



**Request for Proposal  
HVAC Mechanical Equipment Package  
April 25<sup>th</sup>, 2022**

# RFP Bidding Specifications

## 1.0 INTENT

It is the intent of this specification to provide for the purchase of HVAC Mechanical Equipment Package to be used by Fargo Public Works.

Sealed proposals will be received by the City of Fargo Auditor's Office at 225 4<sup>th</sup> Street until 2:00 PM on Monday, April 25<sup>th</sup>, 2022.

In comparing proposals, comparison will not be confined to price only. The successful proposer will be one whose product is judged as best serving the interests of the City of Fargo when price, product, quality and delivery are considered. The City of Fargo also reserves the right to reject any or all proposals or any part thereof, and to waive any minor technicalities. A contract will be awarded to the proposer submitting the lowest responsible proposal meeting the requirements.

## 2.0 EQUIVALENT PRODUCT

Proposals will be accepted for consideration on any make or model that is equal or superior to the items specified. Decisions of equivalency will be at the sole interpretation of the City of Fargo. A blanket statement that equipment proposed will meet all requirements will not be sufficient to establish equivalence.

*An original manufacturer's brochure of the proposed product is to be submitted with proposal.*

## 3.0 INTERPRETATIONS

In order to be fair to all proposers, no oral interpretations will be given to any proposer, as to the meaning of the specification documents or any part thereof. Every request for such a consideration shall be made in writing. Based on such inquiry, the City of Fargo may choose to issue an addendum in accordance with local state laws.

## 4.0 GENERAL

The specification herein states the minimum requirements of the City of Fargo. All proposals must be regular in every respect. Unauthorized conditions, limitations, or provisions shall be cause for rejection. The City of Fargo will consider as irregular or non-responsive any and all proposals that are not prepared and submitted in accordance with the proposal document and specification, or any proposal lacking sufficient technical literature to enable the City of Fargo to make a reasonable determination of compliance to the specification. It shall be the proposer's responsibility to carefully examine each item of the specification. Failure to offer a completed proposal or failure to respond to each section of the technical specification (COMPLY: YES NO) will cause the proposal to be rejected without review as non-responsive. All variances, exceptions and/or deviations shall be fully described in the appropriate section. Deceit in responding to the specification will be cause for rejection.

**CITY OF FARGO RIGHTS**

The City reserves the right to cancel this RFP in writing or postpone the date and time for submitting proposals at any time prior to the proposal due date. The City by this RFP does not promise to accept the lowest cost or any other proposal and specifically reserves the right to reject any or all proposals, to waive any formal proposal requirements, to investigate the qualifications and experience of any Proposer, to reject any provisions in any proposal, to modify RFP contents, to obtain new proposals, to negotiate the requested services and contract terms with any Proposer, or to proceed to do the work otherwise.

The City hereby notifies all proposers that it will affirmatively ensure that in regard to any contract entered into, pursuant to this request, minority business enterprises will be afforded full opportunity and are encouraged to submit proposals in response to this invitation and will not be discriminated against on the grounds of race, color, sex, or national origin in consideration for an award. The City reserves the right to accept or reject any and all bids that is in the best interest of the City. All questions and inquiries will be addressed to:

Operational Questions:

Jeremy Magelky, PE  
Mechanical Engineer  
MBN Engineering, Inc.  
503 7<sup>th</sup> St. North, Suite 200  
Fargo, ND 58102

[JeremyMagelky@mbnengr.com](mailto:JeremyMagelky@mbnengr.com)

Phone: (701) 478-6336  
Fax:

Tanner Smedshammer  
Fleet Purchasing Manager  
Central Garage  
402 23<sup>rd</sup> St N  
Fargo, ND 58102

[Tanner.Smedshammer@FargoND.gov](mailto:Tanner.Smedshammer@FargoND.gov)

Phone: (701) 241-1460  
Fax: (701) 298-6971

## General Specification

Complete units shall be a new model's and shall include all standard equipment unless otherwise specified. On an attached sheet, bidder shall provide an explanation for all specification items without a "yes" response.

