SECTION 221519 - GENERAL-SERVICE PACKAGED AIR COMPRESSORS AND RECEIVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Reciprocating air compressors - oil free.
2. Air filters - inlet type.
3. Compressed-air aftercoolers - air cooled.
4. Compressed-air dryers - refrigerant type.

1.2 DEFINITIONS

A. Actual Air: Air delivered from air compressors. Flow rate is delivered compressed air measured in acfm.

B. Standard Air: Free air at 68 deg F and 1 atmosphere before compression or expansion and measured in scfm.

1.3 ACTION SUBMITTALS

A. Product Data: For each product.

1. For each type of product.

a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
b. Include operating characteristics, electrical characteristics, and furnished accessories.

B. Shop Drawings:

1. Plans, elevations, sections, and mounting details.
2. Details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations and size of each field connection.
3. Diagrams for power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For compressed-air equipment.

1. Indicate actual installed items by marking the submittals with an arrow or box.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Air Compressor, Inlet-Air-Filter Elements: Equal to 100 percent of amount installed, but no fewer than 1 unit.
2. Belts: One for each belt-driven compressor.

1.6 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's written instructions for delivery, storage, and handling.

1.8 WARRANTY

A. Manufacturer Warranty: Manufacturer agrees to repair or replace equipment that fail in materials or workmanship within the specified warranty period.

1. Failures include, but are not limited to, the following:

a. Faulty operation of compressor, safety relief valve, pressure regulating valve, pressure switch, or after cooler .
b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of air compressor through one source from a single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASME Compliance: Fabricate and label receivers to comply with ASME Boiler and Pressure Vessel Code.

2.3 GENERAL REQUIREMENTS FOR PACKAGED AIR COMPRESSORS AND RECEIVERS

A. General Description: Factory-assembled, -wired, -piped, and -tested; electric-motor-driven; air-cooled; continuous-duty air compressors and receivers that deliver air of quality equal to intake air.

B. Control Panels: Automatic control station with load control and protection functions. Comply with NEMA ICS 2 and UL 508.

1. Enclosure: NEMA ICS 6, Type 12 control panel unless otherwise indicated.
2. Motor Controllers: Full-voltage, combination magnetic type with undervoltage release feature and motor-circuit-protector-type disconnecting means and short-circuit protective device.
3. Control Voltage: 120 V ac or less, using integral control power transformer.
4. Motor Overload Protection: Overload relay in each phase.
5. Starting Devices: Hand-off-automatic selector switch in cover of control panel, plus pilot device for automatic control.
6. Instrumentation: Include discharge-air pressure gauge, air-filter maintenance indicator, hour meter, compressor discharge-air and coolant temperature gauges, and control transformer.

C. Receivers: Steel tank constructed in accordance with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

1. Pressure Rating: At least as high as highest discharge pressure of connected compressors, and bearing appropriate code symbols.
2. Interior Finish: Corrosion-resistant coating.
3. Accessories: Include safety valve, pressure gauge, drain, and pressure-reducing valve.

2.4 RECIPROCATING AIR COMPRESSORS - OIL LESS

A. Compressor(s): Oil-less (nonlubricated), reciprocating-piston type, with sealed oil-free bearings, that deliver air of quality equal to intake air.

1. High discharge-air temperature switch.
2. Belt guard totally enclosing pulleys and belts.

B. Receiver: ASME construction steel tank.

1. Arrangement: Horizontal or Vertical.
2. Capacity: Per Plan.
3. Interior Finish: Epoxy or galvanized coating.
4. Pressure Rating-150 psig minimum.
5. Pressure Regulator Setting:100 psig.
6. Pressure Relief Valve Setting: 150 psig.
7. Drain: Automatic valve.

2.5 AIR FILTERS - INLET TYPE

A. Description for Each Compressor: Combination inlet-air filter-silencer, suitable for remote installation, for each air compressor.

1. Construction: Weatherproof housing for replaceable, dry-type filter element, with silencer tubes or other method of sound reduction.
2. Capacity: Match capacity of air compressor, with filter having collection efficiency of 99 percent retention of particles larger than 10 micrometers.

2.6 COMPRESSED-AIR AFTERCOOLERS - AIR COOLED

A. Compressed-Air Aftercoolers - Air Cooled.

B. Description: Electric-motor-driven, fan-operation, finned-tube unit; rated at 250 psig and leak tested at 350 psig minimum air pressure; in capacities indicated. Size units to cool compressed air in compressor-rated capacities to 10 deg F above summertime maximum ambient temperature. Include moisture separator and automatic drain.

2.7 COMPRESSED-AIR DRYERS - REFRIGERANT TYPE

A. Compressed-Air Dryers - Refrigerant Type.

B. Description: Noncycling, air-cooled, electric-motor-driven unit with steel enclosure and capability to deliver 35 deg F, 100 psigair at dew point. Include automatic ejection of condensate from airstream, step-down transformers, disconnect switches, inlet and outlet pressure gauges, thermometers, automatic controls, and filters.

2.8 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230500 "Common Work Results for Mechanical."

1. Enclosure: Rated for outdoor use under a canopy.
2. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load does not require motor to operate in service factor range above 1.0.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of compressed air piping to verify actual location before air compressor installation.

3.2 INSTALLATION OF EQUIPMENT

A. Equipment Mounting:

1. Install air compressors, aftercoolers, and air dryers on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Comply with requirements for vibration isolation and seismic control devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Install compressed-air equipment anchored to substrate.

C. Arrange equipment so controls and devices are accessible for servicing.

D. Maintain manufacturer's recommended clearances for service and maintenance.

E. Install the following devices on compressed-air equipment:

1. Thermometer, Pressure Gauge, and Safety Valve: Install on each compressed-air receiver.
2. Pressure Regulators: Install downstream from air compressors and dryers.
3. Automatic Drain Valves: Install on aftercoolers, receivers, and dryers. Discharge condensate over nearest floor drain.

3.3 PIPING CONNECTIONS

A. Comply with requirements for piping specified in Section 221513 "General-Service Compressed-Air And Process Gas Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to equipment, allow space for service and maintenance.

3.4 ELECTRICAL CONNECTIONS

A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate to be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."

3.5 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

3.6 IDENTIFICATION

A. Identify general-service air compressors and components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.7 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks in accordance with manufacturer's written instructions.
2. Check for lubricating oil in lubricated-type equipment.
3. Check belt drives for proper tension.
4. Verify that air compressor inlet filters and piping are clear.
5. Check for equipment vibration-control supports and flexible pipe connectors, and verify that equipment is properly attached to substrate.
6. Check safety valves for correct settings. Ensure that settings are higher than air compressor discharge pressure, but not higher than rating of system components.
7. Drain receiver tanks.
8. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
9. Test and adjust controls and safeties.

3.8 ADJUSTING

A. Adjust equipment to function smoothly, and lubricate as recommended by manufacturer.

B. Adjust control set points.

3.9 FIELD QUALITY CONTROL

A. Test Agency: Engage a qualified testing agency to perform tests and inspections.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuity has been energized, start unit to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
5. Air compressors, aftercoolers, air dryers, and controllers will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 221519