SPEED CONTROLLER**

- A. Install controller in a concealed, but accessible location at or near fan for fan speed adjustment and airflow balance, unless indicated otherwise on the drawings.

### **3.05 TEST AND BALANCE**

- A. Prior to requesting final inspection the Contractor shall run all exhaust fans to insure proper operation.
- B. Refer to the Section entitled TEST AND BALANCE.

End of Section

**Article I      233424      UPBLAST POWER ROOF VENTILATORS**

**PART 1 - GENERAL**

**1.01    SCOPE**

- A.    Provide all upblast power roof ventilators of size, capacity, and electrical characteristics as indicated on the drawings and specified herein.

**1.02    RELATION TO OTHER WORK**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.

**1.03    REGULATIONS, CODES, STANDARDS AND ORDINANCES**

- A.    AMCA certified as to both sound and performance ratings.
- B.    U.L. listed.

**1.04    SUBMITTALS**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK .
- B.    Include data on: fan size, fan performance (including rating certification), fan brake horsepower, motor horsepower and electrical characteristics, sound power levels by octave band, and fan accessories.
- C.    Data shall take the form of engineering data sheets, clearly depicting specification compliance, and a complete schedule worked up by fan number.

**1.05    CERTIFIED PERFORMANCE**

- A.    The exhaust fans shall be AMCA certified as to both sound and performance ratings.
- B.    Fans mounted on the exterior roofs or walls of buildings shall be approved by the State of Florida for construction in compliance with the Florida Building Code requirements for the specific Hurricane Code requirements for the area in which the fan is to be installed.

**1.06    MANUFACTURER**

- A.    Basis of Design: Greenheck CUBE (belt drive).
- B.    Products of Loren Cook Company, or Acme Engineering and Manufacturing Company, may be submitted for approval provided that they meet the requirements of these specifications and will easily fit available space.

## PART 2 - PRODUCTS

### **2.01 FAN HOUSING**

- A. Weatherproof and constructed of heavy gauge aluminum.
- B. Motor and Drive: Supported by a structural frame independent of hood, housing, and curb base.
- C. Curb cap shall be aluminum construction capable of supporting unit.

### **2.02 FAN WHEEL**

- A. Backward curved non-overloading, aluminum, air foil blade type, statically and dynamically balanced.
- B. Wheels shall be keyed and locked to shaft.

### **2.03 MOTOR**

- A. Motor shall be resiliently mounted on the exhaust fan assembly, removable as a unit from the housing.
- B. Fan motor shall be TEFC construction designed for the scheduled power on the drawings.
- C. Motors shall have built-in overload protection and permanently lubricated ball bearings.
- D. Motor horsepower shall not exceed that scheduled on the drawings.

### **2.04 DRIVE ASSEMBLY**

- A. Motor and drive assembly located out of exhaust air stream, cushion-mounted on multidirectional neoprene vibration isolators and positively ventilated.
- B. Direct drive type or Belt drive type.
- C. Belt drive pillowblock bearings shall be rated for a minimum life (L-50) in excess of 200,000 hours.

### **2.05 DISCONNECT SWITCH**

- A. Provide factory mounted polarized plugs or NEMA 1 disconnect switches factory wired to the motors.

### **2.06 CURBS**

- A. Provide factory built roof curbs. Aluminum all welded construction with 2" acoustical liner of fire retardant fiberglass insulation conforming to NFPA 90A as

to flame spread and smoke developed ratings. Curb shall be of straight side design.

- B. Minimum of 12 inches high above the finished roof surface.
- C. Curb to be sloped as required to maintain a level top.

### **2.07 BACKDRAFT DAMPER**

- A. Provide all aluminum backdraft damper assembly with nylon bearings.

### **2.08 SCREEN**

- A. Provide galvanized wire bird screen of not more than 1/2 inch mesh.

## **PART 3 - EXECUTION**

### **3.01 FAN PLACEMENT AND MOUNTING**

- A. Fan location shall be essentially as shown on the drawings; however, actual placement of roof curb shall be verified using field measurements and data relating to the equipment approved for actual installation.
- B. Mount fan and accessories in strict accordance with manufacturer's instructions.
- C. Install top of curb in a level plane to permit fan to be level and plumb.
- D. Mount fan and accessories in accordance with manufacturer's instructions.

### **3.02 WIRING**

- A. Power wiring and conduit shall be performed as work of, and shall comply with, the Electrical Division of this specification.
- B. Control and Interlock wiring and conduit shall be performed as work of this Division in accordance with the requirements of the Electrical Division.
- C. Connections between the factory mounted and wired disconnect and the conduit system shall be made using flexible conduit properly installed so as not to transmit fan vibration or noise to the building components.
- D. Provide variable speed drive with across the line bypass starter. Both to have overload protection, analog room thermostat and remote control by the BAS.

### **3.03 DUCT CONNECTIONS**

- A. Connect inlet ducts (where required) to roof curb inlet flanges using flexible connectors. Install connectors so that they are not in tension and are aligned with ductwork.



- B. Provide grounding straps across flexible connections equal to Thompson #588 braided copper bonding straps.

#### **3.04 TEST AND BALANCE**

- A. Prior to requesting final inspection, operate all fans, adjust drive speeds to achieve design air flow, record motor amperes and nameplate data, and forward records and performance information to Engineer for review.
- B. Refer to the Section entitled TEST AND BALANCE.

End of Section

**Article I      233416      UPBLAST POWER ROOF VENTILATORS**

**PART 1 - GENERAL**

**1.01    SCOPE**

- A.    Provide all upblast power roof ventilators of size, capacity, and electrical characteristics as indicated on the drawings and specified herein.

**1.02    RELATION TO OTHER WORK**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.

**1.03    REGULATIONS, CODES, STANDARDS AND ORDINANCES**

- A.    AMCA certified as to both sound and performance ratings.
- B.    U.L. listed.

**1.04    SUBMITTALS**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK .
- B.    Include data on: fan size, fan performance (including rating certification), fan brake horsepower, motor horsepower and electrical characteristics, sound power levels by octave band, and fan accessories.
- C.    Data shall take the form of engineering data sheets, clearly depicting specification compliance, and a complete schedule worked up by fan number.

**1.05    CERTIFIED PERFORMANCE**

- A.    The exhaust fans shall be AMCA certified as to both sound and performance ratings.
- B.    Fans mounted on the exterior roofs or walls of buildings shall be approved by the State of Florida for construction in compliance with the Florida Building Code requirements for the specific Hurricane Code requirements for the area in which the fan is to be installed.

**1.06    MANUFACTURER**

- A.    Basis of Design: Greenheck CUBE (belt drive).
- B.    Products of Loren Cook Company, or Acme Engineering and Manufacturing Company, may be submitted for approval provided that they meet the requirements of these specifications and will easily fit available space.

## PART 2 - PRODUCTS

### **2.01 FAN HOUSING**

- A. Weatherproof and constructed of heavy gauge aluminum.
- B. Motor and Drive: Supported by a structural frame independent of hood, housing, and curb base.
- C. Curb cap shall be aluminum construction capable of supporting unit.

### **2.02 FAN WHEEL**

- A. Backward curved non-overloading, aluminum, air foil blade type, statically and dynamically balanced.
- B. Wheels shall be keyed and locked to shaft.

### **2.03 MOTOR**

- A. Motor shall be resiliently mounted on the exhaust fan assembly, removable as a unit from the housing.
- B. Fan motor shall be TEFC construction designed for the scheduled power on the drawings.
- C. Motors shall have built-in overload protection and permanently lubricated ball bearings.
- D. Motor horsepower shall not exceed that scheduled on the drawings.

### **2.04 DRIVE ASSEMBLY**

- A. Motor and drive assembly located out of exhaust air stream, cushion-mounted on multidirectional neoprene vibration isolators and positively ventilated.
- B. Direct drive type or Belt drive type.
- C. Belt drive pillowblock bearings shall be rated for a minimum life (L-50) in excess of 200,000 hours.

### **2.05 DISCONNECT SWITCH**

- A. Provide factory mounted polarized plugs or NEMA 1 disconnect switches factory wired to the motors.

### **2.06 CURBS**

- A. Provide factory built roof curbs. Aluminum all welded construction with 2" acoustical liner of fire retardant fiberglass insulation conforming to NFPA 90A as

to flame spread and smoke developed ratings. Curb shall be of straight side design.

- B. Minimum of 12 inches high above the finished roof surface.
- C. Curb to be sloped as required to maintain a level top.

### **2.07 BACKDRAFT DAMPER**

- A. Provide all aluminum backdraft damper assembly with nylon bearings.

### **2.08 SCREEN**

- A. Provide galvanized wire bird screen of not more than 1/2 inch mesh.

## **PART 3 - EXECUTION**

### **3.01 FAN PLACEMENT AND MOUNTING**

- A. Fan location shall be essentially as shown on the drawings; however, actual placement of roof curb shall be verified using field measurements and data relating to the equipment approved for actual installation.
- B. Mount fan and accessories in strict accordance with manufacturer's instructions.
- C. Install top of curb in a level plane to permit fan to be level and plumb.
- D. Mount fan and accessories in accordance with manufacturer's instructions.

### **3.02 WIRING**

- A. Power wiring and conduit shall be performed as work of, and shall comply with, the Electrical Division of this specification.
- B. Control and Interlock wiring and conduit shall be performed as work of this Division in accordance with the requirements of the Electrical Division.
- C. Connections between the factory mounted and wired disconnect and the conduit system shall be made using flexible conduit properly installed so as not to transmit fan vibration or noise to the building components.
- D. Provide variable speed drive with across the line bypass starter. Both to have overload protection, analog room thermostat and remote control by the BAS.

### **3.03 DUCT CONNECTIONS**

- A. Connect inlet ducts (where required) to roof curb inlet flanges using flexible connectors. Install connectors so that they are not in tension and are aligned with ductwork.

- B. Provide grounding straps across flexible connections equal to Thompson #588 braided copper bonding straps.

#### **3.04 TEST AND BALANCE**

- A. Prior to requesting final inspection, operate all fans, adjust drive speeds to achieve design air flow, record motor amperes and nameplate data, and forward records and performance information to Engineer for review.
- B. Refer to the Section entitled TEST AND BALANCE.

End of Section

**Article I      233428      GRAVITY VENTS AND ROOF CURBS**

PART 1 - GENERAL

**1.01 DESCRIPTION**

- A. Provide factory assembled roof air intake(s) and relief vent(s) where indicated. Sizes and operating characteristics shall be as scheduled on drawings or as otherwise indicated.

**1.02 RELATION TO OTHER WORK**

- A. Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.

**1.03 SUBMITTALS**

- A. Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.
- B. Include complete data on sizes; required clearances; direction of air flow; construction and dimensions; and capacities and operating characteristics.

**1.04 MANUFACTURER**

- A. Basis of Design: Greenheck Fan and Ventilator Corp.
- B. Products of Loren Cook Company, ACME Engineering and Manufacturing Corporation and Penn Ventilator Company, Inc. may be submitted for approval provided that they meet the requirements of these specifications and will easily fit available space.

PART 2 - PRODUCTS

**2.01 ROOF VENTS**

- A. Sized as indicated on the drawings.
- B. Low silhouette type.
- C. Rain tight under all operating conditions.
- D. Constructed of the following materials: Aluminum, Galvanized steel, or Fiberglass.
- E. Pass indicated air quantities at not greater than 0.05 inches wg total pressure; and, for intakes only, 500 fpm maximum throat and perimeter velocity.
- F. Provide 1/4 inch mesh galvanized steel or PVC coated bird screen:
- G. Provide air intake filter racks where scheduled, noted, or shown on the drawings.

## **2.02 ROOF CURBS**

- A. Sized as indicated for equipment specified, or as indicated on the drawings.
- B. Rain tight under all operating conditions.
- C. Constructed of any of the following materials: Aluminum, Galvanized steel, or Fiberglass.
- D. Height of 18" minimum on shortest side s.
- E. Constructed of the following materials: Aluminum, Galvanized steel, or Fiberglass.
- F. Designed for compliance with the Florida Building Code.

## PART 3 - EXECUTION

### **3.01 PLACEMENT AND MOUNTING**

- A. Location shall be essentially as shown on the drawings; however, actual placement of the roof curb shall be verified using field measurements and data relating to the equipment approved for actual installation of this project.
- B. Mount roof curbs to the building roof structure in strict accord with manufacturer's instructions, the Florida Building Code, and as detailed on the drawings.
- C. Mount items of equipment on the roof curbs in strict accord with manufacturer's instructions. Permanently secure to roof curbs with threaded fasteners in accordance with the Florida Building Code, and as detailed on the drawings.

### **3.02 DUCT CONNECTIONS**

- A. Connect ducts to roof curb inlet flanges using flexible connectors. Install connectors properly so that they are not in tension and are aligned with ductwork.
- B. Ground metal ducts across the flexible connector using Thompson #588 flexible copper bonding straps.

### **3.03 PROTECTION OF EQUIPMENT**

- A. Protect items from damage until final acceptance and replace any hoods, housings, or bases damaged during installation of the equipment roofing, or adjacent materials and equipment.

End of Section

**Article I      233445      HIGH VOLUME, LOW SPEED (HVLS) PROPELLER FANS**

**PART 1 - GENERAL**

**1.01    SCOPE**

- A.    Provide high volume, low speed propeller fans of size, capacity, sound power levels, and electrical characteristics indicated on drawings.

**1.02    RELATION TO OTHER WORK**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.

**1.03    SUBMITTALS**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.
- B.    Include data on: fan size, fan performance (including rating certification), fan brake horsepower, motor horsepower and electrical characteristics, sound power levels by octave band, and fan accessories.
- C.    Data shall take the form of engineering data sheets, clearly depicting specification compliance, and a complete schedule worked up by fan number.
- D.    Provide manufacturer's certification that high volume, low speed propeller fans are licensed to bear the Air Movement and Control Association (AMCA) Certified Rating Seal for Circulating Fan Performance.

**1.04    CERTIFIED PERFORMANCE**

- A.    The fans shall be AMCA certified as to both sound and performance ratings.

**1.05    MANUFACTURER**

- A.    Basis of Design: Greenheck Fan and Ventilator Corp.
- B.    Products of MacroAir Technologies, Inc., Entermatic Group Fans and Big Ass Fan Company may be submitted for approval provided that they meet the requirements of these specifications and will easily fit available space.

**PART 2 - PRODUCTS**

**2.01    DIRECT DRIVE HIGH VOLUME, LOW SPEED (HVLS) PROPELLER FANS**

- A.    General Description:
  - 1.    Fan housing and motor compartment shall be constructed of galvanized steel, lined with fiberglass insulation. Housing shall be finished in baked enamel.



- B. Impeller:
  - 1. Fan housing and motor compartment shall be constructed of galvanized steel, lined with fiberglass insulation. Housing shall be finished in baked enamel.
- C. Motor:
  - 1. Fan housing and motor compartment shall be constructed of galvanized steel, lined with fiberglass insulation. Housing shall be finished in baked enamel.
- D. Variable Frequency Drive (VFD):
  - 1. Fan housing and motor compartment shall be constructed of galvanized steel, lined with fiberglass insulation. Housing shall be finished in baked enamel.
- E. Universal Ceiling Mount & Downtube:
  - 1. Fan housing and motor compartment shall be constructed of galvanized steel, lined with fiberglass insulation. Housing shall be finished in baked enamel.
- F. Safety Retention Cables:
  - 1. Fan housing and motor compartment shall be constructed of galvanized steel, lined with fiberglass insulation. Housing shall be finished in baked enamel.
- G. Guy Wires:
  - 1. Fan housing and motor compartment shall be constructed of galvanized steel, lined with fiberglass insulation. Housing shall be finished in baked enamel.
- H. Fire Control Panel Integration:
  - 1. Fan housing and motor compartment shall be constructed of galvanized steel, lined with fiberglass insulation. Housing shall be finished in baked enamel.
- I. Options/Accessories:
  - 1. Fan housing and motor compartment shall be constructed of galvanized steel, lined with fiberglass insulation. Housing shall be finished in baked enamel.

J. Guy Wires:

1. Fans shall include braided galvanized steel guy wires designed to prevent lateral movement of the fan when installed.
2. Guy wires shall be secured to the building structure via the included beam clamps and quick links for ease of installation.
3. Guy wires shall be secured to the fan and tensioned via high-strength steel turnbuckles with quick links. Turnbuckles shall be connected to each guy wire via a minimum of 2 u-bolt steel cable clamps per guy wire as standard. Optionally, turnbuckles may be connected to each guy wire via 1 No. 4 Gripple<sup>®</sup> connector per guy wire for ease of installation.

K. Options/Accessories:

1. Finishes (Hi-Pro Polyester):
  - a. Fan Components: Universal Ceiling Mount Downtube Impeller Hub Airfoil Blades Winglets.
  - b. Color: Concrete Gray.
2. Mounting Hardware: Steel Truss Kit and/or Unistrut Kit, coordinate with existing conditions.
3. Fan Controls:
  - a. Type: Touchscreen Control with BACnet.
  - b. Controls shall be capable of operating one or multiple HVLS fans as standard. Controls shall provide start/stop, speed, and rotation direction control capabilities as well as diagnostic and fault history information for each connected fan.
  - c. Controls shall include RJ45 ports for plug-and-play connection to HVLS fans via CAT-5e communication cable in the field.
4. CAT-5e Cable Length:
  - a. Type: 50 feet, 75 feet and 100 feet are available. Coordinate length with contractor and the drawings.
  - b. CAT-5e cable must be shielded 26 gauge cable with a drain wire and must be compliant with ISO 11801 to prevent network communication issues. Cable must use shielded RJ45 connectors with a soldered drain and wiring configuration must follow EIA/TIA T568B wiring pinout.

PART 3 - EXECUTION

### **3.01 FAN PLACEMENT AND MOUNTING**

- A. Fan location shall be essentially as shown on drawings; however, actual fan placement shall be verified using field measurements and data relating to the equipment approved for actual installation on this project.
- B. Verify that the fan is to be installed in a location where the airfoils will be a minimum of 10 feet above the finished floor with a minimum of 3 feet of clearance to any obstructions.
- C. If the building is equipped with a fire sprinkler system, verify that the placement of the fan will not interfere with correct sprinkler operation and that the fan installation complies with all national, state and local codes. For NFPA 13 compliance, fans must be installed in the center of four adjacent sprinklers with at least 3 feet of vertical clearance between the fan and sprinkler deflectors. Fans must also be interlocked to shut down upon receiving a waterflow signal from the building's alarm system.
- D. Check to see if the intended placement of the fan is directly below any building lights or skylights. Avoid installing fans directly below a light source to prevent a strobing effect that can be caused by fan rotation.
- E. Mount fan and accessories in accordance with manufacturer's instructions.

### **3.02 WIRING**

- A. Power wiring and conduit shall be performed as work of, and shall comply with, the Electrical Division of this specification.
- B. Control and Interlock wiring and conduit shall be performed as work of this Division in accordance with the requirements of the Electrical Division.
- C. Connections between the factory mounted and wired disconnect and the conduit system shall be made using flexible conduit properly installed so as not to transmit fan vibration or noise to the building components.

### **3.03 SYSTEM START UP**

- A. Refer to Installation, Operation, and Maintenance Manual (IOM).

### **3.04 CLEANING**

- A. Clean as recommended by manufacturer. Do not use material or methods which may damage finish surface or surrounding construction.

### **3.05 PROTECTION**

- A. Protect installed product and finished surfaces from damage during construction.

- B. Protect installed fans to ensure that, except for normal weathering, fans will be without damage or deterioration at time of substantial completion.

End of Section

**Article I      233700      AIR DISTRIBUTION EQUIPMENT**

**PART 1 - GENERAL**

**1.01    SCOPE**

- A.    Provide all air distribution devices as indicated on the drawings and as specified herein for a complete and operable system free from drafts and excessive noise.
- B.    The air distribution devices and sound attenuation measures indicated on the drawings and specified herein have been selected to maintain a sound power level within the occupied space of not more than NC 30 for Classrooms and Conference Rooms, NC 40 for Break Rooms, Corridors, and Lounges, and NC 35 for all other spaces, unless otherwise noted. The Contractor shall coordinate air distribution devices, sound attenuation measures, and equipment actually provided to insure that these design goals are not exceeded by the system as actually installed.

**1.02    RELATION TO OTHER WORK**

- A.    Coordinate the work of the ceiling, drywall and plastering trades as required to insure an orderly progression of work and a first class finished system with respect to placement, alignment, finish and general fit.
- B.    Refer to the Section entitled COMMON REQUIREMENTS FOR HVAC WORK.
- C.    Refer to the Section entitled DUCTWORK.
- D.    Refer to the Section entitled THERMAL INSULATION.

**1.03    SUBMITTALS**

- A.    Refer to the requirements of COMMON REQUIREMENTS FOR HVAC WORK.
- B.    Include complete data on proposed sizes, noise levels, pressure drops, air flow quantities, throw, finishes, and accessory devices including mounting frames completely dimensioned.
- C.    The data shall be in the form of engineering data sheets and a complete schedule worked up by room numbers.

**1.04    MANUFACTURER**

- A.    Basis of Design: Titus.
- B.    Equal products of Titus, Anemostat, Metalaire, Nailor, and Tuttle & Bailey meeting these specifications may be submitted for approval. Equality shall be determined by the Engineer.

## PART 2 - PRODUCTS

### **2.01 LOUVER FACE CEILING DIFFUSERS (CD) - TITUS**

- A. In Acoustical tile ceilings with exposed T-bar suspension system.
- B. Provide removable face, 2 foot by 2 foot, lay-in, louver face ceiling diffusers where diffusers are indicated full size of acoustical tile ceiling. Diffusers shall be fabricated of heavy gauge aluminum.
- C. Pattern and Size: Diffuser face size shall be as specified hereinbefore. Shell and neck sizes and capacities shall be as indicated on the drawings. Pattern shall be four way unless indicated by 3W for 3 way, 2W for 2 way or 1W for 1 way. All ceiling diffusers specified for return air or exhaust air shall be one way.
- D. Volume Control: Provide spin-in fitting with butterfly damper and 2" handle stand-off for balancing of all diffusers. No scoops permitted.
- E. Model and Finish: Diffusers shall be Model TDC-AA, Border Type 3 with off-white enamel finish on frame, face and interior.

### **2.02 LOUVER FACE CEILING DIFFUSERS (CD) - TITUS**

- A. In acoustical tile, gypsum board or plaster ceilings.
- B. Provide removable face, 2 foot by 2 foot, lay-in, louver face ceiling diffusers where diffusers are indicated full size of acoustical tile ceiling. Diffusers shall be fabricated of heavy gauge aluminum. Provide lay-in frame to match diffuser size for gypsum drywall ceilings.
- C. Pattern and Size: Diffusers size and capacities shall be as indicated on the drawings. Provide four-way pattern unless indicated by 3W for 3 way, 2W for 2 way or 1W for 1 way. All ceiling diffusers specified for return air or exhaust air shall be one way.
- D. Volume Control: Provide spin-in fitting with butterfly damper and 2" handle stand-off for balancing of all diffusers. No scoops permitted.
- E. Model and Finish: Diffusers shall be Model TDC-AA, Border Type 6 with off-white enamel finish on frame, face and interior.

### **2.03 RECTANGULAR CEILING MOUNTED EXHAUST AND RETURN GRILLES (EG) - TITUS**

- A. In Acoustical tile ceilings with exposed T-bar suspension system.
- B. Provide aluminum horizontal bar style core grilles and registers with 3/4 inch spacing between bars and 2 foot x 2 foot lay-in frame. Frames shall be constructed of extruded aluminum.

- C. Size and Capacity: Register sizes and capacities are indicated on the drawing.
- D. Volume Control: Provide spin-in fitting with butterfly damper at the duct tap for each ducted return and exhaust.
- E. Model and Finish: Grilles shall be Model 350FL with border type 3 (2 foot by 2 foot) lay-in frame. Finish shall be off-white enamel.

#### 2.04 **RECTANGULAR CEILING MOUNTED EXHAUST AND RETURN GRILLES AND REGISTERS (ER/EG) - TITUS**

- A. In acoustical tile, gypboard or plaster ceilings.
- B. Provide horizontal bar style core registers with 3/4 inch spacing between bars and gasketed surface mounting frames. Frames shall be constructed or extruded aluminum.
- C. Size and Capacity: Register sizes and capacities are indicated on the drawing.
- D. Volume Control: Provide spin-in fitting with butterfly damper at the duct tap for each ducted return and exhaust. Provide key operated opposed blade volume control damper for all returns and exhausts where a spin-in fitting is inaccessible.
- E. Model and Finish: Grilles and registers shall be Model 350FL with border type 1 having 3/16 inch countersunk screw holes for mounting. Finish shall be off-white enamel.

#### 2.05 **MOUNTING SCREWS**

- A. Where grilles, diffusers, or registers are specified which require mounting screws visible from the face of the device, these screws shall be furnished with the air distribution equipment and shall be finished at the factory to match the finish on the grille, diffuser, or register in which they are to be used.

### PART 3 - INSTALLATION

#### 3.01 **RECTANGULAR CEILING DIFFUSERS**

- A. Where diffusers are the lay-in type, they shall be supported by the inverted T-bar suspension system but all ducts connected thereto shall be supported independently of the ceiling as specified under Section entitled DUCTWORK.
- B. Surface mounted diffusers shall be supported by the duct runouts or drops where sheet metal ducts are indicated and by separate hangers where flex runouts are indicated.
- C. All rectangular ceiling diffusers shall be installed with their lines parallel and perpendicular to the building lines and properly aligned with the ceiling.

### **3.02 EXHAUST AND RETURN CEILING REGISTERS AND GRILLES**

- A. Use finished screws provided and secure to duct and finished ceiling (or finished ceiling for non-ducted returns) in accordance with the manufacturer's instructions.
- B. Where required to provide adequate support for non-ducted registers or grilles, provide appropriate mounting frame for incorporation into the ceiling system.

### **3.03 DUCTWORK**

- A. Diffuser/register/grille connections to ductwork shall be made for a tight fit with no air leakage noise.

### **3.04 PROTECTION OF WORK UNTIL FINAL ACCEPTANCE**

- A. Coordinate the installation of the air distribution equipment with related work and finishing of adjacent surfaces to prevent damage to the devices or adjacent finishes.
- B. Protect the finish of all air distribution equipment until final acceptance.
- C. Replace or repair to the Engineer's satisfaction any damaged equipment.

