

SECTION 15720
AIR HANDLING UNITS
FUTURE/NOT IN CONTRACT

PART 1: GENERAL

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary Conditions, and Division 1 General Requirements, apply to work specified in this Section.
- B. Requirements of Section 15050, "Basic Mechanical Materials and Methods" apply to work specified in this Section.

1.02 SUMMARY

- A. This section includes Air handling units.
- B. Related Work Specified in Other Sections:
 - 1. Section 15070, "Vibration Control & Seismic Restraints" for vibration hangers and supports.
 - 2. Section 15910, "Control Systems" for control devices.
 - 3. Section 16420, "Motor starters"
 - 4. Division 16, Electrical power wiring.

1.03 SUBMITTALS

- A. Shop Drawings: Indicate assembly, unit dimensions, weight loading, required clearances, construction details, field connection details, and electrical characteristics and connection requirements.
- B. Submit computer generated fan curves for each air handling unit with specific design operating point noted.
- C. Submit a computer generated psychometric chart for each cooling coil with design points and final operating point clearly noted.
- D. Submit sound data for discharge, radiated and return position by octave band for each unit.
- E. Include calculations for required base rail heights.
- F. Product Data:
 - 1. Provide literature that indicates dimensions, weights, capacities, ratings, fan performance, gauges and finishes of materials, and electrical characteristics and connection requirements.

2. Provide data of filter media, filter performance data, filter assembly, and filter frames.

C. Manufacturer's Installation Instructions.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience, who issues complete catalog data on total product.

B. Codes and Standards:

1. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
2. AMCA 99 - Standards Handbook.
3. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
4. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
5. AMCA 500 - Test Methods for Louver, Dampers, and Shutters.
6. ARI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils.
7. ARI 430 - Central-Station Air-Handling Units.
8. ARI 435 - Application of Central-Station Air-Handling Units.
9. NEMA MG1 - Motors and Generators.
10. NFPA 70 - National Electrical Code.
11. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
12. UL 723 - Test for Surface Burning Characteristics of Building Materials
13. UL 900 - Test Performance of Air Filter Units.
14. UL 1995 - Standard for Heating and Cooling Equipment
15. UL 94 - Test for Flammability of Plastic Materials for Parts in Devices and Appliances

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site.

B. Accept products on site in factory-fabricated protective containers, with factory-installed shipping skids. Inspect for damage.

C. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

D. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

1.06 OPERATION AND MAINTENANCE DATA

A. Maintenance Data: Include instructions for lubrication, filter replacement, motor and drive replacement, spare parts lists, and wiring diagrams.

B. Provide one set for each unit of fan belts and filters.

PART 2: PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with requirements, provide air handling units by one of the following:
 - 1. McQuay
 - 2. York
 - 3. Trane
 - 4. Carrier

2.02 GENERAL DESCRIPTION

- A. Configuration: Fabricate as shown to efficiently fit in allocated position.
- B. Performance: Conform to ARI 430 and as scheduled
- C. Acoustics: Sound power levels (dB) for the unit shall not exceed the following specified levels. The manufacturer shall provide the necessary sound treatment to meet these levels if required.

Octave Band at Center Frequency (Hz)								
	63	125	250	500	1000	2000	4000	8000
Radiated								
Discharge								
Return								

2.03 CASING

- A. Fabricate unit casing of 16 gauge channel posts and removable panels assembled with mechanical fasteners and a galvanized steel finish. Assemble sections with high compression gasketing between each frame member and unit panel or door to prevent thermal bridging from interior to exterior of unit.
 - 1. Outside casing shall consist of 18 gauge, G90 galvanized steel; Internal lining 20 gauge, solid G90 galvanized steel.
 - 2. Floor plate: 20 gauge, G90 galvanized steel.
 - 3. Entire unit shall have a 8 inch full perimeter base rail for structural rigidity and condensate trapping.
- B. Module to module assembly shall be accomplished with an overlapping, full perimeter internal splice joint that is sealed with bulb type gasketing on both mating modules to minimize on-site labor along with meeting indoor air quality standards.
- C. Unit casing leak rate shall not exceed 0.5 cfm per square foot of cabinet area at 5” static pressure in order to meet efficiency and indoor air quality standards.
- D. Insulation: 2 inch thick, 3 lb. per cu ft density, neoprene coated, glass fiber insulation with adhesive and pins on units without liners.

- E. Access Doors: Made of galvanized steel, flush mounted to cabinetry, with minimum of two six inch long stainless steel piano-type hinges, latch and full size (4.5" minimum) handle assembly provide inspection window for fan section. Door shall swing outward for unit sections under negative pressure (inward for unit sections under positive pressure). Doors limited from swinging inward (such as side access filter sections) on positive pressure sections, shall have a secondary latch to relieve pressure and prevent injury upon access.
- F. Construct drain pans from 304 stainless steel with cross break and double sloping pitch to drain connection. Provide drain pans under cooling coil section and fan section. Drain connection centerline shall be a minimum of 3" above the base rail to aid in proper condensate trapping. Drain connections that protrude from the base rail are not acceptable.