- WARRANTY:** Vendor will submit warranty on complete unit with bid
- MANUALS:** One (1) complete service manual, paperback or electronic  
One (1) complete parts manual, paperback or electronic  
Three (3) operations manuals, paperback or electronic
- DELIVERY:** Bidder must perform a complete pre-delivery service prior to delivery of equipment installed. All units are F.O.B., Fargo Public Works West, 2401 3<sup>rd</sup> St. North, Fargo, North Dakota.
- BIDDER QUALIFICATION:** Bidders must have a local dealer with a reasonable amount of parts inventory for the unit that has been bid and a complete service facility.
- Information shall include name of contact person and telephone number of that individual.

**SECTION 23 3600  
AIR TERMINAL UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Single-duct terminal units.
  - 1. Single-duct, variable-volume units.

**1.02 REFERENCE STANDARDS**

- A. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils 2001, with Addendum (2011).
- B. AHRI 880 (I-P) - Performance Rating of Air Terminals 2017.
- C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2018.
- D. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors current edition, including all revisions.

**1.03 SUBMITTALS**

- A. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate air flow, static pressure, and NC designation. Include electrical characteristics and connection requirements.
- B. Shop Drawings: Indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.
- C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists. Include directions for resetting constant-volume regulators.

**PART 2 PRODUCTS**

**2.01 SINGLE-DUCT, VARIABLE-VOLUME UNITS**

- A. Manufacturers:
  - 1. Price
  - 2. Titus
  - 3. Trane
  - 4. Nailor
  - 5. Envirotec
- B. General:
  - 1. Factory assembled, AHRI 880 rated, variable air volume control terminal with damper assembly, flow sensor, externally mounted volume controller, duct collars, and all required features. Provide with access door in the bottom of the plenum between the damper and heating coil.
  - 2. Control box bearing identification, including but not necessarily limited to nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil (right or left hand) connection, where applicable.
  - 3. Manufacturer shall receive controller and actuator from controls subcontractor on the project for factory installed controls.
- C. Unit Casing:
  - 1. Air Inlet Collar: Provide round, suitable for standard flexible duct sizes.
  - 2. Unit Discharge: Rectangular, with S slip and drive connections.
  - 3. Acceptable Liners:
    - a. 3/4 inch thick adhesive of fiber free foam complying with UL 181 erosion requirements in accordance with ASHRAE Std 62.1, and having a maximum smoke-developed index of 50, for both insulation and adhesive, when tested according to ASTM E84.
      - 1) Liner not to contain pentabrominated diphenyl ether (CAS #32534-81-9) or octabrominated diphenyl ether.

- D. Damper Assembly:
  - 1. Heavy-gage, galvanized steel or extruded aluminum construction with solid steel, nickel-plated shaft pivoting on HDPE, self-lubricating bearings.
  - 2. Provide integral position indicator or alternative method for indicating damper position over full range of 90 degrees.
  - 3. Incorporate low leak damper blades for tight airflow shutoff.
- E. Air Flow Sensor:
  - 1. Air flow sensor shall be of a cross configuration located at the inlet of the assembly. The sensor shall have twelve total pressure sensing ports and a center averaging chamber designed to accurately average the flow across the inlet of the assembly. Sensor shall provide accuracy within 5% with a 90° sheet metal elbow directly at the inlet of the assembly. The air flow sensor shall amplify the sensed air flow signal.
- F. Hot Water Heating Coil:
  - 1. Coil Casing: Minimum 22 gage, 0.0299 inch galvanized steel, factory-installed on terminal discharge with rectangular outlet, duct connection type.
  - 2. Minimum 2-row heating coil.
  - 3. Coil Fins: Aluminum or aluminum plated fins, mechanically-bonded to seamless copper tubes.
  - 4. Coil leak tested to minimum 350 psig.
  - 5. Base performance data on tests run in accordance with AHRI 410 and units to bear AHRI 410 label.
- G. Controls:
  - 1. Manufacturer shall receive controller and actuator from controls subcontractor on the project for factory installed controls.

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 23 5233.14  
FINNED MODULAR BOILERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Boilers.
- B. Controls and boiler trim.
- C. Hot water connections.
- D. Fuel connection.