End of Section



**Article I      237433      DEDICATED OUTDOOR AIR UNITS**

**PART 1 - GENERAL**

**1.01    SCOPE**

- A.    Provide dedicated outdoor air units where indicated on the drawings. Unit capacities and operating conditions shall be as scheduled on the drawings.

**1.02    RELATION TO OTHER WORK**

- A.    Refer to Section entitled "COMMON REQUIREMENTS FOR MECHANICAL WORK".
- B.    Contractor shall coordinate shop drawings; equipment ordering, delivery and placement; structural framing; roof construction; roofing; utility connections; and the work of all trades to insure an orderly and timely progress of the work.

**1.03    SHOP DRAWINGS**

- A.    Refer to Section entitled "COMMON REQUIREMENTS FOR MECHANICAL WORK".
- B.    Include complete data on roof curbs; duct opening requirements; equipment weights; power and control wiring (both factory and field); operating and safety controls; capacities and rating conditions; and equipment sound power levels in each octave band.

**1.04    OPERATING AND MAINTENANCE INSTRUCTIONS**

- A.    Refer to Section entitled OPERATION AND MAINTENANCE MANUALS.

**1.05    WARRANTY**

- A.    Contractor shall include in his price the cost of one year's warranty on entire system plus an additional four years warranty on refrigerant system and all components thereof.
- B.    The first year's warranty shall comply with the Section entitled COMMON REQUIREMENTS FOR MECHANICAL WORK.
- C.    The additional four-year warranty shall include parts, refrigerant, and oil, exclusive of labor.

**1.06    MANUFACTURER**

- A.    Units shall bear the UL label.
- B.    Basis of Design: Aaon. The following may be submitted for approval provided they meet the space and dimensional requirements: :

## PART 2 - PRODUCTS

### **2.01 GENERAL DESCRIPTION**

- A. Packaged rooftop unit shall include compressor, evaporator coil, filters, supply fan, dampers, air-cooled condenser coils, condenser fan, reheat coil, electric heater, exhaust fan, energy recovery wheel, and unit controls.
- B. Unit shall be factory assembled and tested including leak testing of the DX coils, pressure testing of the refrigeration circuit, and run testing of the completed unit. Run test report shall be supplied with the unit in the service compartment's literature pocket.
- C. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.
- D. Unit components shall be labeled, including refrigeration system components and electrical and controls components.
- E. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.
- F. Installation, Operation and Maintenance manual shall be supplied within the unit.
- G. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment's hinged access door.
- H. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment's hinged access door.

### **2.02 CONSTRUCTION**

- A. Any work rejected by Engineer because it does not conform to specifications shall be removed immediately and replaced properly.
- B. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.
- C. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D-1929 for a minimum flash ignition temperature of 610°F.
- D. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, prevents heat transfer through the panel, and prevents exterior condensation on the panel.
- E. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the

minimum external static pressure provided in AHRI Standard 210/240. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.

- F. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.
- G. Access to filters, dampers, cooling coil, reheat coil, heater, exhaust fan, energy recovery wheel, compressor, and electrical and controls components shall be through hinged access doors with quarter turn, lockable handles. Full length stainless steel piano hinges shall be included on the doors.
- H. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.
- I. Units shall include double sloped 304 stainless steel drain pans.
- J. Unit shall be provided with through the base vertical discharge and return air openings. All openings through the unit shall have upturned flanges of at least 1/2 inch around the opening.
- K. Unit shall include lifting lugs on the top of the unit.
- L. Unit base pan shall be provided with 1/2 inch thick foam insulation.

### **2.03 SUPPLY FANS**

- A. Unit shall include direct drive, unhooded, backward curved, plenum supply fans.
- B. Blowers and motors shall be dynamically balanced.
- C. Motor shall be inverter rated efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
- D. Variable frequency drive shall be factory wired and mounted in the unit. Fan motor shall be inverter rated efficiency.

### **2.04 EXHAUST FANS**

- A. Exhaust dampers shall be sized for 100% relief.
- B. Fans and motors shall be dynamically balanced.
- C. Access to exhaust fans shall be through double wall, hinged access doors with quarter turn lockable handles.

- D. Unit shall include belt driven, unhooded, backward curved, plenum exhaust fans.
- E. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
- F. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.

## **2.05 COOLING COILS**

- A. Coils shall be designed for use with R-410A refrigerant and constructed of copper tubes with aluminum fins mechanically bonded to the tubes and aluminum end casings. Fin design shall be sine wave rippled.
- B. Coil shall be standard capacity
- C. Coils shall be helium hydrogen or helium leak tested.
- D. Coils shall be furnished with factory installed electronic expansion valves.

## **2.06 REFRIGERATION SYSTEM**

- A. Unit shall be factory charged with R-410A refrigerant.
- B. Compressors shall be scroll type with thermal overload protection and carry a 5 year non-prorated warranty, from the date of original equipment shipment from the factory.
- C. Compressors shall be mounted in an isolated service compartment which can be accessed without affecting unit operation. Lockable hinged compressor access doors shall be fabricated of double wall, rigid polyurethane foam injected panels to prevent the transmission of noise outside the cabinet.
- D. Compressors shall be isolated from the base pan with the compressor manufacturer's recommended rubber vibration isolators, to reduce any transmission of noise from the compressors into the building area.
- E. Each refrigeration circuit shall be equipped with thermostatic expansion valve type refrigerant flow control.
- F. Each refrigeration circuit shall be equipped with automatic reset low pressure and manual reset high pressure refrigerant safety controls, Schrader type service fittings on both the high pressure and low pressure sides and a factory installed replaceable core liquid line filter driers.
- G. Unit shall include a variable capacity scroll compressor on the refrigeration circuit which shall be capable of modulation from 10-100% of its capacity.
- H. Refrigeration circuit shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a control signal terminal

which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.

- I. Unit shall be configured as an air-source heat pump. Refrigeration circuit shall be equipped with a factory installed liquid line filter drier with check valve, reversing valve, accumulator, and thermal expansion valves on both the indoor and outdoor coils. Reversing valve shall energize during the heat pump cooling mode of operation.
- J. Refrigeration circuit shall be equipped with a liquid line sight glass.

## **2.07 CONDENSERS**

- A. Condenser fans shall be a vertical discharge, axial flow, direct drive fans.
- B. Coils shall be designed for use with R-410A refrigerant.
- C. Heat pump outdoor coil shall be constructed of copper tubes with aluminum fins mechanically bonded to the tubes and aluminum end casings. Fin design shall be sine wave rippled.
- D. Coils shall be designed for a minimum of 10°F of refrigerant sub-cooling.
- E. Coils shall be hydrogen or helium leak tested.
- F. Condenser fans shall be high efficiency electrically commutated motor driven with factory installed head pressure control module. Condenser airflow shall continuously modulate based on head pressure and cooling operation shall be allowed down to 35°F with adjustable compressor lockout.

## **2.08 ELECTRIC HEATING**

- A. Unit shall include an electric heater consisting of electric heating coils, fuses and a high temperature limit switch, with capacities as shown on the plans.
- B. Electric heating coils shall be located in the reheat position downstream of the cooling coil.
- C. Electric heater shall have full modulation capacity controlled by an SCR (Silicon Controlled Rectifier). A 0-10 VDC heating control signal shall be field provided to control the amount of heating.

## **2.09 FILTERS**

- A. Unit shall include 4 inch thick filters with an ASHRAE MERV rating of 13, upstream of the cooling coil.
- B. Unit shall include 2 inch aluminum mesh pre filters upstream of the outside air opening.

- C. Unit shall include 2 inch thick filters with an ASHRAE MERV rating 7, upstream of the heat wheel.
- D. Unit shall include a clogged filter switch.

## **2.010 ENERGY RECOVERY**

- A. Unit shall contain a factory installed and tested energy recovery wheel. The energy recovery wheel shall be mounted in an insulated cassette frame containing the wheel drive motor, drive belt, wheel seals and bearings. Rigid frame shall be removable from the cabinet.
- B. Wheel shall be wound continuously with one flat and one structured layer in an ideal parallel plate geometry providing laminar flow and minimum pressure drop-to-efficiency ratios. The layers shall be effectively captured in stainless steel wheel frames or aluminum and stainless steel segment frames that provide a rigid and self-supporting matrix.
- C. Wheel frame construction shall be a welded hub, spoke and rim assembly of stainless, plated and/or coated steel and shall be self-supporting without matrix segments in place. Wheel bearings shall be selected to provide an L-10 life in excess of 400,000 hours. Rim shall be continuous rolled stainless steel.
- D. All diameter and perimeter seals shall be provided as part of the cassette assembly and shall be factory set. Drive belts of stretch urethane shall be provided for wheel rim drive without the need for external adjustment.
- E. The energy recovery cassette shall be an Underwriters Laboratories Recognized Component for electrical and fire safety. The wheel drive motor shall be an Underwriters Laboratory Recognized Component and shall be mounted in the cassette frame and supplied with a service connector or junction box. Thermal performance shall be certified by the manufacturer in accordance with ASHRAE Standard 84, Method of Testing Air-to-Air Heat Exchangers and AHRI Standard 1060, Rating Air-to-Air Energy Recovery Ventilation Equipment. Cassettes shall be listed in the AHRI Certified Products.
- F. Energy recovery wheel cassette shall carry a 5 year non-prorated warranty, from the date of original equipment shipment from the factory. The first 12 months from the date of equipment startup, or 18 months from the date of original equipment shipment from the factory, whichever is less, shall be covered under the standard AAON limited parts warranty. The remaining period of the warranty shall be covered by Air exchange. The 5 year warranty applies to all parts and components of the cassette, with the exception of the motor, which shall carry an 18 month warranty. Warranty shall cover material and workmanship that prove defective, within the specified warranty period, provided the air exchange written instructions for installation, operation and maintenance have been followed. Warranty excludes parts associated with routine maintenance, such as belts. Refer to the air exchange Energy Recovery Cassette Limited Warranty Certificate.

- G. Unit shall include 2 inch thick, pleated panel outside air filters with an ASHRAE MERV rating of 8, upstream of the wheels.
- H. Hinged service access door shall allow access to the wheel.
- I. Total energy recovery wheel shall be coated with silica gel desiccant permanently bonded by a process without the use of binders or adhesives, which may degrade desiccant performance. The substrate shall be lightweight polymer and shall not degrade nor require additional coatings for application in marine or coastal environments. Coated wheel shall be washable with detergent or alkaline coil cleaner and water. Desiccant shall not dissolve nor deliquesce in the presence of water or high humidity.

## **2.011 CONTROLS**

- A. Unit controller shall be capable of controlling all features and options of the unit. Controller shall be factory installed in the unit controls compartment and factory tested.
- B. Controller shall be capable of stand alone operation with unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling available without dependence on a building management system.
- C. Controller shall have an onboard clock and calendar functions that allow for occupancy scheduling.
- D. Controller shall include non-volatile memory to retain all programmed values without the use of a battery, in the event of a power failure.
- E. Unit shall modulate cooling with constant airflow to meet space temperature cooling loads.
- F. With modulating hot gas reheat, unit shall modulate cooling and hot gas reheat as efficiently as possible, to meet space humidity loads and prevent supply air temperature swings and overcooling of the space.
- G. Unit shall modulate heating with constant airflow to meet space temperature heating loads. Modulating heating capacity shall modulate based on supply air temperature.
- H. Unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling shall be accomplished with connection to interface module with LCD screen and input keypad, interface module with touch screen, or with connection to PC with free configuration software. Controller shall be capable of connection with other factory installed and factory provided unit controllers with individual unit configuration, setpoint adjustment, sensor status viewing, and occupancy scheduling available from a single unit. Connection between unit controllers shall be with a modular cable. Controller shall be capable of communicating and integrating with a LonWorks or BACnet network.

- I. Unit shall be provided with a safety shutdown terminal block for field installation of a smoke detector which shuts off the unit's control circuit.

## **2.012 PAD MOUNTED CURB**

- A. Curbs shall to be fully gasketed between the curb top and unit bottom with the curb providing full perimeter support, cross structure support and air seal for the unit. Curb gasket shall be furnished within the control compartment of the rooftop unit to be mounted on the curb immediately before mounting of the rooftop unit. The curb shall have horizontal supply and return openings.

## **2.013 ELECTRICAL**

- A. Unit shall have a 5kAIC SCCR.
- B. Unit shall be provided with factory installed and factory wired, non-fused disconnect switch.
- C. Unit shall be provided with a factory installed and factory wired 115V, 12 amp GFI outlet disconnect switch in the unit control panel.
- D. Unit shall be provided with phase and brown out protection which shuts down all motors in the unit if the electrical phases are more than 10% out of balance on voltage, the voltage is more than 10% under design voltage or on phase reversal.

## **PART 3 - INSTALLATION**

### **3.01 UNIT PLACEMENT AND MOUNTING**

- A. Unit location shall be essentially as shown on drawings; however, actual placement of the roof curb shall be verified using field measurements and data relating to the equipment approved for actual installation on this project.
- B. The roof decking, roof slab, and roof insulation shall be continuous throughout the area enclosed by the curb with the exception of the actual supply and return duct penetrations. Duct penetrations shall be continuously sealed using a non-hardening sealant.

### **3.02 WIRING**

- A. All power, control, and interlock wiring shall be run in conduit.
- B. All power wiring and conduit shall be performed as work of the Electrical Division of this specification.
- C. All control interlock wiring and conduit will be provided by Mechanical Division in accordance with the Electrical Division of the specifications.



### **3.03 SOUND AND VIBRATION CONTROL**

- A. Refer to Sections entitled "SOUND ATTENUATORS" and "DUCTWORK" for sound control, and "VIBRATION ISOLATION" for vibration control.

### **3.04 DUCT CONNECTIONS**

- A. Supply and return ducts shall be connected to their respective unit duct collars using flexible connectors. These connectors shall be installed properly so that they are not in tension and are aligned with their respective ducts.
- B. Ducts shall be grounded across the flexible connectors using Thompson #588 flexible copper bonding straps.

### **3.05 MANUFACTURER'S FIELD SUPERVISION**

- A. Contractor shall include in his price, the services of an authorized representative of the equipment manufacturer who shall personally supervise the following: check out of all field wiring; unit start up; and unit test and balance including control calibration.

### **3.06 TESTING AND BALANCING**

- A. Refer to the Section entitled TEST AND BALANCE.

### **3.07 CLEANING AND PROTECTION OF EQUIPMENT**

- A. Contractor shall protect the unit from damage from the time of its receipt until final acceptance and shall thoroughly clean the equipment of all dirt and construction debris prior to requesting final inspection.
- B. Casing panels, access doors, gaskets, coils and like items which become damaged during the course of construction shall be repaired to "as new" condition or shall be replaced with new material or equipment components.

End of Section

**Article I      238127      SPLIT SYSTEM HEAT PUMPS**

PART 1 - GENERAL

**1.01    SCOPE**

- A.    Provide all equipment, labor and material required to install complete and make operable air cooled split system air conditioning systems as indicated on the drawings and specified herein.

**1.02    RELATION TO OTHER WORK**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.
- B.    Refer to the Section entitled REFRIGERANT PIPING AND ACCESSORIES.

**1.03    SUBMITTALS**

- A.    Refer to Section entitled COMMON REQUIREMENTS FOR HVAC WORK.
- B.    Include complete data on: performance at indicated operating conditions; unit dimensions; accessory items including thermostats, filters, and like items; equipment weights; power and control wiring (both factory and field); operating and safety controls; utility connections, and minimum operating and service clearances.
- C.    Provide manufacturers data indicating calculation of refrigerant line sizes for each split system.

**1.04    MANUFACTURER**

- A.    Basis of Design: York, see drawings for model series.
- B.    Equivalent products of Carrier or Trane may be submitted for approval.
- C.    Equivalent products of other manufacturers may be submitted for approval provided they meet the requirements of these specifications, and will easily fit in the available spaces.

PART 2 - PRODUCTS

**2.01    OUTDOOR AIR COOLED COMPRESSOR SECTIONS**

- A.    General: Units shall be completely factory assembled and prewired and shall incorporate the following features.
- B.    Casing: The unit shall be constructed of corrosion resistant steel with zinc rich prime coat and baked enamel finish. Casing shall be structurally rigid and adequately braced to prevent distortion and provide support for condenser fan,

coil, compressors, and control panels. The access provided shall be sufficient to permit easy access to all controls, fan, motor, compressor, filter drier, service valves, and other refrigerant system accessories.

- C. Drains: Unit shall provide weather protection for the compressor, control panel, and like items and shall be constructed to permit rapid draining of any rain water in order to prevent internal corrosion.
- D. Fan: The outdoor fan may be of the propeller type and shall be statically and dynamically balanced. Fans shall be provided with protective guard. Fan blade hub shall be keyed to the shaft and may be direct driven. Fan motor shall be permanent-split capacitor type, totally enclosed with overload protection.
- E. Coils: Shall be of the seamless copper or aluminum tube refrigerant type with aluminum heat transfer fins mechanically bonded thereto. Coils shall be tested at not less than 400 psig and proved tight. Coil guards shall be provided to protect coils from physical damage.
- F. Compressor: Shall be hermetically sealed reciprocating type or scroll type, protected with internal temperature and electric current sensitive overloads, crankcase heater, (not required for scroll compressors) hard start gear (when applicable), internal high pressure relief valve, high and low pressure switches, vibration isolators, and starting contractor.
- G. Refrigerant System Controls: Provide liquid line filter- dryer, and backseating suction and discharge service valves with gauge ports. Provide third gauge port for checking operating suction pressure in heating mode.
- H. Control-Power Panel: All system controls shall be factory mounted and prewired within a control panel, and all field connection points shall be brought out to easily identified terminal blocks. Control panels shall include low voltage transformer with fused secondary for remote thermostat/subbase control.
- I. Holding Charge: Units shall be factory evacuated, tested and provided with oil and a refrigerant holding charge.

## **2.02 INDOOR AIR HANDLING SECTION**

- A. Units shall be completely factory assembled and shall incorporate the following features.
- B. Casing: Unit shall be constructed of corrosion resistant steel with zinc rich prime coat and epoxy enamel finish. The casing shall be structurally rigid with adequate internal backing to prevent distortion and maintain proper drive component alignment. Access shall be sufficient to provide easy access to all controls, fans, drive components, coils, filters, refrigerant systems accessories.
- C. Drain Pan: Unit shall have an plastic drain pan which shall extend under the entire coil section.

- D. Insulation: Entire casing shall be factory insulated with fiberglass conforming to the requirements of NFPA 90A as to flame spread and smoke developed ratings and having a neoprene stabilized face in contact with the air stream. Insulation shall meet the requirements of the Florida Energy Code.
- E. Fan: The fan wheel shall be of the double width double inlet type statically and dynamically balanced and shall not pass through the first critical speed at the scheduled operating conditions. Fan wheels shall be keyed to their respective fan shafts.
- F. Bearings: Shall be of the factory lubricated type.
- G. Coils: Shall be of the seamless copper tube refrigerant type with aluminum heat transfer fins mechanically bonded thereto. Coils shall be tested at not less than 400 psig and proved tight. Provide piston refrigerant control system or expansion valve refrigerant control system as required to meet energy code ratings.
- H. Filters: The units shall incorporate filter racks for 1 inch thick throw-away type filters.

### **2.03 ELECTRIC HEATERS**

- A. Provide accessory electric heaters of the capacities and power requirements scheduled on the drawings. Heaters shall be specifically manufactured to be used with the air conditioning equipment provided.
- B. Electric heaters shall be the open coil type, designed for installation within the air handling unit housing when in either the vertical or horizontal position. Heaters shall have full line break contactors which will break all ungrounded conductors.

### **2.04 REFRIGERANT PIPING SYSTEMS**

- A. See Section entitled REFRIGERANT PIPING AND ACCESSORIES.

### **2.05 CONTROLS**

- A. Provide thermostat for one stage cooling (°F) and two-stage heating (°F), with automatic changeover. Provide thermostat with system switch "OFF-HEAT-COOL-AUTO-EMERGENCY HEAT" and fan switch "AUTO-ON".

### **2.06 ACCESSORIES**

- A. General: Provide the following listed accessories as indicated. Accessories shall be those provided by the manufacturer of the split system equipment. [If manufacturer does not provide a specific accessory listed below, indicate this on the submittal and provide submittal data on proposed substitute item to meet that requirement.
- B. Low Ambient Operation Equipment: All equipment necessary to allow proper operation of the split system for outdoor air temperatures between 55°F and 0° F.

This includes a ball bearing fan motor (if not provided on equipment), a low pressure switch, a bypass time delay relay, an isolation relay, and an evaporator freeze thermostat.

- C. Compressor Short-cycle Protector: A solid state timing device which will delay compressor restart for approximately five minutes after power interruption at the compressor, including normal cycling.
- D. Outdoor Thermostat: Stops operation of second stage of supplemental electric heater when outdoor temperature is above setpoint.

### PART 3 - EXECUTION

#### **3.01 PLACEMENT AND MOUNTING**

- A. Indoor and outdoor unit locations shall be essentially as shown on drawings; however, actual placement of the equipment shall be verified using field measurements and data relating to the units approved for actual installation on this project.
- B. Outdoor Units: Outdoor units shall be installed as indicated on the drawings on a 4" thick concrete pad a minimum of 6" larger than the unit on all four sides. Concrete pad not required for replacement units that fit the existing concrete pad.
- C. Indoor Units: Indoor units shall be installed as indicated on the drawings.

#### **3.02 WIRING**

- A. All power, control, and interlock wiring shall be run in conduit.
- B. Control and Interlock wiring and conduit shall be performed as work of this Division in accordance with the requirements of the Electrical Division.
- C. All power wiring and conduit shall be provided as work of the Electrical Division of this specification.

#### **3.03 REFRIGERANT CHARGE**

- A. After installation, charge the units with refrigerant in accordance with the manufacturer's instructions.

#### **3.04 DUCT CONNECTIONS**

- A. Ducts shall be connected to the AHU frame using flexible connectors.
- B. Connectors shall be properly installed so that they are not in tension and are aligned with ductwork.
- C. Ducts shall be grounded across the flexible connector using Thompson #588 flexible copper bonding straps.

### **3.05 TEST AND BALANCE**

- A. Prior to requesting final inspection, the Contractor shall operate all fans, and adjust drive speeds to achieve design air flow.
- B. The Contractor shall operate the system, and record fan motor and compressor amperes, and nameplate data, and forward the record of performance information to the Engineer for review.
- C. Refer to the Section entitled TEST AND BALANCE.

End of Section

## **SECTION 26 00 10**

## **GENERAL PROVISIONS**

### **PART 1 – GENERAL**

#### **1.01 DESCRIPTION**

- A. Refer to Air Conditioning, Heating and Ventilating Drawings to coordinate materials and equipment locations.
- B. Articles, materials, operations or methods specified herein or indicated on the drawings, require that Division 16 provide each item mentioned or indicated, with quality subject to qualifications noted, perform according to conditions stated each operation prescribed, and provide all necessary labor, materials, equipment and incidentals.
- C. All articles either shown on the drawings or mentioned in the specifications, together with all items necessary for or incidental to the completion of the work, shall be furnished and installed by Division 26, unless otherwise stated. All adjustments shall be made and the systems turned over to the Owner in working order.

#### **1.02 QUALITY ASSURANCE**

- A. Drawings: Civil and Architectural drawings and existing building conditions take precedence over Electrical drawings with reference to building and site construction. Electrical drawings are diagrammatic and indicate the general arrangement and extent of work. Architectural drawings indicate more exactly the desired relationship between diffusers, lighting fixtures, panels, branch and signal wiring devices, plumbing fixtures, and other items which remain visible in the completed building. Exact locations and arrangements of materials and equipment shall be determined, with the concurrence of the Architect, as work progresses, to conform in the best possible manner with the surroundings and with the adjoining work of other trades. Where locations of equipment, devices or fixtures are controlled by Architectural features, establish such locations by referring to dimensions on Architectural drawings and not by scaling electrical drawings.
- B. Materials and Equipment: Refer to Section 26 00 50, "Basic Material, Installation And Wiring Methods."
- C. Installation: Refer to Section 26 00 50, "Basic Material, Installation and Wiring Methods".
- D. Corrosion Protection: Refer to Section 26 00 50, "Basic Material, Installation and Wiring Methods."

#### **1.03 REFERENCES**

- A. Refer to Section 26 00 60, "Codes, Standards and Fees".

#### **1.04 SUBSTITUTIONS**

- A. Substitutions prior to the bid date will not be considered unless written request has been submitted to the Architect for approval at least fifteen (15) days prior to the date for receipt of bids. Approvals will only be made by addendum to the bid documents.
- B. Substitutions after the bid date or in contractor submittals without prior approval, may be reviewed only when all of the following conditions have been agreed to in writing:
  - 1. Contractor offers a substantial credit to the Owner.
  - 2. Contractor shall reimburse the Owner for the cost of additional services performed by the Engineer incurred in the execution of work in reviewing the substitutions. The rate of reimbursement shall be 1.1 times the direct cost for the Engineer's reimbursable expenses and at the rate of \$85.00/hour for time expended.

#### **1.05 SCOPE OF WORK**

- A. The following scope of work is a brief generalization of the type and extent of the work to be performed. Detailed requirements are shown on the drawings and specified in the related sections of division 26.
- B. The work of Division 26 includes all labor, materials, tools, transportation, equipment, insurance, temporary protection, permits, taxes and all other necessary and related items required to provide the various systems shown and described, complete and in excellent operating condition.
- C. Any systems or additions to existing systems, indicated or specified, shall mean all necessary work to provide complete functioning systems.
- D. Rough in and make final connections, provision for connections to future installation by others, or complete installation to equipment furnished by others, as shown or specified.
- E. Work under Division 26 includes, but is not necessarily limited to the following:
  - 1. Excavation: Do all excavation required for the installation of work in this Contract. Excavation to provide sufficient clearance for safe installation of work and to be kept free of water.
  - 2. Backfilling: Backfill immediately after inspections have received approval of local authorities and Architect. For materials and method of execution, see Section on Earthwork.



3. Building Systems Including:

- a. Lighting, Light Fixtures, Lamps and Ballasts
- b. Normal Power, Distribution
- c. Fire Alarm and Detection System
- d. Telephone Conduit Systems
- e. Speaker Systems

**1.06 DEFINITIONS**

- A. The words "supply", "supply and install", "provide", "install", "furnish", "furnish and install" or "complete" as used in this Division, means a complete and properly working electrical installation.

**1.07 RELATIONSHIP TO OWNER'S FACILITY**

- A. Do not necessarily disturb or interfere with the Owner's use of facilities associated with or adjacent to this Contract. When interference is necessary, permission shall be obtained from the Owner before any operation or service line is disturbed or disconnected.
- B. All required power interruptions shall be scheduled with the Owner and Utility Company.