2.04 SUPPLY / RETURN FANS

- A. Provide DWDI airfoil supply fan. Fan assemblies including fan, motor and sheaves shall be dynamically balanced by the manufacturer on all three planes and at all bearing supports. Manufacturer must ensure maximum fan RPM is below the first critical speed.
- B. Bearings shall be self-aligning, grease lubricated, ball or roller bearings with extended copper lubrication lines to access side of unit. Grease fittings shall be attached to the fan base assembly near access door. If not supplied at the factory, contractor shall mount copper lube lines in the field.
- C. Fan and motor shall be mounted internally on a steel base. Factory mount motor on slide base that can be slid out the side of unit if removal is required. Provide access to motor, drive, and bearings through hinged access door. Fan and motor assembly shall be mounted on 2" deflection spring vibration type isolators inside cabinetry.

2.05 BEARINGS AND DRIVES

- A. Bearings: Basic load rating computed in accordance with AFBMA - ANSI Standards, L-50 life at 200,000 hours, heavy duty pillow block type, self-aligning, grease-lubricated ball bearings.
- B. Shafts shall be solid, hot rolled steel, ground and polished, keyed to shaft, and protectively coated with lubricating oil. Hollow shafts are not acceptable.
- C. V-Belt drives shall be cast iron or steel sheaves, dynamically balanced, bored to fit shafts and keyed. Fixed sheaves, matched belts, and drive rated based on motor horsepower. Provide a minimum of 2 belts on all fans. Standard drive service factor 1.3 times fan brake horsepower.

2.06 ELECTRICAL

- A. Wiring Termination: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclosed terminal lugs in terminal box sized to NFPA 70.
- B. Motors: provide ODP type with premium efficiency suitable for operation with variable frequency drives. Electrical characteristics shall be as shown in schedule.

2.07 COOLING AND HEATING COIL SECTIONS

- A. Provide access to coils from opposite side of unit for service and cleaning. Enclose coil headers and return bends fully within unit casing. Unit shall be provided with coil connections that extend a minimum of 5" beyond unit casing for ease of installation. Drain and vent connections shall be provided exterior to unit casing. Coil connections must be factory sealed with grommets on interior and exterior and gasket sleeve between outer wall and liner where each pipe extends through the unit casing to minimize air leakage and condensation inside panel assembly. If not factory packaged, Contractor must supply all coil connection grommets and sleeves. Coils shall be removable through side and/or top panels of unit without the need to remove and disassemble the entire section from the unit.
- B. Certify air coil capacities, pressure drops, and selection procedures in accordance with ARI 410.
- C. Water Coils:
 - 1. Fins shall have a minimum thickness of 0.0075" of aluminum plate construction. Fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Bare copper tubes shall not be visible between fins.
 - 2. Coil tubes shall be 5/8 inch OD seamless copper, 0.020" nominal tube wall thickness, expanded into fins, brazed at joints. Soldered U-bends shall be provided to minimize the effects of erosion and premature failure having a minimum tube wall thickness of .025". 1/2" tubes and hairpin construction is not acceptable.
 - 3. Water coils shall be provided with headers of seamless copper tubing with intruded tube holes to permit expansion and contraction without creating undue stress or strain. Coil connections shall be carbon steel with connection size to be determined by manufacturer based upon the most efficient coil circuiting. Vent connections provided at the highest point to assure proper venting. Drain connections shall be provided at the lowest point to insure complete drainage and prevent freeze-up.
 - 4. Coil casings shall be a formed channel frame of galvanized steel.
 - 5. Provide two row high chilled water and energy recovery (run around loop) coils.

2.08 FILTERS

- A. Provide the filter section with filter racks and guides with hinged and latching access doors on both sides, for side loading and removal of filters
- B. Filter media shall be UL 900 listed, Class I or Class II.
- C. Flat arrangement with 2", deep pre- filters followed by 12" cartridge filters

2.09 ADDITIONAL SECTIONS

- A. Provide Mixing box section shall be with factory mounted low leak airfoil blade outside and return air dampers of galvanized steel in a galvanized frame. Dampers shall be hollow core airfoil blades, fully gasketed and have continuous vinyl seals between damper blades. Dampers shall have stainless steel jamb seals along end of dampers. Linkage and ABS plastic end caps shall be provided when return and outside air dampers sized for full airflow. Return and outside air dampers of different sizes must be driven separately.
- B. Access section shall provide access between components shall be a minimum of 36" deep. Access doors of galvanized steel for flush mounting, with gasket, latch and full size (minimum of 4.5") handle assembly. Heavy-duty floor thickness to be 14 gauge to accommodate walk-in weight of service technician.

2.10 DAMPERS

- A. Damper Leakage: Leakage rate shall be less than two tenths of one percent leakage at 2 inches static pressure differential. Leakage rate tested in accordance with AMCA Standard 500.

PART 3: EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

END OF SECTION 15720