**1.02 REFERENCE STANDARDS**

- A. ANSI Z21.13 - American National Standard for Gas-Fired Low-Pressure Steam and Hot Water Boilers; 2010.
- B. ASME (BPV IV) - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; The American Society of Mechanical Engineers; 2007.
- C. ASME (BPV VIII, 1) - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; The American Society of Mechanical Engineers; 2007.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2008.
- E. NFPA 54 - National Fuel Gas Code; National Fire Protection Association; 2009.
- F. UL (HCVCE) - Heating, Cooling, Ventilating and Cooking Equipment Directory; Underwriters Laboratories Inc.; current edition.

**1.03 SUBMITTALS**

- A. Product Data: Provide data indicating general assembly, components, controls, safety controls, and wiring diagrams with electrical characteristics and connection requirements.
- B. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start up instructions.
- C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, cleaning procedures, replacement parts list, and maintenance and repair data.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum ten years of documented experience.

**1.05 REGULATORY REQUIREMENTS**

- A. Conform to ASME (BPV IV) and (BPV VIII,1) for boiler construction.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect units before, during, and after installation from damage to casing by leaving factory shipping packaging in place until immediately prior to final acceptance.

**1.07 EXTRA MATERIALS**

- A. Provide one additional set of combustion air filters.

**1.08 WARRANTY**

- A. Provide a five year warranty to include coverage for heat exchangers.
- B. Provide a ten year warranty on the burner.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Lochinvar Corporation: [www.lochinvar.com](http://www.lochinvar.com).
- B. Burnham/Thermal Solutions Apex:

### **2.02 MANUFACTURED UNITS**

- A. Sealed combustion hot water boiler with stainless steel finned tube heat exchanger, gas burning system, combustion chamber, controls and boiler trim.
- B. Performance: See schedule on plans.

### **2.03 FABRICATION**

- A. Assembly: Stainless steel tube heat exchanger assembled within combustion chamber conforming to ASME (BPV IV) and (BPV VIII, 1) requirements, and tested for maximum working pressure of 160 psi.
- B. Combustion Chamber: Stainless steel metal-mesh burner enclosed in stainless steel with a fully water-backed tube sheet heat exchanger.
- C. Jacket: Galvanized steel with factory applied powder coat finish, insulated with foil faced fiberglass insulation.

### **2.04 FUEL BURNING SYSTEM**

- A. Sealed Combustion Gas Burner: Stainless steel metal-mesh burner with no moving parts, full modulation with minimum 10:1 turn down utilizing a VFD and negative pressure regulation gas valve, interrupted-type mixed fuel/air pilot system with electric spark-to-pilot ignition, pilot proving device, manual shut-off and automatic main and redundant 100% safety gas shut-off valves, high and low gas pressure switches, blower, replaceable combustion air filter and combustion air pressure switch.
- B. Safety Controls: Energize ignition, limit time for establishment of flame, prevent opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, energize blower motor, and after air flow proven allow gas valve to open. Conform to requirements of UL 795 and CSD-1.
- C. Corrosion resistant stainless steel condensate collection/evaporation components.
- D. Venting: Polypropylene piping rated for venting gas fired equipment.
- E. Air Intake: PVC piping.
- F. Provide factory concentric vent kit. Refer to drawings for roof or wall termination.

### **2.05 TRIM**

- A. ASME rated pressure relief valve set at 50 psi.
- B. Low water cut-off and inlet flow switch to automatically prevent burner operation when water falls below safe level or on low flow through boiler.
- C. Provide unit mounted water pressure and temperature gauge.

### **2.06 CONTROLS**

- A. Operating Controls: Smart System control with multi-colored graphic lcd display, pre-wired, factory assembled electric control including pilot safety and thermocouple transformer, 24-volt gas valve, manual main and pilot valves, and junction box.
- B. Electronic operating temperature controller:
  - 1. NEMA 250 Type 1 enclosure installed on boiler.
  - 2. Ambient temperature range -30 to 150 degrees F.
  - 3. Adjustable reset ratio of outside air temperature change to discharge control point change 1:2 to 100:1.
  - 4. Integral set point adjustment 80 to 230 degrees F.
  - 5. Electronic primary and outdoor sensors.



