



CITY OF HOUSTON

INVITATION TO BID

Issued: *September 7, 2012*

Bid Opening:

REVISED 9/11/2012

Sealed bids, in duplicate, will be received by the City Secretary of the City of Houston, in the City Hall Annex, Public Level, 900 Bagby, Houston, Texas 77002 until **10:30 A.M. Thursday, October 4, 2012**, and all bids will be opened and publicly read in the City Council Chamber, City Hall Annex, Public Level, 900 Bagby at 11:00 A.M. on that date for the purchase of:

REMOVE, FURNISH AND INSTALL HEATING VENTILATION AND AIR CONDITIONING SYSTEMS AND ASSOCIATED EQUIPMENT FOR THE GENERAL SERVICES DEPARTMENT (PHASE II)

Invitation to Bid No. S50-C24374

NIGP Code: 031-67/914-50/941-55

Buyer:

Questions regarding this solicitation should be addressed to Arturo Lopez, Senior Procurement Specialist, at **832-393-8731** or e-mail to arturo.lopez@houstontx.gov.

Electronic Bidding:

In order to submit a bid for the items associated with this procurement, you must fill in the pricing information on the "PLACE BID" page.

Prebid Conference:

A Pre-Bid Conference will be held for all Prospective Bidders in the Strategic Purchasing Division, Concourse Level (Basement), Conference Room #1, City Hall, 901 Bagby, at 10:00 a.m. on Wednesday, September 19, 2012. The site visit will be scheduled at the pre-bid conference.

All Prospective Bidders are urged to be present. It is the bidder's responsibility to ensure that they have secured and thoroughly reviewed all aspects of the solicitation documents prior to the Pre-Bid Conference. Any revisions to be incorporated into this solicitation document arising from discussions before, during and subsequent to the Pre-Bid Conference will be confirmed in writing by Letter(s) of Clarification prior to the bid due date. Verbal responses will not otherwise alter the specifications, terms and conditions as stated herein.

Bidding forms, specifications, and all necessary information should be downloaded from the Internet at www.purchasing.houstontx.gov. By registering and downloading this solicitation document, all updates to this solicitation document will be automatically forwarded via e-mail to any registered bidders. This information may also be obtained from the Supplier Assistance Desk, Strategic Purchasing Division, 901 Bagby, Concourse Level, Houston, Texas 77002.

The place of the bid opening may be transferred in accordance with Paragraph (b), (5) of Section 15-3 of The Code of Ordinances, Houston, Texas. The bid-opening meeting may be rescheduled in accordance with Paragraph (b), (6) of said Section 15-3.

The City reserves the right to reject any or all bids, or to accept any bid or combination of bids deemed advantageous to it.

City employees are prohibited from bidding on this solicitation in accordance with the Code of Ordinances Section 15-1.

***CONTENTS:**

- A. OFFER
- B. SCOPE OF WORK/SPECIFICATIONS
- C. GENERAL, SUPPLEMENTARY CONDITIONS AND BOND FORMS

*NOTE 1: Actual page numbers for each section may change when the solicitation document is downloaded from the Internet or because of letters of clarification. Therefore, bidders must read the solicitation document in its entirety and comply with all the requirements set forth therein.

*NOTE 2: **To be considered for award please submit the electronic bid form and the forms listed in section A, including the signature page, which must be signed by a company official authorized to bind the company and a 10% Bid Bond.**

SECTION A



FORMAL ONE-TIME BID
REMOVE, FURNISH AND INSTALL HEAT VENTILATION AND AIR CONDITIONING SYSTEMS
AND ASSOCIATED EQUIPMENT FOR THE GENERAL SERVICES DEPARTMENT (PHASE II)
Bid No. S50-C24374
NIGP Code: 031-67/914-50/941-55

To The Honorable Mayor
and City Council Members
of the City of Houston, Texas (the "City"):

The undersigned hereby offers to provide services necessary to **Remove, Furnish and Install Heat Ventilation and Air Conditioning Systems and Associated Equipment at the Houston Police Department's Mid-West Command Station, located at 7277 Regency Square Blvd., Houston TX, 77036 for the General Services Department**, F.O.B. destination point Houston, Texas, in accordance with the City's Specifications and General Terms & Conditions and/or samples/drawings provided herein. When issued by the City of Houston, Letters of Clarification shall automatically become part of this bid document and shall supersede any previous specifications or provisions in conflict with Letters of Clarification. It is the responsibility of the bidder to ensure that it has obtained all such letters. By submitting a bid on this project, bidder shall be deemed to have received all Letters of Clarification and to have incorporated them into the bid.

The City may accept this bid offer by issuance of a Notice of Award Letter and/or a Purchase Order at any time on or before the 120th day following the day this Official Bid Form is opened by the City. This offer shall be irrevocable for 120 days after bid opening or for 90 days after City Council awards the bid, whichever comes last, but this period may be extended by written agreement of the parties.

The City reserves the right to INCREASE quantities during the twelve-month period following the issuance of the first purchase order subject to agreement in writing by the Prime Contractor/Supplier to honor the same bid price.

The City reserves the option, after bids are opened, to adjust the quantities listed on the electronic bid form upward or downward, subject to the availability of funds, and/or make award (s) on a line item basis.

SECTION A

Documents/forms must be downloaded from the City's Website
<http://www.houstontx.gov/purchasing/index.html>

Additional Required Forms to be Included with this bid:

In addition to the electronic Bid Form and the Official Signature Page, the Forms listed in Table 1 **must be completed and submitted to the Office of the City Secretary on or before the date and time the bid is due:**

Table 1
Affidavit of Ownership
Fair Campaign Ordinance
Statement of Residence
Conflict of Interest Questionnaire
Contractors References
Pay or Play Contract Compliance Acknowledgement Form
10% Bid Bond

Table 2 lists other documents and forms that should be viewed/downloaded from the City's website, but are not required to be submitted with the bid. The City will request these forms, as applicable, to be completed and submitted to the City by the recommended/successful bidder:

Table 2
Formal Instructions for Bid Terms
Drug Forms
Insurance Certificates Over \$50,000.00
Insurance Certificate Endorsements
OCP Insurance Certificate Over \$100,000.00
Performance, Maintenance and Statutory Payment Bonds
Construction 2012 Building Wage Decission
Pay or Play Certification of Agreement to Comply with Program
Pay or Play Form 3 / List of Participating Contractors

NOTE:

Questions concerning the Bid should be submitted in writing to: City of Houston, Strategic Purchasing Division, 901 Bagby, Room B506, Houston, TX 77002, Attn: Arturo Lopez or via fax: 832-393-8759 or via email (preferred method) to arturo.lopez@houstontx.gov no later than **4:00 PM, Monday, September 24, 2012.**

QUALITY AND WORKMANSHIP:

The bidder must be able to demonstrate upon request that it has performed satisfactorily, services similar to the services specified herein. The bidder will provide records of warranty and repair services performed for others upon request. The City of Houston shall be the sole judge whether the services performed are similar to the scope of services specified herein.

PERMITS/ELECTRICAL WORK REQUIRED:

Successful Contractor shall be responsible for securing any electrical permits and all permits for proposed work. Any fee charged for these permits should be the responsibility of the Contractor and not the City of Houston.

CITY BUILDING CODES:

All work performed or equipment installed shall be in strict accordance with the City of Houston Building Codes. The Contractor will immediately correct any deficiencies discovered during work or after completion. Failure to correct deficiencies will result in the City having corrections made at the Contractor's expense.

MATERIALS AND QUALITY ASSURANCE:

All Material must meet or exceed the standard in the industry for improvement of the services to be performed and conforms with respects to the specifications. Should any materials be found defective, not meeting specifications, or that which has not been approved in writing by the City shall, upon discovery (including any time within the period of the guarantee), be replaced with the specified equipment or material at no additional cost to the City.

CLEAN-UP:

Unless specifications state otherwise at the completion of all work, the Contractor shall remove from the area all trash, rubbish, and debris caused by its operations, leaving the job site clean.

PRODUCT LITERATURE/SPECIFICATION SHEETS:

To evaluate bids, the user department and the City purchasing staff may require product literature/specification sheets. When required, the bidders(s) should submit the requested product literature/specification sheets within five (5) calendar days from date of request.

FAILURE ON BIDDER'S PART TO FURNISH THE REQUESTED TECHNICAL DATA IN THE TIME LIMIT GIVEN ABOVE MAY BE CAUSE FOR REJECTION OF THE BID.

SITE INSPECTION:

The City of Houston reserves the right to inspect the bidder's current place of business to evaluate equipment condition and capabilities, staff experience, training and capabilities, and storage capabilities as they relate to the performance of this contract. The City will have the right to inspect all Contractor furnished materials and workmanship during the course of the work.

BID BOND:

The Contractor shall be required to provide and submit with the bid a Bid Bond in the amount of 10% of the total amount bid by the Contractor. The Bid Bond shall be in the same form as that distributed by the City, and attached hereto, all duly executed by this Bidder (as "Principal") and by a corporate surety company licensed to do business in the State of Texas, and if the amount of the bond is greater than \$100,000.00 the surety must hold a certificate of authority from the United States Secretary of the Treasury, or a Cashier's or a Certified check in a like amount. Company or personal checks are not acceptable.

PERFORMANCE BOND and PAYMENT BOND:

The successful Contractor(s) shall be required to provide a Performance and Payment Bond in the total amount (100%) of the Contract if the award is in excess of \$25,000.00.

The Performance and/or Payment Bond shall be in the same form as that distributed by the City, and attached hereto, all duly executed by this bidder (as "Principal") and by an incorporated surety company licensed to do business in the State of Texas. If the amount of the bond is greater than \$100,000.00 the surety must hold a certificate of authority from the United States Secretary of the Treasury.

The Contractor(s) shall be required to provide a Performance and/or Payment Bond as outlined above, which will be delivered to the City Purchasing Agent of the City, on or before the tenth (10th) day following the day the bidder receives notice from the City.

MAINTENANCE BOND:

The Contractor shall furnish a maintenance bond in the total (100%) bid amount in the form required by the City (samples attached). One bond, also referred to as the One Year Maintenance Bond, will be conditioned upon Contractor's repair, replacement or restoration of any work or any portion of the work which is found to be defective or fails in any way to comply strictly with this contract or the plans and specifications for such work within a period of one (1) year from the date of acceptance of such work by the City Council or after the date that the "CO", or his designee in writing, determines, in a written notice to the Contractor, to be the date upon which the project is both substantially complete and available for the full and beneficial occupancy or use of the City.

HIRE HOUSTON FIRST:

Designation as a City Business or Local Business

To be designated as a City or Local Business for the purposes of the Hire Houston First Program, as set out in Article XI of Chapter 15 of the Houston City Code, a bidder or proposer must submit the **Hire Houston First Application and Affidavit ("HHF Affidavit")** to the Director of the Mayor's Office of Business Opportunities and receive notice that the submission has been approved prior to award of a contract. Bidders are encouraged to secure a designation prior to submission of a bid or proposal if at all possible.

Download the HHF Affidavit from the Office of Business Opportunities Webpage at the City of Houston e-Government Website at the following location:

www.houstontx.gov/obo/moreforms/hirehoustonfirstaffidavit.pdf

Submit the completed application forms to: Mayor's Office of Business Opportunity, One Stop Business Center, 900 Bagby St., Public Level, Houston, TX 77002 or Applications may be submitted via e-mail to HHF-MOBO@houstontx.gov or faxed to 832.393.0952.

Award of Procurement of \$100,000 or More for Purchase of Non-Professional Services , Including Construction Services:

THE CITY WILL AWARD THIS PROCUREMENT TO A " CITY BUSINESS," AS THAT TERM IS DEFINED IN SECTION 15-176 OF THE CITY OF HOUSTON CODE OF ORDINANCES ("THE CODE"):

- IF THE BID OF THE LOCAL BUSINESS IS THE LOWEST RESPONSIBLE BID OR IS WITHIN 3% OF THE LOWEST BID RECEIVED, AND
- UNLESS THE USER DEPARTMENT DETERMINES THAT SUCH AN AWARD WOULD UNDULY INTERFERE WITH CONTRACT NEEDS, AS PROVIDED IN SECTION 15-181 OF THE CODE.

IF THERE IS NO BID OF A LOCAL BUSINESS THAT MEETS THESE CRITERIA, THE CITY WILL AWARD THE PROCUREMENT TO THE LOWEST RESPONSIBLE BIDDER.

Award of Procurement under \$100,000 Purchase of Non-Professional Services Including Construction Services:

THE CITY WILL AWARD THIS PROCUREMENT TO A "LOCAL BUSINESS," AS THAT TERM IS DEFINED IN SECTION 15-176 OF THE CITY OF HOUSTON CODE OF ORDINANCES ("THE CODE"):

- IF THE BID OF THE CITY BUSINESS IS THE LOWEST RESPONSIBLE BID OR IS WITHIN 5% OF THE LOWEST BID RECEIVED, AND
- UNLESS THE USER DEPARTMENT DETERMINES THAT SUCH AN AWARD WOULD UNDULY INTERFERE WITH CONTRACT NEEDS, AS PROVIDED N SECTION 15-181 OF THE CODE.

IF THERE IS NO BID OF A LOCAL BUSINESS THAT MEETS THESE CRITERIA, THE CITY WILL AWARD THE PROCUREMENT TO THE LOWEST RESPONSIBLE BIDDER.

Award of Procurement that may be More or Less than \$100,000 for Purchase of Non-Professional Services, Including Construction Services:

THE CITY WILL AWARD THIS PROCUREMENT TO A " LOCAL BUSINESS," AS THAT TERM IS DEFINED IN SECTION 15-176 OF THE CITY OF HOUSTON CODE OF ORDINANCES ("THE CODE"):

- IF THE BID OF THE LOCAL BUSINESS IS LESS THAN \$100,000 AND IS THE LOWEST RESPONSIBLE BID OR IS WITHIN 5% OF THE LOWEST BID RECEIVED, OR
- IF THE BID OF THE LOCAL BUSINESS IS MORE THAN \$100,000 AND IS THE LOWEST RESPONSIBLE BID OR IS WITHIN 3% OF THE LOWEST BID RECEIVED, AND
- UNLESS THE USER DEPARTMENT DETERMINES THAT SUCH AN AWARD WOULD UNDULY INTERFERE WITH CONTRACT NEEDS, AS PROVIDED IN SECTION 15-181 OF THE CODE.

IF THERE IS NO BID OF A LOCAL BUSINESS THAT MEETS THESE CRITERIA, THE CITY WILL AWARD THE PROCUREMENT TO THE LOWEST RESPONSIBLE BIDDER.

INTERLOCAL AGREEMENTS:

Under the same terms and conditions hereunder, the Contract may be expanded to other government entities through inter-local agreements between the City of Houston and the respective government entity that encompass all or part of the products/services provided under this contract. Separate contracts will be drawn to reflect the needs of each participating entity.

LOBBYING AND OTHER FORMS OF INFLUENCE PROHIBITED:

Neither Bidder(s) nor any person acting on Bidder(s)'s behalf shall attempt to influence the outcome of the award by the offer, presentation or promise of gratuities, favors, or anything of value to any appointed or elected official or employee of the City of Houston, their families or staff members. All inquiries regarding the solicitation are to be directed to the designated City Buyer identified on the first page of the solicitation. Upon issuance of the solicitation through the pre-award phase and up to the award, aside from Bidder's formal response to the solicitation, communications publicly made during the official pre-bid conference, written requests for clarification during the period officially designated for such purpose by the City Buyer, neither Bidder(s) nor persons acting on their behalf shall communicate with any appointed or elected official or employee of the City of Houston, their families or staff through written or oral means in an attempt to persuade or influence the outcome of the award or to obtain or deliver information intended to or which could reasonably result in an advantage to any Bidder. However, nothing in this paragraph shall prevent Bidder from making public statements to the City Council body convened for a regularly scheduled session after the official selection has been made and placed on the City Council agenda for action.

