SECTION 15751
DUCTLESS SPLIT AIR CONDITIONING SYSTEMS

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

A. The general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 General Requirements, apply to work specified in this Section.

B. Requirements of Section 15010, “Mechanical Filed Sub-Bid Requirements” and Section 15050, “Basic Mechanical Materials and Methods” apply to work specified in this section.

1.02 SUMMARY

A. This section specifies ductless split air conditioning systems, their installation and coordination with work of other trades.

B. Related Work Specified in Other Sections:

1. Division 15, Section “Hydronic HVAC Piping and Specialties”
2. Division 15, Section “Hangers and Supports”
3. Division 15, Section “Vibration Control and Seismic Restraint”
4. Division 16, Electrical

1.03 SUBMITTALS

A. General: Make submittals in accordance with requirements of Section 01300-Submittals.

B. Product Data: Submit manufacturer's product data and specifications including capacities, efficiencies, ratings, performance characteristics, finishes of materials, and installation instructions.

C. Shop Drawings: Submit assembly-type shop drawings showing unit dimensions, construction details, and field connection details.

D. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring to terminal units. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.

E. Maintenance Data: Submit maintenance instructions, including lubrication instructions, filter replacement, motor and drive replacement, and spare parts lists. Include this data, product data, shop drawings in maintenance manuals; in accordance with requirements of Division 1.

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of the specified equipment of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Codes and Standards:

1. ARI Compliance: Provide coil ratings in accordance with ARI Standard 410 “Forced-Circulation air-cooling and Air-Heating Coils”.

2. ASHRAE Compliance: Test coils in accordance with ASHRAE Standard 33 “Methods of Testing Forced Circulation Air Cooling and Heating Coils”.

3. ARI Compliance: Test and rate fan-coil units in accordance with ARI Standard 440 “Room Fan-Coil Air Conditioners”.

4. UL Compliance: Construct and install fan-coil units in compliance with UL 883 “Safety Standards for Fan Coil Units and Room Fan Heater Units”.

5. UL Compliance: Provide electrical components for terminal units which have been listed and labeled by UL.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Handle equipment and components to prevent damage. Replace damaged equipment or components with new.

B. Store equipment and components in clean dry location, off the ground and protect from weather, water, and physical damage.

C. Rig and place equipment in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

B. Split System Air Conditioning Units:
1. Sanyo.
2 Mitsubishi.
3. Friedrich.

2.02 DUCTLESS SPLIT AIR CONDITIONING SYSTEMS

A. General: Ductless split air-conditioning units shall consist of matched indoor fan coil unit(s) and outdoor, air cooled condensing units. Equipment shall be by same manufacturer.

B. Refrigerant: Provide factory holding charge of R-22 or nitrogen

C. Fan coil unit: Fan coil unit shall consist of evaporator coil, condensate drain pan, fan, motor, filters and controls in an insulated casing.

1. Casing: insulated, rugged, high-density plastic with knockouts for electrical power and control wiring.
2. Evaporator Coil: Copper tubing with mechanically bonded aluminum fins.
3. Discharge Louver/Grille: Provide permanent discharge grille or adjustable discharge air louver
4. Filter: permanent washable filter
5. Evaporator Fan: direct driven tangential type
6. Refrigerant Connections: provide flexible refrigerant piping leads that allow field piping connections for the right or left end of the unit.
7. Drainage: integral condensate drain pan with factory-connected flexible drain hose.

D. Condensing Unit: Condensing unit shall consist of compressor, condenser coil, condenser fan, and controls enclosed in a heavy gage enclosure designed for outdoor installation.

1. Compressor: hermetically sealed mounted on vibration isolators and overload protection. Provide time delay controls for compressor protection.
2. Casing: heavy gage, zinc-coated cabinet with baked-on electrostatic primer and enamel finish. Provide knockouts for electrical and controls connections. Provide removable panel and/or access doors for servicing.
3. Condenser Coil: copper tubing with mechanically bonded aluminum fins.
4. Discharge Grille: Provide weather resistant discharge louver.
5. Condenser Fan: direct driven propeller type with totally enclosed motor
6. Refrigerant Connections: provide service valves in refrigerant liquid and suction lines.