6. Built-in sequencing options for lead-lag or efficiency optimized modulation logic with rotation.
  7. Two terminal strips for safety and operating controls and integral relays for pump control.
- C. High limit temperature controller with manual reset for burner to prevent boiler water temperature from exceeding safe system temperature.

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 23 6213  
CONDENSING UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Condensing unit package.
- B. Charge of refrigerant and oil.
- C. Controls and control connections.
- D. Refrigerant piping connections.
- E. Motor starters.
- F. Electrical power connections.

**1.02 REFERENCE STANDARDS**

- A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment 2023.
- B. ASHRAE Std 15 - Safety Standard for Refrigeration Systems 2019, with All Amendments and Errata.
- C. ASHRAE Std 23.1 - Methods for Performance Testing Positive Displacement Refrigerant Compressors and Condensing Units that Operate at Subcritical Pressures of the Refrigerant 2019.
- D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2018.
- F. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical Current Edition, Including All Revisions.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Provide phase monitors and brown out protection on all three phase units.

**1.04 SUBMITTALS**

- A. Product Data: Provide rated capacities, weights specialties and accessories, electrical nameplate data, and wiring diagrams. Include equipment served by condensing units in submittal, or submit at same time, to ensure capacities are complementary.
- B. Shop Drawings: Indicate components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections. Include schematic layouts showing condensing units, cooling coils, refrigerant piping, and accessories required for complete system.
- C. Design Data: Indicate pipe and equipment sizing.
- D. Operation and Maintenance Data: Include start-up instructions, maintenance instructions, parts lists, controls, and accessories.
- E. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

**1.05 QUALITY ASSURANCE**

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

### **1.07 WARRANTY**

- A. Provide a five year warranty to include coverage for refrigerant compressors.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Aeon
- B. McQuay/Daikin
- C. Trane, a brand of Ingersoll Rand: [www.trane.com/#sle](http://www.trane.com/#sle).
- D. Johnson Controls/YORK

### **2.02 MANUFACTURED UNITS**

- A. Units: Self-contained, packaged, factory assembled and pre-wired units suitable for outdoor use consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, controls, liquid receiver, wind deflector, hail guards on condenser coils, and fan guards.
- B. Construction and Ratings: In accordance with AHRI 210/240. Test in accordance with ASHRAE Std 23.1.
- C. Performance Ratings: Energy Efficiency Rating (EER) and Coefficient of Performance (COP) not less than prescribed by ASHRAE Std 90.1.
- D. Provide phase monitors and brown out protection on all three phase units.

### **2.03 CASING**

- A. House components in welded steel frame with galvanized steel panels with weather resistant, baked enamel finish.
- B. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.
- C. Provide removable access doors or panels with quick fasteners and piano hinges.

### **2.04 CONDENSER COILS**

- A. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide sub-cooling circuits. Air test under water to 425 psig, and vacuum dehydrate. Seal with holding charge of nitrogen.

### **2.05 FANS AND MOTORS**

- A. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge. Equip with roller or ball bearings with grease fittings extended to outside of casing.
- B. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3 phase, with permanent lubricated ball bearings and built in current and thermal overload protection. Refer to Section 23 0513.

### **2.06 COMPRESSORS**

- A. Compressor: Semi-hermetic reciprocating type.
- B. Mounting: Statically and dynamically balance rotating parts and mount on spring vibration isolators.
- C. Lubrication System: Reversible, positive displacement oil pump with oil charging valve, oil level sight glass, and magnetic plug or strainer.
- D. Capacity Reduction Equipment: Suction valve unloaders, with lifting mechanism operated by electrically actuated solenoid valve, with unloaded compressor start; controlled from suction pressure.
- E. Sump Oil Heater: Evaporates refrigerant returning to sump during shut down. Energize heater continuously when compressor is not operating.