CONTRACTOR'S QUESTIONNAIRE

In order to receive bid award consideration, the bidder must be able to demonstrate that they are currently providing or have had at least one contract, to **remove, furnish and install a HVAC systems and associated equipment** that is similar in size and scope to this contract. **Bidder must have references documenting that it has performed removal, furnishing and installation of HVAC systems and associated equipment.** The reference(s) should be included in the space provided below. Please attach another piece of paper if necessary. If references are not included with the bid, the bidder shall be required to provide such references to the City of Houston within five working days from receipt of a written request from the City of Houston to do so. **Bidder's capability and experience shall be a factor in determining the Contractor's responsibility.**

1. Business Name: _____

Business Address: _____

City, State, Zip: _____

Name of Owner/Contact Person: _____

Phone: _____ Fax: _____ Email: _____

No. of Years providing Service to this business: _____

2. Business Name: _____

Business Address: _____

City, State, Zip: _____

Name of Owner/Contact Person: _____

Phone: _____ Fax: _____ Email: _____

No. of Years providing Service to this business: _____

3. Business Name: _____

Business Address: _____

City, State, Zip: _____

Name of Owner/Contact Person: _____

Phone: _____ Fax: _____ Email: _____

No. of Years providing Service to this business: _____

4. Business Name: _____

Business Address: _____

City, State, Zip: _____

Name of Owner/Contact Person: _____

Phone: _____ Fax: _____ Email: _____

No. of Years providing Service to this business: _____

SECTION B
SCOPE OF WORK/TECHNICAL SPECIFICATIONS

1.0 Summary of Scope of Work:

1.1 GENERAL

1.1.1 The Contractor shall be required to provide all labor, equipment, tools, supervision, transportation and incidentals necessary to remove and properly dispose of three existing Carrier 50TFF-006-601YA, 5-ton roof-top package units (RTU's), two Carrier 50TFF-008-611BA, 7.5-ton RTU's, two Carrier 50TFF-012-601BA, 10-ton RTU's and eight Carrier 50TTJ-016-681YA, 15-ton RTU, heating ventilation and air conditioning (HVAC) systems and associated equipment at the Houston Police Department's Midwest Command Station, located at 7277 Regency Square Blvd., Houston, TX 77036. The Contractor shall also be required to furnish and install one new mini-split 12,000 BTU/H wall mounted air conditioning system, (Reference: Mitsubishi mini-split MSY-GE12NA-8 and MUY-GE12NA), to include a secondary drain system in the server room, three Carrier 50TFF-006-601YA, 5-ton RTU's, two Carrier 50TFF-008-611BA, 7.5-ton RTU's, two Carrier 50TFF-012-601BA, 10-ton RTU's and eight Carrier 50TTJ-016-681YA, 15-ton RTU, HVAC systems and associated equipment, or City approved equals at the aforementioned location.

1.1.2 The Contractor shall be required to disconnect and reconnect (soldering) all the copper condensate lines and furnish and install new "Armaflex" pipe insulation and wrap, furnish and install hail-guards to protect the unit coils on the fifteen (15) new RTU's, the four existing Carrier 50TFF012-801BA, RTU's and the one Carrier 55CEX060000ACAA, RTU installed during Phase I. The Contractor shall also be required to flush out the condensate lines of all twenty (20) RTU.'s. and clean all debris and algae from the roof top storm drains where the condensate lines drain. The Contractor shall also be required to test, program and ensure that all systems are in optimum working condition.

Note: The Contractor shall be responsible for all hoisting (craning).

2.0 Specified Equipment, or Equivalent:

2.1 Wherever in the specifications any materials or processes are indicated or specified by patent of proprietary name and/or by name of manufacturer, such specifications shall be deemed to be used for the purpose of facilitating descriptions of the performance, materials and/or processes desired and shall be deemed to be followed by the words, "or equivalent", if not so stated in the specifications herein.

2.2 The burden of proof shall rest with the bidder, in the course of a technical evaluation, to prove that the proposed item(s) are equivalent to the performance, materials, processes, or articles specified. DETERMINATION AS TO WHETHER THE ITEM (S) BID IS (ARE) EQUIVALENT TO THOSE SPECIFIED SHALL REST SOLELY WITH THE CITY PURCHASING AGENT AND THE RECEIVING DEPARTMENT.

3.0 Brand Name or Trade Name:

- 3.1 Any manufacturer's names, trade names, brand names, or catalog numbers used in the specifications are for the purpose of describing and establishing the general quality level, design and performance desired. Such references are not intended to limit or restrict bidding by other Contractors/Suppliers, but are intended to approximate the quality design or performance that is desired. Any bid that proposes like quality, design or performance, will be considered. Equivalent products will be considered, provided a complete description and product literature is provided. Unless a specific exception is made, the assumption will be that the item bid is exactly as specified in the Invitation to Bid.

4.0 Performance Time:

- 2.1 The work must be completed as expeditiously as possible within **72 calendar days** after receipt of the purchase order. It shall be the Contractors responsibility to schedule and coordinate the work in such a manner as to complete the work within the specified time.

5.0 Warranty:

- 5.1 The Contractor shall warranty all materials, equipment and workmanship for **one-year** from the date of full acceptance of the work.

TECHNICAL SPECIFICATIONS

Section 01000

GENERAL CONSTRUCTION REQUIREMENTS

PART 1 - GENERAL

1.1 BIDDER'S REPRESENTATION

- 1.1.1 Each bidder in submitting its bid proposal represents that it has read and understands the bidding documents, drawings and the specifications, including the portion of the work under other contractors, and has visited the project site, and familiarized itself with the local conditions under which the project is to be performed.
- 1.1.2 Each bidder represented that it has compared the site's existing conditions and compared it with the drawings and specifications, and satisfied itself of the conditions of delivery, handling, storage of materials, and all other matters that are incidental to the work before submitting its bid or proposal.
- 1.1.3 Each bidder represents that its bid or proposal is based upon the materials and/or equipment described in the project's drawings and specifications.
- 1.1.4 Submission of a bid or proposal will be considered as evidence of the bidder's representation. No allowance will be made to the successful contractor by reason of any error or omission on its part due to neglecting the requirements of this article.

1.2 GENERAL STIPULATIONS

- 1.2.1 The Contractor shall be responsible for the obtainment of all required trade permits under this contract, including the payment of all applicable fees to the governmental authorities with the jurisdiction over the project.
- 1.2.2 The drawings, in many instances, are schematic and do not define exact locations or dimensions. Items furnished may vary in dimensions and other ways from the specific items called for in the drawings. In such cases, the contractor shall, prior to performing the work, determine the exact position or dimensions by means of field measurements, drawings furnished by the suppliers and/or coordination with other trades.
- 1.2.3 Information as to existing conditions shown on the drawings reflect the best available data at the time the drawings were prepared, each contractor shall investigate and verify the data in the field prior to submitting his bid or proposal, and prior to start of field construction.

1.3 RELATION OF THE DOCUMENTS

- 1.3.1 Complementary: The drawing and specifications are complementary and anything included in one, but not in the other shall be provided as if included completely in both. In case of conflict between the documents or within either, the Engineer shall determine the intent.

- 1.3.2 Cost Basis: In case of conflicts, the requirement defining the greater quantity and/or the higher quality shall govern unless otherwise directed.
- 1.3.3 Standard Reference Documents: Various Standards Association documents are included by reference such as ASTM, ACI, AISC, etc. Provisions of each of these documents are basic to the contract unless exceeded by the drawings or specifications. Where building code standards apply to similar provisions, they shall govern unless exceeded by the referenced standard drawings or specifications.
- 1.3.4 General Conditions of the Construction Contract: Unless otherwise indicated in the contract documents, the "General Conditions for the Contract for Construction" fully applicable to this project is "AIA Document A201-2007" published by the American Institute of Architects.

1.4 CONTRACTOR'S USE OF PREMISES AND ACCESS

- 1.4.1 The Contractor's use of the premises shall be confined to established work and storage areas and approved access routes only, and he shall be responsible for protection and restoration to original conditions of all unaltered areas affected by the work.
- 1.4.2 Where not otherwise shown, details of work area enclosures, determination of access ways, and other limitations of the Contractor's use of existing premises shall be developed with the City before commencement of the work and recorded for mutual understanding of the parties, and thereafter, any required or advisable changes shall likewise be developed with the City and recorded.
- 1.4.3 Protections: The Contractor is responsible for the installation of fences, barricades, temporary partitions, etc. with suitable locked doors or gates as required, for the performance of its own work and for the protection of workers, occupants, the public and the work.
- 1.4.4 Separate Contractors: Accommodation shall be made for the requirements of separate contractors working on the same project.

1.5 SCHEDULE OF VALUES

- 1.5.1 No later than 20-days following receipt of the Notice-to-Proceed letter from the City, the Contractor shall furnish to the City's Representative the Schedule of Values listing the names of major subcontractors and the cost breakdown of each subcontractor or trade, separated by labor material and equipment cost for each.

1.6 TEMPORARY FACILITIES

- 1.6.1 Lighting & Power: The City will provide temporary power for the performance of the work.
- 1.6.2 Water: The City will provide temporary water for the construction of the project.
- 1.6.3 Sanitary: The Contractor shall provide suitable portable toilets for the use of all its workmen. Proper ventilation shall be provided and a sanitary condition maintained at all times. These facilities shall meet all local codes and regulations.

- 1.6.4 Winter Heating: The Contractor shall provide portable heaters for the use of its work, and the protection from condensation of work in place, OSHA and local code fire safety requirements shall be observed at all times.
- 1.6.5 Trash: A trash dumpster will be provided by the City to facilitate the collection of construction debris. However, the Contractor shall be responsible for clean-up of its own debris, collecting it and disposing into the dumpster.
- 1.6.6 Field Office: Not required, however the contractor shall provide a temporary table and a set of Drawings & Specifications properly marked up with appropriate revisions as "Record Drawings" provided to the City at the completion of the work.

1.7 TAXES

- 1.7.1 Each bidder shall include in his bid or proposal amount, all applicable taxes associated with labor, materials and/or equipment incorporated into the project.

1.8 COOPERATION WITH OTHER CONTRACTORS

- 1.8.1 Each Contractor shall provide his own facilities to perform his work and shall cooperate with other contractors to facilitate the execution of theirs.

1.9 WARRANTY/GUARANTEE

- 1.9.1 Warranty/Guarantee on all material, equipment and labor shall be for a minimum of one-year from the date of Substantial Completion, additional Warranty/Guarantee as required by these specifications shall remain in full force and effect.

1.10 SAFETY MEASURES

- 1.10.1 General Requirements: The contractor must comply with the latest Occupational Safety and Health Act (OSHA) Standards.
- 1.10.2 Radiation Permits or Authorizations: Contractors contemplating the use of radioactive materials or radiation producing equipment while performing work on this contract must obtain written authorization from the City.
- 1.10.3 Self-Propelled Elevating Work Platforms: All self-propelled elevating work platforms will be designed, constructed, maintained, used, and operated in accordance with the guidance provided in American National Standard for Self-Propelled Elevating Work Platforms (ANSI A92) together with any amendments, which may be in force at time contract is awarded.

END OF SECTION

Section 01040

GENERAL COORDINATION

PART 1 - GENERAL

1.1 RELATIONSHIP BETWEEN TRADES

1.1.1 Require cooperation and coordination between various Trades and Subcontractors whose work is dependent upon one another. Schedule such work so as to prevent delays in dependent work and so that all related work will progress together. Require each Trade or Subcontractor to make necessary provisions for the requirements of such other work areas. No additional compensation for extra work incurred through the lack of cooperation and coordination between various Trades and Subcontractors will be allowed.

1.2 ACCEPTANCE OF PRIOR WORK

1.2.1 New Work: Work executed in relation to following work shall be inspected and notice given of any defects, improper workmanship or materials, or other conditions that would affect the satisfactory execution and permanency of such following work. No further work shall be executed until such defects or conditions have been corrected. The absence of any such notifications will be construed as an acceptance by these Trades or Subcontractors of the prior related work, and later claims of defects in this work will not in any way relieve the Prime Contractor from responsibility of the resulting defects.

1.3 MEASUREMENTS

1.3.1 Verify the governing lines, levels and dimensions of the premises, establish the lines and levels for construction from the data as confirmed, tape all dimensions and turn all angles by instrument and verify by triangulation and closure. Verify dimensions on existing work and report in writing all differences from the documents. Submit request for the direction prior to proceeding with the work. Verify all dimensions of new work as constructed and make good all discrepancies as directed. Layout rough and finish construction horizontally and vertically as the work progresses and verify the placement of the work of the various trades and subcontracts.

1.4 SAFE LOADING

1.4.1 The Contractor shall ascertain the design loads and shall not load or permit loading of the structure beyond the design limits either by shoring, stockpiling or otherwise, and he shall make good all spread, deflection, cracking or other damage to the structure due to such cause as directed without cost to the City.

1.5 CUTTING AND PATCHING

1.5.1 Leave all chases, holes, and openings straight, true, and of proper size and cut them in existing work as may be necessary for the proper installation of the work. Consult with all Subcontractors concerned, regarding proper locations and size. In case of conflict between requirement for cutting and patching and any other requirement of the Work, submit request for direction before proceeding with the Work. In case of failure to leave or cut them in the proper place, they shall be cut afterward at no expense to the City.

1.5.2 No excessive cutting will be permitted, nor shall any piers or other structural members be cut without prior approval.

- 1.5.3 After such work has been installed, satisfactorily and carefully fit around, close up, repair, patch, and point up all cuts.
- 1.5.4 All work shall be done with proper tools by careful workmen of the particular trade to which work belongs and shall be done without extra expense to the City.
- 1.5.5 No description of specific cutting, patching, digging, etc., required for the work under a Specification Section that may be required for the proper accommodation of that work to the work of other trades shall relieve the Contractor from responsibility described herein. Execute this work with competent workmen skilled in the trade required.

END OF SECTION

Section 01120

REMODELING PROCEDURES

PART 1 - GENERAL

1.1 GENERAL DESCRIPTION OF WORK OF THIS SECTION

- 1.1.1 Work in general, includes procedures pertaining to remodeling, alteration, minor demolition, cutting, patching, removal, refinishing, relocation, and disposal work required throughout the Project and becomes a part of each Section and Division where remodeling, alteration, minor demolition, cutting, patching, removal, refinishing, relocation, and disposal work is required, with the same force and effect as if written in full therein.
- 1.1.2 The Contractor, subcontractors and/or vendors are responsible for visiting the Project Site to determine by inspection all existing conditions, including access to the Site, the nature of structures, objects, and materials to be encountered, and all other facts concerning or affecting the Work. Information on the Drawings showing existing conditions does not constitute a guarantee that other items may not be found or encountered. Claims for additional time or extra costs will not be granted.
- 1.1.3 Obvious existing conditions, installations, and obstructions affecting work of this Section shall be taken into consideration as necessary work and included as part of work of this Section, the same as though completely shown or described.