**1.08 PAINTING**

- A. Refer to Division 9

**1.09 CODES, STANDARDS AND FEES**

- A. Refer to Section 26 00 60, "Codes, Standards and Fees."

**1.10 TESTS**

- A. Refer to Section 26 00 70, "Testing, Certification and Acceptance".

**1.11 SUBMITTALS**

- A. All equipment and materials furnished and installed by this Contractor shall be submitted for review. The Contractor shall furnish the Architect with nine (9) copies of all contract submittals, schedules and complete descriptive and technical data on all items, including detailed manufacturers installation instructions.
- B. As soon as practicable and within thirty (30) days after the date of award of contract and before placing any equipment orders or installing any equipment or materials, a complete schedule including complete descriptive and technical literature shall be submitted to the Architect for review. No consideration shall be given to partial lists submitted from time to time.
- C. The work described in any submission shall be carefully checked by this

Contractor for all clearances, field conditions, maintenance of Architectural conditions and proper coordination with all trades of the job. Each submittal shall include a certificate by the Contractor that all related conditions on the project have been checked and that no conflict exists.

- D. The review of any submitted data or contractor submittals for materials, equipment, apparatus, devices, arrangements and/or layouts shall not relieve the Contractor from the responsibility of furnishing same of proper dimensions, capacities, sizes, quantity, quality and installation details to efficiently perform the requirements and intent of the Contract. Such review shall not relieve the Contractor from responsibility for errors of any sort on the submittal data or contractor submittals.

#### **1.12 REMOVALS, RELOCATIONS AND REARRANGEMENTS**

- A. Refer to Section 26 00 11.

#### **1.13 EXAMINATION OF PREMISES**

- A. Before submitting bid proposal, examine all existing conditions affecting compliance with Division 26 and drawings by visiting site and/or building. Ascertain access to site, available storage space and delivery facilities.
- B. Tender of bid proposal confirms agreement to all items and conditions referred to herein and/or indicated on accompanying drawings. No consideration will be granted for alleged misunderstandings.

#### **1.14 CUTTING AND PATCHING**

- A. Refer to Section 26 00 50 "Basic Materials, Installation and Wiring Methods."

#### **1.15 SITE DAMAGE, EXCAVATION AND BACKFILL**

- A. Refer to Section on Earthwork.

End of Section

## SECTION 26 00 11

## REMOVALS, RELOCATIONS AND REARRANGEMENTS

### PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. The drawings indicate the renovated areas and identify those portions of the existing building where renovation work shall be done. These identified areas of the existing building show new electrical work that shall be furnished and installed as shown.
- B. Removals, relocations and rearrangements shall be performed in all identified areas of the existing building where renovation work occurs.
- C. When the contract documents include demolition drawings that are reproductions of existing building drawings, the drawings shall be interpreted as not accurate, are included for "Reference Only", and in general represent existing building conditions.
- D. When the contract documents include demolition drawings that have been developed by the Architect, the drawings shall be interpreted as incomplete, and in general represent existing building conditions.
- E. The demolition drawings included in the contract documents are not to be considered complete or accurate, and are only included to provide the contractor with the general scope and extent of removals, relocations and rearrangements. It shall be the contractors' responsibility to visit the site prior to submitting the bid, and verify existing building conditions, in order to more accurately establish all removals, relocations and rearrangements required for the project.
- F. Examine the existing building and installation for the work of any and all trades which will influence the cost of the work on this project. The work shall include removals, relocations and rearrangements as follows:
  - 1. Relating directly or incidental to the work of Division 26.
  - 2. The work of other Divisions which may interfere with, disturb or complicate, the performance of the work of Division 26.
  - 3. Involving systems and/or equipment and related service lines which shall continue to be used or operated as part of the finished project.
- G. Lamps and ballasts shall be disposed of in an approved manner. Pay all fees and other costs necessary for proper disposal.

#### 1.02 EXISTING CONDITIONS

- A. Generally, in all indicated areas scheduled for demolition and remodeling, remove all electrical devices such as branch and signal circuits wiring and conduits, panelboards, lighting fixtures, wiring devices, telephone boxes, speakers, fire alarm devices, television outlets, disconnect motors, etc., that are

located above ceilings and on existing walls or partitions which are to be demolished. Remove all exposed portions of the branch and signal circuit wiring and conduits, and be responsible for maintaining the continuity of existing power circuits feeding devices that are to remain.

- B. All exposed power feeders and branch circuits conduits and wiring and all exposed signal systems feeders and signal circuits conduit and wiring including all signal wiring not in conduit, which is rendered inoperable due to removals, relocations and rearrangements, shall be disconnected and removed by this contractor. Re-circuit and reconnect all devices to remain in operation.
- C. In such cases where new circuit breakers are to be added to existing panelboards, switchboards, etc., they shall be of the same manufacturer, type and AIC rating as the existing breakers, and shall be of the sizes as indicated on the drawings. Wherever necessary, be responsible for rearranging any and all existing circuit breakers within the existing equipment, to accommodate the new circuit breakers being added. Provide additional bolts and hardware, directory modifications, etc., required to accomplish these modifications.
- D. In such cases where existing walls are to remain, all exposed raceways, surface and recessed outlet boxes, etc., which are not to be reused, shall be completely removed. In such cases where new conduits and outlets are to be added to existing walls, in finished rooms, they shall be concealed by cutting and patching the walls for the conduits and outlet boxes. Confirm with Architect before starting work.
- E. Wherever the drawings show the elimination of, addition to, or structural changes in walls, floors, ceilings, duct and pipe chases, etc., remove, relocate and rearrange as required, all existing services provided under Division 16, such that portions of systems to remain shall continue to function.

### **1.03 REMOVALS, RELOCATIONS, AND REARRANGEMENTS**

- A. Include in the base bids, sufficient amount of material and labor costs to accomplish all removals, relocations and rearrangements, both in identified areas and through the building, necessary and/or required to provide acceptable operation and coordination of the combined new and existing equipment and systems.
- B. There will exist during construction, at numerous locations throughout the existing building, conflicts and coordination issues between existing power and signal electrical conduits which remain after demolition, and the installation of the new HVAC ductwork and equipment. Include in the base bid sufficient amounts of material and labor costs to accomplish the relocation necessary and required to permit the installation of the new HVAC ductwork.

End of Section

## **SECTION 26 00 20**

## **DIVISION OF WORK**

### **PART 1 - GENERAL**

#### **1.01 TEMPORARY SERVICE**

- A. Refer to Sections 01 50 00.

#### **1.02 AIR CONDITIONING HEATING AND VENTILATING**

- A. Coordination with work of other trades: It shall be the responsibility of Division 26 to coordinate all electrical power, wiring and installation between the various trades involved so that all equipment and devices furnished under other divisions are properly wired and installed to perform its intended function. Division 26 sub-contractor shall review the Submittals on all equipment furnished under Division 23 to confirm fuses, circuit breakers, wire, conduit sizes and shall adjust the sizes shown on the electrical drawings to the sizes required by the Division 23 Submittals.
- B. General
  1. The object of this Article is to delineate the division of work between Division 23 Air Conditioning, Heating and Ventilating and Division 26 Electrical insofar as work necessary for this Division is concerned.
  2. Specific work to be done by Division 26 is herein listed or described and all other electrical work necessary for the operation of the equipment not called for in this Division is to be done by Division 23.
  3. Division 26 shall make all connections to motor starters, motors, and terminal connections to new and relocated packaged and pre-wired equipment furnished by the Division 23.
  4. All thermal, remote selector and disconnect switches, motor control centers, emergency breakglass stations, fire alarm fan shutdown circuits, interlocking, and duct ionization detectors shall be furnished and wired by Division 26.
  5. All magnetic motor starters not specified as an integral part of new and existing packaged and pre-wired equipment specified in Division 23, shall be furnished by Division 23 and installed and wired by Division 26.
  6. All timers, 7-day clocks, pressure, float, flow, pneumatic electric (PE) and electric pneumatic (EP) switches, freezestats, firestats, line and low voltage thermostats and solenoid valves, will be furnished and installed by Division 23 and shall be wired by Division 26.
  7. All wiring required for the environmental controls will be furnished and installed by Division 23.

8. All roof exhaust fans shall be wired through built-in disconnect switches.
9. Horsepowers for all motors in Division 23 are indicated in the schedules shown on the drawings. Division 26 shall confirm loads and wiring requirements by reviewing approved Division 23 Contractor submittals and installation instructions.

End of Section

**PART 1 - GENERAL****1.01 MATERIALS AND EQUIPMENT**

- A. New and in mint condition. Bear the Underwriters' UL label, when under their jurisdiction, unless specifically permitted otherwise. Materials and products shall conform in all respects to the quality and features indicated by specifications and drawings and shall be the best materials and finishes available. Where material or product is indicated or necessary, but not specifically described in specifications or drawings, such material or product shall conform to the quality and features of similar items described or otherwise indicated. All materials and equipment shall be the standard products of manufacturers regularly engaged in the manufacture of the products.

**1.02 INSTALLATION**

- A. In general, the "Standard of Installation" published by the National Electric Contractors Association (NECA) shall set the standard for installation of equipment and for workmanship. Where specific methods of installation are indicated by specifications or drawings, the methods so established shall be used unless otherwise permitted by the Architect. Install materials and equipment in a neat and orderly manner. Secure cabinets, boxes, wiring, conduits and other equipment rigidly to structure. Cover conduits, boxes, cabinets and other enclosures with plastic covers or caps to prevent entrance of plaster, concrete or other debris when work is not being done therein. Materials and equipment shall be installed using tools and equipment designed for the particular application.

**1.03 CORROSION PROTECTION**

- A. Special precautions shall be taken to protect materials and equipment from corrosion during construction. Materials or equipment damaged from corrosion or other causes will be rejected and shall be removed from the project site immediately.

**1.04 REQUIREMENTS**

- A. Refer to Section 26 27 25, "Outlet and Floor Boxes, Cabinets and Structural Supports", for additional installation requirements.
- B. Refer to Section 26 27 26, "Wiring Devices", for additional installation requirements.
- C. Refer to Section 26 00 60, "Codes, Standards and Fees", for references.
- D. Systems shall be properly grounded and continuously polarized throughout following the color coding specified.

- E. All feeder connections shall be made to equipment using solderless connections of the compression type.
- F. In general, conductors shall be the same size from the last protective device to the load.
- G. Permanent wiring shall not be installed in conduits buried in plaster or in poured concrete until the encasing medium is set and dry and then only after conduits have been swabbed out.
- H. The use of lubricating materials to help install non-lead conductors is to be avoided. Where absolutely necessary, Ideal-Aqua-Gel, Polywater, or Yellow 77 shall be used. Any other lubricants shall be approved by the Architect prior to use.
- I. Non-metallic sheathed cable shall not be used.
- J. "MC" cable shall not be used.
- K. Aluminum wire and cable shall not be used.
- L. Conduit runs are shown diagrammatically and may be modified to meet field conditions, but the general arrangement shall be as shown.
- M. Deviations from the arrangement shown must have the approval of the Architect.
- N. Become familiar with the general construction of the building and place all sleeves, inserts, etc., as required. Support all conduit with suitable fixtures and hangers.
- O. All conduit shall be arranged in a neat manner for access to other work installed by other trades.
- P. Generally, all exposed conduit runs, and conduit runs in exposed ceiling areas, shall be installed parallel or perpendicular to floors, walls and ceilings.
- Q. Conduit runs in exposed ceiling areas shall be installed at the top of the cavity (roof deck). Conduit runs shall not be installed on the bottom cord of the structural steel (bar joists).
- R. Concealed wiring methods shall generally be used throughout, except in mechanical and electrical rooms, and in ceiling cavities as described herein. The contractor shall install conduits below the concrete floor slab. Horizontal runs in concrete masonry units are not acceptable, and shall generally be avoided. Install in voids as wall is laid. Chases in concrete or block walls are not permitted.
- S. When installed above lay-in type ceilings, do not interfere with "lift-out" feature of the ceiling system.



- T. Whenever conduit is installed on exposed steel columns, the conduit shall be installed on the column web, and not on the flange.
- U. When required, provide the trade responsible with all information regarding openings for equipment. These openings will be left in new floors, walls and ceilings. After installation of conduits, this contractor shall pack the remainder of the openings with expansive grout and make the openings water tight.
- V. Determine and be responsible for proper location of all openings and sleeves and shall when required, give the trade responsible due and proper notification in regard to them.
- W. Furnish and install sleeves for all single conduit runs which pass through floors and walls, where openings are not utilized.
- X. After completion of electrical installation, the remainder of all openings shall be sealed by this contractor.
- Y. All penetrations through existing floors shall be core drilled and sleeved.
- Z. Lighting fixtures, detectors, etc., in mechanical rooms shall be installed with surface wiring after ducts, headers and equipment are in place. Generally, locate lights wall mounted for best distribution.
- AA. No recessed electrical outlet box or backbox in separate rooms shall be installed back to back, without the express approval of the Architect.
- BB. Outlet boxes when installed in vertical fire resistive assemblies classified as fire/smoke and smoke partitions shall not affect the fire classification. Openings shall occur on one side only in each framing space and the openings shall not exceed 16 square inches. All clearances between such outlet boxes and the gypsum board must be completely filled with joint compound or other approved materials. The wall shall be built around outlets of a larger size so as to not interfere with the integrity of the wall rating. The aggregate surface area of the boxes shall not exceed 100 square inches per 100 square feet. Boxes located on opposite sides of walls or partitions shall be separated by a horizontal distance of 24 inches. The outlet or switch boxes shall be securely fastened to the studs and the opening in the wallboard facing shall be cut so that the clearance between the box and the wallboard does not exceed 1/8 inch.
- CC. Clean all equipment before leaving the job.
- DD. Repair, refinish or touch up all damaged surfaces.
- EE. No materials except those specified shall be kept on the project site.
- FF. Provide fire stopping means at all penetrations thru fire rated walls, partitions, ceilings or floors, required for installation of electrical work.

## **1.05 IDENTIFICATION**

- A. Clearly and permanently label in a neat and orderly manner all Switchboards, Panelboards, all devices, Disconnect Switches and Individual Motor Starters. Locate nameplates for easiest reading.
- B. Refer to applicable equipment sections of the specification for specific details and complete descriptions of nameplate labeling requirements.
- C. Nameplates: Lamacoid type with 1/4" high white letters on black background machine engraved. Nameplates shall have strong adhesive backing for attaching to equipment.
- D. Directories: Use card provided by equipment manufacture. Provide new card for each existing panel being altered. Typewrite identification of function and location for each circuit using final room names and/or numbers as selected by Owner. Permanently fasten in place and protect behind glass or heavy gauge non-yellowing plastic cover.

#### **1.06 CUTTING AND PATCHING**

- A. Refer to conditions of other Divisions and supplements thereto for cutting and patching work.
- B. Refer to Section 01 73 29 for cutting and patching of work relating to alteration work.

#### **1.07 FOUNDATIONS AND SUPPORTS**

- A. Level and align equipment on steel bases and/or concrete pads as indicated. If details are not shown, submit a design to the Architect for approval before proceeding.
- B. Whether specifically referred to or not under Divisions and Sections for equipment, all machinery furnished under Division 26 with moving or rotating parts, such as motors, generators, etc. shall be suspended on vibration isolators. Such isolators shall be of the type and design suitable for the particular piece of equipment.
- C. Concrete pads shall be furnished and installed under Division 26 and Division 26 shall be responsible for providing all details and instructions.

#### **1.08 OBSTACLES, INTERFERENCE AND COORDINATION**

- A. Provide fittings, elbows, pullboxes, etc., as required to effect necessary changes in direction, offsets, transitions, etc.
- B. Coordinate the work with the other trades, determining exact routes and locations of raceways, equipment, etc., prior to fabrication and installation. Install the work to permit removal of the parts of other trade requiring periodic maintenance or replacement without damage. Allow for proper operation of swinging or overhead doors, access panels, control components, etc.

- C. Maintain minimum 7'0" head room in mechanical and/or electrical equipment rooms.
- D. Prior to roughing-in for equipment furnished by others, obtain approved roughing-in drawings indicating exact location of services for each item of equipment. Relocation of any services incorrectly roughed-in shall be without extra compensation.

#### **1.09 CHANGEOVERS, RELOCATIONS AND REWORK OF UTILITIES**

- A. Make all changeovers, tie-ins, removals, etc., that affect the continuity of present building services or operation, at times selected to avoid interference with building activities. Set up special schedules and secure approval before proceeding.
- B. Do as much work as possible prior to any shut-down to minimize the down time. Make temporary connections as necessary to maintain approved schedules, at no increase in cost to the Owner.
- C. Refer also to Division 1.

#### **1.10 ACCESS PANELS**

- A. Generally, all concealed junction boxes, control devices, duct mounted heat and smoke detectors, etc. are located above accessible type ceilings. Should any device be inaccessibly located, furnish access doors Milcor style 'K' with flush screw-driver operated lock, of size to permit complete access. Doors shall be of a type suitable to the construction in which they are to be installed.

#### **1.11 FIRE STOPPING**

- A. Design Criteria
  - 1. Material used shall be a UL classified "System" of sufficient material to provide the following:
    - a. When exposed to heat or fire, the fire stop material shall expand rapidly, at a minimum of three times at 1,000° Fahrenheit, about the conduit or cable to form a fire barrier equal to or greater than the rating of the wall, partition, ceiling or floor.
    - b. Shall form a seal around conduits or cables which penetrate fire rated walls, partitions, floors or ceilings, that is impervious to water, heat and flame.
    - c. Shall be an intumescent latex elastomer material (expands when exposed to heat), rubber-like, which will allow for expansion and contraction of the structure and expansion joints, low flame spread and smoke density.

2. Poke thru assemblies shall be UL Listed assemblies approved for use with 3-hour fire rated floors. Assemblies serve power or low voltage, or both, as required or indicated. Provide complete compatible accessories and devices as indicated.
- B. Requirements of Regulatory Agencies
1. ASTM E-814 (UL1479)
  2. National Electrical Code - Article 300
  3. NFPA Code # 107
- C. Acceptable Manufacturers - Fire Safing Insulation
1. Dow Corning - 3/6548 Silicone RTV Foam.
  2. 3M/Electro Products Division - 7902 and 7904 Series.
  3. O-Z Gedney - CFS and CAFS Series.
  4. Thomas and Betts - Flame-Safe.
  5. Nelson - Flame Seal.
- D. Acceptable Manufacturers - Smoke and Fire Stop Assemblies
1. Fittings for conduit and cables with UL classified fire ratings, "Fire Seal" Series by O.Z./Gedney, Steel City or Square-D poke thru.
- E. Installation
1. Furnish and install for all conduits and cables passing thru fire rated walls, partitions, ceilings and floors.
  2. Follow manufacturer's requirements for installation.
  3. Core drill or provide sleeves at all penetrations thru fire rated walls, partitions, ceilings and floors.

End of Section

PART 1 - GENERAL

**1.01 DESCRIPTION**

- A. Listing of codes, standards and required fees used in the development of the contract drawings and specifications.

**1.02 REFERENCES**

- A. Applicable portions of the "Conditions of the Contract" including the "General Conditions" and "Supplementary Conditions", and "General Requirements" are a part of this Division.
- B. Refer to Section 26 00 12 "Allowances and Alternates" for work affecting this Division.

**1.03 QUALITY ASSURANCE**

- A. The contractor shall accomplish the work defined in Division 26, as indicated on the contract drawings and specifications, in complete conformance with all the latest Federal, State, City, and Utility Company rules, regulations and ordinances having jurisdiction over this work, and all codes in the local in which the work is being done.
- B. The contractor shall accomplish the work in complete conformance with all the requirements of the latest editions of the codes and standards listed in this section.
- C. The listings are partial. Any codes, standards or required fees not listed in this section or other sections of the specification, does not relieve the contractor from accomplishing the work in complete conformance with all applicable codes, standards and required fees.
- D. The completed installation shall be inspected and certified by the agency designated in the local area. The agency shall be requested to certify that the installation is in accordance with the latest editions of the National Electrical Code or such other standards as may be applicable.

#### **1.04 LISTING OF CODES**

- A. Florida Building Code
- B. National Electrical Code - NFPA 70
- C. Life Safety Code - NFPA 101
- D. Florida Administrative Code - Chapter 59A-3
- E. Installation, Maintenance, and Use of Protective Signaling Systems - NFPA 72
- F. Standard on Automatic Fire Detectors - NFPA 72E
- G. Guide for the Installation, Maintenance and Use of Notification Appliances for Protective Signaling Systems - NFPA 72G
- H. Testing Procedures for Local, Auxiliary, Remote Station and Proprietary Protective Signaling Systems-NFPA 72H
- I. Standard for Emergency and Standby Power Systems NFPA 110
- J. Americans with Disabilities Act (ADA) - Accessibility Guide lines for Buildings and Facilities

#### **1.05 LISTING OF STANDARDS**

- A. Underwriters Laboratories (UL)
- B. National Electrical Manufacturers Associations (NEMA)
- C. Institute of Electrical and Electronics Engineers (IEEE)
- D. American National Standards Institute (ANSI)
- E. American Society of Testing Materials Standards (ASTM)
- F. Motors and Generators, NEMA MG-1

#### **1.06 LIST OF FEES**

- A. General
  - 1. The contractor shall apply for, obtain and pay for any and all fees or service charges related to required permits, inspections and certifications.
  - 2. Include in the bid, all costs for the services of an authorized representative of the "equipment or system" manufacturer, as specified in the applicable "equipment or system" sections, to instruct the Owners' representative in the proper operation of each partial or complete piece of "equipment or system" installed under Division 26.
  - 3. Refer to Section 26 00 70, "TESTING, CERTIFICATION AND ACCEPTANCE".

End of Section

**PART 1 - GENERAL****1.01 DESCRIPTION**

- A. Listing of systems and equipment requiring testing, certification and acceptance requirements for final approval by the Architect for occupancy. Required for project completion.

**1.02 QUALITY ASSURANCE**

- A. The Owner will assume no liability or responsibility for any portions of the installation under Division 26 until they are finally tested and accepted in writing. Final inspections and tests will be made only after the Architect is satisfied that the work shown on the contract drawings and in the specifications has been completed in accordance with the intent of the drawings and specifications.
- B. After a system or piece of equipment is complete, and when directed by Architect, run a test in the presence of the Architect, during which the total system or piece of equipment operation shall be demonstrated and final adjustments made. If any system or piece of equipment within a system fails to function properly, rectify such defects or inadequacies and make a final test run as directed by the Architect.
- C. All tests shall be scheduled at the convenience of the Owner and the Architect and in no case shall be scheduled without at least 48 hours written notice.
- D. Conduct tests to verify all systems and equipment are energized and operating properly. Systems or equipment not operating properly shall be promptly corrected and/or replaced without cost to the Owner.
- E. Include in the Bid, all charges or fees including the cost of any special test equipment, factory engineers, fuel, etc., necessary for the proper performance of the tests.
- F. The listing is partial. Any system or piece of equipment not listed in this section or other sections of the specification does not relieve the contractor from accomplishing the requirements of this specification, in complete conformance with all applicable codes and standards.

**1.03 PROJECT COMPLETION**

- A. At the time of request for final on site review, submit to the Architect, the following material:
  - 1. Letters of certification from all systems manufacturers, certifying that all tests and inspections required have been completed and approved, and the systems are 100% functional.

2. Signed affidavits that the Owner's representative has received the required system's operational instructions and demonstrations.
  3. Certificate of Approval from the State Board of Fire Underwriters and/or local authority having jurisdiction.
- B. Upon completion of the work and before request for final payment, deliver to the Architect for transmittal to the Owner, two sets of hard backed, 3-ring binders each containing the following material:
1. One (1) copy of each final shop drawing, wiring diagram, operating manual, maintenance manual, spare parts list and fixture brochure, test reports and guarantees. Standard printed information shall be edited for the specific equipment furnished by neatly lining out non-applicable items, noting options furnished and printing in items specific to the equipment furnished.
  2. Project Record Drawings

#### **1.04 GUARANTEES**

- A. Furnish written guarantees commencing on the date of final acceptance, that any and all defects in material, operation and workmanship appearing within one (1) year shall be repaired or replaced without cost to the Owner. Include all other work which may be damaged during correction of defects. Guarantee shall be signed by a properly authorized officer of the firm. Extend the period for equipment and systems where longer guarantees are specified in other sections.

#### **1.05 INSTRUCTIONS AND SERVICE**

- A. Supplement Section 01 73 13 by all articles and sub-articles within Division 26.
- B. Refer to section 26 00 60, "Codes, Standards and Fees."
- C. Comparable system shall have been supplied with maintained engineering and service departments capable of designing and maintaining the equipment in operation. Make available to Owner, a local service department of a duly authorized distributor of the equipment, which is to stock the manufacture's standard parts. On- the -premises repair is to be provided during normal working hours at no cost to the Owner for a period of 12 months from the date of acceptance of the installation by the Architect, unless damage is caused by misuse, abuse or accident.



## **1.06 LOOSE EQUIPMENT**

- A. Upon completion of the work and before request for final payment, deliver to the Owner's representative the following:
  - 1. Keys for every different pieces of electrical equipment furnished under this Contract which is equipped with a lock.
  - 2. Keys for each different type fire alarm station or lock type switch.
  - 3. All loose equipment specified and/or supplied for use with the respective system.
- B. Obtain a receipt, in duplicate, for this equipment, and deliver one (1) copy to the Architect.

## **1.07 PROJECT RECORD DOCUMENTS**

- A. Refer to Section 01 71 23.13.
- B. Furnish marked drawings showing the exact locations of all buried conduits, and, all addendum and field changes made to the final contract drawings.

## **1.08 CLEANING**

- A. Prior to final acceptance, clean all fixtures, lenses, panelboards, and switchboards, device plates, and signal and communication equipment. Remove all debris, surplus equipment, raceway, wire and cable, insulation, cartons, etc., resulting from the work of this trade.

## **1.09 LISTING OF SYSTEMS AND EQUIPMENT - TEST REPORTS**

- A. Lamps and Ballasts
- B. All Interior Lighting Fixtures
- C. All Exterior Lighting Fixtures
- D. Fire Alarm System

## **1.10 LISTING OF SYSTEMS AND EQUIPMENT - CERTIFICATION LETTERS**

- A. Fire Alarm System

## **PART 2 - REQUIREMENTS**

### **2.01 GENERAL**

- A. Test requirements and procedures have been defined for the systems and equipment listed herein.

