PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Lubricated, reciprocating air compressors.
2. Oil-flooded, rotary-screw air compressors.
3. Oil-sealed, rotary, sliding-vane air compressors.
4. Inlet-air filters.
5. Air-cooled, compressed-air aftercoolers.
6. Refrigerant compressed-air dryers.

1.2 PERFORMANCE REQUIREMENTS

A. [Delegated Design: Design compressed-air equipment mounting, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.]

B. Seismic Performance: Compressed-air equipment shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.3 SUBMITTALS

A. Product Data: For each model indicated, provided dimensions, weights, capacities at scheduled conditions, electrical requirements, required clearances, methods for assembling components, accessories, and location and size of each field connection.

B. [Delegated-Design Submittal: For compressed-air equipment mounting indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.]

1. [Detail fabrication and assembly of supports.]
2. [Design Calculations: Calculate requirements for selecting vibration isolators[ and seismic restraints] and for designing vibration isolation bases.]

C. Seismic Qualification Certificates: For compressed-air equipment, accessories, and components, from manufacturers.

D. Operation and maintenance data.
1.4 QUALITY ASSURANCE

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.

PART 2 - PRODUCTS

2.1 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.
   3. Control Voltage: 120-V ac or less, using integral control power transformer.
   5. Starting Devices: Hand-off-automatic selector switch in cover of control panel, plus pilot device for automatic control.
   6. Automatic control switches to [alternate lead-lag compressors for duplex] [sequence lead-lag compressors for multiplex] air compressors.
   7. Instrumentation: Include discharge-air pressure gage, air-filter maintenance indicator, hour meter, compressor discharge-air and coolant temperature gages, and control transformer.
   8. Alarm Signal Device: For connection to alarm system to indicate when backup air compressor is operating.

C. Receivers: Steel tank constructed according to 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 gage, drain, and pressure-reducing valve.

D. Mounting Frame: Fabricate mounting and attachment to pressure vessel with reinforcement strong enough to resist packaged equipment movement during a seismic event when base is anchored to building structure.
2.2 LUBRICATED, RECIPROCATING AIR COMPRESSORS

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

2. CompAir, Ltd.
3. Curtis-Toledo.
5. General Air Products, Inc.
6. Ingersoll-Rand; Air Solutions Group.
7. Kaeser Compressors, Inc.
8. Powerex, Inc.
9. Quincy Compressor; an EnPro Industries company.
10. Saylor-Beall Manufacturing Company.

B. Compressor(s): Lubricated, reciprocating-piston type with lubricated compression chamber and crankcase.

1. Submerged gear-type oil pump.
2. Oil filter.
3. Combined high discharge-air temperature and low lubrication-oil pressure switch.
4. Belt guard totally enclosing pulleys and belts.

C. Characteristics:

1. [Provide intercooler between stages of two-stage units.]
2. Mounting: [Freestanding] [Tank mounted].
   a. Interior Finish: [Epoxy] [Epoxy or galvanized] [Galvanized] <Insert coating> coating.
   b. Pressure Rating: 300 psig minimum.
   c. Pressure Regulator Setting: [100 psig]<Insert psig>.
   d. Pressure Relief Valve Setting: 150 psig.

2.3 OIL-FLOODED, ROTARY-SCREW AIR COMPRESSORS

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

2. CompAir, Ltd.
4. Ingersoll-Rand; Air Solutions Group.
5. Kaeser Compressors, Inc.
6. Quincy Compressor; an EnPro Industries company.
7. Sullair Corporation.

B. Compressor(s): Oil-flooded, rotary-screw type with lubricated helical screws and lubricated gear box.
2. Cooling/Lubrication System: Unit-mounted, air-cooled exchanger package prepiped to unit; with air pressure circulation system with coolant stop valve, full-flow coolant filter, and thermal bypass valve.
3. Air Filter: Dry type, with maintenance indicator and cleanable replaceable filter element.
5. Capacity Control: Capacity modulation between zero and 100 percent air delivery, with operating pressures between 50 and 100 psig. Include necessary control to hold constant pressure. When air demand is zero, unload compressor by using pressure switch and blowdown valve.