1.2 REFERENCES

- 1.2.1 In addition to those requirements of local ordinances and governing codes, work shall be performed under the following regulations:
 - 1.2.1.1 American National Standards Institute (ANSI): Safety Requirements for Demolition, Document A10.6
 - 1.2.1.2 Occupational Safety and Health Administration (OSHA): Construction Safety Act, Part 1926

1.3 SUBMITTALS

- 1.3.1 Responsibility for planning and effective implementation of the Work, as well as safety to persons and property is the total responsibility of the Contractor. This responsibility shall not transfer to the City, Architect, Engineer or governing authorities.
- 1.3.2 Demolition procedures and operational sequence should consider permits and notices authorizing demolition, certificate of severance of utility serves, if required, method of traffic maintenance, permit for transport and disposal of debris, location of disposal area, etc.

1.4 PROJECT CONDITIONS

- 1.4.1 The Contractor shall accept the conditions of the jobsite as they exist and perform his work accordingly.
- 1.4.2 Any adverse condition which might affect the performance of the work described in these specifications must be brought to the attention of the City's Representative in writing immediately upon its discovery.
- 1.4.3 Secure field measurements required for proper installation of work covered by this Section. Exact measurements are Contractor's responsibility.

1.5 QUALITY ASSURANCE

- 1.5.1 Perform remodeling, alteration, minor demolition, cutting, patching, removal, refinishing, relocation, and disposal work in accordance with Federal, State, and local health and safety standards, codes and ordinances. Where conflicts occur, comply with the more restrictive requirements.
- 1.5.2 Perform remodeling, alteration, minor demolition, cutting, patching, removal, refinishing, and relocation work in such a manner as to preserve the aesthetic and structural integrity of materials and construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- 2.1.1 Matching Existing Work: Except where otherwise specifically indicated or specified as a definite change, the finish materials and appearance of the new work shall match the existing work and shall be relatively imperceptible in the finished work when viewed under finished lighting conditions from a distance of 5 ft.

2.1.2 Cutting

- 2.1.2.1 Structural Elements: If not specifically shown, removal or alteration only upon written approval of the Structural Engineer. Do not damage or alter any structural element of the existing building. Where drilling or fastening to reinforced concrete construction is required, Use appropriate metal detector devices at existing structure to determine rebar locations and potential for tension release before proceeding. Notify Architect in each instance when

conflict occurs. Architect will determine corrective action where required. Do not proceed until corrective action has been received.

2.2 SALVAGE MATERIAL

- 2.2.1 Prior to commencing demolition, contact City's representative to find out which items the City has an interest in retaining any salvage.
- 2.2.2 If the City wishes to keep some, or all of the salvage material, as listed on the Drawings. Stack, pile or roll to permit examination and protection from unnecessary loss and damage until the City removes, or rejects.
- 2.2.3 If the City elects to abandon some, or all of the salvage materials, they become the property of the Contractor.

PART 3 - EXECUTION

3.1 INSPECTION

- 3.1.1 Check Drawings carefully and thoroughly investigate existing building construction (if any), prior to the start of construction and demolition.

3.2 PREPARATION

- 3.2.1 Furnish and maintain temporary types of protection as necessary to adequately protect and prevent accidental injury to the public, City's personnel and personnel employed at the work. Take all necessary precautions to keep trespassers out of work areas.
- 3.2.2 Protect work to remain from damage. Use barricades, tarpaulins, temporary walls, plywood, planking, masking, and other suitable means and methods as approved.
 - 3.2.2.1 Restore accidental or careless damage to work that remain in place to a condition as good as or better than existed before work was commenced and at no additional cost to the City.
- 3.2.3 Carefully remove and replace items of existing construction indicated to remain upon completion of the Contract, but which require removal to complete the work. Match condition of construction prior to the start of the Work unless otherwise required. Carefully remove items indicated for relocation in new work, or to be retained by the City, to avoid damage, thoroughly clean, and reinstall as indicated or store as directed.

3.3 DUST CONTROL

- 3.3.1 The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the building and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

3.4 PERFORMANCE

- 3.4.1 Minor Demolition and Removals

- 3.4.1.1 Carefully remove and store all items indicated or required to be reused.
- 3.4.1.2 Perform minor demolition and removal work completely and remove debris from the Site. Use such methods as required to complete the work within the limitations of governing regulations.
 - 3.4.1.2.1 Proceed with demolition and removal work in a systematic manner, from the top to the bottom unless otherwise shown in areas indicated.
 - 3.4.1.2.2 Remove debris and lower to ground by means of hoists, derricks, or other suitable methods to limit air pollution.
 - 3.4.1.2.3 Locate demolition equipment throughout the structure and remove materials so as to not impose excess loads to supporting walls, floors, or framing.

3.5 CLEAN-UP

- 3.5.1 Debris and Rubbish: Debris and rubbish shall be removed on a daily basis, unless otherwise directed by the City's Representative in writing.
- 3.5.2 Debris Control: Debris shall be removed and transported in a manner as to prevent spillage on streets or adjacent areas.
- 3.5.3 Regulations: Local regulations regarding hauling and disposal apply.

END OF SECTION

Section 01300

SUBMITTALS AND SHOP DRAWINGS

PART 1 - GENERAL

1.1 GENERAL

- 1.1.1 Submit a complete schedule of shop drawing submittals in conformance with this specification. Applications for payments will not be processed until the schedule of shop drawing submittals has been reviewed by the Architect and in his opinion is in conformance with the contract documents.
- 1.1.2 Submit shop drawings and product data as required by the contract documents in a form and quality suitable for reproduction. The number of shop drawings and product data submittal shall include four for the use of the City plus two for Architect use.
- 1.1.3 Allow 10 calendar days for each submittal or resubmittal review, the Contractor shall be responsible for allowing proper review time on long lead items, no time extensions will be granted on the basis of the Contractor's failure to allow proper review time.

- 1.1.4 All shop drawings and submittal data shall be in the English language, and all dimensions, weights, capacities, and other measurements shall be expressed in the Standard English system of measurements.

1.2 CONTRACTOR RESPONSIBILITIES

- 1.2.1 Review shop drawings and product data prior to submission. Verify:
 - 1.2.1.1 Field measurements.
 - 1.2.1.2 Field construction criteria.
 - 1.2.1.3 Catalog numbers and other data.
 - 1.2.1.4 Conformance with submission requirements.
 - 1.2.1.5 Clear identification of all design deviations from the contract documents (if any).
 - 1.2.1.6 Signature and sealing of all design deviations from the contract documents by a qualified Registered Professional Architect.
- 1.2.2 After checking and verifying all field measurements, and after complying with applicable procedures specified in the General Requirements, the Contractor shall submit to Architect for review in accordance with the accepted schedule of shop drawing submissions, or for other appropriate action, all shop drawings, which will bear a stamp or specific written indication that the Contractor has satisfied the Contractor's responsibilities under the contract documents with respect to the review of the submission. All submissions shall be identified with a unique sequential number, and referencing the relative specification and where appropriate the drawing sheet. The data shown on the shop drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to enable Architect to review the information as required.
- 1.2.3 The Contractor shall also submit samples and documents for review to Architect with such promptness as to cause no delay in the work. All samples will have been checked by and accompanied by a specific written indication that the Contractor has satisfied the Contractor's responsibilities under the contract documents with respect to the review of the submission and will be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which intended.
- 1.2.4 Before submission of each shop drawing or sample, Contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto, and reviewed or coordinated each shop drawing or sample with other shop drawings and samples and with the requirements of the work and the contract documents.
- 1.2.5 At the time of each submission, Contractor shall give Architect specific written notice of each variation that the shop drawings or samples may have from the requirements of the contract documents and, in addition, shall cause a specific notation to be made on

each shop drawing submitted to Architect for review of each variation.

- 1.2.6 Where a shop drawing or sample is required by the specifications, any related work performed prior to Architect review of the pertinent submission will be at the sole expense and responsibility of the Contractor.
- 1.2.7 The Contractor's coordination of each submittal shall include submission of all components, necessary for the Architect to adequately review submittal, as a complete package. Reproduction of design drawings for use of shop drawings will not be allowed.
- 1.2.8 The Contractor's responsibility for errors and omissions is not relieved by the Architect's review of submittals.

1.3 ARCHITECT'S RESPONSIBILITIES

- 1.3.1 Architect will review with reasonable promptness, shop drawings and samples, but Architect's review will be only for compliance with the information given in the Architect's documents and shall not relieve the Contractor from the responsibility of complying with the contract documents and shall not extend to means, methods, techniques, sequences, or procedures of constructions, or extend to safety precautions or programs incident thereto. A separate item can not be reviewed without appropriate information on the assembly in which the item functions.
- 1.3.2 Architect's review of shop drawings, or samples, shall not relieve the Contractor from total responsibility for the design and installation of any substitution from the requirements of the contract documents, nor will acknowledgment by the Architect relieve the Contractor from responsibility for errors or omissions in the shop drawings.
- 1.3.3 Architect will affix ink stamp and initials or signature, signifying review of submittal and return the submittal with appropriate comments within 15 days after each submittal, or re-submittal.
- 1.3.4 The Contractor shall transmit submittals per instructions in this specification.

1.4 SHOP DRAWINGS

- 1.4.1 Identify equipment by reference to sheet and detail numbers on contract drawings.
- 1.4.2 Include on the drawings all information required for submission and submit transmittal letter containing required information in accordance with Submission Requirements.

1.5 PRODUCT DATA

- 1.5.1 Modify the manufacturer's standard schematic drawings to delete or supplement information as applicable.
- 1.5.2 For manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other descriptive data:
 - 1.5.2.1 Clearly mark each copy to identify pertinent materials, products, or models

being supplied.

1.5.2.2 Show dimensions and clearances required for product being supplied.

1.5.2.3 Show performance characteristics and capacities.

1.5.2.4 Show wiring diagrams and controls.

1.5.3 Include on the data all information required for submission or place required information on the transmittal letter.

1.5.4 Product data shall be submitted in a three-ring binder and properly indexed.

1.6 SUBMISSION REQUIREMENTS

1.6.1 Submittals shall be transmitted per City's representative instructions.

1.6.2 All design deviations must be signed and sealed by a qualified professional Architect registered in the State of Texas.

1.6.3 All shop drawings and product data shall contain:

1.6.3.1 Field dimensions clearly identified as such.

1.6.3.2 A blank space on each shop drawing, approximately 5" x 5", for an ink stamp of the Architect.

1.6.3.3 The Contractor's stamp on each item submitted, initialed, or signed, certifying review of submittal, verification of field measurements, and compliance with contract documents.

END OF SECTION

Section 10200

ALUMINUM LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

1.1.1 Section includes furnishing and installing aluminum louvers with insect screens.

1.2 RELATED WORK

1.2.1 Related Work of Other Sections:

1.2.1.1 Section 07110 – Bituminous Dampproofing.

1.2.1.2 Section 07920 – Caulking and Sealants.

1.3 PERFORMANCE REQUIREMENTS

- 1.3.1 Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
- 1.3.2 Wind Loads: Provide louver system, including anchorage, capable of withstanding wind-load design pressures applicable to the Project based upon a 3 second gust wind speed of 110-miles per hour (49-meters per second) at 33-feet (10-meters) above grade (Exposure B, Importance Factor 1.15), according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.4.2, "Analytic Procedure," based on mean roof heights above grade indicated on the Drawings.
- 1.3.3 Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and night time sky heat loss.
 - 1.3.3.1 Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
 - 1.3.3.2 Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.4 SUBMITTALS

- 1.4.1 Product Data: For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- 1.4.2 Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.
 - 1.4.2.1 For installed louvers and vents indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- 1.4.3 Samples for Initial Selection: For units with factory-applied color finishes.
- 1.4.4 Samples for Verification: For each type of metal finish required.
- 1.4.5 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.

1.5 QUALITY ASSURANCE

- 1.5.1 Source Limitations: Obtain louvers and vents through one source from a single

manufacturer where indicated to be of same type, design, or factory-applied color finish.

1.5.2 Welding: Qualify procedures and personnel according to the following:

1.5.2.1 AWS D1.2, "Structural Welding Code--Aluminum."

1.6 PROJECT CONDITIONS

1.6.1 Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6.1.1 Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PRODUCT AND MANUFACTURER

2.1.1 Drainable Louvers: Provide extruded aluminum louvers, stationary, drainable blade type, as follows:

2.1.1.1 Subject to compliance with requirements, provide Ruskin, Model No. ELF3750X (Construction Specialties, Inc., Model No. 4157, Airo-lite Model K 6776,) or approved equivalent

2.1.1.2 Louver Depth: 4 inches (100 mm).

2.1.1.3 Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch (2.0 mm) for blades and 0.080 inch (2.0 mm) for frames.

2.1.1.4 Performance Requirements:

2.1.1.4.1 Free Area: Not less than 7.0 sq. ft. (0.65 sq. m) for 48-inch- (1.2-m-) wide by 48- inch- (1.2-m-) high louver.

2.1.1.4.2 Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 800- fpm (4.1-m/s) free area velocity.

2.1.1.4.3 Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rain fall rate of 8 inches (200 mm) per hour and a wind speed of 50 mph (22.4 m/s) at a core area intake velocity of 500 fpm (2.5 m/s).

2.1.1.5 AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.1.2 Insect Screens: Provide manufacturer's standard insect screens in rewirable

aluminum frames, finished to match louvers.

2.2 BLANK-OFF PANELS

- 2.2.1 Insulated, Blank-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with metal sheets.
 - 2.2.1.1 Thickness: 1 inch (25 mm) 2 inches (50 mm).
 - 2.2.1.2 Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.8-mm) nominal thickness.
 - 2.2.1.3 Insulating Core: Unfaced mineral-fiber or foamed-plastic rigid insulation board.
 - 2.2.1.4 Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum channel frames, not less than 0.080-inch (2.0-mm) nominal thickness, with corners mitered and with same finish as panels.
 - 2.2.1.5 Seal perimeter joints between panel faces and louver frames with 1/8-by-1-inch (3.2- by-25-mm) PVC compression gaskets.
 - 2.2.1.6 Panel Finish: Same finish applied to louvers.
 - 2.2.1.7 Attach blank-off panels to back of louver frames with stainless-steel sheet metal screws.

2.3 ALUMINUM FINISH

- 2.3.1 General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- 2.3.2 Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.
- 2.3.3 Exterior High-Performance Organic Finish (3-Coat Fluoropolymer): AA-C12C40R1x (Chemical finish: cleaned with inhibited chemicals; Chemical finish: conversion coatings; Organic Coating: manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 – "Voluntary Specification, performance Requirements and Test Procedures for Superior Performance Organic Coatings on Aluminum Extrusions and Panels" and with coating and resin manufacturers' written instructions.
 - 2.3.3.1 Color: Provide color to match manufactured metal roof panels as approved

by the City.

2.4 FABRICATION, GENERAL

- 2.4.1 Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- 2.4.2 Maintain equal louver blade spacing to produce uniform appearance.
- 2.4.3 Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- 2.4.4 Include supports, anchorages, and accessories required for complete assembly.
- 2.4.5 Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 60 inches (1524 mm) o.c., whichever is less.
- 2.4.6 Join frame members to each other and to fixed louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.
- 2.4.7 Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

PART 3 - EXECUTION

3.1 EXAMINATION

- 3.1.1 Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- 3.2.1 Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- 3.3.1 Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- 3.3.2 Form closely fitted joints with exposed connections accurately located and secured. Provide perimeter reveals and openings of uniform width for sealants and joint fillers,

as indicated.

- 3.3.3 Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Make required alterations, and refinish entire unit or provide new units.
- 3.3.4 Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- 3.4.1 Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- 3.4.2 Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- 3.4.3 Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by the City, remove damaged units and replace with new units.
- 3.4.4 Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating

END OF SECTION

Section 15000

HVAC GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL

- 1.1.1 See provisions of Division 1.
- 1.1.2 These Specifications are part of the contract documents and must be used in connection with the Drawings.