E. Accessories: Provide the following accessories

1. Brackets for mounting fan coil unit to wall or ceiling as applicable
2. Emergency shut-off switch to permit bypass of control circuit and force cooling operation.
3. Temporary control switch to allow for manual operation of unit if controller is malfunctioning or misplaced.
4. Trim to give installation finished appearance

2.03 REFRIGERANT AND OIL

A. Provide refrigerant of types and quantities recommended by HVAC equipment manufacturer for proper system operation. Refrigerant shall be specifically for use in HVAC refrigeration applications.

B. Provide oil of types and quantities recommended by HVAC equipment manufacturer for proper system operation. Oil shall be specifically for use in HVAC refrigeration applications.

PART 3 - EXECUTION

3.01 EXAMINATION AND COORDINATION

A. Examine equipment for damage prior to installation; do not install damaged equipment. Remove and replace damaged or malfunctioning equipment with new.

B. Examine conditions under which equipment is to be installed prior to installation. Coordinate with work of other trades. Inform Architect of any issues that may present problems prior to installation.

C. Coordinate installation of equipment supports and roof penetrations with General Contractor.

D. Coordinate installation of piping with Piping Contractor.

E. Coordinate power wiring with Electrical Contractor.

3.02 INSTALLATION

A. Install equipment in accordance with manufacturer's installation instructions.

B. Install equipment level and plumb.

C. Install equipment so that manufacturer's recommended clearances are maitained.

D. Install components furnished by equipment manufacturer for field installation.

E. Anchor equipment to supports and/or provide vibration isolation and/or seismic control as specified in Division 15, “Vibration Control and Seismic Restraint”.

F. After refrigerant coils/system have been checked for leaks, provide refrigerant and oil and charge system as directed by the equipment manufacturer, as specified in Section “Refrigerant Piping Systems”.

3.03 CONNECTIONS

A. Install piping to allow service and maintenance.

B. Provide flexible connectors at piping connections.

C. Coordinate with Division 16 to provide electrical connections.

3.04 FIELD QUALITY CONTROL

A. Test DX Cooling Coils/refrigerant system as specified in Division 15, “Refrigerant Piping Systems”. Handle and dispose of refrigerant in accordance with ASHRAE 15, “Safety Code for Mechanical Refrigeration”.

B. Operational Test: Upon completion of inspection, testing, and startup, test system for proper operation and system capacity. Repair malfunctions and/or replace components. Re-test equipment until proper operation is achieved.

C. Inspect and test refrigerant piping according to ASME B31.5, Chapter VI
   1. After system has been placed and installed, remove core of filter drier, charge system with nitrogen to 200 psig. Perform final inspection at 27 psig vaccum and 200 psig and oil and test for leaks using halide torch or electronic leak detector. Repair leaks.

D. Handle and dispose of refrigerant in accordance with ASHRAE 15, “Safety Code for Mechanical Refrigeration”.

E. Operational Test: Upon completion of inspection, leak testing, and startup, test system to for proper operation, system capacity, compatability with air handling equipment served, and compliance with requirements. Repair malfunctions and/or replace components. Re-test equipment until proper operation is achieved.

F. Comply with USM IDAT per section 01810.

3.05 CLEANING

A. After completing system installation and testing, inspect exposed finishes. Clean and remove burrs and construction debris; repair damaged finishes.

B Vacuum equipment interior to remove foreign material and construction dirt and dust. Vacuum clean fan wheel, fan cabinet, and coils.

3.06 TRAINING

A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:

   1. Representative shall provide a minimum of 4 hours of training with Owner. Provide at least 7 days' advance notice.

   2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.

   3. Review data in the maintenance manuals. Refer to Section 01770 “Closeout Procedures and Submittals.”

3.07 DEMONSTRATION

A. After completion of inspections, installation, and testing, contractor shall perform the following demonstration inspections and tests in the presence of the Architect. Refer to Section 15050, Basic Mechanical Materials and Methods”, for scheduling and coordination of demonstrations.

   1. Verification of proper installation

   2. System functional and safety tests

   3. System operational tests

END OF SECTION 15750