## **2.07 CONTROLS**

- A. On unit, mount weatherproof steel control panel, NEMA 250, containing power and control wiring, molded case disconnect switch, factory wired with single point power connection.
- B. For each compressor, provide across-the-line starter, non-recycling compressor overload, starter relay, and control power transformer or terminal for controls power. Provide manual reset current overload protection. For each condenser fan, provide across-the-line starter with starter relay.
- C. Provide safety controls arranged so any one will shut down machine:
  - 1. High discharge pressure switch (manual reset) for each compressor.
  - 2. Low suction pressure switch (automatic reset) for each compressor.
  - 3. Oil Pressure switch (manual reset).
- D. Provide the following operating controls:
  - 1. One minute off timer prevents compressor from short cycling.
  - 2. Hot gas bypass sized for minimum compressor loading on one compressor only, bypasses hot refrigerant gas to evaporator.
  - 3. Low ambient thermostat to lock out compressor at low ambient temperatures.
- E. Provide controls to permit operation down to 0 degrees F ambient temperature.
- F. Gauges: Prepiped for suction and discharge refrigerant pressures and oil pressure for each compressor.

## **PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 23 7313  
AIR-HANDLING UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Casing construction.
- B. Fan section.
- C. Coil section.
- D. Filter and air cleaner section.
- E. Damper section.
- F. Access section.

**1.02 REFERENCE STANDARDS**

- A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings 2015.
- B. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils 2001, with Addendum (2011).
- C. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program 2015.
- D. AMCA 99 - Standards Handbook 2016.
- E. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating 2016.
- F. AMCA 300 - Reverberant Room Method for Sound Testing of Fans 2014.
- G. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data 2014.
- H. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating 2018.
- I. ASHRAE Std 62.1 - Ventilation for Acceptable Indoor Air Quality Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.03 SUBMITTALS**

- A. Product Data:
  - 1. Published Literature: Indicate dimensions, weights, capacities, ratings, gauges and finishes of materials, and electrical characteristics and connection requirements.
  - 2. Fans: Performance and fan curves with specified operating point clearly plotted, power, RPM.
  - 3. Sound Power Level Data: Fan outlet and casing radiation at rated capacity.
- B. Shop Drawings: Indicate assembly, unit dimensions, weight loading, required clearances, construction details, field connection details, and electrical characteristics and connection requirements.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. Extra Filters: One set for each unit.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Accept products on site in factory-fabricated protective containers, with factory-installed shipping skids and lifting lugs. Inspect for damage.
- B. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.
- C. Do not operate units until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

## 1.05 EXTRA MATERIALS

- A. Supply one set for each unit of filters.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Daikin Applied: [www.daikinapplied.com/#sle](http://www.daikinapplied.com/#sle).
- B. Trane Inc: [www.trane.com/#sle](http://www.trane.com/#sle).
- C. York International Corporation / Johnson Controls Inc: [www.york.com/#sle](http://www.york.com/#sle).

### 2.02 CASING CONSTRUCTION

- A. Full Perimeter Base Rail:
  - 1. Construct of galvanized steel.
  - 2. Provide base rail of sufficient height to raise unit for external trapping of condensate drain pans.
- B. Casing:
  - 1. Construct of one piece, insulated, double wall panels.
  - 2. Provide mid-span, no through metal, internal thermal break.
  - 3. Construct outer panels of galvanized steel and inner panels of galvanized steel.
  - 4. Casing Air Pressure Performance Requirements:
    - a. Able to withstand up to 8 inches w.g. positive or negative static pressure.
    - b. Not to exceed 0.0042 inches per inch deflection at 1.5 times design static pressure up to a maximum of plus 8 inches w.g. in positive pressure sections and minus 8 inches w.g. in negative pressure sections.
- C. Drain Pan Construction:
  - 1. Provide cooling coil and humidifier sections with an insulated, double wall, stainless steel drain pan complying with ASHRAE Std 62.1 for indoor air quality and sufficiently sized to collect all condensate.
  - 2. Slope in two planes to promote positive drainage and eliminate stagnate water conditions.
  - 3. Locate outlet of sufficient diameter at lowest point of pan to prevent overflow at normal operating conditions.
  - 4. Provide threaded drain connections constructed of drain pan material, extended sufficient distance beyond the base to accommodate field installed, condensate drain trapping.
- D. Construction: Fabricate on channel base and drain pan of welded stainless steel. Assemble sections with gaskets and bolts. Outside and inside casing shall be solid galvanized steel. Insulation between the casings shall be foam with minimum R-13.
- E. Access Doors: galvanized steel insulated sandwich construction, for flush mounting, with hinges, gasket, latch, and handle assemblies,
- F. Drain Pans: Construct from double thickness stainless steel with insulation between layers with welded corners. Cross break and pitch to drain connection. Provide drain pans under cooling coil section .
- G. Strength: Provide structure to brace casings for suction pressure of 2.5 inch wg, with maximum deflection of 1 in 200.
- H. Performance: Case leakage rates shall not exceed 1% of supply air volume at design static pressure up to +- 8" w.c.
- I. Finish:
  - 1. Indoor Units
    - a. Baked Enamel Finish