1.2 WORK INCLUDED

- 1.2.1 The Contractor shall furnish all labor, materials, tools, transportation, equipment, services, facilities required for the complete and substantial installation of all HEATING, VENTILATING and/or AIR CONDITIONING work shown on the Plans or outlined in these Specifications. The work shall include all materials, accessories, and apparatus not specifically mentioned herein or noted on the Plans, but which are necessary to make a complete working installation of all systems shown on the Plans or described herein.

1.2.2 Work consists of, but is not limited to:

1.2.2.1 HVAC

1.2.2.1.1 Packaged HVAC systems

1.2.2.1.2 Ductwork systems

1.2.2.1.3 Exhaust fans

1.2.2.1.4 Grilles, diffusers, louvers

1.2.3 Related work described elsewhere:

1.2.3.1 Painting unless otherwise noted

1.2.3.2 HVAC control conduit

1.2.3.3 Flashing of roof openings

1.2.3.4 Electrical connections to HVAC and plumbing equipment

1.3 CODES, REGULATIONS, STANDARDS, PERMITS, AND FEES

1.3.1 Work shall comply with pertinent local ordinances or regulations.

1.3.2 Materials and equipment shall meet standards of and be approved by nationally recognized standards and testing authorities where such materials and equipment are available.

1.3.3 Installation shall be by competent mechanics, thoroughly experienced in this type of work and performing this work in a neat and workmanlike manner.

1.3.4 The Contractor shall comply with safety and occupational health requirements of OSHA and of local authorities. Responsibility for compliance rests solely on the Contractor and cannot be abrogated by virtue of these Plans and Specifications or actions of the City, or Engineer.

1.4 CONTRACTOR QUALIFICATIONS AND RESPONSIBILITIES

1.4.1 Any Contractor bidding on these Specifications and Drawings shall be a specialist in this field and have the personal skill and organization to provide a practical working system. Any practical criticism or exception given with the proposal will be considered at that time. If no criticism or exception is given with the proposal, it shall be assumed that the Contractor agrees that the system, as outlined in the Drawings and Specifications, can be made into a completely working system.

1.4.2 Use of the term "Contractor", "HVAC Contractor", "Plumbing Contractor",

“Electrical Contractor” or similar terminology in these Specifications is intended as an aid to the bidder only and to mean the organization engaged to execute the work included whether it be the General Contractor, his subcontractor, or others, and is not intended to indicate any jurisdictional assignments or other assignments of work, that being the responsibility of the General Contractor.

- 1.4.3 The Specifications and accompanying Drawings are intended to encompass a system that will not interfere with the structural, mechanical, or architectural design of the building, and which will fit into the several available spaces. As it is not within the scope of the Drawings to show all necessary offsets, obstructions, or structural conditions, it shall be the responsibility of the Contractor to install his work in such a manner that it will conform to the structure, avoid obstructions, and interferences with other trades, and keep passageways clear.

1.5 PLANS AND SPECIFICATIONS

- 1.5.1 Reference to Engineer from this point forward in these specifications shall be interpreted to mean the person designated by the City to interface with the Contractor.
- 1.5.2 The Drawings show diagrammatically the sizes and location of the various outlets and equipment items and the sizes of the major interconnecting ducts, etc., without showing exact details as to elevations, offsets, control lines, and installation details.
- 1.5.3 The Contractor shall carefully lay out his work at the site to conform to the architectural and structural conditions and to avoid obstructions. Exact locations of outlets, apparatus, and connections thereto shall be determined by reference to the general plans, to all detail Drawings, roughing-in Drawings, etc., by measurement at the building and in cooperation with other Contractors and in all cases shall be subject to the approval of the Engineer.
- 1.5.4 It shall be the Contractor’s responsibility to visit the actual site and compare same with the Drawings and Specifications, ascertain and check locations of any existing obstructions, underground or otherwise, which may affect the work. Failure to determine conditions will not be considered cause for granting additional compensation. Submittal of bid shall constitute constructive agreement that the site has been visited and that no circumstances will adversely affect the work other than those shown on the Plans.
- 1.5.5 In case of conflict between Plans and Specifications, or discrepancies within Plans and/or Specifications, the Contractor shall request clarification from the Engineer. For purposes of bidding, the more expensive materials or method shall be bid. After clarifications, if the less expensive method or material is indicated, due credit will be issued.
- 1.5.6 All ductwork and piping except in various equipment rooms, unfinished spaces, or

where specifically designated herein or on the Plans shall be concealed in furrings or chases. Where conditions exist which would cause any of these items to be exposed in finished spaces, or to interfere with architectural features or work of other divisions, the Contractor shall immediately call the situation to the attention of the Engineer and shall stop work in those areas until the Engineer directs resumption of work.

- 1.5.7 The Engineer shall have the right to clarify location of grilles, louvers, and diffusers, and to direct minor relocation of such items prior to rough-in at no additional cost to City.
- 1.5.8 Do not scale Drawings. If location of grilles, diffusers, control devices, or equipment is not dimensioned on Drawing and is not obvious or fixed by architectural features, verify location prior to installation.
- 1.5.9 Wall mounted equipment, devices, etc., shall be grouped neatly in a logical arrangement, in as aesthetically pleasing a manner as possible, and at the same height, unless otherwise indicated. Coordinate with other trades to satisfy this requirement.
- 1.5.10 Contractor shall refer to architectural sheets in the set of Drawings and shall notify the Engineer of any difference from items shown on Drawings related to this section.

1.6 COORDINATION WITH OTHER SECTIONS

- 1.6.1 Coordinate work with work of other trades in putting the installation in place at the time when the space required by this installation is accessible. Cutting and patching necessitated by any failure on the part of the Contractor to do this shall be performed at no additional cost to the City.
- 1.6.2 Verify openings, supports, and space availability shown on plans for use of this Contractor or for installation of its equipment. If such items are not suitable, notify the Engineer immediately.
- 1.6.3 Provide roof jacks, vents, sleeves, etc., as required for HVAC and plumbing equipment installation. Install these prior to final roof installation and coordinate with Roofing Contractor for flashing.
- 1.6.4 Each trade shall coordinate with other trades to assure that plans properly reflect the correct equipment connection requirements for equipment furnished by that trade or connected by that trade.

1.7 WARRANTY

- 1.7.1 In addition to all legally inherent warranties, the Contractor shall provide a written guarantee that:
 - 1.7.1.1 All material and equipment shall be new, free from defect, and of the quality and rating shown or specified.
 - 1.7.1.2 Any defect due to missing or improper material or faulty workmanship existing or developing during the resulting warranty period shall be corrected and the resulting damage repaired without additional cost to the City. Equipment replaced under warranty shall carry an additional one year

warranty on equipment and labor.

1.7.1.3 Period of warranty shall be as legally stipulated, but shall be a minimum of one year from the date of acceptance by the Engineer unless specifically extended by these Specifications for certain equipment.

1.7.2 Above warranty shall be concurrent with manufacturer's warranties on equipment. Manufacturer's written warranties shall be submitted to the City as specified elsewhere.

1.8 MATERIALS

1.8.1 Properly store all material and equipment at the job site, protecting same from the elements when in open storage and from damage by work of other trades when in place. Material improperly handled or damaged from rough usage or improper storage shall be taken out and replaced at no additional cost to the City with new units at the direction of the Engineer.

1.8.2 Whenever a definite manufacturer's product is specified, it is the intent of these Specifications and Drawings to set a standard of performance and quality and to define features of the product. Unless "no substitutions" are indicated, products by other reliable manufacturers will be accepted, provided they have equal capacity, construction, features, performance, maintenance requirements, and other qualities deemed significant. Final approval, however, shall rest with the Engineer at the time of submittal of Shop Drawings and brochures.

1.8.3 It must be understood that the Contractor shall be responsible for all consequences of any substitution, e.g., required changes in space requirements, access, layout, and clearances; effect on related equipment; impact on building codes; impact on work and interface of other trades.

1.8.4 The Contractor shall verify that materials used in all phases of this work comply fully with local code requirements and are approved for use by the authority having jurisdiction. Notify Engineer prior to installation if use of any material is questionable.

1.8.5 Submittal of bid by Contractor is assumed to be for the specified or scheduled material unless specifically noted at the time of submission of bid.

1.8.6 Where performance criteria or specific features are listed for items of material or equipment, this requirement shall take precedence over manufacturer's designation or model number indicated.

1.9 SUBMITTALS

1.9.1 Required submittals consist of three categories: Shop Drawings, Maintenance and Operations Literature, and Record Drawings. Contract shall not be considered complete until satisfactory compliance with all categories.

1.9.1.1 Shop Drawings

1.9.1.1.1 Submit Shop Drawings in accordance with General Provisions. The Contractor shall utilize Shop Drawings to assure

coordination with and absence of interference with work of other trades, and compatibility with physical features of the project. Shop Drawings consist of brochures, catalog cut sheets, Drawings, specification sheets which completely describe all items. Shop Drawings shall be submitted per procedure described in general or supplemental conditions or, in absence thereof, shall be submitted in five (5) copies, four of which will be returned to the Contractor after review and appropriate comments. Purpose of review shall be to assure compliance with intent of design and shall not relieve the Contractor of any responsibilities under the Contract. Material or items submitted will be held to comply exactly with characteristics of scheduled items or with specifications unless deviations are specifically noted on the submittal. See related requirements under Materials.

1.9.1.1.2 Submit Shop Drawings on the following items and n any other items requested by the Engineer:

1.9.1.1.2.1 HVAC

1.9.1.1.2.1.1 Ductwork systems

1.9.1.1.2.1.2 Grilles, diffusers, louvers

1.9.1.1.2.1.3 Control components

1.9.1.1.2.1.4 Packaged HVAC systems

1.9.1.1.2.1.5 Exhaust systems

1.9.1.1.2.1.6 Unit Heater

1.9.1.1.3 Shop Drawings shall be submitted as early as practical providing ample time for review and resubmittal if required. Failure of the Contractor to receive returned submittal shall not relieve him of any obligation or responsibilities under the Contract.

1.9.1.1.4 Shop Drawings shall be submitted in logical groupings including as few groups as possible. All submittals shall be signed by the submitting Subcontractor indicating his review and agreement with the submittals. Failure to sign shall be cause for rejection. Submittals shall be explicitly keyed to identifying numbers or symbols in the Drawings and Specifications.

1.9.1.2 Maintenance and Operations Literature

1.9.1.2.1 Submit at conclusion of project, three (3) copies of permanent three-ring binders containing, for all installed items, manufacturer's Maintenance and Operation instructions, spare

parts lists, installation instructions, etc. Specifically included shall be recommended periodic maintenance information for all items requiring periodic maintenance.

1.9.1.2.2 Include also copies of all manufacturer's warranties. This compilation of information shall be properly identified on cover and back.

1.9.1.3 Record Drawings: Submit, at conclusion of project, one (1) set of prints, marked in red, to indicate as-built conditions including any deviations or changes whether covered by change order or not. The Contractor shall secure from the Engineer one (1) set of prints for this purpose and this purpose exclusively. Prints submitted shall be marked "Record Prints", bear the name of the General Contractor and Subcontractor and be signed by an officer of the submitting Subcontractor.

1.10 GENERAL REQUIREMENTS

1.10.1 All equipment and materials shall be installed in conformance with manufacturer's recommendations and instructions unless in conflict with these Drawings and Specifications.

1.10.2 Conform to specific requirements shown on the Drawings or described elsewhere in these Specifications. All equipment furnished and installed shall be properly secured in place. Follow manufacturer's recommendations unless otherwise indicated; use vibration isolators where applicable. (See NOISE AND VIBRATION).

1.10.3 All piping, raceways, and equipment suspended from structure shall be supported with hangers designed for the purpose. Makeshift supports of wire are not acceptable. Hangers of perforated strap are not acceptable. Pipe support spacing shall be per Manufacturer's recommendations or as scheduled on the Drawings.

1.10.4 Wall-mounted equipment, devices, etc., shall be grouped neatly in a functionally logical arrangement, and in as aesthetically pleasing a manner as possible. Coordinate with other trades where their wall-mounted equipment is in close proximity.

1.10.5 Penetrations through walls, ceilings, or floors shall be accomplished neatly. Where visible, penetrations shall be provided with appropriate trim. Penetrations through exterior walls shall be made weatherproof and insect-proof.

1.10.6 Penetrations shall not impair the integrity of the wall, floor, or ceiling; e.g., dust-tight walls, soundproof walls, fire-rated walls, etc. Penetrations through roofs shall be made weatherproof.

1.10.7 All ferrous metal of equipment or structures installed outdoors shall be galvanized, or galvanized then painted, unless other treatment is specified or scheduled. All ferrous metal on equipment or structures installed indoors shall be painted, galvanized, or otherwise protected from rusting. Care shall be taken to protect integrity of finishes during handling, installation, field cutting, etc. Touch up all scratches, cuts, etc., with matching finish in a manner acceptable to Engineer.

- 1.10.8 Unless otherwise noted, motor starters for HVAC equipment shall be furnished by the Contractor furnishing such equipment, and shall be installed by the Electrical Contractor.
- 1.10.9 Unless otherwise indicated on the Drawings, hot water, where included in the project, shall have temperature set for 120° F maximum. The Contractor shall verify temperature setting with a thermometer.

1.11 NOISE AND VIBRATION

- 1.11.1 Each of the various pieces of equipment shall operate without objectionable vibration or noise. All rotating equipment shall be in static and dynamic balance and shall be mounted, supported and fastened so that no equipment vibration is transmitted to building structure, piping, ductwork, or other equipment. Vibration isolation, if not otherwise specified, shall be in accordance with manufacturer's recommendations.
- 1.11.2 If, in opinion of the Engineer, objectionable vibrations, or transmission thereof to the building occurs, the Contractor shall undertake such remedial measures as may be necessary to eliminate the objectionable condition at no additional cost to the City.

1.12 NAMEPLATE, IDENTIFICATIONS, AND MARKINGS

- 1.12.1 The following shall be identified with engraved nameplates as described hereinafter:

1.12.1.1 HVAC

1.12.1.1.1 Air handling units

1.12.1.1.2 Exhaust fans

1.12.1.1.3 Compressor/condenser units

1.12.1.1.4 Boiler

1.12.1.1.5 Unit Heaters

- 1.12.2 Unless otherwise indicated, nameplates shall be black phenolic with chamfered edges engraved with minimum 3/16" letters to white core. Attachment will be made by stainless steel screws. Adhesive attachments will not be accepted.
- 1.12.3 Nameplates on materials and equipment furnished will be maintained in original condition. Whenever possible, equipment shall be installed so that nameplates are readily visible. Damaged or unreadable nameplates shall be replaced. Where equipment is modified, nameplates shall be appropriately corrected.
- 1.12.4 Location of underground piping shall be marked by the use of underground warning tape, colored with printed message. Tape to be buried directly over pipe, 6" below finished grade. Tape to be polyethylene, 6" wide. Tape for metallic pipe to be .004" thick; tape for non-metallic pipe to consist of two layers of polyethylene with a metallic film ribbon between.

1.13 DESIGN CONDITIONS

- 1.13.1 The design of the Air Conditioning and Heating Systems are based on the data as shown on the Drawings including design temperatures and outside air requirements.
- 1.13.2 Above parameters are with system tolerances, capabilities, and design limitations. Equipment used must be able to produce the design conditions.

PART 2 - PRODUCTS Not applicable.