- B. The test requirements and procedures are general in nature, and may not completely define all the requirements and procedures necessary to comply with the applicable codes. This does not relieve the contractor from accomplishing all the tests, and to comply with the applicable code requirements.

## **2.02 EQUIPMENT OPERATION TEST**

- A. Show by demonstration in service that all circuits are in good operating condition. Cycle all control equipment under load.

## **2.03 EQUIPMENT AND APPARATUS FACTORY TESTS**

- A. Manufacturer's normal quality control tests are acceptable, unless specific factory witnessed tests are specified in other Sections.
- B. Submit copies of factory test reports.

## **2.04 WIRING DEVICES – GROUNDING**

- A. Test the polarity of each receptacle. Correct any found incorrect.
- B. Test the ground fault trip on all GFI receptacles and breakers.

## **2.05 FIRE ALARM SYSTEM**

- A. A factory trained technician shall supervise the installation and shall test and adjust all equipment upon completion. Each detector, station and signaling device shall be tested by the manufacturer's representative in the presence of a representative of the Owner, and a test report shall be made out, in triplicate, and signed by the Owner's representative indicating that he witnessed the actual individual test of the system. This testing time is in addition to the training time. A copy of the test report shall be furnished to the Owner and Architect.
- B. The Fire Alarm System Certification and Description form as out lined in NFPA-72 shall be completed and available at final inspection.

## **2.06 APPROVAL FOR OCCUPANCY**

- A. Prior to occupancy of any building, portion thereof, or major department, the area in question must have a final acceptance in regard to general construction, mechanical construction, and electrical construction, and the area accepted for occupancy by the Architect. Prior to acceptance, all work must be completed including all items of the general requirements. Division 16 shall be deemed to be delaying the Owner when the Owner requests occupancy and the work is not in sufficient compliance with the Contract requirements to warrant acceptance for occupancy by the Architect.

End of Section

**SECTION 26 05 19**

**LOW VOLTAGE ELECTRICAL POWER  
CONDUCTORS AND CABLES**

PART 1 - GENERAL

**1.01 QUALITY ASSURANCE**

A. Acceptable Manufacturers

1. Wire and Cable (0-600 volt)

- a. Shall be manufactured by Pirelli Cable Corp., General Cable, Cerro, General Electric, Okonite or approved equal.

B. Design Criteria

1. Wire and Cable (0-600 volt)

- a. Shall be labeled with UL approval and be marked with the size, type and year of manufacture. Wire and cable more than 1 yr. old at the time of installation will not be accepted.
- b. Shall have each reel or carton clearly labeled with the month and year of manufacture. Reels and carton dated more than 1 yr. prior to Contract award date are prohibited.
- c. Shall be copper, heat and moisture resistant, thermal plastic insulated, solid conductor for all sizes No. 10 or smaller and stranded for all larger sizes. Smaller sizes than No. 12 AWG shall not be used for light and power wiring.
- d. Branded and labeled per NE Code requirements.

**1.02 SUBMITTALS**

A. Contractor submittals

- 1. Include evidence of UL listing and furnish names of cable manufacturers being used.

## PART 2 - PRODUCTS

### **2.01 MATERIAL**

#### A. Wire and Cable

1. Insulation Types shall be applied as follows:
  - a. Type THW, THWN or THHN - For General Use - #10 and smaller
  - b. Type THHN, THWN - For General Use and Panel Feeders - #8 and larger.
  - c. Type THWN - For all panel feeders underground or as indicated
  - d. Special Types - As shown or specified herein.
2. Conductor Color Coding shall be as follows:
  - a. White - All neutral conductors and these only.
  - b. Green - All ground conductors and these only.
  - c. All other colors - All other wiring.

## PART 3 - EXECUTION

### **3.01 INSTALLATION**

- A. Refer to Section 26 00 50, "Basic Materials, Installation and Wiring Methods".

End of Section

## **SECTION 26 05 26**

## **GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### **1.01 DESCRIPTION**

- A. Related Work Specified Elsewhere
- B. Requirements
  - 1. Provide Neutral and Equipment Grounding
  - 2. Provide Building Grounding

#### **1.02 QUALITY ASSURANCE**

- A. Acceptable Manufacturers
  - 1. Molded Fusion Welding Process – Cadweld
  - 2. Ground-Rods - Copperweld
    - 3. Pipe Clamps - Thomas and Betts, Burndy
- B. Requirements of Regulatory Agencies
  - 1. Lightning Protection Code - NFPA 780
  - 2. National Electrical Code - NFPA 70

#### **1.03 SUBMITTALS**

- A. Contractor submittals
  - 1. Required for all Materials

### **PART 2 - MATERIAL**

#### **2.01 GROUNDING MATERIAL**

- A. Ground Conductor - Size as per NEC requirements, bare stranded, soft drawn or soft annealed, copper wire.
- B. Joints and Connections - Molded fusion welding process using proper mold and the number, size and type cartridge for the joint or connection.

## PART 3 - EXECUTION

### **3.01 GENERAL**

- A. All equipment, whether furnished by this Division or by others, shall be grounded.

### **3.02 INSTALLATION**

- A. Ground conductors shall be connected copper to copper.

### **3.03 TESTS**

- A. Refer to Section 26 00 70 "Testing, Certification and Acceptance".

End of Section

**SECTION 26 09 23**

**LIGHTING CONTROL DEVICES**

PART 1 - GENERAL

Section 26 00 50 BASIC MATERIALS, INSTALLATION AND WIRING METHODS applies to work specified in this section.

**1.01 REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

GREEN SEAL (GS)

GS-12 (1997) Occupancy Sensors

ILLUMINATING ENGINEERING SOCIETY (IES)

IES LM-48 (2001) Guide for Testing the Calibration of Locking-Type Photoelectric Control Devices Used in Outdoor Applications

UNDERWRITERS LABORATORIES (UL)

UL 20 (2010; Reprint Feb 2012) General-Use Snap Switches

UL 773 (2016; Reprint Nov 2017) UL Standard for Safety Plug-In, Locking Type Photocontrols for Use with Area Lighting

UL 773A (2016; Reprint May 2018) UL Standard for Safety Nonindustrial Photoelectric Switches for Lighting Control

UL 98 (2016) UL Standard for Safety Enclosed and Dead-Front Switches

**1.02 SUBMITTALS**

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.

SD-03 Product Data

Occupancy Sensors; G

Motion Sensors; G

SD-06 Test Reports

System Operation Tests

SD-10 Operation and Maintenance Data Lighting

Control System, Data Package 5

## PART 2 - PRODUCTS

### **2.01 SYSTEM DESCRIPTION**

Provide UL listed occupancy sensor complying with FCC Part 15 and GS-12. Design occupancy sensors and power packs to operate on the voltage indicated. Provide sensors and power packs with circuitry that only allows load switching at or near zero current crossing of supply voltage, with mounting as indicated. Provide sensor with an LED occupant detection indicator, adjustable sensitivity, and adjustable delayed-off time range of 5 minutes to 15 minutes. Provide color matching the adjacent wall plates, wall mounted sensors, and white ceiling mounted sensors. Provide ceiling mounted sensors with 6.28 rad 360 degree coverage unless otherwise indicated.

Provide sensors with:

- a. A crystal controlled ultrasonic sensor which does not cause detection interference between adjacent sensors.
- b. Infrared sensors with a daylight filter, and a fresnel lens that is applicable to the controlled space.
- c. Ultrasonic/Infrared Combination Sensor

(1) Occupancy detection to turn lights on requires both ultrasonic and infrared sensor detection, such that the lights remain on if either the ultrasonic or infrared sensor detects movement. Provide infrared sensor with a lens selected for indicated usage and daylight filter to prevent short wavelength infrared interference. Provide crystal controlled ultrasonic sensor frequency.

## PART 3 - EXECUTION

### **3.01 INSTALLATION**

Submit installation drawings for occupancy sensitive, motion sensitive control devices in accordance with the manufacturer's recommended instructions for installation.

#### **A. Manual and Safety Switches**

Coordinate terminal lugs with the wire size. Securely fasten switches to the supporting structure or wall using not less than four 6.4 mm 1/4 inch bolts. Do not use sheet metal screws.

End of Section



## **SECTION 26 24 16**

## **PANELBOARDS**

### **PART 1 - GENERAL**

#### **1.01 DESCRIPTION**

- A. Related Work Specified Elsewhere
  - 1. Section 26 28 16.20 - Circuit Breakers
- B. Requirements
  - 1. The secondary distribution as described herein includes low voltage (600 volts or less) power and lighting panelboards.
  - 2. Refer to the panel schedules and single line diagrams shown on the drawings, for complete panelboard requirements.

#### **1.02 SUBSTITUTIONS**

- A. Reference to Section 26 00 10, "Substitutions".

#### **1.03 QUALITY ASSURANCE**

- A. Acceptable Manufacturers: General Electric, Cutler-Hammer, Square-D or Siemens.
- B. Design criteria referred to herein are those of the acceptable manufacturers listed herein, and constitutes the type, quality and function of the equipment specified.
- C. Requirements of Regulatory Agencies
  - 1. NEMA PB-1 - Panelboards
  - 2. UL listing where applicable

#### **1.04 DESIGN CRITERIA**

- A. Identification
  - 1. All panels shall be provided with engraved nameplates as herein specified.
  - 2. Refer to Section 26 00 50, "Basic Materials, Installation & Wiring Methods", for nameplate requirements and color coding.
  - 3. Typical labeling shall include panel designation and distribution branch, "6PA".

#### **1.05 DEFINITIONS**

- A. "Space" means complete provision for future installation of branch or feeder device, including mounting provisions, bus ties and blank cover plates.
- B. "Spare" means completely installed branch or feeder device for future use.

#### **1.06 SUBMITTALS**

- A. Contractor submittals are required for all panelboards, and shall include the following information:
  - 1. Panelboard voltage, current rating, bus bar bracing.
  - 2. Overall dimensions
  - 3. Bus bar material
  - 4. Circuit breakers frame and trip ampere rating, and ampere interrupting rating (RMS Symmetrical).
  - 5. Special requirements as indicated.
- B. Provide maintenance and operating instructions.

### PART 2 - PRODUCTS

#### **2.01 GENERAL**

- A. All panelboards shall be of the same manufacturer and of the same manufacturer as the switchboards.
- B. All circuit protective devices shall be of the same manufacturer. Exception: devices which are generally not manufactured by more than a few manufacturers.

#### **2.02 PANELBOARDS**

- A. Each panel shall be furnished with the proper voltage rating, bus ampere rating, current withstand rating with circuit breakers of the quantity, rating and type as indicated or implied. Minimum interrupting rating shall be 10,000 amps at 240V, 14,000 amps at 480V, RMS symmetrical. Bus bars shall be copper or tin plated copper. Provide copper ground bars where so indicated, with lugs for ground wires.
- B. Phase buses shall be full size from top to bottom and rated to carry the full current indicated in the panel schedules. Phase sequence shall be A-B-C from left to right as viewed from the front. Buses shall be fully drilled and tapped for all cross and center connectors and complete with all connections necessary for main and branch protective devices.

- C. Neutral bus shall be fully rated, electrically isolated and complete with solderless connectors for all feeder and branch neutral conductors. Material shall be same as phase buses.
- D. Ground bus shall be electrically bonded to panelboard box and complete with solderless connectors for all feeder and branch ground conductors. Set screw type bonding connection (at neutral bus or ground connection) shall not be permitted.
- E. Lighting and receptacle panelboards may have (plug-in) (bolt-on) breakers wherever the use of such breakers is feasible. All switchboards and power distribution panels shall have bolt-on type breakers.
- F. Panelboards requiring a main circuit breaker shall not have the breaker in a branch breaker position.
- G. For panels specified with main breaker or feeder breakers shunt trip device, the breaker shall be equipped with a 120 volt shunt trip coil and a 120 volt power supply connection from the main bus. Provide fuse protected control power transformer as required. Provide terminals for the shunt trip connection to remote pushbutton station(s).
- H. The panelboard assembly shall be factory assembled and be enclosed in a code gauge galvanized steel cabinet with flush or surface trim as indicated and with ample wiring gutters on top, sides and bottom. Outdoor panels shall have NEMA 3R outdoor, weatherproof, raintight enclosures. Refer to panel schedules on drawings for "Outdoor" panels.
- I. Front trims, for flush and surface mounted panels, shall have concealed trim fasteners, door with concealed hinges and flush lock. All panels shall be keyed alike.
- J. The panelboard front shall be of the door-in-door type with one hinged door covering the interior and providing access to the circuit breaker operating handles and the other hinged door providing access to the wiring gutters.
- K. Each panel shall:
  - 1. Be provided with mill ring catch and lock and two keys. Keys shall be identical for all new panels.
  - 2. Shall be provided with a complete glass or plastic protected directory, with all circuits labeled in a type-written format.

## PART 3 - EXECUTION

### **3.01 INSTALLATION**

- A. Locate panelboards such that the highest circuit breaker toggle handle is no more than 66" above finished floor at location shown, unless otherwise indicated. Align top and bottom edges parallel to finished floor.

### **3.02 WIRE CONNECTIONS**

- A. Circuits sharing a common neutral shall not be connected to the same phase.
- B. When a home run to an existing panel is shown, compatible circuit breakers of the indicated ampere ratings shall be provided.

End of Section

## SECTION 26 27 25

## OUTLET AND FLOOR BOXES, CABINETS AND STRUCTURAL SUPPORTS

### PART 1 - GENERAL

#### 1.01 DESCRIPTION

##### A. Requirements

1. Furnish and install boxes to permit installation of wiring and raceway systems, and to house wiring devices. Boxes shall include:
  - a. Outlet, switch and junction
  - b. Pull
2. Furnish and install cabinets to house terminal strips and equipment at locations indicated on the drawings and as required by the wiring and raceway systems.
3. Furnish and install structural support systems for suspending light fixtures and light track, supporting outlet, junction and pull boxes, as indicated on the drawings and as required by building conditions.
4. Generally, all boxes and structural support systems, installed in spaces with no ceilings, will be painted-in with the space. Painting done by the painting contractor. Rust and corrosion protection by this division contractor.

#### 1.02 QUALITY ASSURANCE

##### A. Acceptable Manufacturers

1. Metal outlet boxes, fittings and covers: Thomas & Betts, Steel City, Appleton, Hubbell, Raco or approved equal.
2. Cabinets: Same manufacturer as panelboards.
- 3... Structural support systems: Thomas & Betts, Steel City "KINDORF" or approved equal.

## PART 2 - PRODUCTS

### **2.01 BOXES**

#### A. General

1. Metal, fabricated from galvanized sheet steel or cadmium plated pressed sheet steel, with device covers, extension, etc. as required by the installation.
2. Where exposed to moisture or weather, cadmium cast alloy iron or malleable iron complete with gasketed screw-fastened covers. Hinged covers will not be accepted unless otherwise specified.

#### B. Outlet and Junction Boxes shall be:

1. 4" square by 1-1/2" depth minimum, without clamps for either conduit or tubing.
2. 4-11/16" square by 1-1/2" depth minimum, without clamps, for either conduit or tubing.

#### C. Switch Boxes shall be:

1. Single gang - 4" wide by 4" long by 1-1/2" depth minimum.
2. Two gang - 4" square by 2-1/8" deep.
3. Multi-gang - 4-1/2" high by 2-1/8" deep by width as required by number of gangs. Complete with partitions where required.

#### D. Pullboxes shall be:

1. NEMA 1, 3, or 4 as required by area. Provide partitions to separate multiple boxes at same location. Minimum #14 gauge. Construct from galvanized sheet steel. Solder or braze all seams, roll edges at openings. Provide matching cover. Finish box in primer for field painting.

#### E. FS and FD Boxes

1. Acceptable manufacturers: Appleton Electric Co., Crouse-Hinds Co., Killark Electric Mfg. Co.

### **2.02 CABINETS**

#### A. General

1. Box and front to match panelboards. Depth as noted, or 4" minimum.

### **2.03 STRUCTURAL SUPPORTS**

- A. Steel solid base channels, 1 5/8" by 1 5/8", 12 gauge, with all required channel fasteners, pipe hangers, threaded rods, channel joints, beam flange clips, miscellaneous fittings, etc.
- B. Electro-plated zinc plus zinc dichromate.
- C. Kindorf "Superstrut", or approved equal.

## PART 3 - EXECUTION

### **3.01 INSTALLATION**

- A. Outlet, Switch and Junction Boxes
  - 1. Provide boxes where required for outlet facility. Wherever possible and except where specifically noted "surface mounted", make installation recessed. Support securely from building construction, not from raceway. Where installed in exposed block or structural glazed tile walls, locate at center of block joint. Locate raceway as required to meet block conditions, coordinating with the work of other trades.
  - 2. Coordinate location of all ceiling boxes with the work of other trades using same space. Close off all unused openings with proper fittings. Maintain the accessibility of all boxes.
  - 3. Installed with no part visible when they are specified concealed.
  - 4. Securely fastened in place using same types and methods as for conduit. Wooden supports in other than wood construction are not permitted.
  - 5. Installed with plaster rings where required.
- B. Pull Boxes
  - 1. Installation in finished rooms is prohibited, except where specifically shown and noted on drawings. All boxes are to be concealed and accessible after completion of building. Support independent of raceway. Use same types and methods as for conduit. Support directly from building construction. Close off all unused openings with proper fittings.
- C. Install all outlet boxes snugly, rigidly, plumb and level. Do not cut insulation in outside walls to install outlet boxes. Do not use through-the-wall boxes. Protect boxes during construction to prevent entrance of foreign materials such as concrete, mortar, plaster, paint, etc.
- D. Install outlet boxes in glazed tile, brick, or other masonry wall not covered by wood wainscot or paneling with square cornered tile (or masonry) extension rings of proper depth.

- E. Install outlet boxes in sheetrock walls with square cornered tile (or masonry) rings of proper depth. Standard drywall rings will not be acceptable.
- F. Install outlet boxes for electric water coolers (EWC) concealed inside cooler cabinet. Locate outlet boxes using rough-in template furnished with cooler.
- G. Size all boxes so they are completely covered by the wall plate or fixture.
- H. Use galvanized steel boxes and fittings unless indicated otherwise. Provide galvanized steel outlet boxes and covers for surface mounted boxes in unfinished areas.
- I. Use cast iron floor boxes in slab on grade, in damp or wet locations, or as indicated on the Plans.
- J. Cabinets
  - 1. Install flush in wall except where specifically noted surface mounted. Support securely from building construction and align with adjacent panelboards. Maximum height of top to be less than 6'-6", provide "structural" support where equipment is installed therein. Extend support from floor to structure above.
- K. Structural supports (steel channels) shall be utilized for suspending, light fixtures, light track, etc., for outlet and junction boxes as indicated on the drawings, and generally as supports for miscellaneous equipment, outlets, etc.

End of Section



## SECTION 26 27 26

## WIRING DEVICES

### PART 1 - GENERAL

#### 1.01 REQUIREMENTS

- A. Furnish and install all labor, material and equipment required to provide wiring devices governed by these specifications, to be wired, connected and left in first class operating condition.

#### 1.02 QUALITY ASSURANCE

- A. Acceptable Manufacturers
  - 1. Wiring device manufacturers and Catalog No.'s are included herein.
  - 2. Those wiring devices not indicated herein, shall be as specified on the Drawings.
  - 3. Unless otherwise noted, or not manufactured, all wiring devices shall be supplied by the same manufacturer.
- B. Design Criteria
  - 1. Lighting Switches
    - a. Shall be heavy duty, premium or specification grade as noted.
    - b. Shall be side wired, quiet action, with captive mounting screws.
    - c. Shall be toggle style.
    - d. Shall be (white) (brown) (ivory).
  - 2. Receptacles
    - a. Shall be heavy duty, premium, specification or hospital grade as noted.
    - b. Shall be side wired, grounding type, standard NEMA configured fabricated of molded urea.
    - c. Shall be ivory.

3. Cover Plates
  - a. Shall be smooth, satin stainless steel.
  - b. Shall be single two-gang plate for "Double Duplex" outlets.
- C. Requirements of Regulatory Agencies
  1. Switches
    - a. Underwriter's Laboratories U.L.
    - b. NEMA WDI-3, NEMA WD-1, NEMA WD-6 Standards
    - c. Federal Specification W-S-896E.
  2. Receptacles
    - a. Underwriter's Laboratories U.L.
    - b. NEMA WDI-4, NEMA WD-1, NEMA WD-6 standards
    - c. Federal Specification W-C-596

### **1.03 SUBMITTALS**

- A. Refer to Section 26 00 10, "General Provisions."
- B. Samples
  1. Will be required, of manufacturers not listed herein who intend to supply wiring devices, as part of submittal for evaluation. Furnish one of each type to be installed.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Lighting Switches - Toggle Handle Type.
  1. 20 Ampere, 120-277 Volt, Specification Grade.
    - a. Single Pole  
Hubbell - HBL1221 series  
Leviton - 1221 series  
Pass & Seymour – 20 AC1 series

b. Three-Way

Hubbell - HBL1223 series  
Leviton - 1223 series  
Pass & Seymour – 20 AC3 series

B Duplex Receptacles - Specification Grade

1. 20 amp, 125 volt, specification grade, grounding type, straight blade, NEMA 5-20R-standard face.

Hubbell - HBL5352 series  
Leviton - 5352 series  
Pass & Seymour – 5362 series

C. Duplex Receptacles - Premium Grade

1. Ground fault interrupting, feed-thru type, 20 amp, 125 volt, heavy duty, premium specification grade, grounding type, straight blade, NEMA 5-20R.

Hubbell - GF-5352A series  
Leviton - 6598 series

## PART 3 - EXECUTION

### **3.01 INSTALLATION**

A. General

1. Refer to Symbol Schedule on drawings for mounting heights of devices. Unless otherwise noted, mounting heights indicated are to the center of device. Mounting heights not listed herein or on the drawings, shall be obtained from the Architect.
2. Unless otherwise noted, all wall mounted wiring devices shall be mounted vertically.
3. Lighting switches shall be installed so the upper position of switch handles shall be the "ON" position.
4. Unless otherwise noted or shown, switches and dimmers shall be located on the strike, knob, handle or push side of all doors, and shall be installed above finished floor (AFF) as indicated on the drawings, and not less than 4" or more than 18" horizontally from the door jamb.

5. Unless otherwise noted or shown, duplex receptacles shall be installed above finished floor (AFF) as indicated on drawings.
6. Unless otherwise noted, duplex receptacles shall be installed vertically with grounding pole up.
7. Unless otherwise noted or shown, receptacles designated as over counter shall be located with 1" clearance above the back-splash. This location shall be approved by the Architect prior to installation.
8. Double Duplex devices (two receptacles) shall be installed in minimum 2 gang boxes under one common cover and shall all be of same color.
9. Devices designated as weatherproof (by suffix WP) shall be corrosion resistant type and where shown outdoors shall be installed in heavy duty die cast aluminum boxes with lockable weatherproof "while in use" covers. Where shown indoors may be installed in standard outlet boxes with weatherproof covers. Outlet covers shall have a suitable style back plate for a specific receptacle(s) and have a clear hinged cover. The enclosure shall have cord exit ports to allow appropriate size electrical cords to exit outlet cover when receptacle(s) are activated. There shall be an equal number of ports in relation to the number of cords exiting the base of the outlet cover. The cover base shall have a latch which will engage the lid to properly maintain weatherproof integrity.

End of Section

## **SECTION 26 28 13**

## **FUSES**

### **PART 1 - GENERAL**

#### **1.01 DESCRIPTION**

- A. Related Work Specified Elsewhere
  - 1. Section 26 28 16.10 – Enclosed Switches and Circuit Breakers (Disconnect Switches)
- B. Requirements
  - 1. Low voltage fuses: 600 volts and less, for use with switches.

#### **1.02 QUALITY ASSURANCE**

- A. Acceptable Manufacturers
  - 1. Low voltage fuses: Busmann, Gould Shawmut, or Littelfuse.

### **PART 2 - PRODUCTS**

#### **2.01 GENERAL**

- A. Fuses shall be rated for the voltage at which they are applied.
- B. Fuses shall be dual element where required to allow for initial surges (motor starting, etc.) yet provide long-time protection at the level for which they are rated.
- C. Fuses shall have minimum interrupting ratings required for the location where they are applied.

#### **2.02 SERVICE ENTRANCE MAINS, FEEDERS AND BRANCH CIRCUITS**

- A. Circuits 600 Amps or less shall be protected by current-limiting fuses. Fuses shall hold 500% of rated current for a minimum of 10 seconds and shall be UL listed and CSA certified with an interrupting of 200,000 rms symmetrical amperes. Gould Shawmut AJT or equivalent.
- B. Motor and Motor Controller Protection – All individual motor circuits shall be protected by Class J or Class L time delay fuse as follows:
  - Class J – Gould Shawmut AJT or equivalent
  - Class L – Gould Shawmut A4BQ, A4BY, A4BT or equivalent

- C. Circuit breakers and Circuit Breaker Panels shall be protected by Class J or Class L fuses sized in accordance with Tested UL. Series rated combination published in the UL Recognized Component Directory. Fuses shall be as follows:
  - Class J – Gould Shawmut AJT or equivalent
  - Class L – Gould Shawmut A4BQ, A4By, A4BT or equivalent
- D. Control Circuits shall be protected by Class CC time delay.
  - Class CC – Gould Shawmut ATDR, ATQR or equivalent.

### PART 3 - EXECUTION

#### **3.01 INSTALLATION**

- A. Install quantity and type as required for device requiring fuses.
- B. Replace all fuses, which fail or are found to be defective during an inspection of all fuses.
- C. Supply one set of spare fuses for each fuse type and rating used on the project. The spare fuses shall be installed in a wall mounted cabinet neatly arranged in clips or holders. Mark the cabinet "Disconnect Switch Fuses", engraved in a plastic laminated nameplate.

End of Section

## **SECTION 26 28 16.10**

### **ENCLOSED SWITCHES AND CIRCUIT BREAKERS (DISCONNECT SWITCHES)**

#### PART 1 - GENERAL

##### **1.01 DESCRIPTION**

- A. Related Work Specified Elsewhere
  - 1. Section 26 28 13 - Fuses
- B. Requirements
  - 1. Individually mounted disconnect switches for protection of feeders and branch circuits.