### 2.03 FAN SECTION

- A. Type: Refer to the drawings for fan type.
- B. Performance Ratings: Determined in accordance with AMCA 210 and labeled with AMCA Certified Rating Seal.

- C. Sound Ratings: AMCA 301; tested to AMCA 300 and label with AMCA Certified Sound Rating Seal.
- D. Bearings: Self-aligning, grease lubricated, with lubrication fittings extended to exterior of casing with plastic tube and grease fitting rigidly attached to casing.
- E. External Motor Junction Box: Factory mount NEMA 4 external junction box and connect to extended motor leads from internally mounted motors.
- F. Motor Wiring Conduit: Factory wire fan motor wiring to the unit mounted starter-disconnect, variable frequency drive, and external motor junction box.
- G. Drives:
  - 1. Comply with AMCA 99.
  - 2. Bearings: Heavy duty pillow block type, ball bearings with ABMA STD 9 L-10 life at 50 000 hours.
- H. Shafts: Solid, hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.

#### **2.04 COIL SECTION**

- A. Casing: Provide access to both sides of coils. Enclose coils with headers and return bends exposed outside casing. Slide coils into casing through removable end panel with blank off sheets and sealing collars at connection penetrations.
- B. Drain Pans: 24 inch downstream of coil and down spouts for cooling coil banks more than one coil high.
- C. Eliminators: Three break of galvanized steel, mounted over drain pan.
- D. Air Coils:
  - 1. Certify capacities, pressure drops, and selection procedures in accordance with AHRI 410.
- E. Fabrication:
  - 1. Tubes: 1/2 inch or 5/8 inch OD seamless copper expanded into fins, brazed joints.
  - 2. Fins: Aluminum.
  - 3. Casing: Die formed channel frame of galvanized steel.
- F. Water Heating Coils:
  - 1. Headers: Seamless copper tube.
  - 2. Configuration: Drainable, with threaded plugs for drain and vent; serpentine type with return bends on smaller sizes and return headers on larger sizes.
- G. Refrigerant Coils:
  - 1. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.
  - 2. Headers: Seamless copper tubes with silver brazed joints.
  - 3. Liquid Distributors: Brass or copper venturi distributor with seamless copper distributor tubes.
  - 4. Configuration: Down feed with bottom suction.

#### **2.05 FILTER AND AIR CLEANER SECTION**

- A. General: Provide filter sections with filter racks, minimum of one access door for filter removal, and filter block-offs to prevent air bypass.
- B. Refer to plans for filter requirements.
- C. Filter Gages:
  - 1. 3-1/2 inch diameter diaphragm actuated dial in metal case with static pressure tips.

#### **2.06 DAMPER SECTION**

- A. Mixing Section: Provide a functional section to support the damper assembly for modulating the volume of outdoor and return air.
- B. Damper Blades:

1. Double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on each blade.
2. Self-lubricating stainless steel or synthetic sleeve bearings.
3. Comply with ASHRAE Std 90.1 I-P for rated maximum leakage rate.
4. Provide leakage testing and pressure ratings in compliance with AMCA 500-D test methods.
5. Arrange in parallel or opposed-blade configuration.

**2.07 ACCESS SECTION**

- A. Provide as required and where indicated on drawings and of sufficient size to allow for inspection, cleaning, and maintenance of field-installed components.
- B. Construct access doors same as previously specified within this Section.

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**