C. Characteristics:

1. Receiver: ASME construction steel tank.
   a. Interior Finish: [Epoxy] [Epoxy or galvanized] [Galvanized] <Insert coating> coating.
   b. Pressure Rating: 300 psig minimum.
   c. Pressure Regulator Setting: [100 psig]<Insert psig>.
   d. Pressure Relief Valve Setting: [150 psig]

2. Enclosure: Steel with sound-attenuating material lining.

2.4 OIL-SEALED, ROTARY, SLIDING-VANE AIR COMPRESSORS

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

1. Becker Pumps Corp.
2. Davey Compressor Company.
3. Gast Manufacturing Inc.
4. CompAir, Ltd.

B. Compressor(s): Nonpulsating, rotary, sliding-vane type with oil-sealed sliding vanes.

1. Cleanable inlet screens.
2. Outlet silencers and oil-mist separators on discharge connections.

C. Characteristics:

1. Air Compressor(s): Single stage.

2. Receiver: ASME construction steel tank.
   a. Interior Finish: [Epoxy] [Epoxy or galvanized] [Galvanized] <Insert coating> coating.
   b. Pressure Rating: 200 psig minimum.
   c. Pressure Regulator Setting: [100 psig]<Insert psig>.
d. Pressure Relief Valve Setting: [150 psig].

2.5 INLET-AIR FILTERS

A. Description: 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 AIR-COOLED, COMPRESSED-AIR AFTERCOOLERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Air/Tak, Inc.
   2. Arrow Pneumatics, Inc.
   3. Curtis-Toledo.
   5. Hankison International.
   6. Ingersoll-Rand; Air Solutions Group.
   7. Kaeser Compressors, Inc.
   8. Pneumatech Inc.
   10. Van Air Systems, Inc.
   11. Zeks Compressed Air Solutions.

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 REFRIGERANT COMPRESSED-AIR DRYERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Air/Tak, Inc.
   2. Arrow Pneumatics, Inc.
   4. Curtis-Toledo.
   5. Domnick Hunter Limited; ZANDER, Inc.
   8. Ingersoll-Rand; Air Solutions Group.
12. Pneumatech Inc.
13. SPX Air Treatment.
14. Van Air Systems, Inc.
15. Wilkerson Operations; Pneumatic Division.

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

C. Characteristics:
   1. Inlet Filter: 0.1 microns.
   2. Outlet Filter: Particulate.

2.8 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 15 Section "Common Motor Requirements for Plumbing Equipment."

   1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
   2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 16 Sections.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Install units, level, plumb, and anchored to substrate in locations indicated. Maintain manufacturer's recommended clearances. Orient equipment so controls and devices are accessible for servicing.

B. Equipment Mounting: Install air compressors[ and aftercoolers] [ and air dryers] [, aftercoolers, and air dryers] on concrete bases using [elastomeric pads] [elastomeric mounts] [restrained spring isolators] <Insert device>. Comply with requirements in Division 3. Comply with requirements for vibration isolation devices specified in Division 15 Section "Vibration [and Seismic] Controls for Plumbing Piping and Equipment."

   1. Minimum Deflection: [1/4 inch] [1 inch] <Insert dimension>.

C. Equipment Mounting: Install air compressors[ and aftercoolers] [ and air dryers] [, aftercoolers, and air dryers] on vibration isolation inertia bases. Comply with requirements specified in Division 15 Section "Vibration [and Seismic] Controls for Plumbing Piping and Equipment."
D. Equipment Mounting: Install air compressors[and aftercoolers] [and air dryers] [, aftercoolers, and air dryers] on concrete bases. Comply with requirements in Division 3.

E. Install compressed-air equipment anchored to substrate.

F. Install the following devices on compressed-air equipment:
   1. Thermometer, Pressure Gage, 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.

G. Engage a factory-authorized service representative to perform startup service.
   1. Complete installation and startup checks according to 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. [Check for proper seismic restraints.]
   8. Drain receiver tanks.
   9. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
   10. Test and adjust controls and safety.

3.2 CONNECTIONS

   A. Comply with requirements for piping specified in Division 15 Section "General-Service Compressed-Air Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

   B. Install piping adjacent to machine to allow service and maintenance.

   C. Connect piping to air compressors and receivers, except safety relief valve connections, with flexible pipe connectors of materials suitable for service. Flexible pipe connectors and their installation are specified in Division 15 Section "General-Service Compressed-Air Piping."

   D. Ground equipment according to Division 16.

   E. Connect wiring according to Division 16.

3.3 IDENTIFICATION

   A. Identify general-service air compressors and components. Comply with requirements for identification specified in Division 15 Section "Identification for Plumbing Piping and Equipment."
3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air compressors and aftercoolers, and air dryers.

END OF SECTION