PART 3 - EXECUTION

3.1 INSPECTION, TESTS, CLEANING, ADJUSTMENT

- 3.1.1 Periodic inspections will be made during construction by the Engineer and/or the City. The Contractor will have an experienced, knowledgeable representative accompany inspector, open enclosures, provide requested tests, etc.
- 3.1.2 The Contractor will provide a knowledgeable representative to demonstrate all systems to the City's operating and maintenance personnel. This demonstration shall be set a minimum three (3) days in advance and shall be at a time specified by the City.
- 3.1.3 The Contractor shall test and balance system to meet original airflow quantities set forth on the Plans. The results of air balance tests are to be included in Maintenance and Operation Literature submittal. Results of tests are to be signed by the performing technician and by an officer of the sub-contractor.
- 3.1.4 After installation is completed, all work shall be thoroughly cleaned of dirt, dust, oil, grease, etc.; air filters shall be clean at the acceptance of the project. Refer to "Filters" as specified hereinafter in this Section.
- 3.1.5 Bearings shall be properly lubricated in accordance with manufacturer's recommendations.
- 3.1.6 After systems have been cleaned and tested to satisfaction of the Engineer, they shall be operated for a minimum period of one week and all necessary adjustments made to assure that systems are properly operating when turned over to the City.
- 3.1.7 After installation is completed, all work shall be thoroughly cleaned of dirt, dust, oil, grease, etc., remove all protective covers and polish all chrome, brass, etc.

3.2 EQUIPMENT INSTALLATION

- 3.2.1 It is the intent of these construction documents to describe an installation in which equipment is positioned to provide adequate clearances for compliance with applicable codes, for proper operation, for efficient maintenance, and for effective repairs. Care shall be taken by the Contractor to accomplish this end. Conduit, piping, insulation, mounting hardware, suspension members, etc. shall be installed to maintain these clearances.
- 3.2.2 If with careful and prudent planning, it is apparent that clearances indicated, or clearances recommended by the manufacturers, cannot be accomplished, the

Contractor shall immediately notify the Engineer and stop the affected work until instructed to proceed. No additional compensation shall be due the Contractor for rework due to failure to notify the Engineer in a timely manner.

- 3.2.3 Install equipment square, plumb, and level with access for proper operation and maintenance.
- 3.2.4 Installations shall be consistent in completeness and appearance whether enclosed or exposed.
- 3.2.5 Follow manufacturer's approved written directions for assembling, erecting, installing, lubricating, and cleaning manufactured equipment and materials.
- 3.2.6 Cut materials accurately to measurements established at Work site; install without springing or forcing.
- 3.2.7 Do not weaken structural portions of buildings or structures.
- 3.2.8 Make final connections to all equipment.
- 3.2.9 Install counterflashing.
- 3.2.10 Make allowance for expansion and contraction by use of swing joints, loops, or changes in direction.
- 3.2.11 Provide sleeves and inserts; coordinate location of sleeves, inserts, openings, and under floor lines in ample time to avoid cutting new construction.

3.3 DUCTWORK AND PIPING INSTALLATION

- 3.3.1 Install ductwork and piping parallel with the lines of the building unless otherwise indicated.
- 3.3.2 Make changes in size and direction with fittings.
- 3.3.3 Install access doors and access panels for concealed items such as valves, control motors, control components, and fire dampers.
- 3.3.4 Located access panels and access doors in ample time to avoid cutting new construction.

3.4 OPENING, CUTTING AND PATCHING

- 3.4.1 Openings: Major openings required for piping, ductwork, and equipment required for the Work shall be provided with due care and consideration for the work of other trades and for the appearance and integrity of the building.
- 3.4.2 Location: The Contractor shall, at a time in advance of the Work, verify the openings as shown on the Architectural Drawings.
- 3.4.3 Cutting and Patching: All additional cutting and patching and reinforcement of

construction of buildings shall be subject to approval by ENGINEER OF RECORD.

3.5 PIPE ESCUTCHEON

- 3.5.1 Pipe escutcheons shall be installed on each pipe penetration through floors, walls, partitions and ceilings where penetration is exposed to view, and on the exterior of the building. Escutcheons shall be secured to the pipe or insulation and shall cover the penetration hole. Insulation integrity shall be maintained.
- 3.5.2 Dimensions: Pipe sleeves shall be sized to permit free movement of piping and insulation, if any, but a minimum of two pipe sizes larger than the piping run, unless otherwise recommended by the sleeve seal manufacturer. The length of the sleeve shall be equal to the thickness of construction, except floor sleeves. Floor sleeves shall be ¼ inch longer than the thickness of construction for non-sloped floors, and 3/4 inch longer than the thickness of construction for floors sloped to drain.
- 3.5.3 Installation:
 - 3.5.3.1 Pipe sleeves shall be supported to prevent movement during placement of concrete or during installation of other work around sleeves. Sleeves shall be covered to prevent entrance of concrete or other foreign materials.
 - 3.5.3.2 Sleeves shall be installed flush to the surfaces except floor sleeves. Non-sloped- floor sleeves shall be installed 1/4 inch above finish floor, sloped-floor sleeves shall be installed 3/4 inch above finish floor.

3.6 PIPE SLEEVES SEALS

- 3.6.1 Pipe sleeves seals shall be installed in accordance with the seal manufacturer's written instructions to form a watertight seal between the pipe and sleeve. Seals shall be installed so the heads of bolts are a maximum of 3/4 inch from the surface of the penetrated structure. On exterior walls, the heads of bolts shall be a maximum of 3/4 inch from the exterior surface.
- 3.6.2 Sealing compound shall be applied in accordance with the sealing compound manufacturer's written instructions.
- 3.6.3 Sealing compound shall be applied between pipe and pipe-penetrated structures where pipe sleeves cannot be used. Sealing compound thickness shall be the same as the structure thickness.

3.7 DUCT CONSTRUCTION, HANGERS AND SUPPORTS

- 3.7.1 Comply with SMACNA HVAC Duct Construction Standards, 1st Edition and as shown on the drawings.
- 3.7.2 All supply, return, outside, toilet exhaust and general exhaust air ductwork shall be constructed, supported and installed in accordance with SMACNA, 1 inch W.G. class, Table 1-4 and its associated figures and tables.
- 3.7.3 Duct hangers and supports shall be in accordance with applicable sections of SMACNA Section IV.

3.8 EQUIPMENT SUPPORTS, BASES AND ANCHORS

- 3.8.1 Mechanical equipment such as piping, ductwork and fans shall be anchored to the structure with due care and in complete coordination with the structural systems design. Fastening devices and anchors installed after concrete has been poured shall require careful placement to ensure that damage to reinforcing steel or violation of structural integrity does not occur.
- 3.8.2 The Contractor shall be responsible for locating the anchors.
- 3.8.3 Concrete housekeeping pads and equipment supports shall be provided for all equipment and have dimensions as required to provide complete support of the equipment being furnished. Concrete pads shall extend a minimum of 4 inches beyond the outside dimension of equipment base. Equipment pads shall have a minimum of 1/2-inch top coat of approved cement grout, troweled to smooth and level finish. Minimum pad height shall be 6 inches or as shown on the drawings.
- 3.8.4 Dimensional drawings and tie down bolts for all equipment shall be provided in accordance with approved equipment manufacturer's requirements.

3.9 FLASHING

- 3.9.1 Flash and counterflash where mechanical equipment passes through weather or waterproofed walls, floors, and roofs.
- 3.9.2 Flash vent and soil pipes projecting above a finished roof surface with lead worked 1 inch minimum into the hub, 8 inches minimum clear on the sides, with minimum 24 inches x 24 inches sheet size. For pipes through outside walls, turn the flange back into the wall and caulk completely.
- 3.9.3 Flash floor drains over finished areas with lead, 10 inches clear on the sides, with minimum 36 inches x 36 inches sheet size. Fasten flashing to drain clamp device.
- 3.9.4 Provide curbs for mechanical roof installations, 8 inches high minimum. Flash and counterflash with steel, soldered and waterproofed. Curbs shall mate with its associated mechanical equipment.

END OF SECTION

Section 15101

MECHANICAL, HVAC PACKAGED UNITS

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

- 1.1.1 Outdoor mounted, electrically controlled Packaged heating and cooling unit utilizing a hermetic compressor(s) for cooling duty and gas combustion for heating duty. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.

1.2 QUALITY ASSURANCE

- 1.2.1 Unit shall be rated in accordance with ARI (Air-Conditioning & Refrigeration Institute) Standards 210/240-2003 or 360 and 270. Designed in accordance with Latest UL Standard.
- 1.2.2 Unit shall be designed to conform to ASHRAE 15, latest revision.
- 1.2.3 Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL listed and certified as a total package for safety requirements.
- 1.2.4 Roof curb where applicable shall be designed to conform to NRCA Standards.
- 1.2.5 Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- 1.2.6 Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
- 1.2.7 Unit shall be designed in accordance with ISO 9001, and shall be manufactured in a facility registered to ISO 9002/BS5750, Part 2.
- 1.2.8 Each unit shall be subjected to completely automated run testing on the assembly line. Each unit shall contain a factory-supplied printout indicating tested pressures, amperages, data, and inspectors; providing certification of the unit status at the time of manufacture.

1.3 DELIVERY, STORAGE, AND HANDLING

- 1.3.1 Unit shall be stored and handled per manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 EXHAUST FANS

- 2.1.1 Furnish and install exhaust fans as scheduled. Fans (other than rest room exhaust fans) shall be rated in accordance with standards of Air Moving and Conditioning Association, Inc. (AMCA). Sound rating for all units shall be in accordance with AMCA Standard 301.
- 2.1.2 Belt drive fans shall utilize totally enclosed, fan cooled, ball bearing motors unless otherwise specified. Provide high quality, steel core belts.
- 2.1.3 Acceptable Manufacturers: Greenheck, Cook or engineer pre-approved equal.

2.2 PACKAGED EQUIPMENT (STANDARD)

- 2.2.1 General:
 - 2.2.1.1 Factory assembled, single-piece heating and cooling unit. Contained within

the unit enclosure shall be all factory wiring, piping, controls, refrigerant charge (R-410A), and special features required prior to field start-up. Acceptable manufacturers; Trane, Johnson Controls or engineer pre-approved equal.

2.2.2 Unit Cabinet:

- 2.2.2.1 Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a pre-painted baked enamel finish on all externally exposed surfaces.
- 2.2.2.2 Evaporator fan compartment interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, flexible fiberglass insulation, coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
- 2.2.2.3 Cabinet panels shall be easily removable for servicing.
- 2.2.2.4 Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and over-head rigging.
- 2.2.2.5 Unit shall have a factory-installed, sloped condensate drain pan made of a non-corrosive material, providing a minimum 5/8-in. connection with both vertical and horizontal drains, and shall comply with ASHRAE Standard 62.
- 2.2.2.6 Unit shall have a factory-installed filter access panel to provide filter access with tool-less removal.
- 2.2.2.7 Unit shall have standard through-the-bottom gas and power connection capability (accessory kit, if any is required).

2.2.3 Fans:

- 2.2.3.1 Evaporator Fan:
 - 2.2.3.1.1 Fan shall be direct or belt driven as shown on the equipment drawings. Belt drive shall include an adjustable-pitch motor pulley.
 - 2.2.3.1.2 Fan wheel shall be double-inlet type with forward-curved blades.
 - 2.2.3.1.3 Bearings shall be sealed, permanently lubricated ball-bearing type for longer life and lower maintenance.
- 2.2.3.2 Evaporator fan shall be made from steel with a corrosion-resistant finish and shall be dynamically balanced.
- 2.2.3.3 Condenser fan shall be of the direct-driven propeller type and shall discharge air vertically.
- 2.2.3.4 Condenser fan shall have aluminum blades riveted to corrosion-resistant

steel spiders and shall be dynamically balanced.

2.2.3.5 Induced-draft blower shall be of the direct-driven, single inlet, forward-curved centrifugal type, made from steel with a corrosion-resistant finish and shall be dynamically balanced.

2.2.4 Compressor(s):

2.2.4.1 Fully hermetic type, internally protected.

2.2.4.2 Factory mounted on rubber grommets and internally spring mounted for vibration isolation.

2.2.4.3 Independent circuits shall be provided for units with cooling capacities equal to or greater than 7.5 tons.

2.2.5 Coils:

2.2.5.1 Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to copper tubes with all joints brazed.

2.2.5.2 Tube sheet openings shall be belled to prevent tube wear.

2.2.5.3 Evaporator coil shall be of the face-split design, in units with capacities equal to or greater than 7.5 tons. Evaporator coil shall be of the full-face active design for units with capacity less than 7.5 tons.

2.2.6 Heating Section:

2.2.6.1 Induced-draft combustion type with energy saving direct-spark ignition system and redundant main gas valve.

2.2.6.2 The heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.

2.2.6.3 Burners shall be of the in-shot type constructed of aluminum-coated steel.

2.2.6.4 All gas piping shall enter the unit cabinet at a single location.

2.2.6.5 The integrated gas controller (IGC) board shall include gas heat operation fault notification using an LED (light-emitting diode).

2.2.6.6 Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high-temperature limit switch. Fault indication shall be made using an LED.

2.2.6.7 The IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high-temperature limit switch.

2.2.6.8 The LED shall be visible without removal of control box access panel.

- 2.2.7 Refrigerant Components: Refrigerant circuit components shall include:
 - 2.2.7.1 Fixed orifice feed system.
 - 2.2.7.2 Refrigerant filter drier
 - 2.2.7.3 Service gage connections on suction, discharge, and liquid lines.
- 2.2.8 Filter Section:
 - 2.2.8.1 Standard filter section shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
 - 2.2.8.2 Filter face velocity shall not exceed 320 fpm at nominal airflows.
 - 2.2.8.3 Filter section should use only one size filter.
 - 2.2.8.4 Filters shall be accessible through an access panel with “no-tool” removal.
- 2.2.9 Controls and Safeties:
 - 2.2.9.1 Unit Controls: Unit shall be complete with self-contained low-voltage control circuit protected by an auto-reset device.
 - 2.2.9.2 Safeties:
 - 2.2.9.2.1 Unit shall incorporate compressor overtemperature and overcurrent safety devices to shut off compressor.
 - 2.2.9.2.2 Heating section shall be provided with the following minimum protections:
 - 2.2.9.2.2.1 High-temperature limit switch.
 - 2.2.9.2.2.2 Induced-draft motor speed sensor.
 - 2.2.9.2.2.3 Flame rollout switch.
 - 2.2.9.2.2.4 Flame proving controls.
- 2.2.10 Operating Characteristics:
 - 2.2.10.1 Unit shall be capable of starting and running at 115 F ambient outdoor temperature, meeting maximum load criteria of ARI Standard 210/240 or 360.
 - 2.2.10.2 Compressor with standard controls shall be capable of operation down to 25 F ambient outdoor temperature.
- 2.2.11 Electrical Requirements: All unit power wiring shall enter unit cabinet at a single

factory-predrilled location.

2.2.12 Motors:

- 2.2.12.1 Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
- 2.2.12.2 Evaporator-fan motor shall have permanently lubricated bearings and inherent automatic-reset thermal overload protection.
- 2.2.12.3 Totally enclosed condenser-fan motor shall have permanently lubricated bearings, and inherent automatic-reset thermal overload protection.
- 2.2.12.4 Induced-draft motor shall have permanently lubricated sealed bearings and inherent automatic-reset thermal overload protection.