##### **1.02 QUALITY ASSURANCE**

- A. Acceptable manufacturers - General Electric, Cutler-Hammer, Square-D and Siemens.
- B. Requirements of Regulatory Agencies
  - 1. Compliance with the following nationally recognized standards:
    - a. NEMA KS-1 - Enclosed Switches

##### **1.03 SUBMITTALS**

- A. Contractor submittals
  - 1. Include evidence of UL listing for each assembly with contractor submittals.

#### PART 2 - PRODUCTS

##### **2.01 DISCONNECT SWITCHES**

- A. General
  - 1. Switches shall be three-pole, three-pole double throw or six-pole heavy duty industrial type rated for the voltage at which they are applied. Provide a solid neutral bar for switches in 4-wire circuits.
  - 2. All switches shall have switch blades which are fully visible in the "off" position, when the door is open.
  - 3. Switches shall have a quick make and quick break operating feature and mechanism, and shall produce a true interlock to prevent opening the

switch cabinet while the switch handle is in the "on" position. The switch handle shall have provision for padlock.

4. Lugs shall be UL listed for copper and/or aluminum cables and front removable. Set screw type lugs are not acceptable for use with aluminum cables.
5. Switches shall be fusible or non-fusible as indicated on the drawings.
6. For fused switches, the fuses shall be the cartridge type, as specified elsewhere. The fuse sizes shall be as indicated on the drawings or as required for the application.
7. Each disconnect switch enclosure shall be equipped with a ground wire lug of suitable size brazed to the enclosure. Unless otherwise specified, the neutral bar (if required) shall be ungrounded.
8. Enclosures shall be suitable for the wiring methods of the area involved. Outdoor switches shall have a minimum of NEMA 3R enclosures.

### PART 3 - EXECUTION

#### **3.01 INSTALLATION**

- A. Install individually mounted and enclosed, and fused/unfused safety switches at approximate locations indicated on drawings in a readily accessible location with proper work space per N.E.C. Locate top of box at approximately 60" above finished floor unless otherwise noted. Arrangements resulting in top of handle at or above 6'-5" AFF are prohibited. Provide enclosures as appropriate for the location. Provide structural supports independent of stud partitions. Provide structural channel supports on masonry construction maintaining air space from wall/structure where exposed to moisture.

End of Section



**SECTION 26 28 16.20 ENCLOSED SWITCHES AND CIRCUIT BREAKERS  
(CIRCUIT BREAKERS)**

PART 1 - GENERAL

**1.01 DESCRIPTION**

- A. Related Work Specified Elsewhere
  - 1. Section 26 24 16 - Panelboards
  - 2. Refer to the Contract Drawings, Panel Schedules and Power Distribution Diagrams.
- B. Requirements
  - 1. Circuit breakers for protection of feeders and branch circuits both individually mounted and assembled in equipment assemblies.

**1.02 SUBSTITUTIONS**

- A. Refer to Section 26 00 10, "Substitutions".

**1.03 QUALITY ASSURANCE**

- A. Acceptable manufacturers - General Electric, Cutler-Hammer, Square-D and Siemens.
- B. Design criteria referred to herein are those of the acceptable manufacturers listed herein, and constitutes the type, quality and function of the equipment specified.
- C. Requirements of Regulatory Agencies
  - 1. UL 489

**1.04 SUBMITTALS**

- A. Contractor submittals shall include the following information:
  - 1. Label with UL listing for each device.
  - 2. Label with "AIC" rating for each device.
  - 3. Label with frame size and trip rating for each device.

**1.05 USE**

- A. Products specified in this section are applicable to Sections 26 24 16 as included in this specification.

PART 2 - PRODUCTS

## 2.01 MOLDED CASE CIRCUIT BREAKERS

- A. All circuit breakers shall be of the same manufacturer.
- B. All circuit breakers shall be fully rated. Series rated circuit breakers are not acceptable.
- C. All circuit breakers shall:
  - 1. Have an inverse time delay thermal magnetic element and an instantaneous magnetic trip element, in each phase, set to operate at 7 to 10 times the long time trip setting. Breakers shall be tungsten rated where used for incandescent loads.
  - 2. Be trip-free and meet UL requirements for non-interchangeability of ratings.
  - 3. Be provided with common trip feature for multiple breakers. No single pole breakers with handle ties will be accepted. All poles shall be mechanically interlocked to cause operation of all poles by any single pole unit.
  - 4. Have terminal lugs suitable and UL listed for the type of cable they feed.
  - 5. Have quick-make, quick-break over center switching mechanism. Automatically tripped units shall be self-indicating by a distinctive handle position.
  - 6. Have current rating label visible when breaker is installed.
  - 7. Have frame size, continuous current rating of trip unit, symmetrical short circuit current rating, poles, voltage rating, cable size, and accessories as indicated on Contract Drawings.
  - 8. Have the proper voltage rating for the application.
  - 9. Have interrupting ratings as indicated. Minimum shall be:
    - a. 120-208-240 volts: 10,000 amps RMS symm.
    - b. 277-480 volts: 14,000 amps RMS symm.
- D. Branch circuit breakers shall have ground fault trips where indicated (GFI).
- E. Circuit breakers for 100 ampere through 225 ampere branch circuit panelboards, for lighting and miscellaneous power, shall be thermal magnetic bolt-on or plug-in type.
- F. Circuit breakers for 225 ampere and larger power distribution panelboards and switchboards, shall be thermal magnetic bolt-on type.

- G. Circuit breakers, as indicated on the Contract Drawings, shall be equipped with 120 volt shunt-trip operating mechanism. Refer to Section 16160.
- H. Circuit breakers for panelboards and switchboards shall be of the following categories to meet the "AIC" requirements indicated on the Contract Drawings:
  - 1. Standard Frame Industrial
  - 2. High Interrupting Frame Industrial
  - 3. Current Limiting Frame
- I. Standard Frame Industrial and High Interrupting Frame Industrial.
  - 1. Molded case industrial line, single, two or three pole, with thermal-magnetic trip in each phase, and with or without interchangeable trips as indicated.
- J. Current Limiting Frame
  - 1. Two or three pole, with thermal-magnetic trip in each pole, and with coordinated current limiter in each phase to clear only high fault currents exceeding the capacity of the instantaneous unit. Blown limiter shall cause breaker to trip and prevent resetting until limiter is replaced. Limiter shall be self-indicating.

## **2.02 GROUND FAULT PROTECTION**

- A. Provide ground fault protection for the main protective and distribution devices, as indicated in the panel schedules on the drawings and as per NEC 230.95.
- B. Circuit breakers shall be provided with static sensors and trip devices, with ground fault protection being an integral part of the static sensor and trip device.
- C. Ground fault protection shall be "ZERO" sequence sensing, utilizing separate C.T.'s (or current sensors) in each ungrounded phase conductor.
- D. Trip Settings: Ground fault protective devices shall have adjustable trip setting for adjusting the trip level over a minimum ratio of 2:1. Trip levels shall be set as low as practicable, however, no lower than 25% of the circuit breaker over-current trip setting and not to exceed 1200 amperes. The ground fault trip level shall be adjustable with a current range of 25% to 50% of circuit breaker over-current trip setting, and not to exceed 1200 amperes.
- E. Time relay: Ground fault protective devices shall have adjustable time delay, with three (3) time delay bands.
- F. Ground fault protection shall be factory assembled within the equipment being protected.

## **2.03 SEPARATELY MOUNTED CIRCUIT BREAKERS**

- A. Circuit breakers shall be in an enclosure type to suit the wiring methods used in the areas involved. Outside mounted enclosed circuit breakers shall have NEMA 4 enclosures.
- B. Circuit breakers shall be of the amperage rating indicated on the Contract Drawings, with number of poles to suit the load being fed or controlled.
- C. Circuit breaker interrupting rating shall conform to the requirements for molded case circuit breakers specified herein, and shall be as indicated on the Contract Drawings. Voltage ratings shall suit the requirements of the circuit involved.
- D. Each breaker enclosure shall be equipped with a ground wire lug of suitable size brazed to the enclosure. Unless otherwise specified, the neutral bar (if required) shall be ungrounded.

### PART 3 - EXECUTION

#### **3.01 INSTALLATION**

- A. Install circuit breakers in assemblies as indicated.
- B. Install circuit breaker individually mounted and enclosed at approximate locations indicated on the Contract Drawings.
- C. Installation shall be in a readily accessible location with proper work space per NEC code requirements. Locate top of box at approximately 60" above floor unless otherwise noted. Arrangements resulting in top of handle at or above 6'-5" AFF are prohibited.
- D. Provide structural supports independent of stud partitions. Provide structural channel supports on masonry construction maintaining air space from wall/structure.

End of Section

## SECTION 26 51 00

## INTERIOR LIGHTING

### PART 1 - GENERAL

#### 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

#### AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR- CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 189.1	(2014) Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
ASHRAE 90.1 - IP	(2013) Energy Standard for Buildings Except Low-Rise Residential Buildings

#### Nonresidential Buildings

#### ILLUMINATING ENGINEERING SOCIETY (IES)

IES HB-10	(2011; Errata 2015) IES Lighting Handbook
IES LM-79	(2008) Electrical and Photometric Measurements of Solid-State Lighting Products
IES LM-80	(2015) Measuring Lumen Maintenance of LED Light Sources

#### NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA SSL 1	(2010) Electronic Drivers for Led Devices, Arrays, or Systems
NEMA SSL 3	(2011) High-Power White LED Binning for General Illumination
NEMA WD 1	(1999; R 2015) Standard for General Color Requirements for Wiring Devices

#### 1.2 RELATED REQUIREMENTS

Luminaires and accessories mounted on exterior surfaces of buildings are specified in Section 26 56 00 EXTERIOR LIGHTING.

### 1.3 DEFINITIONS

- a. Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, must be as defined in IEEE 100 and IES RP-16.
- b. For LED luminaire light sources, "Useful Life" is the operating hours before reaching 70 percent of the initial rated lumen output (L70) with no catastrophic failures under normal operating conditions. This is also known as 70 percent "Rated Lumen Maintenance Life" as defined in IES LM-80.
- c. For LED luminaires, "Luminaire Efficacy" (LE) is the appropriate measure of energy efficiency, measured in lumens/watt. This is gathered from LM-79 data for the luminaire, in which absolute photometry is used to measure the lumen output of the luminaire as one entity, not the source separately and then the source and housing together.
- d. Total harmonic distortion (THD) is the root mean square (RMS) of all the harmonic components divided by the total fundamental current.

### 1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.]

#### SD-02 Shop Drawings

Luminaire Drawings; G

Occupancy/Vacancy Sensor Coverage Layout; G

#### SD-03 Product Data

Luminaires; G

Light Sources; G

Drivers, Ballasts and Generators; G

LED Luminaire Warranty; G

Luminaire Design Data; G

Vacancy Sensors; G

LED Emergency Drivers; G

Occupancy Sensors; G

## 1.5 QUALITY CONTROL

### 1.5.1 Luminaire Drawings

Include dimensions, accessories, and installation and construction details. Photometric data, including zonal lumen data, average and minimum ratio, aiming diagram, and computerized candlepower distribution data must accompany shop drawings.

### 1.5.2 Occupancy/Vacancy Sensor Coverage Layout

Provide floor plans showing coverage layouts of all devices using manufacturer's product information.

### 1.5.3 LED Driver and Dimming Switch Compatibility Certificate.

Submit certification from the luminaire, driver, or dimmer switch manufacturer that ensures compatibility and operability between devices.

### 1.5.4 Occupancy/Vacancy Sensor Verification Tests

Submit test report outlining post-installation coverage and operation of sensors.

### 1.5.5 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products must have been in satisfactory commercial or industrial use for two years prior to bid opening. The two-year period must include applications of equipment and materials under similar circumstances and of similar size. The product must have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the two-year period. Where two or more items of the same class of equipment are required, these items must be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

### 1.5.6 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

### 1.5.7 Material and Equipment Manufacturing Date

Products manufactured more than six months prior to date of delivery to site must not be used, unless specified otherwise.

### 1.5.8 Energy Efficiency

Submit data indicating lumens per watt efficacy and color rendering index of light source.

## 1.6 WARRANTY

Support all equipment items by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

### 1.6.1 LED Luminaire Warranty

- a. Provide a written 5 year on-site replacement warranty for material, fixture finish, and workmanship. On-site replacement includes transportation, removal, and installation of new products.
  - (1) Include finish warranty to include failure and substantial deterioration such as blistering, cracking, peeling, chalking, or fading.
  - (2) Material warranty must include:
    - (a) All drivers.
    - (b) Replacement when more than 10 percent of LED sources in any lightbar or subassembly(s) are defective or non-starting.
- b. Warranty period must begin on date of beneficial occupancy. Provide the Contracting Officer with signed warranty certificates prior to final payment.

#### 1.6.1.1 Provide Luminaire Useful Life Certificate

Submit certification from the manufacturer indicating the expected useful life of the luminaires provided. The useful life must be directly correlated from the IES LM-80 test data using procedures outlined in IES TM-21. Thermal properties of the specific luminaire and local ambient operating temperature and conditions must be taken into consideration.

## PART 2 - PRODUCTS

### 2.1 LUMINAIRES

Provide luminaires as indicated in luminaire schedule. Provide luminaires complete with light sources of quantity, type, and wattage indicated. Provide all luminaires of the same type by the same manufacturer. Luminaires must be specifically designed for use with the driver, ballast or generator and light source provided.

### 2.2 LED Luminaires

Provide luminaires complete with power supplies (drivers) and light sources. Provide design information including lumen output and design life in luminaire schedule on project plans for LED luminaires.

LED luminaires must also meet the following minimum requirements:

- a. Luminaires must have a minimum 5 year manufacturer's warranty.



- b. Luminaires must have a minimum L70 lumen maintenance value of 50,000 hours as calculated by IES TM-21, with data obtained per IES LM-80 requirements.
- c. Luminaire drive current value must be identical to that provided by test data for luminaire in question.

#### 2.2.1 Luminaires for Hazardous Locations

In addition to requirements stated herein, provide [LED,][fluorescent,][HID,][induction] luminaires for hazardous locations which conform to UL 844 or which have Factory Mutual certification for the class and division indicated.

### 2.3 DRIVERS

#### 2.3.1 LED Drivers

NEMA SSL 1, UL 8750. LED drivers must be electronic, UL Class 1, constant-current type and comply with the following requirements:

- a. Output power (watts) and luminous flux (lumens) as shown in luminaire schedule for each luminaire type to meet minimum luminaire efficacy (LE) value provided.
- b. Power Factor (PF) greater than or equal to 0.9 over the full dimming range when provided.
- c. Current draw Total Harmonic Distortion (THD) of less than 20 percent.
- d. Class A sound rating.
- e. Operable at input voltage of 120-277 volts at 60 hertz.
- f. Minimum 5 year manufacturer's warranty.
- g. RoHS compliant.
- h. Integral thermal protection that reduces or eliminates the output power if case temperature exceeds a value detrimental to the driver.
- i. UL listed for dry or damp locations typical of interior installations.

### 2.4 LIGHT SOURCES

NEMA ANSLG C78.377, NEMA SSL 3. Provide type and wattage as indicated in luminaire schedule on project plans.

#### 2.4.1 LED Light Sources

- a. Correlated Color Temperature (CCT) as shown on drawings.
- b. Minimum Color Rendering Index (CRI) R9 value of 80.

#### 2.4.1.1 LED Retrofit T8 Tubes

Provide linear T8 tubular LED light sources to replace fluorescent light sources as indicated on drawings. Provide only where entire luminaires are not being replaced. Light sources must be compatible with existing instant-start or programmed-start ballasts and have the following requirements:

- a. Correlated Color Temperature (CCT) of 3500 degrees K.
- b. Total Harmonic Distortion (THD) less than 20 percent, with Power Factor (PF) greater than 90 percent.
- c. Minimum lumen per watt efficacy greater than 120.
- d. Minimum beam angle of 180 degrees.
- e. Minimum 5 year warranty.
- f. Minimum Color Rendering Index (CRI) of 80.

### 2.5 LIGHTING CONTROLS

#### 2.5.1 Sensors for Lighting Control

IEEE C62.41, NEMA WD 1, UL 94, UL 916, UL 508, ASTM D4674 REV A.

##### 2.5.1.1 Occupancy Sensors

Provide occupancy sensors with coverage patterns as indicated on project plans. Provide no less quantity of sensors as shown on plans, but add additional sensors when required to fulfill coverage requirement for the specific model sensor provided. Sensor must be provided with an adaptive learning function that automatically sets sensor in optimum calibration in a set period of time after installation and a non-volatile memory that saves settings after a power outage. Provide sensors designed for ceiling, wall or wall-box installation as indicated. Operating voltage must be 120[277] volts. Operating voltage must be 24V in conjunction with a control system or separate power pack which interacts with luminaire being controlled. Provide housing of high-impact, injection-molded thermoplastic with a multi-segmented lens for PIR and dual technology sensors. Sensor operation requires movement to activate luminaires controlled, and turns luminaires off after a set time of inactivity. Provide integral photocell mounted in occupancy sensor housing when indicated.]

##### 2.5.1.1.1 Passive Infrared (PIR) Sensors

Provide ceiling or wall-mounted PIR sensors meeting the following requirements:

- a. Temperature compensated, dual element sensor and a multi-element fresnel lens (Poly IR4 material).

- b. Technology to optimize automatic time delay to fit occupant usage patterns.
- c. No minimum load requirement for line voltage sensors and be capable of switching from zero to 800 W at 120 VAC, 50/60 Hz and from zero to 1200 W at 277 VAC, 50/60 Hz. Control voltage sensors must not exceed a maximum load requirement of 20 mA at 24VDC.
- d. Time delay of five to 30 minutes in increments of five minutes with a walk through and test mode set by DIP switch.
- e. LED indicator that remains active during occupancy.
- f. Built-in light level sensor that is operational from 0.8 to 18 lux 8 to 180 foot-candles.
- g. Coverage pattern tested to NEMA WD 7 standards.
- h. Standard five year warranty and be UL listed
- i. No leakage current to load when in the off mode.

#### 2.5.1.1.2 Ultrasonic Sensors

Provide ceiling-mounted ultrasonic sensors meeting the following requirements:

- a. Operate at an ultrasonic frequency of 25 kHz[40 kHz][\_\_\_\_\_].
- b. LED on exterior of device to indicate occupant detection.
- c. Adjustable time delay period of 15 seconds to 1 minutes.
- d. UL listed with minimum five year warranty.

#### 2.5.2 Dual Technology Sensors

Provide dual technology sensors that meet the requirements for PIR sensors and ultrasonic sensors indicated above. If either the passive infrared or ultrasonic sensing registers occupancy, the luminaires must remain on.

##### 2.5.2.1 Power Packs for Sensors

UL 2043, CEC Title 24, ASHRAE 90.1 - IP. Power packs used to provide power to one or more lighting control sensors must meet the following requirements:

- a. Input voltage - 120-277 VAC; output voltage - 24 VDC at 225 mA.
- b. Plenum-rated, high-impact thermoplastic enclosure.
- c. Utilizes zero-crossing circuitry to prevent damage from inrush current.
- d. Maximum load rating of 16 amps for electronic lighting loads.
- e. RoHS compliant.

### 2.5.3 Vacancy Sensors

Provide vacancy sensors as indicated above under paragraph OCCUPANCY SENSORS, but with requirement of a manual operation to activate luminaires controlled. Provide automatic operation to turn luminaires off after a set period of inactivity. Provide LED emergency driver with automatic power failure detection, test switch and LED indicator (or combination switch/indicator) located on luminaire exterior, and fully-automatic solid-state charger, battery and inverter integral to a self-contained housing. Provide self-diagnostic function integral to emergency driver. Integral nickel-cadmium battery is required to supply a minimum of 90 minutes of emergency power at 10 watts, 50 VDC [compatible with LED forward voltage requirements], constant output. Driver must be RoHS compliant, rated for installation in plenum-rated spaces and damp locations, and be warranted for a minimum of five years.

### 2.6 Self-Diagnostic Circuitry for LED Emergency Drivers

Provide emergency lighting unit with fully-automatic, integral self-testing/diagnostic electronic circuitry. Circuitry must provide for a one minute diagnostic test every 28 days, and a 30 minute diagnostic test every six months, minimum. Any malfunction of the unit must be indicated by LED(s) visible from the exterior of the luminaire. A manual test switch must also be provided to perform a diagnostic test at any given time.

### 2.7 Straps

Galvanized steel, 25 by 4.76 mm one by 3/16 inch, conforming to ASTM A653/A653M, with a light commercial zinc coating or ASTM A1008/A1008M with an electrodeposited zinc coating conforming to ASTM B633, Type RS.

### 2.8 POWER HOOK LUMINAIRE HANGERS

UL 1598 Provide an assembly consisting of through-wired power hook housing, interlocking plug and receptacle, power cord, and luminaire support loop. Power hook housing must be cast aluminum having two 19 mm 3/4 inch threaded hubs. Support hook must have safety screw. Fixture support loop must be cast aluminum with provisions for accepting 19 mm 3/4 inch threaded stems. Power cord must include 410 mm 16 inches of 3 conductor No. 16 Type SO cord. Assembly must be rated 120 volts or 277 volts, 15 amperes.

### 2.9 EQUIPMENT IDENTIFICATION

#### 2.9.1 Manufacturer's Nameplate

Each item of equipment must have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

### 2.10 FACTORY APPLIED FINISH

Provide all luminaires and lighting equipment with factory-applied painting system that as a minimum, meets requirements of NEMA 250 corrosion-resistance test.

## 2.11 RECESS- AND FLUSH-MOUNTED LUMINAIRES

Provide access to lamp and ballast from bottom of luminaire. Provide trim [and lenses]for the exposed surface of flush-mounted luminaires as indicated on project drawings and specifications.

## 2.12 SUSPENDED LUMINAIRES

Provide hangers capable of supporting twice the combined weight of luminaires supported by hangers. Provide with swivel hangers to ensure a plumb installation. Provide cadmium-plated steel with a swivel-ball tapped for the conduit size indicated. Hangers must allow fixtures to swing within an angle of 0.79 rad 45 degrees. Brace pendants 1219 mm 4 feet or longer to limit swinging. Single-unit suspended luminaires must have twin-stem hangers. Multiple-unit or continuous row luminaires must have a tubing or stem for wiring at one point and a tubing or rod suspension provided for each unit length of chassis, including one at each end. Provide rods in minimum 4.57 mm 0.18 inch diameter.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

Electrical installations must conform to IEEE C2, NFPA 70, and to the requirements specified herein. Install luminaires and lighting controls to meet the requirements of ASHRAE 90.1 - IP and ASHRAE 189.1. To encourage consistency and uniformity, install luminaires of the same manufacture and model number when residing in the same facility or building.

#### 3.1.1 Light Sources

When light sources are not provided as an integral part of the luminaire, deliver light sources of the type, wattage, lumen output, color temperature, color rendering index, and voltage rating indicated to the project site and install just prior to project completion, if not already installed in the luminaires from the factory.

#### 3.1.2 Luminaires

Set luminaires plumb, square, and level with ceiling and walls, in alignment with adjacent luminaires and secure in accordance with manufacturers' directions and approved drawings. Installation must meet requirements of NFPA 70. Mounting heights specified or indicated must be to the bottom of the luminaire for ceiling-mounted luminaires and to center of luminaire for wall-mounted luminaires. Obtain approval of the exact mounting height on the job before commencing installation and, where applicable, after coordinating with the type, style, and pattern of the ceiling being installed. Recessed and semi-recessed luminaires must be independently supported from the building structure by a minimum of four wires, straps or rods per luminaire and located near each corner of the luminaire. Ceiling grid clips are not allowed as an alternative to independently supported luminaires. Round luminaires or luminaires smaller in size than the ceiling grid must be independently supported from the building structure by a minimum of four wires, straps or rods per luminaire, spaced approximately equidistant around. Do not support luminaires by acoustical tile ceiling panels. Where luminaires of sizes less than the ceiling grid are indicated to be centered in the acoustical panel, support each independently and provide at least two 19 mm 3/4 inch metal

channels spanning, and secured to, the ceiling tees for centering and aligning the luminaire. Provide wires, straps, or rods for luminaire support in this section. Luminaires installed in suspended ceilings must also comply with the requirements of Section 09 51 00 ACOUSTICAL CEILINGS.

### 3.1.3 Suspended Luminaires

Provide suspended luminaires with 0.79 rad 45 degree swivel hangers so that they hang plumb and level. Locate so that there are no obstructions within the 0.79 rad 45 degree range in all directions. The stem, canopy and luminaire must be capable of 0.79 rad 45 degree swing. Pendants, rods, or chains 1.2 meters 4 feet or longer excluding luminaire must be braced to prevent swaying using three cables at 2.09 rad 120 degree separation. Suspended luminaires in continuous rows must have internal wireway systems for end to end wiring and must be properly aligned to provide a straight and continuous row without bends, gaps, light leaks or filler pieces. Utilize aligning splines on extruded aluminum luminaires to assure minimal hairline joints. Support steel luminaires to prevent "oil-canning" effects. Luminaire finishes must be free of scratches, nicks, dents, and warps, and must match the color and gloss specified. Match supporting pendants with supported luminaire. Aircraft cable must be stainless steel. Canopies must be finished to match the ceiling and must be low profile unless otherwise shown. Maximum distance between suspension points must be 3.1 meters 10 feet or as recommended by the manufacturer, whichever is less.

### 3.1.4 Drivers

Typically, provide drivers integral to luminaire as constructed by the manufacturer.

### 3.1.7 Occupancy/Vacancy Sensors

Provide testing of sensor coverage in all spaces where sensors are placed. This should be done only after all furnishings (carpet, furniture, workstations, etc.) have been installed. Provide quantity of sensor units indicated as a minimum. Provide additional units to give full coverage over controlled area. Full coverage must provide hand and arm motion detection for office and administration type areas and walking motion for industrial areas, warehouses, storage rooms and hallways. Locate the sensor(s) as indicated and in accordance with the manufacturer's recommendations to maximize energy savings and to avoid nuisance activation and deactivation due to sudden temperature or airflow changes and usage.

End of Section

## SECTION 26 56 00

## EXTERIOR LIGHTING

### PART 1 – GENERAL

#### 1.1 DESCRIPTION

This section specifies the furnishing, installation, and connection of exterior fixtures, poles, and supports. The terms “lighting fixtures”, “fixture” and “luminaire” are used interchangeably.

#### 1.2 RELATED WORK

- A. Section 26 05 19, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low voltage power and lighting wiring.
- B. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
- C. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings, and boxes for raceway systems.