2.2.13 Special Features:

- 2.2.13.1 Roof Curbs (Horizontal and Vertical):
 - 2.2.13.1.1 Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
 - 2.2.13.1.2 Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
- 2.2.13.2 Manual Outdoor-Air Damper: Manual damper package shall consist of damper, birdscreen, and rainhood which can be preset to admit up to 50% outdoor air for year round ventilation.
- 2.2.13.3 Electronic Programmable Thermostat: Capable of using deluxe full-featured electronic thermostat. Shall use built-in compressor cycle delay control for both heating and cooling duty. Capable of working with Carrier direct digital controls or Engineer approved equal.
- 2.2.13.4 Flue Shield: Provides protection from the hot sides of the gas flue hood.
- 2.2.13.5 Condenser Coil Hail Guard Assembly: Hail guard shall protect against damage from hail and flying debris.
- 2.2.13.6 Condenser Coil Grille: The grille protects the condenser coil from damage by large objects without increasing unit clearances.
- 2.2.13.7 Compressor Cycle Delay: Unit shall be prevented from restarting for minimum of 5 min. after shutdown.
- 2.2.13.8 Through the Bottom Service Connectors: Kit shall provide connectors to permit gas and electrical connections to be brought to the unit through the basepan.

- 2.2.13.9 Filter Status Switch: Provides status of filter (CLEAN/DIRTY). Status shall be displayed with an indicator light at the thermostat.

END OF SECTION

Section 15120

MECHANICAL, VIBRATION ISOLATION

PART 1 - GENERAL

1.1 GENERAL

- 1.1.1 All provisions of HVAC General Requirements, Section 15000, apply.

1.2 VIBRATION, GENERAL

- 1.2.1 It is the intent of these specifications that all equipment shall operate without excessive self-destructive vibration, and that any vibration generated shall not be transmitted to other equipment or the building structure.

- 1.2.2 The contractor shall provide recommended vibration isolation to accomplish this intent.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS APPLICATION

- 2.1.1 Vibration isolators shall be supplied for the following:

2.1.1.1 Equipment: Air Handling Unit, Floor Unit

2.1.1.2 Vibration Isolator Type: Stable Spring, Un-housed Isolator

2.1.1.3 Remarks: Korfund WSC, Sized for Equipment Point Loads

- 2.1.2 Catalog designations given are by Korfund; equal equipment by Amber/Booth, Vibration Mounting and Control, or Mason are acceptable.

- 2.1.3 Selection of size and ratings of vibration isolators shall be made by the vibration isolator supplier based on equipment information supplied by the HVAC Contractor and/or Plumbing Contractor.

- 2.1.4 Installation shall conform to manufacturer's recommendations.

2.2 VIBRATION ISOLATION PADS

- 2.2.1 Vibration isolating pads shall be provided at all vibrating equipment in accordance with manufacturer's recommendation and where indicated on the Drawings.

END OF SECTION

Section 15140

MECHANICAL MOTORS AND CONTROLLERS

PART 1 - GENERAL

1.1 GENERAL

1.1.1 All provisions of HVAC General Requirements, Section 15000, apply.

PART 2 - PRODUCTS

2.1 MOTORS, GENERAL

- 2.1.1 All motor-driven mechanical equipment shall be furnished with motors, factory installed.
- 2.1.2 Motors shall be suitable for continuous duty in ambient temperature for -30° C to 40° C at the rated service factor.
- 2.1.3 Motors shall have a service factor of 1.15, minimum.
- 2.1.4 All motors shall be UL listed.
- 2.1.5 Motor bearings shall be ball or cylindrical roller bearings, grease lubricated. Bearings shall be selected to provide a L-10 rated life of 30,000 hours with external load factors per NEMA MGI-14.42.

2.2 MOTORS, ENERGY EFFICIENT

- 2.2.1 Standard NEMA frame motors for equipment so indicated on the drawings shall be classified as "energy efficient" by the manufacturer.
- 2.2.2 Efficiency data for these motors shall be published by the manufacturer having been determined by testing are in accordance with the latest revision of NEMA MGI-12.53a, IEEE Test Standard, Method B with segregated loss analysis.
- 2.2.3 Typical minimum efficiencies of three phase energy efficient motors shall be as follows:

	<u>HPRPM</u>	<u>Efficiency</u>	<u>PF%</u>	
2.2.3.1	3	1,800	88.5	84.0
2.2.3.2	5	3,600	88.5	92.5
		1,800	87.5	85.0
		1,200	89.5	79.5
2.2.3.3	7-½	3,600	89.5	88.5
		1,800	90.2	84.0
		1,200	91.0	78.5
2.2.3.4	10	3,600	89.5	89.5

		1,800	90.2	86.5
		1,200	91.7	79.0
2.2.3.5	15	3,600	91.0	92.0
		1,800	91.7	83.5
		1,200	91.7	82.0
2.2.3.6	20	3,600	91.	93.0
		1,800	92.4	85.0
		1,200	91.7	83.5

2.3 MOTOR CONTROLLERS - GENERAL

- 2.3.1 HVAC Contractor shall furnish, for all motor driven equipment furnished by them, motor controllers appropriate for the equipment, complying with applicable codes, and complying with these specifications.
- 2.3.2 All motor control equipment (with exception of variable frequency controllers) furnished by a single sub-contractor shall be of the same manufacturer.
- 2.3.3 All motor control equipment shall include a normally closed auxiliary contact to control motor winding heaters.

2.4 MOTOR CONTROLLERS - ACROSS-THE-LINE START

- 2.4.1 Motor controllers (starters) shall be of the NEMA type, not IEC, unless otherwise noted. Overload relays shall be melting alloy type unless otherwise noted.
- 2.4.2 Motor controller, not automatically controlled, shall have start-stop push buttons in cover and shall have pilot light to indicate starter is energized.
- 2.4.3 Motor controllers, automatically controlled, shall have H-O-A switch in cover and shall have pilot light to indicate starter is energized.
- 2.4.4 Starter coils shall operate on 120 VAC. Provide control powered transformer with secondary fuse for starter operating on 460 volts. For starter operating on 208 volt system, line-to-neutral may be used for control; provide control fuse in starter enclosure. Where outside control signal is a voltage signal, furnish interposing relay.

PART 3 - EXECUTION Not applicable

END OF SECTION

Section 15300

MECHANICAL, HVAC AIR DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 GENERAL

- 1.1.1 All provisions of Mechanical General Requirements, Section 15000, apply.

PART 2 - PRODUCTS

2.1 DUCTWORK, RIGID

- 2.1.1 Furnish and install ductwork complying with Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) manual complete with necessary appurtenances. Prepare and submit shop drawings of ductwork systems indicating elevation of ductwork with respect to structure. Utilize shop drawings to plan offsets, etc.
- 2.1.2 Sheet metal shall be galvanized, "Softite" as manufactured by Wheeling or Armco or equal. Longitudinal seams in rectangular ducts shall be double locked and hammered flat. Duct systems shall be made airtight in accordance with SMACNA Balancing Manual. See section "Mechanical Insulation" for insulation requirements.
- 2.1.3 Turning vanes shall be installed in non-radius turns greater than 30 degrees.
- 2.1.4 Splitters where indicated shall be constructed of 16 gauge galvanized steel secured to a square operating rod of adequate cross-section to prevent distortion. Splitter shall be minimum of 1-½ times width of narrow split. Provide sheet metal sleeves where splitters occur in acoustic lined ductwork.
- 2.1.5 Where branch take-offs are indicated, furnish and install Tuttle and Bailey "Vectrol", Titus AG-45 with #3 controller, or equal.
- 2.1.6 Where ductwork is concealed, splitters and branch take-offs shall be equipped with No. 315 Young Regulator Operator, or equal, with chrome plated cover set flush with ceiling and located so as to avoid conflict with light fixtures. Where ductwork is exposed or above accessible ceiling they shall be equipped with locking type quadrants.
- 2.1.7 Furnish and install manual volume dampers where shown on Drawings. Damper blades shall be constructed of minimum 16 gauge galvanized sheet metal securely fastened to square operating rod.

2.2 DUCTWORK, FLEXIBLE

- 2.2.1 Flexible duct, minimum 8" nominal diameter, shall be ATCO Rubber Products company, Class I, suitable for indoor use, metalized jacketed, rated for a maximum velocity of 5000 fpm, maximum positive pressure of 10" WG per Underwriters Laboratory #181, pressure for 8" diameter duct not to exceed 6.0" WG, maximum negative pressure of 3/4" WG, permeability rating of 0.05, and in code compliance with NFPA. Flexible duct where shown shall consist of zinc coated spring steel helix, permanently bonded to a full interior liner, forming the duct core. Factory applied insulation shall be fiberglass, minimum thermal resistance R=5.0, sheathed in a seamless exterior vapor barrier jacket with vapor cuff, both ends. Flex duct used in return air plenum shall have fire spread/smoke developed rating of 25/50. Duct shall be tapped with spin-in fittings of proper type for duct material, incorporating volume damper and extractor unless otherwise indicated. Attachment of flex duct to spin-in shall be with stainless steel worm-gear band or plastic tie-wrap; volume damper handle shall remain operable.

- 2.2.2 Flexible duct shall be supported at points not exceeding 6 feet apart. Hangers shall be from supporting rings integral to the duct or shall be by saddles, minimum 1-½ in. width.
- 2.2.3 Flexible duct shall be installed with no bends exceeding 90 degrees; bending radius shall not be less than 1-½ times nominal duct diameter.
- 2.2.4 Maximum length of flexible duct runs shall be 10 feet unless specifically noted on the Drawings.

2.3 FLEXIBLE CONNECTIONS

- 2.3.1 Furnish and install flexible connections on suction and discharge side of units. Flexible connections to be made of "Ventglass" fire resistant glass fabric as manufactured by Ventfabrics, Inc., or equal, with suitable collar at each end. Material shall weigh approximately 30 ounces per square yard, securely and firmly attached so that a minimum of 2" clearance is provided between ends of the metal members. Connections shall be stitched and not stapled and shall be airtight. Connections exposed to the weather shall be equipped with a raintight and sun-proof shield.

2.4 GRILLES, REGISTERS, DIFFUSERS, LOUVERS

- 2.4.1 Furnish and install grilles, diffusers, registers as scheduled on the Drawings.
- 2.4.2 Substitution of manufacturer of these items is permissible only if of equal type and quality. The Engineer shall be sole judge of equality. The bid shall be based on scheduled items.
- 2.4.3 Grilles, diffusers, registers (air devices) shall be shop painted off-white unless otherwise indicated. For those air devices indicated to be job-painted provide prime coat and coordinate painting with Painting Contractor. Interior of air devices and connecting duct shall not be noticeably visible. Paint interior with flat black paint if required.
- 2.4.4 Where structure, ductwork, conduit, piping, or other items are visible in plenum space through return air grills, these items shall be painted or otherwise concealed to the satisfaction of the Engineer.
- 2.4.5 Verify compatibility of grilles, diffusers, registers, louvers to type of walls or ceilings called for on Architectural Plans. Install recessed devices so no gap is left between device and surface. Install device square with room walls unless otherwise noted.
- 2.4.6 Louvers installed in exterior walls shall be made weather-tight; properly flash device to walls with flashing compatible with wall material and construction.

2.5 FIRE DAMPERS

- 2.5.1 Furnish and install at locations shown on plans, indicated on schedules, or required by Code, fire dampers constructed, tested, and labeled in accordance with UL Standard 555. Fire dampers shall have a 1-½ hour UL classification where installed in walls,

partitions, or floors having a fire resistance rating of more than two hours but less than three hours as indicated on Architectural Plans. Fire dampers in walls, partitions, and floors rated three hours or more shall have a three hour UL classification. All fire dampers shall have a 212° F fusible link unless otherwise noted.

- 2.5.2 Fire dampers used for protection of ceiling openings shall be specifically classified as a ceiling fire damper.
- 2.5.3 Fire dampers shall be equipped for vertical or horizontal installation as required by the location shown. Fire dampers shall be installed using steel sleeves, angles, and other materials and practices required to comply with NFPA, SMACNA, and manufacturer's installation requirements, and to provide an installation substantially equal to conditions under which damper was tested at UL. Fire dampers shall be accessible for resetting and replacement of fusible link through an access door. Exposed access doors shall be architecturally compatible with wall or partition in which it is mounted.
- 2.5.4 Fire dampers in the open position shall not significantly impede air flow and, generally, shall not exceed 0.05 inches w.c. pressure drop at air flows indicated on plans. Submittal literature shall include performance data in accordance with AMCA Standard 500.

2.6 FILTERS

- 2.6.1 Provide filters in air handling units and elsewhere where called for.
- 2.6.2 Unless otherwise indicated on the plans, the air filters shall be commercial grade disposable panel type filters having minimum requirements as follows:
 - 2.6.2.1 Media: 2 inch thick, high efficiency, fiber blanket, factory sprayed with flameproof, non-drip, non-volatile adhesive. Provide industry standard sizes as required for installation.
 - 2.6.2.2 Rating: 500 FPM face velocity, 0.17 inch WG initial resistance, 0.65 inches WG recommended final resistance. Minimum efficiency is 25% as per ASHRAE 52-76 dust spot rating and average ASHRAE arrestance is 90%.
 - 2.6.2.3 Provide filter media in permanent removable frames.
 - 2.6.2.4 Holding Frames: 18 gauge minimum galvanized steel frame with 11 gauge galvanized steel rod grid on inlet and outlet side, hinged with pull and latch mechanism.
- 2.6.3 Filters shall be installed in system prior to initial operation of air moving equipment. Operation without filters installed shall mandate cleaning of coils and duct prior to acceptance.
- 2.6.4 Install clean set of filters at time of final acceptance. Leave one complete set of filters, labeled to indicate location of use, on the job site for future installation by the City.

2.7 FILTER FRAMES

- 2.7.1 Fabricate filter frames and supporting structures of 16 gauge galvanized steel or extruded aluminum T-section construction with necessary gasketing between frames and walls.
- 2.7.2 Standard Sizes: Provide for interchangeability of filter media of other manufacturers; for panel filters, size for required installation of filter media minimum 2 inch thick; for extended surface and high efficiency particulate filters, provide for upstream mounting.
- 2.7.3 Side Servicing Housings: Flanged for connection of ductwork, of reinforced 16 gauge galvanized steel; access doors with continuous gasketing and positive locking devices on both sides; extended aluminum tracks or channels for primary and secondary filters with positive sealing gaskets.

PART 3 – EXECUTION: Refer to Section 15000 – HVAC General Requirements.

END OF SECTION

Section 15320

MECHANICAL, HVAC TESTING, ADJUSTING, BALANCE

PART 1 - GENERAL

1.1 GENERAL

- 1.1.1 All provisions of HVAC General Requirements, Section 15000, apply.

1.2 QUALIFICATION OF THE TAB CONTRACTOR

- 1.2.1 The proposed Testing and Air Balancing Contractor (TAB), in order to be candidates for final selection by the Engineer, shall possess the following:
 - 1.2.1.1 Be independent of any HVAC Contractor and show proof of a minimum of five (5) years experience in air distribution balancing.
 - 1.2.1.2 Have the necessary test equipment to properly perform balancing.
- 1.2.2 The HVAC Contractor shall assure that the TAB Contractor meets the same insurance requirements as the HVAC Contractor either by inclusion under the HVAC Contractor's coverage or by separate coverage.

PART 2 - PRODUCTS Not applicable.

PART 3 - EXECUTION

3.1 AIR BALANCING AND TESTING

- 3.1.1 The Contractor shall obtain, at his expense, the services of an independent Testing and Air Balancing Contractor (TAB) who shall make final balance adjustments on the system and shall prepare and submit a written TAB balance report. The HVAC Contractor shall submit the names of at least two (2) qualified TAB Contractors for final selection by the Engineer. See 1.02 above.
- 3.1.2 The HVAC Contractor shall make any changes in the sheaves, belts, dampers, valves, deviations, etc., required for correct balance as required by the TAB Contractor, at no additional cost to the City.
- 3.1.3 In order that all systems may be properly tested, balanced, and adjusted as required herein by these specifications, the HVAC Contractor shall operate the system for the length of time necessary to properly verify completion and readiness for TAB. This length of time shall be acceptable to the Engineer.
- 3.1.4 The plans and specifications have indicated dampers and miscellaneous adjustment devices for the purpose of adjustment to obtain optimum operating conditions, and it shall be the responsibility of the HVAC Contractor to install these devices in a manner that will leave them accessible and readily adjustable. Should any such device not be readily accessible, the HVAC Contractor shall provide access to said device. Also, any malfunction encountered by the TAB Contractor and reported to the HVAC Contractor, General Contractor, or the Construction Inspector, shall be corrected by the HVAC Contractor immediately so the testing and balancing work can proceed.

3.2 PRELIMINARY REVIEW BY TAB CONTRACTOR

- 3.2.1 The HVAC Contractor shall, prior to installation of any piping or ductwork, submit a set of plans to the selected TAB Contractor, who shall review the plans and provide comments concerning any additional dampers, adjustment, or test points, which he believes necessary for proper air balance of the project. These comments will be submitted through the submittal procedure previously detailed.

3.3 REPORTING DOCUMENTATION

- 3.3.1 TAB contractor shall furnish for City's use one copy of all testing and balancing reports within one week of performing work. Additional copies of reports as required by the specifications for operation and maintenance manuals shall be furnished by the TAB contractor.

END OF SECTION

Section 15400

MECHANICAL, HVAC CONTROLS

PART 1 - GENERAL

1.1 GENERAL

- 1.1.1 All provisions of HVAC General Requirements, Section 15000, apply.

PART 2 - PRODUCTS

2.1 CONTROLS

- 2.1.1 Provide, for each air conditioning system, a low voltage programmable thermostat, automatic changeover, cooling, heating, fan on auto. Provide single or two stage for heating or cooling as indicated on the Drawings. Thermostats shall be honeywell chronotherm III or approved equal.
- 2.1.2 All HVAC control wiring to be in conduit. Electrical Contractor to furnish outlet box and conduit between air handling unit and compressor/condenser unit. Conduit to contain pull wire. HVAC Contractor to install and connect all low voltage wiring.
- 2.1.3 Coordinate with Electrical Contractor for proper location of boxes and conduit attachment equipment.
- 2.1.4 Exposed control wiring at units, strapped to piping, or any other location will not be accepted.
- 2.1.5 Control sequence to be as described on the Drawings.

PART 3 - EXECUTION Not applicable.

END OF SECTION

Section 15800

MECHANICAL, INSULATION

PART 1 - GENERAL

1.1 GENERAL

- 1.1.1 All provisions of Mechanical General Requirements Section apply.
- 1.1.2 Equivalent insulations by other manufacturers, meeting these specifications will be considered. Unless indicated otherwise, insulations shall be unicellular foamed elastomeric rubber meeting ASTM C534 and ASTM D-1056-SBE-41. Insulate for use in return air plenums shall, in addition, have flame spread rating of 25 or less and a smoke developed rating of 50 or less as tested by ASTM E-84-75.
- 1.1.3 Insulation shall be installed per manufacturer's published procedures including the use of the recommended adhesive.
- 1.1.4 Exposed insulation, shall be finished with two coats of vinyl lacquer per manufacturer's published procedures.
- 1.1.5 Insulated piping shall be supported with appropriate hangers as elsewhere specified.
- 1.1.6 Exterior insulated ductwork located outdoors - exterior insulated ductwork shall be protected with minimum .024" thick aluminum or 22 ga. Galv. Steel metal jacketing with

moisture barrier. Jacket to be secured in accordance with the jacket manufacturer's recommendations and longitudinal joints installed to prevent water infiltration. Sectional joints shall be secured using preformed clamps to manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 DUCT INSULATION

- 2.1.1 All supply and return air ducts will be insulated unless otherwise noted or specified. All sheet metal ducts shall be externally insulated with duct wrap; use tight cloth finish around external insulation for painting by others in area exposed to view.
- 2.1.2 Insulation shall be firmly butted at all joints with maximum allowable compression of 25%. All seams shall overlap a minimum of 2" and be finished with appropriate pressure sensitive tape with acrylic adhesive approved by SMACNA.
- 2.1.3 Installed thickness shall be as follows:
 - 2.1.3.1 Supply
 - 2.1.3.1.1 In Return Air Plenum (if any) -2"
 - 2.1.3.1.2 Not in Return Air Plenum - 2"
 - 2.1.3.2 Return - 2"
- 2.1.4 Unless otherwise specified lining material shall be as manufactured by Certain-Teed, Knauf, Owens-Corning, Manville, or approved equal.

2.1 EXTERIOR PIPE FIBERGLASS BLANKET INSULATION

- 2.1.1 General: Insulation material shall be Manville R-Series Microlite FSK, Owens-Corning Type ED100, or Certainteed Type 100 duct wrap 1 pound FSK flexible glass fiber blanket. A protective jacket shall be provided to minimize damage from maintenance work.
- 2.1.2 Conductivity: Insulation shall have an average thermal conductivity (K-value) of no more than 0.31 BTU at 75° F mean temperature and a 250° F temperature limit.
 - 2.1.2.1 Jacket: Insulation shall be furnished with a factory applied foil-scrim-Kraft facing consisting of 0.35 mil aluminum foil reinforced with glass yarn mesh and laminated to 40 pound chemically treated and fire resistant white Kraft.

2.2 INTERIOR PIPE INSULATION

- 2.2.1 Condensate lines in return air plenums as described above: Insulate with Armstrong Armaflex 2000, 1" wall thickness.
- 2.2.2 Condensate lines not in return air plenum and as described above: Insulate with Armstrong Armaflex 2000, 1" wall thickness minimum.

PART 3 – EXECUTION: Refer to Section 15000 – HVAC General Requirements.

END OF SECTION

**Technical Specifications
Mitsubishi Mini-Split System MSY-GE12NA-8 - MUY-GE12NA**

**Mechanical Drawings
M101, M102 & M103**

**A PDF version of the Mitsubishi Technical Specification and Mechanical
Drawings can be viewed at the following web link:**

<https://purchasing.houstontx.gov/buyer/BidDocumentManager.aspx?id=C24374>

Technical Specifications - Mitsubishi Mini-Split MSY-GE12NA-8 and MUY-GE12NA



COOLING & HEATING

SUBMITTAL DATA: MSY-GE12NA-8 & MUY-GE12NA

12,000 BTU/H WALL-MOUNTED AIR-CONDITIONING SYSTEMS

Job Name	Location	Date
Purchaser	Engineer:	
Submitted to:	For <input type="checkbox"/> Reference <input type="checkbox"/> Approval <input type="checkbox"/> Construction	
System Designation:	Schedule No.:	

GENERAL FEATURES

Wall-mounted indoor unit

Auto fan speed control also included
Hand-held Wireless Remote Controller
Indoor unit powered from outdoor unit using A-Control
Auto restart following a power outage

on the compressor
Anti-allergy Enzyme Filter

OPTIONAL ACCESSORIES

Outdoor Unit
Drain Socket Assembly (MAC-860DS)

Indoor Unit
Condensate Pump (230V; SI3100-230)

Controller Options
Wireless Remote Controller Kit (MHK1) with Remote Controller (MRCH1), Wireless Receiver (MIFH1), and cable (MRC1)*
Setback down to 50°F when used with MRCH1 Remote Controller
Portable Controller (MCCH1; for use with Wireless Remote Controller Kit MHK1)*
Outdoor Air Sensor (MOS1; for use with Remote Controller (MRCH1), Wireless Remote Controller Kit (MHK1) and Portable Controller (MCCH1)*

*See Submittal for information on each option.
Wall-mounted Wired Controller (PAR-21MAA; req. MAC-3971F)
MA Contact Terminal Interface (MAC-3971F)
M-NET Control Adapter (MAC-3991F)
Remote Temperature Sensor (M21-JKO-307)
Lockdown Bracket for Hand-held Controller (RCMKP1CB)

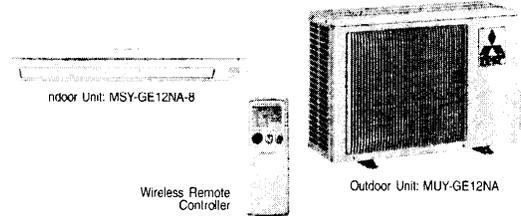
Cooling*
Rated Capacity 12,000 Btu/h
Minimum Capacity 3,800 Btu/h
SEER 20.5 Btu/h/W
Total Input 960 W
Rating Conditions (Cooling) - Indoor: 80°F (27°C) DB, 67°F (19°C) WB; Outdoor: 95°F (35°C) DB, 75°F (24°C) WB.

Electrical Requirements
Power Supply 208 / 230V, 1-Phase, 60 Hz
Breaker Size 15 A

Voltage
ndoor - Outdoor S1-S2 AC 208 / 230V
ndoor - Outdoor S2-S3 DC 12-24V
ndoor - Remote Controller Wireless

OPERATING RANGE

		Indoor Intake Air Temp.	Outdoor Intake Air Temp.
Cooling	Maximum	90 F (32 C) DB, 73 F (23 C) WB	115 F (46 C) DB
	Minimum	67 F (19 C) DB, 57 F (14 C) WB	14 F (-10 C) DB



Indoor Unit

MCA 1 A
Fan Motor 0.76 F.L.A.
Cooling 145 - 170 - 237 - 321 - 399 Dry CFM
109 - 134 - 201 - 286 - 364 Wet CFM
Cooling 19 - 22 - 30 - 37 - 45 dB(A)

DIMENSIONS	UNIT INCHES / MM
W	31-7/16 / 799
D	9-1/8 / 232
H	11-5/8 / 295

Weight 22 lbs. / 10 kg
External Finish Munsell No. 1.0Y 9.2 / 0.2
Field Drainpipe Size O.D. 5/8" / 15.88 mm

Outdoor Unit

Compressor DC Inverter-driven
MCA 12 A
Fan Motor 0.50 F.L.A.
Sound Pressure Level
Cooling 49 dB(A)

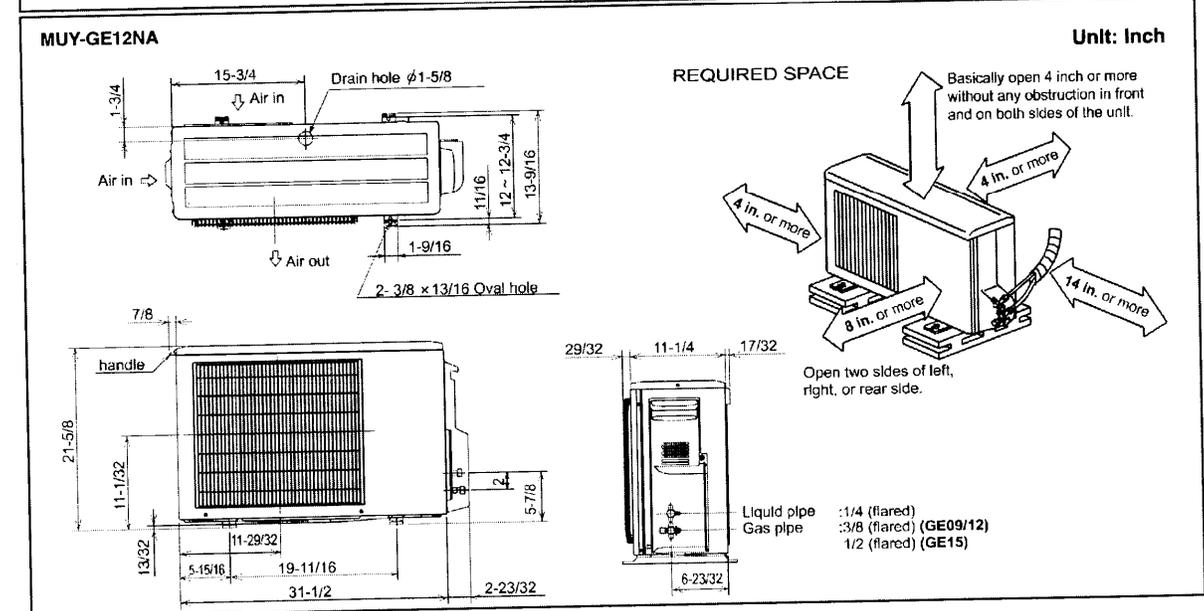
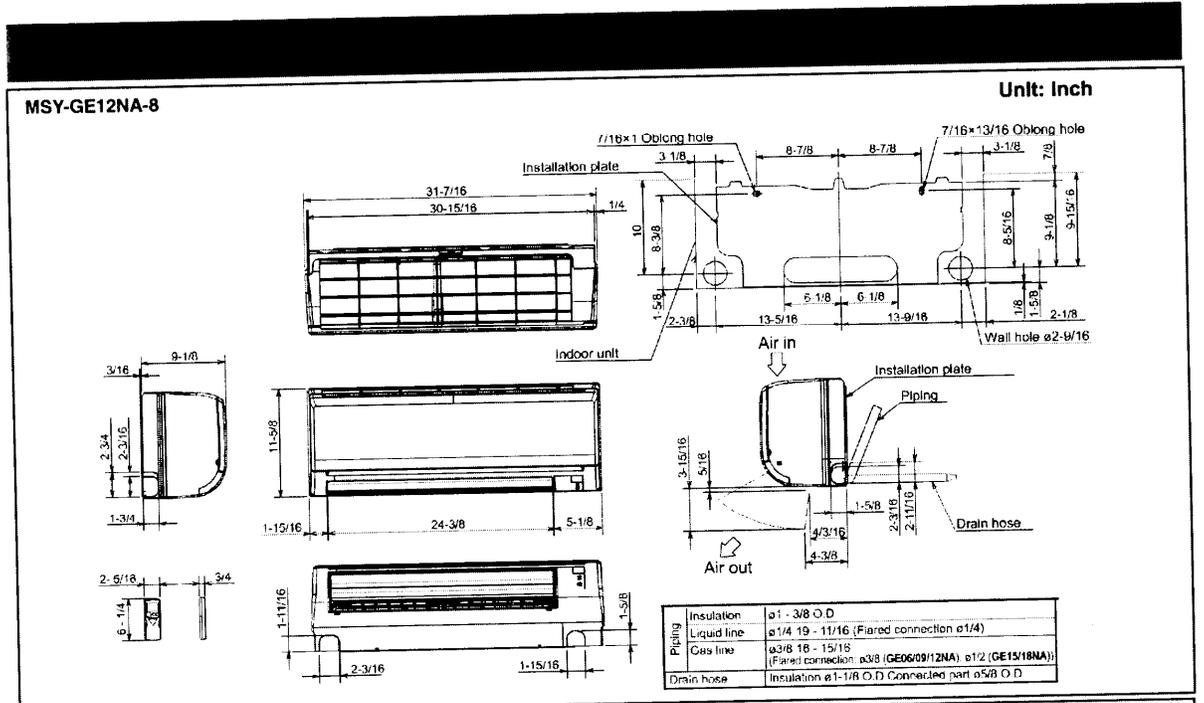
DIMENSIONS	INCHES / MM
W	31-1/2 / 800
D	11-1/4 / 286
H	21-5/8 / 549

Weight 77 lbs. / 35 kg
External Finish Munsell No. 3Y 7.8 / 1.