#### 1.3 SUBMITTALS

- A. Submit in accordance with Paragraph, SUBMITTALS in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, and the following requirements:
  - 1. Shop Drawings:
    - a. Submit the following information for each type of lighting fixture designated on the LIGHTING FIXTURE SCHEDULE, arranged in order of lighting fixture designation.
    - b. Material and construction details, include information on housing and optics system.
    - c. Physical dimensions and description.
    - d. Wiring schematic and connection diagram.
    - e. Installation details.
    - f. Energy efficiency data.
    - g. Photometric data based on laboratory tests complying with IES Lighting Measurements testing and calculation guides.
    - h. Lamp data including lumen output (initial and mean), color rendition index (CRI), rated life (hours), and color temperature (degrees Kelvin).
    - i. For LED lighting fixtures, submit US DOE LED Lighting Facts label, and IES L70 rated life.
    - k. Submit site plan showing all exterior lighting fixtures with fixture tags consistent with Lighting Fixture Schedule as shown on drawings. Site plan shall show computer generated point-by-point illumination calculations. Include lamp lumen and light loss factors used in calculations.

2. Manuals:
  - a. Submit, simultaneously with the shop drawings, complete maintenance and operating manuals, including technical data sheets, wiring diagrams, and information for ordering replacement parts.
  - b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.
3. Certifications: Two weeks prior to final inspection, submit the following.
  - a. Certification by the Contractor that the exterior lighting systems have been properly installed and tested.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

Provide manufacturer's standard provisions for protecting pole finishes during transport, storage, and installation. Do not store poles on ground. Store poles so they are at least 305 mm (12 inches) above ground level and growing vegetation. Do not remove factory-applied pole wrappings until just before installing pole.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL REQUIREMENTS**

Luminaires, materials and equipment shall be in accordance with NEC, UL, ANSI, and as shown on the drawings and specified.

#### **2.2 POLES**

- A. General:
  1. Poles shall be as shown on the drawings, and as specified. Finish shall be as specified on the drawings.
  2. The pole and arm assembly shall be designed for wind loading of 100 mph minimum, as required by wind loading conditions at project site, with an additional 30% gust factor and supporting luminaire(s) and accessories such as shields, banner arms, and banners that have the effective projected areas indicated. The effective projected area of the pole shall be applied at the height of the pole base, as shown on the drawings.
  3. Poles shall be anchor-bolt type designed for use with underground supply conductors. Poles shall have handhole having a minimum clear opening of 65 x 125 mm (2.5 x 5 inches). Handhole covers shall be secured by stainless steel captive screws.
  4. Provide a steel-grounding stud opposite handhole openings, designed to prevent electrolysis when used with copper wire.
  5. Provide a base cover that matches the pole in material and color to conceal the mounting hardware pole-base welds and anchor bolts.
  6. Hardware and Accessories: All necessary hardware and specified accessories shall be the product of the pole manufacturer.



7. Provide manufacturer's standard finish, as scheduled on the drawings. Where indicated on drawings, provide finishes as indicated in Section 09 06 00, SCHEDULE FOR FINISHES.

B. Types:

1. Aluminum: Provide round aluminum poles manufactured of corrosion-resistant AA AAH35.1 aluminum alloys conforming to AASHTO LTS-4. Poles shall be seamless extruded or spun seamless type.

## 2.3 FOUNDATIONS FOR POLES

- A. Foundations shall be cast-in-place concrete, having 3000 psi minimum 28-day compressive strength.
- B. Foundations shall support the effective projected area of the specified pole, arm(s), luminaire(s), and accessories, such as shields, banner arms, and banners, under wind conditions previously specified in this section.
- C. Place concrete in spirally-wrapped treated paper forms for round foundations, and construct forms for square foundations.
- D. Rub-finish and round all above-grade concrete edges to approximately 6 mm (0.25-inch) radius.
- E. Anchor bolt assemblies and reinforcing of concrete foundations shall be as shown on the drawings. Anchor bolts shall be in a welded cage or properly positioned by the tie wire to stirrups.
- F. Prior to concrete pour, install electrode per Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

## 2.4 LUMINAIRES

- A. Luminaires shall be weatherproof, heavy duty, outdoor types designed for efficient light utilization, adequate dissipation of lamp and ballast heat, and safe cleaning and relamping.
- B. Illumination distribution patterns, BUG ratings and cutoff types as defined by the IESNA shall be as shown on the drawings.
- C. Incorporate ballasts in the luminaire housing, except where otherwise shown on the drawings.
- D. Lenses shall be frame-mounted, heat-resistant, borosilicate glass, with prismatic refractors, unless otherwise shown on the drawings. Attach the frame to the luminaire housing by hinges or chain. Use heat and aging-resistant, resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- E. Pre-wire internal components to terminal strips at the factory.
- F. Bracket-mounted luminaires shall have leveling provisions and clamp-type adjustable slip-fitters with locking screws.
- H. Materials shall be rustproof. Latches and fittings shall be non-ferrous metal.

- I. Provide manufacturer's standard finish, as scheduled on the drawings. Where indicated on drawings, match finish process and color of pole or support materials
- J. Luminaires shall carry factory labels, showing complete, specific lamp and ballast information.

## **2.5 LAMPS**

- A. LED sources shall meet the following requirements:
  - 1. Operating temperature rating shall be between -40 degrees C (-40 degrees F) and 50 degrees C (120 degrees F).
  - 2. Correlated Color Temperature (CCT): 4000K
  - 3. Color Rendering Index (CRI):  $\geq 85$ .
  - 4. The manufacturer shall have performed reliability tests on the LEDs luminaires complying with Illuminating Engineering Society (IES) LM79 for photometric performance and LM80 for lumen maintenance and L70 life.
- B. Mercury vapor lamps shall not be used.

## **2.6 LED DRIVERS**

- A. LED drivers shall meet the following requirements:
  - 1. Drivers shall have a minimum efficiency of 85%.
  - 2. Starting Temperature: -40 degrees C (-40 degrees F).
  - 3. Input Voltage: 120 to 480 ( $\pm 10\%$ ) volt.
  - 4. Power Supplies: Class I or II output.
  - 5. Surge Protection: The system must survive 250 repetitive strikes of "C Low" (C Low: 6kV/1.2 x 50  $\mu$ s, 10kA/8 x 20  $\mu$ s) waveforms at 1-minute intervals with less than 10% degradation in clamping voltage. "C Low" waveforms are as defined in IEEE/ASNI C62.41.2-2002, Scenario 1 Location Category C.
  - 6. Power Factor (PF):  $\geq 0.90$ .
  - 7. Total Harmonic Distortion (THD):  $\leq 20\%$ .
  - 8. Comply with FCC Title 47 CFR Part 18 Non-consumer RFI/EMI Standards.
  - 9. Drivers shall be reduction of hazardous substances (ROHS)-compliant.

## **2.7 EXISTING LIGHTING SYSTEMS**

- A. For modifications or additions to existing lighting systems, the new components shall be compatible with the existing systems.
- B. New poles and luminaires shall have approximately the same configurations, dimensions, lamping and reflector type as the existing poles and luminaires, except where otherwise shown on the drawings.

## PART 3 - EXECUTION

### **3.1 INSTALLATION**

- A. Install lighting in accordance with the NEC, as shown on the drawings, and in accordance with manufacturer's recommendations.
- B. Pole Foundations:
  - 1. Excavate only as necessary to provide sufficient working clearance for installation of forms and proper use of tamper to the full depth of the excavation. Prevent surface water from flowing into the excavation. Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath, and the end of conduit.
  - 2. Set anchor bolts according to anchor-bolt templates furnished by the pole manufacturer.
  - 3. Install poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.
  - 4. After the poles have been installed, shimmed, and plumbed, grout the spaces between the pole bases and the concrete base with non-shrink concrete grout material. Provide a plastic or copper tube, of not less than 9 mm (0.375-inch) inside diameter through the grout, tight to the top of the concrete base to prevent moisture weeping from the interior of the pole.
- C. Install lamps in each luminaire.
- D. Adjust luminaires that require field adjustment or aiming.

### **3.2 GROUNDING**

Ground noncurrent-carrying parts of equipment, including metal poles, luminaires, mounting arms, brackets, and metallic enclosures, as specified in Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS. Where copper grounding conductor is connected to a metal other than copper, provide specially-treated or lined connectors suitable and listed for this purpose.

### **3.3 ACCEPTANCE CHECKS AND TESTS**

Verify operation after installing luminaires and energizing circuits.

End of Section

## **SECTION 27 05 28**

## **PATHWAYS FOR COMMUNICATION SYSTEMS**

### **PART 1 - GENERAL**

#### **1.01 DESCRIPTION**

- A. The telephone conduit system shall consist of a complete conduit, outlet box and raceway system as shown on the drawings and as herein specified. This conduit system may be used for data wiring also. This Contractor shall provide and install all conduits, outlets, backboards, cabinets, etc. as shown on the drawings.
- B. Telephone and data cables, jacks, telephones, telephone equipment, etc. will be furnished and installed under another contract. This Contractor shall consult with the telephone installer before installation of the telephone conduits to coordinate their work.
- C. Provide in each conduit, a pull cord as specified elsewhere in this Specification.

### **PART 2 - INSTALLATION**

#### **2.01 GROUNDING**

- A. Install a #6 awg bare green ground wire in 3/4" plastic conduit from the building service entrance ground to the telephone equipment backboard. Where more than one telephone backboard exists, a common grounding conductor from the service entrance point to all equipment backboards shall be used.

#### **2.02 OUTLETS FOR TELEPHONES**

- A. All outlet boxes shall be 2-gang with 1-gang plaster cover. All outlets not used by the telephone installer, for telephones, shall be furnished with blank ivory cover plates to match wire device plates.

#### **2.03 CONDUITS FOR TELEPHONE OUTLETS**

- A. Furnish and install conduits from the outlet boxes, as indicated in the symbol schedule shown on the drawings or as otherwise noted.
- B. All conduit ends shall be terminated in bushings.

#### **2.04 SLEEVES**

- A. All sleeves shall be standard Schedule 40 PVC conduit and shall be of sizes shown on the Plans. All sleeves through exterior walls shall be sealed water tight using material similar in appearance to the surrounding materials. Sleeves through interior walls and floors shall be EMT. Provide fire stopping material in rated walls.

End of Section

**PART 1 GENERAL****1.2 SUMMARY**

Installation of new systems shall result in a complete, supervised fire alarm and mass notification reporting system configured in accordance with NFPA 72. Furnish equipment compatible and UL listed, FM approved, or approved or listed by a nationally recognized testing laboratory in accordance with the applicable NFPA standards.

**1.2.1 Scope**

- a. This work includes completion of design and providing a new fire alarm and mass notification system as described herein and on the contract drawings for Administration Building, Allied Trades, Electronics Building, Auto Service Building, Unheated Storage Building, Hazardous Materials Storage and SMD Building. Include in the system wiring, raceways, pull boxes, terminal cabinets, outlet and mounting boxes, control equipment, alarm, and supervisory signal initiating devices, alarm notification appliances, supervising station fire alarm system transmitter, and other accessories and miscellaneous items required for a complete operating system even though each item is not specifically mentioned or described. Provide system[s] complete and ready for operation.
- b. Provide equipment, materials, installation, workmanship, inspection, and testing in strict accordance with the required and advisory provisions of NFPA 72, ISO 7240-16, IEC 60268-16, except as modified herein. Submit plan view drawing showing device locations, terminal cabinet locations, junction boxes, other related equipment, conduit routing, wire counts, circuit identification in each conduit, and circuit layouts for all floors. Drawings shall comply with the requirements of NFPA 170. Final quantity, system layout, and coordination are the responsibility of the Contractor.
- c. Where remote fire alarm control units are needed, they shall be provided at a terminal cabinet location. Each remote fire alarm control unit shall be powered from a wiring riser specifically for that use or from a local emergency power panel located on the same floor as the remote fire alarm control unit. Where remote fire control units are provided, equipment for notification appliances may be located in the remote fire alarm control units.

**1.3 REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. The edition of each reference that is effective of the date of contracting, shall apply to this specification. Where this specification conflicts with the references shown below, DOE Order 420.1C and DOE Standard 1066 shall govern.

**ACOUSTICAL SOCIETY OF AMERICA (ASA)**

ASA S3.2

Method for Measuring the Intelligibility of Speech Over Communication Systems (ASA 85)

ASME INTERNATIONAL (ASME)

ASME A17.1/CSA B44                      Safety Code for Elevators and Escalators

CALIFORNIA BUILDING STANDARDS COMMISSION

CALIFORNIA BUILDING CODE              California Title 24 Part 2, California Building Code (CBC)

CALIFORNIA ELECTRICAL CODE          California Title 24 Part 3, California Electrical Code (CEC)

CALIFORNIA FIRE CODE                  California Title 24, Part 9, California Fire Code (CFC)

CAL FIRE – OFFICE OF THE STATE FIRE MARSHAL

BML    Building Materials Listing Service

FM GLOBAL (FM)

FM APP GUIDE                              FM Approval Guide

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

IEC 60268-16                                Sound System Equipment - Part 16: Objective Rating Of Speech Intelligibility By Speech Transmission Index

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 7240-16                                 Fire Detection And Alarm Systems — Part 16: Sound System Control And Indicating Equipment

ISO 7240-19                                 Fire Detection and Alarm Systems — Part 19: Design, Installation, Commissioning and Service of Sound Systems for Emergency Purposes

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70                                        National Electrical Code

NFPA 72                                        National Fire Alarm and Signaling Code

NFPA 80                                        Standard for Fire Doors and other Opening Protectives

NFPA 90A                                      Standard for the Installation of Air Conditioning and Ventilating Systems

NFPA 90B Standard for the Installation of Warm Air Heating and Air Conditioning Systems

NFPA 101 Life Safety Code

#### UNDERWRITERS LABORATORIES (UL)

UL 1480 Standard for Speakers for Fire Alarm, Emergency, and Commercial and Professional Use

UL 1638 Visual Signaling Appliances - Private Mode Emergency and General Utility Signaling

UL 1971 Signaling Devices for the Hearing Impaired

UL 2017 General-Purpose Signaling Devices and Systems

UL 268 Smoke Detectors for Fire Alarm Systems

UL 464 Standard for Audible Signal Appliances

UL 521 Heat Detectors for Fire Protective Signaling Systems

UL 864 Standard for Control Units and Accessories for Fire Alarm Systems

UL Electrical Construction Electrical Construction Equipment Directory

UL Fire Protection Directory Fire Protection Equipment Directory

#### UNITED STATES DEPARTMENT OF ENERGY (DOE)

DOE-O-420.1c Facility Safety  
DOE-STD-1066 Fire Protection

### 1.4 DEFINITIONS

Wherever mentioned in this specification or on the drawings, the equipment, devices, and functions shall be defined as follows:

#### 1.4.1 Interface Device

An addressable device that interconnects hard wired systems or devices to an analog/addressable system.

#### 1.4.2 Remote Fire Alarm and Mass Notification Control Unit

A control panel, electronically remote from the fire alarm and mass notification control panel, that receives inputs from automatic and manual fire alarm devices; may supply power to

detection devices and interface devices; may provide transfer of power to the notification appliances; may provide transfer of condition to relays or devices connected to the control unit; and reports to and receives signals from the fire alarm control panel.

#### 1.4.3 Fire Alarm Control Unit and Mass Notification Autonomous Control Unit (FMCP)

A master control panel having the features of a fire alarm and mass notification control unit and fire alarm and mass notification control units are interconnected. The panel has central processing, memory, input and output terminals, and [LCD, LED Display units].

#### 1.4.4 Local Operating Console (LOC)

A unit designed to allow emergency responders and/or building occupants to operate the MNS including delivery or recorded and/or live messages, initiate strobe and textural visible appliance operation and other relayed functions.

#### 1.4.5 Terminal Cabinet

A steel cabinet with locking, hinge-mounted door in which terminal strips are securely mounted.

### 1.5 SUBMITTALS

University and LBNL Fire Marshal approval is required for all fire protection equipment submittals. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### Drawings

- Shop Drawings
- Nameplates
- Instructions
- Wiring Diagrams
- System Layout
- System Operation
- Initiating Devices
- Visual and Audible Notification Appliances
- Amplifiers

#### Product Data

All products used for this project shall be submitted to the University for review and approval by the University and LBNL Fire Marshal prior to the start of construction. Products to submit shall include, but are not limited to:

- Technical Data And Computer Software
- Fire Alarm Control Unit and Mass Notification Control Unit (FMCP)
- LCD, LED Display Unit (VDU)
- Terminal cabinets
- Manual stations
- Batteries



- Battery chargers
- Smoke detectors
- Heat detectors
- Visual and Audible Notification appliances
- Addressable interface devices
- Amplifiers
- Tone generators
- Digitalized voice generators
- Remote Fire Alarm/Mass Notification Control Units

#### Design Data

- Battery power
- Battery chargers

#### Test Reports

- Field Quality Control
- Testing Procedures
- Smoke sensor testing procedures

#### Certificates

- Installer
- Formal Inspection and Tests
- Final Testing

#### Manufacturer's Field Reports

- System Operation
- Fire Alarm/Mass Notification System

#### Operation and Maintenance Data

- Operation and Maintenance (O&M) Instructions

#### Closeout Submittals

- As-Built Drawings

### **1.6 TECHNICAL DATA AND COMPUTER SOFTWARE**

Technical data and computer software (meaning technical data that relates to computer software) that are specifically identified in this project, and may be defined/required in other specifications, shall be delivered, strictly in accordance with the CONTRACT CLAUSES. Identify data delivered by reference to the particular specification paragraph against which it is furnished. Data to be submitted shall include complete system, equipment, and software descriptions. Descriptions shall show how the equipment will operate as a system to meet the performance requirements of this contract. The data package shall also include the following:

- a. Identification of programmable portions of system equipment and capabilities.
- b. Description of system revision and expansion capabilities and methods of implementation detailing both equipment and software requirements.
- c. Provision of operational software data on all modes of programmable portions of the fire alarm and detection system.
- d. Description of Fire Alarm and Mass Notification Control Panel equipment operation.
- e. Description of auxiliary and remote equipment operations.
- f. Library of application software.
- g. Operation and maintenance manuals.

## **1.7 QUALITY ASSURANCE**

Provide a complete new system. Contractor shall use existing conduit system. The system shall be a non-proprietary system.

- a. In NFPA publications referred to herein, consider advisory provisions to be mandatory, as though the word "shall" had been substituted for "should" wherever it appears; interpret reference to "authority having jurisdiction" to mean the LBNL Fire Marshal's Office.
- b. The recommended practices stated in the manufacturer's literature or documentation shall be considered as mandatory requirements.
- c. Devices and equipment for fire alarm service shall be listed by UL Fire Prot Dir or approved by FM APP GUIDE.

### **1.7.1 Qualifications**

#### **1.7.1.1 Design Services**

Installations requiring completion of installation drawings and specification or modifications of fire detection, fire alarm, mass notification system, or fire suppression systems shall require the services and review of a qualified engineer. For the purposes of meeting this requirement, a qualified engineer is defined as a registered professional engineer (P.E.) in Fire Protection Engineering in the State of Florida. The systems may be designed by a NICET Level IV Fire Alarm Design professional; however, a review and approval from a licensed Fire Protection Engineer.

#### **1.7.1.2 Supervisor**

A NICET Level III Fire Alarm Technician with a minimum of eight years of experience shall supervise the installation of the fire alarm system/mass notification system. The Fire Alarm technicians supervising the installation of equipment shall be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

#### 1.7.1.3 Technician

Fire Alarm Technicians shall be a NICET Level II technician, with a minimum of four years of experience may be utilized to install and terminate fire alarm/mass notification devices, cabinets and panels. The Fire Alarm technicians installing the equipment shall be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

#### 1.7.1.4 Installer

A NICET Level II technician may assist in the installation of fire alarm/mass notification devices, cabinets and panels. An electrician shall install wire, cable, conduit and backboxes for the fire alarm system/mass notification system. The Fire Alarm installer shall be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings. The electrical foreman shall be a certified California Fire/Life Safety technician, from the Division of Apprenticeship Standards

#### 1.7.1.5 Apprentice Electricians

All apprentice level electricians shall be certified and possess a current State of California Electrical Trainee certification.

#### 1.7.1.6 Test Personnel

Fire Alarm Technicians with a minimum of eight years of experience (NICET Level III) shall be utilized to test and certify the installation of the fire alarm/mass notification devices, cabinets and panels. The Fire Alarm technicians testing the equipment shall be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

#### 1.7.1.7 Manufacturer's Representative

The fire alarm and mass notification equipment manufacturer's representative shall be present for the connection of wiring to the control panel. The Manufacturer's Representative shall be an employee of the manufacturer with necessary technical training (NICET Level III) on the system being installed.

#### 1.7.1.8 Manufacturer

Components shall be of current design and shall be in regular and recurrent production at the time of installation. Provide design, materials, and devices for a protected premises fire alarm system, complete, conforming to NFPA 72, except as otherwise or additionally specified herein.

### 1.7.2 Regulatory Requirements

#### 1.7.2.1 Requirements for Fire Protection Service

Equipment and material shall have been tested by UL and listed in UL Fire Prot Dir or approved by FM and listed in FM APP GUIDE. Additionally, all equipment must be currently listed in the Building Materials Listing, maintained by the California Office of the State Fire

Marshal (CA OSFM). Where the terms "listed" or "approved" appear in this specification, they shall mean listed in either the UL Fire Prot Dir or the FM APP GUIDE; and the CA OSFM. The omission of these terms under the description of any item of equipment shall not be construed as waiving this requirement. All listings or approval by testing laboratories shall be from an existing ANSI or UL published standard.

#### 1.7.2.2 Fire Alarm/Mass Notification System

Furnish equipment that is compatible and is either UL listed and/or FM approved; with all equipment being listed by the CA OSFM. All listings by testing laboratories shall be from an existing ANSI or UL published standard. Submit a unique identifier for each device, including the control panel and initiating and indicating devices, with an indication of test results, and signature of the factory-trained technician of the control panel manufacturer and equipment installer. With reports on preliminary tests, include printer information. Include the NFPA 72 Record of Completion and NFPA 72 Inspection and Testing Form, with the appropriate test reports.

### 1.8 DELIVERY, STORAGE, AND HANDLING

Protect equipment delivered and placed in storage from the weather, humidity, temperature variation, dirt and dust, and other contaminants.

## **PART 2 PRODUCTS**

### 2.1 MATERIALS AND EQUIPMENT

Submit annotated catalog data as required in the paragraph SUBMITTAL, in table format on the drawings, showing manufacturer's name, model, voltage, and catalog numbers for equipment and components. Submitted shop drawings shall not be smaller than ISO A1.

#### 2.1.1 Standard Products

Provide materials, equipment, and devices that have been tested by a nationally recognized testing laboratory, such as UL or FM Approvals, and listed or approved for fire protection service when so required by NFPA 72 or this specification. All equipment must be compatible with a Siemens XLS system, and the existing LBNL Fire Alarm network.

#### 2.1.2 Nameplates

Major components of equipment shall have the manufacturer's name, address, type or style, model or serial number, catalog number, date of installation, installing Contractor's name and address, and the contract number provided on a new plate permanently affixed to the item or equipment. Major components include, but are not limited to, the following:

- a. FMCPs
- b. Automatic transmitter/transceiver
- c. Terminal Cabinet

Furnish nameplate illustrations and data to obtain approval by the University before installation. Obtain approval by the University for installation locations. Nameplates shall be etched metal or plastic, permanently attached by screws to panels or adjacent walls.

### 2.1.3 Keys

Keys and locks for equipment shall be identical. Provide six (6) copies of all keys. Contractor to verify key code with LBNL Fire Alarm department.

## 2.2 GENERAL PRODUCT REQUIREMENT

All fire alarm and mass notification equipment shall be listed for use under the applicable reference standards.

## 2.3 SYSTEM OPERATION

The Addressable Interior Fire Alarm and Mass Notification System shall be a complete, supervised, noncoded, addressable fire alarm and mass notification system conforming to NFPA 72, UL 864, and UL 2017. The system shall be activated into the alarm mode by actuation of any alarm initiating device. The system shall remain in the alarm mode until the initiating device is reset and the control panel is reset and restored to normal. The system may be placed in the alarm mode by local microphones, LOC, or remotely from authorized locations/users.

Submit data on each circuit to indicate that there is a minimum of 25 percent spare capacity for notification appliances, and a minimum of 25 percent spare capacity for initiating devices. Annotate data for each circuit on the drawings. Submit a complete description of the system operation in matrix format on the drawings. Submit a complete list of device addresses and corresponding messages.

### 2.3.1 Alarm Initiating Devices and Notification Appliances (Visual, Voice, Textual)

- a. Connect alarm initiating devices to Class "B" signal line circuits (SLC), and installed in accordance with NFPA 72.
- b. Connect alarm notification appliances and speakers to Class "B" notification appliance circuits (NAC) in accordance with NFPA 72.
- c. The system shall operate in the alarm mode upon actuation of any alarm initiating device or a mass notification signal. The system shall remain in the alarm mode until initiating device(s) or mass notification signal is/are reset and the control panel is manually reset and restored to normal. Audible, and visual appliances and systems shall comply with NFPA 72 and as specified herein. Fire alarm system/mass notification system components requiring power, except for the control panel power supply, shall operate on 24 Volts DC.

### 2.3.2 Functions and Operating Features

The system shall provide the following functions and operating features:

- a. The FMCP shall provide power, annunciation, supervision, and control for the system. Addressable systems shall be microcomputer (microprocessor or microcontroller) based with a minimum word size of eight bits with sufficient memory to perform as specified.
- b. Provide signaling line circuits for each floor.
- c. Provide signaling line circuits for the network.
- d. Provide notification appliance circuits (NAC) for each floor. The visual alarm notification appliances shall have the flash rates synchronized as required by NFPA 72.
- e. Provide electrical supervision of the primary power (AC) supply, presence of the battery, battery voltage, and placement of system modules within the control panel.
- f. Provide an audible and visual trouble signal to activate upon a single open condition, or ground fault. The trouble signal shall also operate upon loss of primary power (AC) supply, absence of a battery supply, low battery voltage, or removal of alarm or supervisory panel modules. Provide a trouble alarm silence feature that shall silence the audible trouble signal, without affecting the visual indicator. After the system returns to normal operating conditions, the trouble signal shall again sound until the trouble is acknowledged. A smoke sensor in the process of being verified for the actual presence of smoke shall not initiate a trouble condition.
- h. Provide programming to bypass the initiating devices, automatic notification appliance circuits, fire reporting system, air handler shutdown, elevator recall, door release, door unlocking features, and similar outputs. Each bypass shall control only one function. Bypasses controlling multiple actions are prohibited. Do not provide disconnect switches for the water flow initiating devices. Operation of this programming shall indicate this action on the FACP display and printer output.
- i. Alarm, supervisory, and/or trouble signals shall be automatically transmitted to Building 48, and to the LBNL monitoring service.
- j. Alarm functions shall override trouble or supervisory functions. Supervisory functions shall override trouble functions.
- k. The system shall be capable of being activated or de-activated from the panel's keyboard. Programmed information shall be stored in non-volatile memory.
- l. The system shall be capable of operating, supervising, and/or monitoring both addressable and non-addressable alarm and supervisory devices.
- m. There shall be no limit, other than maximum system capacity, as to the number of addressable devices, that may be in alarm simultaneously.
- n. Where the fire alarm/mass notification system is responsible for initiating an action in another emergency control device or system, such as an HVAC system releasing panel, the addressable fire alarm relay shall be in the vicinity of the emergency control device.
- o. An alarm signal shall automatically initiate the following functions:
  - (1) Transmission of an alarm signal to the supervising station

- (2) Visual indication of the device operated on the control panel (FACP/MNCP).  
Indication on a graphic annunciator shall be by floor, zone or circuit, and type of device.
  - (3) Continuous actuation of all alarm notification appliances.
  - (4) Recording of the event via electronically in the history log of the fire control system unit.
  - (5) Release of doors held open by electromagnetic devices.
  - (6) Operation of a duct smoke sensor shall shut down the appropriate air handler in accordance with NFPA 90A in addition to other requirements of this paragraph and as allowed by NFPA 72.
  - (7) Operation of a sprinkler waterflow switch serving an elevator machinery room or elevator shaft shall operate shunt trip circuit breaker(s) to shut down power to the elevators in accordance with ASME A17.1/CSA B44.
  - (8) Where required by personnel, activation of an interface, that operates vibrating pagers worn by hearing-impaired occupants.
- p. A supervisory signal shall automatically initiate the following functions:
- (1) Visual indication of the device operated on the FACP, and on the graphic annunciator, and sound the audible alarm at the respective panel.
  - (2) Transmission of a supervisory signal to the supervising station.
  - (3) Recording of the event electronically in the history log of the control unit.
- q. A trouble condition shall automatically initiate the following functions:
- (1) Visual indication of the system trouble on the FACP, [VDU,] and on the graphic annunciator, and sound the audible alarm at the respective panel.
  - (2) Transmission of a trouble signal to Building 48 and the LBNL supervising station.
  - (3) Recording of the event in the history log of the control unit.
- r. The maximum permissible elapsed time between the actuation of an initiating device and its indication at the FACP is 10 seconds.
- s. The maximum elapsed time between the occurrence of the trouble condition and its indication at the FACP is 200 seconds.

## 2.4 SYSTEM MONITORING

### 2.4.1 Valves

Each valve affecting the proper operation of a fire protection system, including automatic sprinkler control valves, sprinkler service entrance valve, and valves at backflow preventers, shall be electrically monitored to ensure its proper position. Provide each tamper switch with a separate address unless they are within the same room, then a maximum of five can use the same address.

### 2.4.2 Independent Fire Detection System

Each existing independent smoke detection subsystem, kitchen fire extinguishing system, and releasing system (e.g. pre-action systems, AFFF, or other types of fire suppression) shall be monitored both for the presence of an alarm condition and for a trouble condition. Provide each monitored condition with a separate address.

### 2.4.3 Stand-Alone Notification Systems

Where notification systems are provided for non-fire emergency situations (e.g. refrigeration alarms, toxic gas monitoring, radiation, etc.), those systems shall not be connected to the Fire Alarm/Mass Notification system unless directly required by this specification or contract documents.

## 2.5 MASS NOTIFICATION SYSTEM FUNCTIONS

### 2.5.1 Notification Appliance Network

The audible notification appliance network consists of speakers located to provide intelligible instructions at all locations in the building. The Mass Notification System announcements shall take priority over all other audible announcements of the system including the output of the fire alarm system in a normal or alarm state. When a mass notification announcement is activated during a fire alarm, all fire alarm system functions shall continue in an alarm state except for the output signals of the fire alarm audible and visual notification appliances.

### 2.5.2 Strobes

Provide unique strobes to alert hearing-impaired occupants. Mass Notification Strobes can be independent of the strobes for the Fire Alarm System, or can be a component of an emergency messaging notification type appliance that includes speakers, fire alarm strobes, and mass notification strobes.

### 2.5.3 Text Displays

LED text displays (textual visible appliances) for hearing impaired occupants. The textual displays shall be programmable and shall display the same content of the voice message being played. The signs shall be able to provide a minimum of 100 mm 4 inch high letters and be located in high traffic areas easily seen by building occupants. The system shall interface with the Programmable sign controller to activate the proper message.

### 2.5.4 Wide Area MNS



If Wide Area MNS system components are in the area of the building, they shall not be activated by the in-building MNS.

#### 2.5.5 Voice Notification

An autonomous voice notification control unit is used to monitor and control the notification appliance network and provide consoles for local operation. Using a console, personnel in the building can initiate delivery of pre-recorded voice messages, provide live voice messages and instructions, and initiate visual strobe and optional textual message notification appliances. The autonomous voice notification control unit will temporarily override audible fire alarm notification while delivering Mass Notification messages to ensure they are intelligible.

#### 2.5.6 Installation-Wide Control

If an installation-wide control system for mass notification exists, the autonomous control unit shall communicate with the central control unit of the installation-wide system. The autonomous control unit shall receive commands/messages from the central control unit and provide status information.

### 2.6 OVERVOLTAGE AND SURGE PROTECTION

#### 2.6.1 Signaling Line Circuit Surge Protection

For systems having circuits located outdoors, communications equipment shall be protected against surges induced on any signaling line circuit and shall comply with the applicable requirements of IEEE C62.41.1 and IEEE C62.41.2. Cables and conductors that serve as communications links shall have surge protection circuits installed at each end that meet the following waveform(s):

- a. A 10 microsecond by 1000 microsecond waveform with a peak voltage of 1500 volts and a peak current of 60 amperes.
- b. An 8 microsecond by 20 microsecond waveform with a peak voltage of 1000 volts and a peak current of 500 amperes. Protection shall be provided at the equipment.

Fuses shall not be used for surge protection.

#### 2.6.2 Sensor Wiring Surge Protection

Digital and analog inputs and outputs shall be protected against surges induced by sensor wiring installed outdoors and as shown. The inputs and outputs shall be tested with the following waveform[s]:

- a. A 10 by 1000 microsecond waveform with a peak voltage of 1500 volts and a peak current of 60 amperes.
- b. An 8 by 20 microsecond waveform with a peak voltage of 1000 volts and a peak current of 500 amperes. Fuses shall not be used for surge protection.

Fuses shall not be used for surge protection.

## 2.7 ADDRESSABLE INTERFACE DEVICES

The initiating device being monitored shall be configured as Class "B." The system shall be capable of defining any module as an alarm module and report alarm trouble, loss of polling, or as a supervisory module, and reporting supervisory short, supervisory open or loss of polling such as waterflow switches, valve supervisory switches, independent smoke detection systems, relays for output function actuation, etc. The module shall be UL or FM listed as compatible with the control panel. The monitor module shall provide address-setting means compatible with the control panel's SLC supervision and store an internal identifying code. Monitor module shall contain an integral LED that flashes each time the monitor module is polled and is visible through the device cover plate. Pull stations with a monitor module in a common backbox are not required to have an LED.

## 2.8 ADDRESSABLE CONTROL MODULE

The control module shall be capable of operating as a relay (dry contact form C) for interfacing the control panel with other systems, and to control door holders or initiate elevator fire service. The module shall be UL or FM listed as compatible with the control panel. The indicating device or the external load being controlled shall be configured as a Class "B" notification appliance circuits. The system shall be capable of supervising, audible, visual and dry contact circuits. The control module shall have both an input and output address. The supervision shall detect a short on the supervised circuit and shall prevent power from being applied to the circuit. The control model shall provide address-setting means compatible with the control panel's SLC supervision and store an internal identifying code. The control module shall contain an integral LED that flashes each time the control module is polled and is visible through the device cover plate. Control Modules shall be located in environmental areas that reflect the conditions to which they were listed.

## 2.9 ISOLATION MODULES

Provide isolation modules to subdivide each signaling line circuit into groups of not more than 20 addressable devices between adjacent isolation modules.

## 2.10 SMOKE DETECTORS

### 2.10.1 Photoelectric Smoke Detectors

Provide addressable photoelectric smoke detectors as follows:

- a. Provide addressable photoelectric smoke detectors utilizing the photoelectric light scattering principle for operation in accordance with UL 268. Smoke Detectors shall be listed for use with the fire alarm control panel.
- b. Provide self-restoring type detectors that do not require any readjustment after actuation at the FACP to restore them to normal operation. Detectors shall be UL listed as smoke-automatic fire sensors.
- c. Provide twist lock bases for the sensors. The sensors shall maintain contact with their bases without the use of springs. Provide companion mounting base with screw

terminals for each conductor. Terminate field wiring on the screw terminals. The sensor shall have a visual indicator to show actuation.

- d. The detector address shall identify the particular unit, its location within the system, and its sensitivity setting. Detectors shall be of the low voltage type rated for use on a 24 VDC system.
- e. An operator at the control panel, having a proper access level, shall have the capability to manually access the following information for each initiating device.
  - (1) Primary status
  - (2) Device type
  - (3) Present average value
  - (4) Present sensitivity or obscuration selected
  - (5) Sensor range (normal, dirty, etc.)

#### 2.10.2 Ionization Type Smoke Detectors

Provide addressable ionization type smoke Detectors as follows:

- a. Provide analog smoke detectors that operate on the ionization principle and are actuated by the presence of visible or invisible products of combustion. Smoke sensors shall be listed for use with the fire alarm control panel.
- b. Provide self-restoring type detectors that do not require any readjustment after actuation at the FACP to restore them to normal operation. Detectors shall be UL or FM listed as smoke-automatic fire sensors.
- c. Provide twist lock bases for the detectors. The detectors shall maintain contact with their bases without the use of springs. Provide companion mounting base with screw terminals for each conductor. Terminate field wiring on the screw terminals. The detector shall have a visual indicator to show actuation.
- d. The detector address shall identify the particular unit, its location within the system, and its sensitivity setting. Detectors shall be of the low voltage type rated for use on a 24 VDC system.
- e. An operator at the control panel, having a proper access level, shall have the capability to manually access the following information for each initiating device.
  - (1) Primary status
  - (2) Device type
  - (3) Present average value
  - (4) Present sensitivity selected

- (5) Sensor range (normal, dirty, etc.)
- (6) Sensitivity adjustments for smoke detectors.

### 2.10.3 Duct Smoke Detectors

Duct-mounted photoelectric smoke detectors shall be furnished and installed where indicated and in accordance with NFPA 90A. Units shall consist of a smoke detector, mounted in a special housing fitted with duct sampling tubes. It is not permitted to cut the duct insulation to install the duct detector directly on the duct. Detectors shall have a manual reset. Detectors shall be rated for air velocities that are utilized in the project. Detectors shall be powered from the fire alarm panel.

- a. Sampling tubes shall run the full width of the duct. The duct detector package shall conform to the requirements of NFPA 90A, UL 268A, and shall be UL listed for use in air-handling systems. The control functions, operation, reset, and bypass shall be controlled from the fire alarm control panel.
- b. All duct smoke detectors and dampers controlled by duct detectors shall be installed and maintained in an accessible manner. Do not obstruct duct detectors or duct dampers.
- c. Lights to indicate the operation and alarm condition; and the test and reset buttons shall be visible and accessible with the unit installed and the cover in place. Remote indicators shall be provided where required by NFPA 72 and these shall be provided with test and reset switches.
- d. Remote lamps and switches as well as the affected fan units shall be properly identified in etched plastic placards. Detectors shall provide for control of auxiliary contacts that provide control, interlock, and shutdown functions as required. Auxiliary contacts provide for this function shall be located within 3 feet of the controlled circuit or appliance. The detectors shall be supplied by the fire alarm system manufacturer to ensure complete system compatibility.

### 2.10.5 Air Sampling Smoke Detectors

These units shall be programmable in multiple levels to indicate detection of particles that are not normally present, to indicate the presence of particle that could be produced by a fire and to indicate the presence of particles of the proper size and quantity to indicate that fire conditions exists. All detector units shall be installed in a readily accessible location, to provide for system testing and access.

### 2.10.6 Smoke Detector Testing

Smoke sensors shall be tested in accordance with NFPA 72 and manufacturer's recommended calibrated test method. Submit smoke sensor testing procedures for approval. In addition to the NFPA 72 requirements, smoke detector sensitivity shall be tested during the preliminary tests.

## 2.11 HEAT DETECTORS

### 2.11.1 Heat Detectors

Heat detectors shall be designed for detection of fire by combination fixed temperature and rate-of-rise principle [The alarm condition shall be determined by comparing sensor value with the stored values. Heat detector spacing shall be rated in accordance with UL 521.

Detectors located in areas subject to moisture, exterior atmospheric conditions, or hazardous locations as defined by NFPA 70 shall be types approved for such locations.

#### 2.11.1.1 Combination Fixed-Temperature and Rate-of-Rise Detectors

Detectors shall be designed for surface outlet box mounting and supported independently of wiring connections. Contacts shall be self-resetting after response to rate-of-rise principle. Under fixed temperature actuation, the detector shall have a permanent external indication that is readily visible. Detector units located in boiler rooms, showers, or other areas subject to abnormal temperature changes shall operate on fixed temperature principle only. The UL 521 test rating for the fixed temperature portion shall be as shown on contract drawings. The UL 521 test rating for the Rate-of-Rise detectors shall be rated for 50 by 50 feet.

#### 2.11.2 Operator Access

An operator at the control panel, having the proper access level, shall have the capability to manually access the following information for each heat sensor:

- a. Primary status
- b. Device type
- c. Present average value
- d. Sensor range

#### 2.11.3 Operator Control

An operator at the control panel, having the proper access level, shall have the capability to manually control the following information for each heat sensor:

- a. Alarm detection sensitivity values
- b. Enable or disable the point/device
- c. Control sensors relay driver output

## 2.12 ELECTRIC POWER

### 2.12.1 Primary Power

Power shall be 120 VAC service for the FMCP from the AC service to the building in accordance with NFPA 72.

## 2.13 SECONDARY POWER SUPPLY

Provide for system operation in the event of primary power source failure. Transfer from normal to auxiliary (secondary) power or restoration from auxiliary to normal power shall be automatic and shall not cause transmission of a false alarm.

Where secondary/alternative power is provided to the building (e.g. Emergency, Stand-By, Backup), the Fire Alarm/ Mass Notification System shall be connected to the secondary/alternative power source. This will provide for continual operation of the system during scheduled electrical shut downs. This is in addition to battery backup or battery-supplied power to the system.

### 2.13.1 Batteries

Provide sealed, maintenance-free, batteries as the source for emergency power to the FMCP. Batteries shall contain suspended electrolyte. The battery system shall be maintained in a fully charged condition by means of a solid state battery charger. Provide an automatic transfer switch to transfer the load to the batteries in the event of the failure of primary power.

#### 2.13.1.1 Capacity

Battery size shall be the greater of the following two capacities.

- a. Sufficient capacity to operate the fire alarm system under supervisory and trouble conditions, including audible trouble signal devices for 24 hours and audible and visual signal devices under alarm conditions for an additional 15 minutes in accordance with NFPA 72.
- b. Sufficient capacity to operate the mass notification system under supervisory and trouble conditions, including audible trouble signal devices for 24 hours and audible and visual signal devices under alarm conditions for an additional 15 minutes in accordance with NFPA 72.

#### 2.15.1.2 Battery Power Calculations

- a. Verify that battery capacity exceeds supervisory and alarm power requirements.
  - (1) Substantiate the battery calculations for alarm, trouble, and supervisory power requirements. Include ampere-hour requirements for each system component and each panel component, and compliance with UL 864.
  - (2) Provide complete battery calculations for alarm, trouble, and supervisory power requirements. Submit ampere-hour requirements for each system component with the calculations.
  - (3) A voltage drop calculation to indicate that sufficient voltage is available for proper operation of the system and all components, at the minimum rated voltage of the system operating on batteries.

- b. For battery calculations use the following assumptions: Assume a starting voltage of 24 VDC for starting the calculations to size the batteries. Calculate the required Amp-Hours for the specified standby time, and then calculate the required Amp-Hours for the specified alarm time. Calculate the nominal battery voltage after operation on batteries for the specified time period. Using this voltage perform a voltage drop calculation for circuit containing device and/or appliances remote from the power sources.

#### 2.13.2 Battery Chargers

Provide a solid state, fully automatic, variable charging rate battery charger. The charger shall be capable of providing 120 percent of the connected system load and shall maintain the batteries at full charge. In the event the batteries are fully discharged (20.4 Volts DC), the charger shall recharge the batteries back to 95 percent of full charge within 48 hours. Provide pilot light to indicate when batteries are manually placed on a high rate of charge as part of the unit assembly if a high rate switch is provided.

#### 2.14 FIRE ALARM CONTROL UNIT AND MASS NOTIFICATION CONTROL UNIT (FMCP)

Provide a complete control panel that is fully enclosed in a lockable steel cabinet as specified herein. Operations required for testing or for normal care and maintenance of the systems shall be performed from the front of the enclosure. If more than a single unit is required at a location to form a complete control panel, the unit cabinets shall match exactly.

- a. Each control unit shall provide power, supervision, control, and logic for the entire system, utilizing solid state, modular components, internally mounted and arranged for easy access. Each control unit shall be suitable for operation on a 120 volt, 60 hertz, normal building power supply. Provide each panel with supervisory functions for power failure, internal component placement, and operation.
- b. Visual indication of alarm, supervisory, or trouble initiation on the fire alarm control panel shall be by liquid crystal display or similar means with a minimum of 80 characters. The mass notification control unit shall have the capability of temporarily deactivate the fire alarm audible notification appliances while delivering voice messages.
- c. Provide secure operator console for initiating recorded messages, strobes and displays; and for delivering live voice messages. Provide capacity for at least eight pre-recorded messages. Provide the ability to automatically repeat pre-recorded messages. Provide a secure microphone for delivering live messages. Provide adequate discrete outputs to temporarily deactivate fire alarm audible notification, and initiate/synchronize strobes. Provide a complete set of self-diagnostics for controller and appliance network. Provide local diagnostic information display and local diagnostic information and system event log file.

##### 2.14.1 Cabinet

Install control panel components in cabinets large enough to accommodate all components and also to allow ample gutter space for interconnection of panels as well as field wiring. The enclosure shall be identified by an engraved laminated phenolic resin nameplate. Lettering on the nameplate shall say "Fire Alarm and Mass Notification Control Panel" and shall not be less than 1 inch high. Provide prominent rigid plastic or metal identification plates for lamps,

circuits, meters, fuses, and switches. The cabinet shall be provided in a sturdy steel housing, complete with back box, hinged steel door with cylinder lock, and surface mounting provisions.

#### 2.14.2 Control Modules

Provide power and control modules to perform all functions of the FACP. Provide audible signals to indicate any alarm, supervisory, or trouble condition. The alarm signals shall be different from the trouble signal. Connect circuit conductors entering or leaving the panel to screw-type terminals with each terminal marked for identification. Locate diodes and resistors, if any, on screw terminals in the FACP. Circuits operating at 24 VDC shall not operate at less than the UL listed voltage at the sensor or appliance connected. Circuits operating at any other voltage shall not have a voltage drop exceeding 10 percent of nominal voltage

#### 2.14.3 Silencing Switches

##### 2.14.3.1 Alarm Silencing Switch

Provide an alarm silencing switch at the FMCP that shall silence the audible and visual. This switch shall be overridden upon activation of a subsequent alarm.

##### 2.14.3.2 Supervisory/Trouble Silencing Switch

Provide supervisory and trouble silencing switch that shall silence the audible trouble and supervisory signal, but not extinguish the visual indicator. This switch shall be overridden upon activation of a subsequent alarm, supervision, or trouble condition. Audible trouble indication must resound automatically every 24 hours after the silencing feature has been operated.

#### 2.14.4 Non-Interfering

Power and supervise each circuit such that a signal from one device does not prevent the receipt of signals from any other device. Circuits shall be manually reset by switch from the FACP after the initiating device or devices have been restored to normal.

#### 2.14.5 Audible Notification System

The Audible Notification System shall comply with the requirements of NFPA 72 for Emergency Voice/Alarm Communications System requirements ISO 7240-16, IEC 60268-16, except as specified herein. The system shall be a one-way multi-channel voice notification system incorporating user selectability of a minimum eight distinct sounds for tone signaling, and the incorporation of a voice module for delivery of prerecorded messages. Audible appliances shall produce a three-pulse temporal pattern for three cycles followed by a voice message that is repeated until the control panel is reset or silenced. Automatic messages shall be broadcast through speakers throughout the building/facility but not in stairs or elevator cabs. A live voice message shall override the automatic audible output through use of a microphone input at the control panel or the LOC.

- a. When using the microphone, live messages shall be broadcast throughout a selected floor or floors or all call. The system shall be capable of operating all speakers at the same



time. The microprocessor shall actively interrogate circuitry, field wiring, and digital coding necessary for the immediate and accurate rebroadcasting of the stored voice data into the appropriate amplifier input. Loss of operating power, supervisory power, or any other malfunction that could render the digitalized voice module inoperative shall automatically cause the code 3 temporal tone to take over all functions assigned to the failed unit in the event an alarm is activated.

- b. The Mass Notification functions shall override the manual or automatic fire alarm notification or Public Address (PA) functions. Other fire alarm functions including transmission of a signal(s) to the fire department shall remain operational. The system shall have the capability of utilizing LOC with redundant controls of the notification system control panel. Notification Appliance Circuits (NAC) shall be provided for the activation of strobe appliances. The activation of the NAC Circuits shall follow the operation of the speaker NAC circuits. Audio output shall be selectable for line level. Amplifier outputs shall be not greater than 100 watts RMS output. The strobe NAC Circuits shall provide at least 2 amps of 24 VDC power to operate strobes and have the ability to synchronize all strobes. A hand held microphone shall be provided and, upon activation, shall take priority over any tone signal, recorded message or PA microphone operation in progress, while maintaining the strobe NAC Circuits activation.

#### 2.14.5.1 Outputs and Operational Modules

All outputs and operational modules shall be fully supervised with on-board diagnostics and trouble reporting circuits. Provide form "C" contacts for system alarm and trouble conditions. Provide circuits for operation of auxiliary appliance during trouble conditions. During a Mass Notification event the panel shall not generate nor cause any trouble alarms to be generated with the Fire Alarm system.

#### 2.14.5.2 Mass Notification

- a. Mass Notification functions shall take precedence over all other function performed by the Audible Notification System. Messages shall utilize a male or female voice and shall be similar to the following:
  - (1) 1000 Hz tones as required by NFPA 72
  - (2) "May I have your attention please. May I have your attention please. A fire emergency has been reported in the building. Please leave the building by the nearest exit or exit stairway. Do not use the elevators." (Provide a 2 second pause.) "May I have your attention please, (repeat the message)."
- b. Include ALL installation specific messages in this section.
- c. The LOC shall incorporate a Push-To-Talk (PTT) microphone, redundant controls and system status indicators off/for the system. The unit shall incorporate microphone override of any tone generation or prerecorded messages. The unit shall be fully supervised from the control panel. The housing shall contain a latch (not lock).
- d. Auxiliary Input Module shall be designed to be an outboard expansion module to either expand the number of optional LOC's, or allow a telephone interface.

- e. LOC shall incorporate a Push-To-Talk (PTT) microphone, and controls to allow Public Address paging in the facility. The Public Address paging function shall not override any alarm or notification functions and shall be disabled by such signals. The microphone shall be handheld style. Systems that require field modification shall not be approved.
- f. When an installation has more than one LOC, the LOC's shall be programmed to allow only one LOC to be available for page or messaging at a time. Once one LOC becomes active, all other LOC's will have an indication that the system is busy (Amber Busy Light) and cannot be used at that time. This is to avoid two messages being given at the same time. Also, it must be possible to override or lockout the LOC's from the Master Command Panel (in accordance with NFPA 72.)

#### 2.14.6 Memory

Provide each control unit with non-volatile memory and logic for all functions. The use of long life batteries, capacitors, or other age-dependent devices shall not be considered as equal to non-volatile processors, PROMS, or EPROMS.

#### 2.14.7 Field Programmability

Provide control units and control panels that are fully field programmable for control, initiation, notification, supervisory, and trouble functions of both input and output. The system program configuration shall be menu driven. System changes shall be password protected and shall be accomplished using personal computer based equipment. Any proprietary equipment and proprietary software needed by qualified technicians to implement future changes to the fire alarm system shall be provided as part of this contract.

#### 2.14.8 Input/Output Modifications

The FMCP shall contain features that allow the bypassing of input devices from the system or the modification of system outputs. These control features shall consist of a panel mounted keypad and a keyboard. Any bypass or modification to the system shall indicate a trouble condition on the FMCP.

#### 2.14.9 Resetting

Provide the necessary controls to prevent the resetting of any alarm, supervisory, or trouble signal while the alarm, supervisory or trouble condition on the system still exists.

#### 2.14.10 Instructions

Provide a typeset printed or typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame. The card shall show those steps to be taken by an operator when a signal is received as well as the functional operation of the system under all conditions, normal, alarm, supervisory, and trouble. The instructions shall be approved by the University before being posted at the FMCP.

#### 2.14.11 Walk Test

The FACP shall have a walk test feature. When using this feature, operation of initiating devices shall result in limited system outputs, so that the notification appliances operate for

only a few seconds and the event is indicated on the system printer, but no other outputs occur.

#### 2.14.12 History Logging

In addition to the required printer output, the control panel shall have the ability to store a minimum of 400 events in a log. These events shall be stored in a battery-protected memory and shall remain in the memory until the memory is downloaded or cleared manually. Resetting of the control panel shall not clear the memory.

#### 2.15.1 Cabinet

Install remote control unit components in cabinets large enough to accommodate components and also to allow ample gutter space for interconnection of units as well as field wiring. The enclosure shall be identified by an engraved laminated phenolic resin nameplate. Lettering on the nameplate shall be labeled "Remote Fire Alarm/Mass Notification Control Unit" and shall not be less than one inch high. Provide prominent rigid plastic or metal identification plates for lamps, circuits, meters, fuses, and switches. The cabinet shall be provided in a sturdy steel housing, complete with back box, hinged steel door with cylinder lock (keyed the same as the FMCP), and surface mounting provisions.