Refrigerant Type R410A
Refrigerant Pipe Size O.D.
Gas Side 3/8" / 9.52 mm
Liquid Side 1/4" / 6.35 mm
Max. Refrigerant Pipe Length 65 ft. / 20 m
Max. Refrigerant Pipe Height Difference 40 ft. / 12 m
Connection Method Flared



Technical Specifications - Mitsubishi Mini-Split MSY-GE12NA-8 and MUY-GE12NA (2)



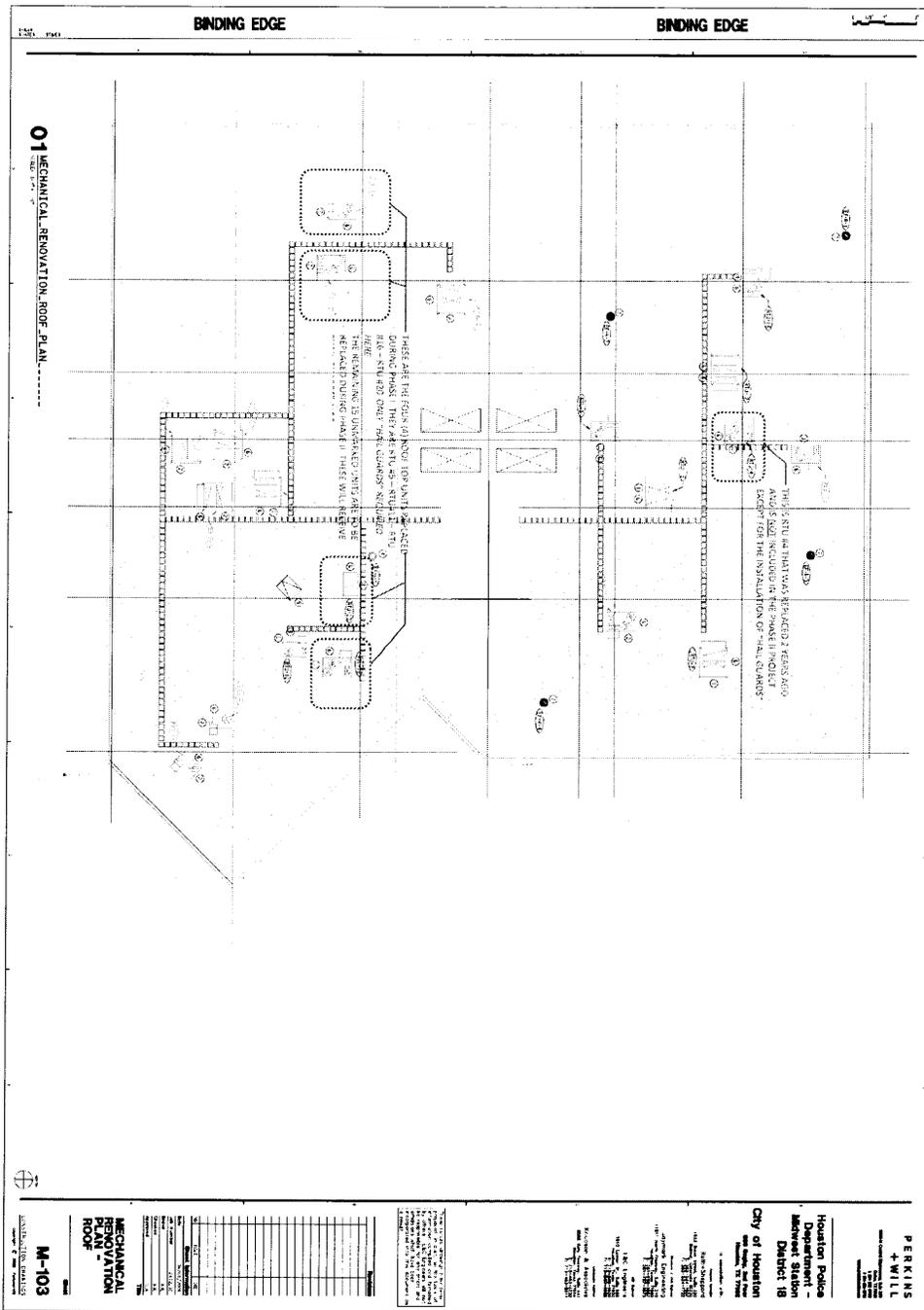
Intertek



3400 Lawrenceville Suwanee Rd
Suwanee, GA 30024

www.mehvac.com

FORM# MSY-GE12NA-8 - MUY-GE12NA - 201108
© 2011 MITSUBISHI ELECTRIC & ELECTRONICS, INC.



A PDF version of the Mitsubishi Technical specification and Mechanical drawings can be viewed at the following web link:
<https://purchasing.houstontx.gov/buyer/BidDocumentManager.aspx?id=C24374>

SECTION C

CITY OF HOUSTON 2012 BUILDING WAGE DECISION

A PDF version of the 2012 Building Wage Decision
can be viewed at the following web Link

<https://purchasing.houstontx.gov/buyer/BidDocumentManager.aspx?id=C24374>

GENERAL CONDITIONS

A PDF version of the General Conditions
can be viewed at the following web link:

<https://purchasing.houstontx.gov/buyer/BidDocumentManager.aspx?id=C24374>

Document 00800

SUPPLEMENTARY CONDITIONS

The following Paragraphs amend and supplement the 2011 edition of General Conditions. Unaltered portions of General Conditions remain in effect.

ARTICLE 3 - THE CONTRACTOR

3.5 *LABOR: Insert the following Paragraph 3.5.3.1.1.*

3.5.3.1.1 Contractor shall make good faith efforts to comply with the City ordinances regarding Minority and Women Business Enterprises (MWBE) and Persons with Disabilities Business Enterprises (PDBE) participation goals which are as follows:

- .1 the MWBE goal is 0 percent, and
- .2 the PDBE goal is 0 percent.

3.28 **CONTRACTOR DEBT**

3.28.1 **IF CONTRACTOR, AT ANY TIME DURING THE TERM OF THIS AGREEMENT, INCURS A DEBT, AS THE WORD IS DEFINED IN SECTION 15-122 OF THE HOUSTON CITY CODE OF ORDINANCES, IT SHALL IMMEDIATELY NOTIFY CITY CONTROLLER IN WRITING. IF CITY CONTROLLER BECOMES AWARE THAT CONTRACTOR HAS INCURRED A DEBT, IT SHALL IMMEDIATELY NOTIFY CONTRACTOR IN WRITING. IF CONTRACTOR DOES NOT PAY THE DEBT WITHIN 30 DAYS OF EITHER SUCH NOTIFICATION, CITY CONTROLLER MAY DEDUCT FUNDS IN AN AMOUNT EQUAL TO THE DEBT FROM ANY PAYMENTS OWED TO CONTRACTOR UNDER THIS AGREEMENT, AND CONTRACTOR WAIVES ANY RECOURSE THEREFORE.**

ARTICLE 8 - TIME

8.1 *PROGRESS AND COMPLETION: Delete Paragraph 8.1.6. and replace with the following 8.1.6.*

8.1.6.1 Contractor shall credit the City by Change Order for inspection services for overtime work or work performed on Sundays or Legal Holidays. The amount Contractor credits the City will be **\$50.00 per hour** per inspector for inspection services.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.1 *UNIT PRICE WORK: Delete Section 9.1 in its entirety and insert the following Section 9.1.*

9.1 References to Unit Prices in individual Specification sections are not applicable to the Contract. Include payment for portions of the Work required by these sections in the Stipulated Price for the Contract.

9.12 LIQUIDATED DAMAGES: Insert the following Paragraph 9.12.1.1.

9.12.1.1 The amount of liquidated damages provided in General Conditions Paragraph 9.12.1 payable by Contractor or Surety for each and every day of delay beyond Contract Time, are \$300.00 per day.

ARTICLE 11 - INSURANCE AND BONDS

11.2 *INSURANCE TO BE PROVIDED BY CONTRACTOR: Delete Paragraph 11.2.8. and replace with the following 11.2.8.*

11.2.1.4 Contractor shall provide Citys and Contractor's Protective Liability Insurance only if the contractor's bid price is equal to or greater than \$100,000.00.

11.2.8 *Endorsement of Primary Insurance: Each policy except Workers' Compensation Insurance must contain an endorsement that the policy is primary insurance to any other insurance available to additional insured with respect to claims arising under the Contract.*

PERFORMANCE BOND

THAT WE, _____, as Principal, (the "Contractor"), and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound to the City of Houston (the "City"), a municipal corporation, in the penal sum of \$_____ for the payment of which sum, well and truly to be made to the City, its successors and assigns, Contractor and Surety do bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has on or about this day executed a Contract in writing with the City for _____, _____, all of such work to be done as set out in full in said Contract documents therein referred to and adopted by the City Council, all of which are made a part of this instrument as fully and completely as if set out in full herein.

NOW THEREFORE, if the said Contractor shall faithfully and strictly perform the Contract in all its terms, provisions, and stipulations in accordance with its true meaning and effect, and in accordance with the Contract documents referred to therein and shall comply strictly with each and every provision of the Contract and with this Bond, then this obligation shall become null and void and shall have no further force and effect; otherwise the same is to remain in full force and effect. Should the Contractor fail to faithfully and strictly perform the Contract in all its terms, including but not limited to the indemnifications thereunder, the Surety shall be liable for all damages, losses, expenses and liabilities that the City may suffer in consequence thereof, as more fully set forth herein.

It is further understood and agreed that the Surety does hereby relieve the City or its representatives from the exercise of any diligence whatever in securing compliance on the part of the Contractor with the terms of the Contract, and the Surety agrees that it shall be bound to take notice of and shall be held to have knowledge of all acts or omissions of the Contractor in all matters pertaining to the Contract. The Surety understands and agrees that the provision in the Contract that the City will retain certain amounts due the Contractor until the expiration of 30 days from the acceptance of the Work is intended for the City's benefit, and the City will have the right to pay or withhold such retained amounts or any other amount owing under the Contract without changing or affecting the liability of the Surety hereon in any degree.

It is further expressly agreed by Surety that the City or its representatives are at liberty at any time, without notice to the Surety, to make any change in the Contract documents and in the Work to be done hereunder, as provided in the Contract, and in the terms and conditions thereof, or to make any change in, addition to, or deduction from the Work to be done hereunder; and that such changes, if made, shall not in any way vitiate the obligation in this Bond and undertaking or release the Surety there from.

It is further expressly agreed and understood that the Contractor and Surety will fully indemnify and save harmless the City from any liability, loss, cost, expense, or damage arising

out of Contractor's performance of the Contract.

If the City gives Surety notice of Contractor's default, Surety shall, within 45 days, take one of the following actions:

1. Arrange for Contractor, with consent of the City, to perform and complete the Contract; or
2. Take over and assume completion of the Contract itself, through its agents or through independent contractors, and become entitled to the payment of the balance of the Contract Price.

If the Surety fails to take either of the actions set out above, it shall be deemed to have waived its right to perform and complete the Contract and receive payment of the balance of the Contract Price and the City shall be entitled to enforce any remedies available at law, including but not limited to completing the Contract itself and recovering any cost in excess of the Original Contract Price from the Surety.

This Bond and all obligations created hereunder shall be performable in Harris County, Texas. This Bond is given in compliance with the provisions of Chapter 2253, Texas Government Code, as amended, which is incorporated herein by this reference.

Notices required or permitted hereunder shall be in writing and shall be deemed delivered when actually received or, if earlier, on the third day following deposit in a United States Postal Service post office or receptacle, with proper postage affixed (certified mail, return receipt requested), addressed to the respective other Party at the address prescribed in the Contract documents, or at such other address as the receiving party may hereafter prescribe by written notice to the sending party.

EXECUTED in multiple originals this _____ day of _____, 20_____.

ATTEST/SEAL: (if a corporation)

WITNESS: (if not corporation)

(Name of Principal)

(Address of Principal)

By: _____

Name:

Title:

Date:

By: _____

Name:

Title:

Date:

ATTEST/SEAL

SURETY WITNESS:

(Name of Surety)

(Address of Surety)

By: _____

Name:

Title:

Date:

By: _____

Name:

Title:

Date:

REVIEWED:

This Bond has been reviewed as to form by the undersigned Paralegal and has been found to meet established Legal Department criteria.

Date

Paralegal

STATUTORY PAYMENT BOND

THAT WE, _____, as Principal, hereinafter called Contractor and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound unto the City of Houston, a municipal corporation, in the sum of \$_____ for the payment of which sum, well and truly to be made to the City of Houston, and its successors, the said Contractor and Surety do bind themselves, their heirs, executors, administrators, successors, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has on or about this day executed a contract in writing with the City of Houston for _____, all of such work to be done as set out in full in said Contract documents therein referred to and adopted by the City Council, all of which are made a part of this instrument as fully and completely as if set out in full herein;

NOW, THEREFORE, if the said Contractor shall pay all claimants supplying labor and materials to him or a Subcontractor in the prosecution of the Work provided for in the Contract, then, this obligation shall be void; otherwise the same is to remain in full force and effect;

PROVIDED HOWEVER, that this Bond is executed pursuant to the provisions of Chapter 2253, Texas Government Code, as amended, and all liabilities on this Bond shall be determined in accordance with the provisions of said Article to the same extent as if it were copied at length herein.

IN WITNESS THEREOF, the said Contractor and Surety have signed and sealed this instrument on the respective dates written below their signatures and have attached current Power of Attorney.

I

ATTEST, SEAL: (if a corporation)

WITNESS: (if not a corporation)

Name of Contractor

By: _____

Name:

Title:

By: _____

Name:

Title:

Date:

ATTEST/SURETY WITNESS:

(SEAL)

Full Name of Surety

Address of Surety for Notice

Telephone Number of Surety

By: _____

Name:

Title:

Date:

By: _____

Name:

Title: Attorney-in-Fact

Date:

This Ordinance or Contract has been reviewed as to form by the undersigned legal assistant and have been found to meet established Legal Department criteria. The Legal Department has not reviewed the content of these documents.

Legal Assistant

Date

ONE-YEAR MAINTENANCE BOND

THAT WE, _____, as Principal, hereinafter called Contractor, and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound to the City of Houston, a municipal corporation, in the sum of \$_____, for the payment of which sum well and truly to be made to the City of Houston and its successors, the said Contractor and Surety do bind themselves, their heirs, executors, administrators, successors, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has on or about this day executed a Contract in writing with the City of Houston for _____

_____, all of such work to be done as set out in full in said Contract documents therein referred to and adopted by the City Council, all of which are made a part of this instrument as fully and completely as if set out in full herein.

NOW THEREFORE, if the said Contractor shall comply with the provisions of Paragraph 11.5.1 of the General Conditions, and correct work not in accordance with the Contract documents discovered within the established one-year period, then this obligation shall become null and void, and shall be of no further force and effect; otherwise, the same is to remain in full force and effect.

Notices required or permitted hereunder shall be in writing and shall be deemed delivered when actually received or, if earlier, on the third day following deposit in a United States Postal Service post office or receptacle, with proper postage affixed (certified mail, return receipt requested), addressed to the respective other party at the address prescribed in the Contract documents, or at such other address as the receiving party may hereafter prescribe by written notice to the sending party.

IN WITNESS THEREOF, the said Contractor and Surety have signed and sealed this instrument on the respective dates written below their signatures and have attached current Power of Attorney.

I

WITNESS: (if not a corporation)

Name of Contractor _____

By: _____

Name:

Title:

By: _____

Name:

Title:

Date:

ATTEST/SURETY WITNESS:

(SEAL)

Full Name of Surety

Address of Surety for Notice

Telephone Number of Surety

By: _____

Name:

Title:

Date:

By: _____

Name:

Title: Attorney-in-Fact

Date:

This Ordinance or Contract has been reviewed as to form by the undersigned legal assistant and have been found to meet established Legal Department criteria. The Legal Department has not reviewed the content of these documents.

Legal Assistant

Date