#### 2.15.2 Control Modules

Provide power and control modules to perform all functions of the remote control unit. Provide audible signals to indicate any alarm or trouble condition. The alarm signals shall be different from the trouble signal. Connect circuit conductors entering or leaving the panel to screw-type terminals with each terminal marked for identification. Locate diodes and relays, if any, on screw terminals in the remote control unit. Circuits shall not have a voltage drop exceeding 10 percent of nominal voltage. Circuits shall be arranged so that there is 25 percent spare capacity for any circuit.

#### 2.15.3 Silencing Switches

Provide an alarm silencing switch at the remote control unit that shall silence the audible signal and extinguish the visual alarms. This switch shall be overridden upon activation of a subsequent alarm. Provide trouble and supervisory silencing switch that shall silence the audible trouble and supervisory signal, but not extinguish the visual indicator. This switch shall be overridden upon activation of a subsequent trouble or supervisory signal. Audible trouble indication must resound automatically every 24 hours after the silencing feature has been operated.

#### 2.15.4 Non-Interfering

Power and supervise each circuit such that a signal from one device does not prevent the receipt of signals from any other device. Circuits shall be manually resettable by switch from the remote control unit after the initiating device or devices have been restored to normal.

#### 2.15.5 Memory

Provide each control unit with non-volatile memory and logic for all functions. The use of long life batteries, capacitors, or other age-dependent devices shall not be considered as equal to non-volatile processors, PROMS, or EPROMS.

#### 2.15.6 Field Programmability

Provide control units that are fully field programmable for control, initiating, supervisory, and trouble functions of both input and output. The system program configuration shall be menu driven. System changes shall be password protected and shall be accomplished using personal computer based equipment. Any proprietary equipment and proprietary software needed by qualified technicians to implement future changes to the fire alarm system shall be provided as part of this contract.

#### 2.15.7 Input/Output Modifications

Each remote control unit shall contain features that allow the elimination of input devices from the system or the modification of system outputs. Any such modifications shall indicate a trouble condition on the remote control unit, the FACP, and a printed output of the trouble condition.

#### 2.15.8 Resetting

Provide the necessary controls to prevent the resetting of any alarm, supervisory, or trouble signal while the alarm, supervisory, or trouble condition on the system still exists.

#### 2.15.9 Instructions

Provide a typeset printed or typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame. Install the frame in a conspicuous location observable from the remote fire alarm control unit.[ Install the frame in a conspicuous location observable from the remote fire alarm control unit.] The card shall show those steps to be taken by an operator when a signal is received as well as the functional operation of the system under all conditions, normal, alarm, supervisory, and trouble. The instructions shall be approved by the University before being posted.

#### 2.15.10 Walk Test

Each remote control unit shall have a walk test feature. When using this feature, operation of initiating devices shall result in limited system outputs, so that the notification appliances operate for only a few seconds and the event is indicated on the system printer, but no other outputs occur.

#### 2.15.11 History Logging

In addition to the required printer output, the control panel shall have the ability to store a minimum of 1000 events in a log. These events shall be stored in a battery-protected memory and shall remain in the memory until the memory is downloaded or cleared manually. Resetting of the control panel shall not clear the memory.

### 2.16 AMPLIFIERS, PREAMPLIFIERS, TONE GENERATORS

Any amplifiers, preamplifiers, tone generators, digitalized voice generators, and other hardware necessary for a complete, operational, textual audible circuit conforming to NFPA 72 shall be housed in a remote FMCP, terminal cabinet, or in the FMCP. Submit data to indicate that the amplifiers have sufficient capacity to simultaneously drive all notification speakers at the maximum rating plus 50 percent spare capacity. Annotate data for each circuit on the drawings.

#### 2.16.1 Operation

The system shall automatically operate and control all building speakers except those installed in the stairs and within elevator cabs. The speakers in the stairs and elevator cabs shall operate only when the microphone is used to deliver live messages.

#### 2.16.2 Construction

Amplifiers shall utilize computer grade solid state components and shall be provided with output protection devices sufficient to protect the amplifier against any transient current up to 10 times the highest rated voltage in the system.

#### 2.16.3 Inputs

Equip each system with separate inputs for the tone generator, digitalized voice driver and panel mounted microphone Public Address Paging Function. Microphone inputs shall be of the low impedance, balanced line type. Both microphone and tone generator input shall be operational on any amplifier.

#### 2.16.4 Tone Generator

The tone generator shall be of the modular, plug-in type with securely attached labels to identify the component as a tone generator and to identify the specific tone it produces. The tone generator shall produce a three-pulse temporal pattern, and shall be constantly repeated until interrupted by either the digitalized voice message, the microphone input, or the alarm silence mode as specified. The tone generator shall be single channel with an automatic backup generator per channel such that failure of the primary tone generator causes the backup generator to automatically take over the functions of the failed unit and also causes transfer of the common trouble relay.

#### 2.16.5 Protection Circuits

Each amplifier shall be constantly supervised for any condition that could render the amplifier inoperable at its maximum output. Failure of any component shall cause automatic transfer to a designated backup amplifier, illumination of a visual "amplifier trouble" indicator on the control panel, appropriate logging of the condition on the system printer, and other actions for trouble conditions as specified.

### 2.18 ANNUNCIATOR

#### 2.18.1 Annunciator Panel

Where necessary, provide an annunciator that includes an LCD display. The display shall indicate the device in trouble/alarm or any supervisory device. Display the device name, address, and actual building location.

A building floor plan shall be provided mounted (behind plexiglass or similar protective material) at the annunciator location. The floor plan shall indicate all rooms by name and number including the locations of stairs and elevators. The floor plan shall show all devices and their programmed address to facilitate their physical location from the LCD display information.

## 2.18.2 Programming

Where programming for the operation of the annunciator is accomplished by a separate software program than the software for the FMCP, the software program shall not require reprogramming after loss of power. The software shall be reprogrammable in the field.

## 2.19 MANUAL STATIONS

Provide metal, semi-flush mounted, addressable manual stations which are ADA Compliant, and are not subject to operation by jarring or vibration. Stations shall be equipped with screw terminals for each conductor. Stations that require the replacement of any portion of the device after activation are not permitted. Stations shall be finished in fire-engine red with molded raised lettering operating instructions of contrasting color. The use of a key or wrench shall be required to reset the station. Manual stations shall be mounted in accordance with ADA mounting heights. Stations shall have a separate screw terminal for each conductor.

## 2.20 NOTIFICATION APPLIANCES

### 2.20.1 Fire Alarm/Mass Notification Speakers

Audible appliances shall conform to the applicable requirements of UL 464. Appliances shall be connected into notification appliance circuits. Surface mounted audible appliances shall be painted red or white, but consistent as chosen. Recessed audible appliances shall be installed with a grill that is painted with a factory finish to match the surface to which it is mounted.

- a. Speakers shall conform to the applicable requirements of UL 1480. Speakers shall have six different sound output levels and operate with audio line input levels of 70.7 VRMs and 25 VRMs, by means of selectable tap settings. Tap settings shall include taps of 1/8, 1/4, 1/2, 1, and 2 watt. Speakers shall incorporate a high efficiency speaker for maximum output at minimum power across a frequency range of 150 Hz to 10,000 Hz, and shall have a sealed back construction. Speakers shall be capable of installation on standard 4 inch square electrical boxes. Where speakers and strobes are provided in the same location, they may be combined into a single unit. All inputs shall be polarized for compatibility with standard reverse polarity supervision of circuit wiring via the FMCP.
- b. Provide speaker mounting plates constructed of cold rolled steel having a minimum thickness of 16 gauge or molded high impact plastic and equipped with mounting holes and other openings as needed for a complete installation. Fabrication marks and holes

shall be ground and finished to provide a smooth and neat appearance for each plate. Each plate shall be primed and painted.

- c. Speakers shall utilize screw terminals for termination of all field wiring.

## 2.20.2 Visual Notification Appliances

Visual notification appliances shall conform to the applicable requirements of UL 1971. Fire Alarm Notification Appliances shall have clear high intensity optic lens, xenon flash tubes, and be marked "Fire" in red letters. Strobe candela shall be as required for the spacing of the device, and in accordance with NFPA 72. Strobe shall be surface or semi-flush mounted. Where more than two appliances are located in the same room or corridor or field of view, provide synchronized operation in accordance with NFPA 72. Devices shall use screw terminals for all field wiring.

## 2.21 CIRCUITS AND WIRING

### 2.21.1 Circuits

All fire alarm circuits shall be Class B (Pathway Survivability Level 1) as defined in NFPA 72. All terminations shall be made upon screw compression terminal blocks. Wire nuts shall not be permitted. Each conductor shall be clearly labeled as to its specific circuit using machine-generated labels.

- a. Provide fire alarm circuit conductors with insulation color coded as follows. The color code of the wiring shall not be transposed.
- b. Power Branch Circuit Conductors' Color Code:
  - Phase 'A': Black
  - Phase 'B': Red
  - Phase 'C': Blue
  - Neutral: White
  - Ground: Green
- c. Detector Indicating Light, Violet and red
- d. Indication/Notification Appliance Circuit: Black (-) (in and out); White (+) (in and out). [Belden Cable #9527: Red and Yellow (positive); Black and Blue (negative).]
- e. Door Release: Gray (both conductors).
- f. Multiple pair cables shall be solid conductor, shall conform to ICEA color code chart #3, and shall be terminated on terminal blocks only.
- g. Fire/Smoke damper: Gray (both conductors).

### 2.21.2 Wiring

- a. The design shall specify fire alarm system conductors as required for the capacity of the intended circuit as substantiated in the shop drawing submittal.
- b. Provide all wiring in electrical metallic conduit, per the CEC and NFPA 70.
- c. Substitutions will be considered only when submitted in writing as part of the design submittal with corresponding compatibility data from the fire alarm system manufacturer.

## 2.22 FIRE ALARM NAMEPLATES AND COLOR CODE

### 2.22.1 Identification

Identify fire alarm equipment devices by means of 3/32 inch (3 mm) thick red laminated phenolic nameplate with white core. Engrave fire alarm panel identification using a minimum size of 1 inch (25 mm) character height, Helvetica style font. Device numbers shall be a minimum of 3/16 inch (5 mm) size and fire alarm zone numbers shall be 1/4 inch (7 mm) size. Attach nameplates with No. 4-36 RH nickel plated brass machine screws.

### 2.22.2 Covers

Box and conduit body covers shall be painted red

## PART 3 EXECUTION

### 3.1 INSTALLATION OF FIRE ALARM AND MASS NOTIFICATION SYSTEM

All initiating devices, notification appliances, panels, controls, and components of the fire alarm system that may need testing, maintenance or regular inspection shall be mounted with sufficient clearance for inspection, testing, and maintenance.

#### 3.1.1 FMCP

Locate the FMCP where indicated on contract drawings. Mount the enclosure with the top of the cabinet 6 feet above the finished floor or center the cabinet at 5 feet, whichever is lower. Conductor terminations shall be labeled and a drawing containing conductors, their labels, their circuits, and their interconnection shall be permanently mounted in the FMCP. All components of the control panels and associated batteries must be mounted in a readily accessible location, where access is available without the use of ladders, elevated platforms, or other associated equipment.

#### 3.1.2 Manual Stations

Locate manual stations as required by NFPA 72. Mount stations so that their operating handles are ADA Compliant. Mount stations so they are located no farther than 5 feet from the exit door they serve, measured horizontally.

#### 3.1.3 Notification Appliance Devices

Locate notification appliance devices as required by NFPA 72 and as specified by the project. Mount assemblies on walls or ceilings as required by NFPA 72 and to meet the intelligibility requirements.

#### 3.1.4 Smoke and Heat Detectors

Locate sensors as required by NFPA 72 and their listings.

#### 3.1.5 Water Flow Detectors and Tamper Switches



Connect all water flow alarm initiating devices and valve tamper switches to the FMCP.

### 3.1.6 Door Hold Devices

Mount outlet box for electric door hold devices to withstand 80 pounds (36.4 kg) of pulling force. The closer or magnetic door holder coil voltage shall be 24 VDC.

### 3.1.7 Local Operating Console (LOC)

Locate the LOC as required by NFPA 72.

### 3.1.8 Resistance

All wiring shall be checked and tested to ensure that there are no grounds, opens, or shorts. The minimum allowable resistance between two conductors or between conductors and grounds is 10 mega-ohms, as checked with a 50V mega-ohm meter. This test shall be made after conduit, wire, etc. are installed, but before alarm initiators are plugged in.

## 3.2 SYSTEM FIELD WIRING

### 3.2.1 Wiring within Cabinets, Enclosures, and Boxes

Provide wiring installed in a neat and workmanlike manner and installed parallel with or at right angles to the sides and back of any box, enclosure, or cabinet. Conductors that are terminated, spliced, or otherwise interrupted in any enclosure, cabinet, mounting, or junction box shall be connected to screw-type terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. The use of wire nuts or similar devices is prohibited. Conform wiring to NFPA 70.

Indicate the following in the wiring diagrams.

- a. Point-to-point wiring diagrams showing the points of connection and terminals used for electrical field connections in the system, including interconnections between the equipment or systems that are supervised or controlled by the system. Diagrams shall show connections from field devices to the FACP and remote fire alarm control units, initiating circuits, switches, relays and terminals.
- b. Complete riser diagrams indicating the wiring sequence of devices and their connections to the control equipment. Include a color code schedule for the wiring. Include floor plans showing the locations of devices and equipment.

### 3.2.2 Terminal Cabinets

Provide a terminal cabinet at the base of any circuit riser, on each floor at each riser, and where indicated on the drawings. Terminal size shall be appropriate for the size of the wiring to be connected. Conductor terminations shall be labeled and a drawing containing conductors, their labels, their circuits, and their interconnection shall be permanently mounted in the terminal cabinet. Minimum size is 8 inches by 8 inches. Only screw-type terminals are permitted.

### 3.2.3 Alarm Wiring

Voltages shall not be mixed in any junction box, housing, or device, except those containing power supplies and control relays. Provide all wiring in electrical metallic conduit. Initiating and notification devices wiring shall be installed in separate conduits.

Conceal conduit in finished areas of new construction and wherever practicable in existing construction. The use of flexible conduit not exceeding a 6 foot length shall be permitted in initiating device or notification appliance circuits.

### 3.2.4 Conductor Terminations

Solid conductors terminated at screwed connections of any type shall be formed about the screw shank in a clockwise direction. Stranded conductors shall be terminated with a pressure-applied lug connector, applied with a tool approved for the use by the lug connector manufacturer and the University.

Labeling of conductors at terminal blocks in terminal cabinets, FMCP, and remote FMCP and the LOC shall be provided at each conductor connection. Each conductor or cable shall have a shrink-wrap label to provide a unique and specific designation. Each terminal cabinet, FMCP, and remote FMCP shall contain a laminated drawing that indicates each conductor, its label, circuit, and terminal. The laminated drawing shall be neat, using 12 point lettering minimum size, and mounted within each cabinet, panel, or unit so that it does not interfere with the wiring or terminals. Maintain existing color code scheme where connecting to existing equipment.

### 3.2.5 End-Of-Line Devices

End-of-line devices, for either initiating or indicating/notification appliance circuits, shall be mounted only in a control panel or transmitter panel and shall be labeled as such.

## 3.3 FIRESTOPPING

Provide firestopping for holes at conduit penetrations through floor slabs, fire rated walls, partitions with fire rated doors, corridor walls, and vertical service shafts where required to maintain fire resistance rated assemblies in accordance with the CBC and CFC.

## 3.4 PAINTING

Paint exposed electrical, fire alarm conduit, and surface metal raceway to match adjacent finishes in exposed areas. Paint junction boxes red in unfinished areas and conduits and surface metal raceways shall be painted with a 1-inch wide red band every 10 feet in unfinished areas.

## 3.5 FIELD QUALITY CONTROL

### 3.5.1 Testing Procedures

Submit detailed test procedures, prepared and signed by a Registered Professional Engineer or a NICET Level III Fire Alarm Technician, and signed by representative of the installing company, for the fire detection and alarm system 30 days prior to performing system tests.

Detailed test procedures shall list all components of the installed system such as initiating devices and circuits, notification appliances and circuits, signaling line devices and circuits, control devices/equipment, batteries, transmitting and receiving equipment, power sources/supply, annunciators, special hazard equipment, emergency communication equipment, interface equipment, Guard's Tour equipment, and transient (surge) suppressors. Test procedures shall include sequence of testing, time estimate for each test, and sample test data forms. The test data forms shall be in a check-off format (pass/fail with space to add applicable test data; similar to the forms in NFPA 72) and shall be used for the preliminary testing and the acceptance testing. The test data forms shall record the test results and shall:

- a. Identify the NFPA Class of all Initiating Device Circuits (IDC), Notification Appliance Circuits (NAC), Voice Notification System Circuits (NAC Audio), and Signaling Line Circuits (SLC).
- b. Identify each test required by NFPA 72 Test Methods and required test herein to be performed on each component, and describe how this test shall be performed.
- c. Identify each component and circuit as to type, location within the facility, and unique identity within the installed system. Provide necessary floor plan sheets showing each component location, test location, and alphanumeric identity.
- d. Identify all test equipment and personnel required to perform each test (including equipment necessary for testing smoke detectors using real smoke).
- e. Provide space to identify the date and time of each test. Provide space to identify the names and signatures of the individuals conducting and witnessing each test.

### 3.5.2 Tests Stages

#### 3.5.2.1 Preliminary Testing

Conduct preliminary tests to ensure that devices and circuits are functioning properly. Tests shall meet the requirements of paragraph entitled "Minimum System Tests." After preliminary testing is complete, provide a letter certifying that the installation is complete and fully operable. The letter shall state that each initiating and indicating device was tested in place and functioned properly. The letter shall also state that panel functions were tested and operated properly. The letter shall include the names and titles of the witnesses to the preliminary tests. The Contractor and an authorized representative from each supplier of equipment shall be in attendance at the preliminary testing to make necessary adjustments.

#### 3.5.2.2 Request for Formal Inspection and Tests

When tests have been completed and corrections made, submit a signed, dated certificate with a request for formal inspection and tests to the LBNL Fire Marshal's Office.

#### 3.5.2.3 Final Testing

Notify the University in writing when the system is ready for final acceptance testing. Submit request for test at least 15 calendar days prior to the test date. The tests shall be performed in accordance with the approved test procedures in the presence of the University

representative. Furnish instruments and personnel required for the tests. A final acceptance test will not be scheduled until the following are provided at the job site:

- a. The systems manufacturer's technical representative
- b. Marked-up red line drawings of the system as actually installed
- c. Megger test results
- d. Loop resistance test results
- e. Complete program printout including input/output addresses

The final tests will be witnessed by the LBNL Fire Marshal's Office. At this time, any and all required tests shall be repeated at their discretion.

#### 3.5.2.4 System Acceptance

Following acceptance of the system, as-built drawings and O&M manuals shall be delivered to the University for review and acceptance. Submit six sets of detailed as-built drawings. The drawings shall show the system as installed, including deviations from both the project drawings and the approved shop drawings. These drawings shall be submitted within two weeks after the final acceptance test of the system. At least one set of as-built (marked-up) drawings shall be provided at the time of, or prior to the final acceptance test.

- a. Furnish one set of full size paper as-built drawings and schematics in ANSI D Size sheets (22 inches by 34 inches). Furnish one CD containing software back-up and CAD based drawings in latest version of AutoCAD of as-built drawings and schematics.
- b. Include complete wiring diagrams showing connections between devices and equipment, both factory and field wired.
- c. Include a riser diagram and drawings showing the as-built location of devices and equipment.

#### 3.5.3 Minimum System Tests

Test the system in accordance with the procedures outlined in NFPA 72. The required tests are as follows:

- a. Loop Resistance Tests: Measure and record the resistance of each circuit with each pair of conductors in the circuit short-circuited at the farthest point from the circuit origin. The tests shall be witnessed by a University representative and test results recorded for use at the final acceptance test.
- b. Verify the absence of unwanted voltages between circuit conductors and ground. The tests shall be accomplished at the preliminary test with results available at the final system test.

- c. Verify that the control unit is in the normal condition as detailed in the manufacturer's O&M manual.
- d. Test each initiating device and notification appliance and circuit for proper operation and response at the control unit. Smoke sensors shall be tested in accordance with manufacturer's recommended calibrated test method. Use of magnets is prohibited. Testing of duct smoke detectors shall comply with the requirements of NFPA 72. If there is a failure at these devices, then supervision shall be tested at each device.
- e. Test the system for specified functions in accordance with the contract drawings and specifications and the manufacturer's O&M manual.
- f. Test both primary power and secondary power. Verify, by test, the secondary power system is capable of operating the system for the time period and in the manner specified.
- g. Determine that the system is operable under trouble conditions as specified.
- h. Visually inspect wiring.
- i. Test the battery charger and batteries.
- j. Verify that software control and data files have been entered or programmed into the FACP. Hard copy records of the software shall be provided to the University.
- k. Verify that red-line drawings are accurate.
- l. Measure the current in circuits to ensure there is the calculated spare capacity for the circuits.
- m. Measure voltage readings for circuits to ensure that voltage drop is not excessive.
- n. Disconnect the verification feature for smoke sensors during tests to minimize the amount of smoke needed to activate the sensor. Testing of smoke sensors shall be conducted using real smoke or the use of canned smoke which is permitted.
- o. Measure the voltage drop at the most remote appliance (based on wire length) on each notification appliance circuit.

#### 3.5.3.1 Intelligibility Tests

Intelligibility testing of the System shall be accomplished in accordance with NFPA 72 for Voice Evacuation Systems. Following are the specific requirements for intelligibility tests:

- a. Intelligibility Requirements: Verify intelligibility by measurement after installation.
- b. Ensure that a CIS value greater than the required minimum value is provided in each area where building occupants typically could be found. The minimum required value for CIS is 0.7.

- c. Areas of the building provided with hard wall and ceiling surfaces (such as metal or concrete) that are found to cause excessive sound reflections may be permitted to have a CIS score less than the minimum required value if approved by the LBNL Fire Marshal's Office, and if building occupants in these areas can determine that a voice signal is being broadcast and they must walk no more than 33 feet to find a location with at least the minimum required CIS value within the same area.
- d. Areas of the building where occupants are not expected to be normally present are permitted to have a CIS score less than the minimum required value if personnel can determine that a voice signal is being broadcast and they must walk no more than 50 feet to a location with at least the minimum required CIS value within the same area.
- e. Take measurements near the head level applicable for most personnel in the space under normal conditions (e.g., standing, sitting, sleeping, as appropriate).
- f. The distance the occupant must walk to the location meeting the minimum required CIS value shall be measured on the floor or other walking surface as follows:
  - (1) Along the centerline of the natural path of travel, starting from any point subject to occupancy with less than the minimum required CIS value.
  - (2) Curving around any corners or obstructions, with a 12 inches clearance there from.
  - (3) Terminating directly below the location where the minimum required CIS value has been obtained.

Use commercially available test instrumentation to measure intelligibility as specified by ISO 7240-19 and ISO 7240-16 as applicable. Use the mean value of at least three readings to compute the intelligibility score at each test location.

#### 3.5.4 System Acceptance

- a. Procedure for the Acceptance Tests shall be submitted for University's approval. Tests shall be performed in the presence of a representative from the Fire Marshal's Office of the LBNL.
- b. The completed smoke detection system shall be tested to ensure that it is operating properly. The testing shall consist of exposing the installed smoke detection units to the standard test per requirements of NFPA 72.
- c. Acceptance of the system shall also require a demonstration of the operation and stability performance of the system. This shall be adequately demonstrated if the system operates for a ninety (90) day period without any unwarranted alarms. Should an unwarranted alarm(s) occur, the Subcontractor shall readjust or replace the detector(s) and begin another ninety (90) test period.
- d. As required by the University, the Subcontractor shall recheck the detectors using the installation standard test after each readjustment or replacement of detectors. This test shall not start until the University has obtained beneficial use of the building under test.

- e. If the requirements of the above paragraphs are not completed within one (1) year after beginning the tests described therein, the Subcontractor shall replace the system, and the process shall be repeated until acceptance of the equipment by the University.

### 3.6 OPERATION AND MAINTENANCE (O&M) INSTRUCTIONS

Submit two copies of the Operation and Maintenance Instructions, indexed and in booklet form. The Operation and Maintenance Instructions shall be a single volume or in separate volumes, and may be submitted as a Technical Data Package. Manuals shall be approved prior to training. The Interior Fire Alarm And Mass Notification System Operation and Maintenance Instructions shall include:

- a. Operating manual outlining step-by-step procedures required for system startup, operation, and shutdown. The manual shall include the manufacturer's name, model number, service manual, parts list, and complete description of equipment and their basic operating features.
- b. Maintenance manual listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guide. The manuals shall include conduit layout, equipment layout and simplified wiring, and control diagrams of the system as installed.
- c. The manuals shall include complete procedures for system revision and expansion, detailing both equipment and software requirements.
- d. Software delivered for this project shall be provided, on each type of CD/DVD media utilized.
- e. Printouts of configuration settings for all devices.
- f. Formal operation and maintenance training shall be conducted by the vendor or manufacturer's representatives within two weeks of the date of activation of equipment. An outline of the proposed program shall be submitted for approval at least two weeks before date of commencement of training.

### 3.7 EXTRA MATERIALS

#### 3.7.1 Repair Service/Replacement Parts

Repair services and replacement parts for the system shall be available for a period of 10 years after the date of final acceptance of this work by the University. During guarantee period, the service technician shall be on-site within 24 hours after notification. All repairs shall be completed within 24 hours of arrival on-site.

#### 3.7.2 Interchangeable Parts

Spare parts furnished shall be directly interchangeable with the corresponding components of the installed system. Spare parts shall be suitably packaged and identified by nameplate, tagging, or stamping. Spare parts shall be delivered to the University at the time of the final acceptance testing.

### 3.7.3 Spare Parts

Furnish a minimum of one individual or five percent (whichever is greater) of spare parts for the following parts and accessories:

- a. Fuses for each fused circuit
- b. Each type of notification appliance in the system (e.g. speaker, FA strobe, MNS strobe, etc.)
- c. Each type of initiating device included in the system (e.g. smoke detector, thermal detector, manual station, etc.)

### 3.7.4 Special Tools

Software, connecting cables and proprietary equipment, necessary for the maintenance, testing, and reprogramming of the equipment shall be furnished to Camp Blanding.

End of Section