

SECTION 15481 - COMPRESSED AIR SYSTEM
[Add6-7]

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Submit under provisions of Section 15010.**
- B. Shop Drawings: Indicate piping system schematic with electrical characteristics and connection requirements.**
- C. Product Data: Provide manufacturers catalog literature with capacity, weight, and electrical characteristics and connection requirements.**
- D. Test Reports: Submit inspector's certificate for air receiver for inclusion in Operating and Maintenance Manuals.**
- E. Manufacturer's Installation Instructions: Indicate hoisting and setting requirements, starting procedures.**

1.02 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 15010.**
- B. Record actual locations of equipment and components. Modify shop drawings to indicate final locations.**

1.03 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 15010.**
- B. Operation Data: Submit for air compressor, air receiver and accessories, after cooler, refrigerated air dryer, and pressure reducing station.**
- C. Maintenance Data: Submit for air compressor, air receiver and accessories, after cooler, refrigerated air dryer, and pressure reducing station.**

1.04 REGULATORY REQUIREMENTS

- A. Conform to ASME codes for installation of pressure vessels.**
- B. Provide certificate of compliance from Factory Mutual indicating approval of air receiver.**
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.**

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 15010.**
- B. Protect piping and equipment from weather and construction traffic.**

1.06 WARRANTY

- A. Provide five-year warranty under provisions of Section 15010.**

1.07 MAINTENANCE MATERIALS

- A. *Provide maintenance materials under provisions of 15010.*

PART 2 - PRODUCTS

2.01 LABORATORY FITTINGS:

- A. *Laboratory fittings will be furnished to the job site by the Laboratory Equipment Supplier, with necessary holes cut in the laboratory equipment. The Contractor shall receive, store, and install the fittings and make all necessary connections thereto.*

2.02 PIPING:

- A. *Compressed air piping shall be ASTM Specification B-88, Type "K" hard drawn, seamless copper tubing with wrought copper solder fittings. No ferrous piping will be permitted in the system. Where threaded nipples are required these shall be I.P.S. brass.*
- B. *All piping shall be pitched back so as to drain to the point shown on the Drawings. All branch air take-offs shall be made from the top of the mains.*

2.03 VALVES:

- A. *Compressed air and laboratory valves shall be Spirax Sarco Model 60, stainless steel ball valves, with screwed joint and Teflon seats.*

2.04 TESTS:

- A. *All airlines shall be tested at 150 pounds per square inch and proved tight at this pressure. All tests shall be observed by a representative of the Architect before the tests are removed.*

PART 3 - AIR COMPRESSOR SYSTEM

3.01 BASE UNIT DESCRIPTION:

- A. *Scroll Enclosed Series 20-HP system complete with multiple oil-less scroll compressors, mounted inside of a rigid steel enclosure. Enclosures to have a powder coated finish, and include sound deadening insulation. Noise level shall not exceed 58 DBA with all compressor units in operation. Each compressor has a 1750 RPM TEFC motor, V-Belt Drive, isolation valve, and air-cooled after-cooler. System to include a controller for energy efficiency. Assembly shall be equal to Squire-Cogswell/Aeros Model # A2000S-ST4 (SEQTD2007) Quadruplex Stack Mounted Oil-Less Scroll Air Compressor System. Total capacity 4 compressors --- 48.4 SCFM @ 145 PSIG 20 HP total (5 HP ea.) / 460/3/60 voltage / 120 gallon receiver tank.*

3.02 COMPRESSORS:

- A. *The compressors shall be Oil-Less Rotary Scroll type, belt driven, single-stage, air-cooled construction with absolutely no oil needed for operation. The rotary design shall not require any inlet or exhaust valves and shall be rated for 100% continuous duty. Direct drive compressors shall not be used. Tip seals shall be of a composite PTFE material and be rated for 8,000 hours operation. A cooling fan shall be attached to the flywheel and shall direct air across the compressor by means of an integral cooling shroud. Compressor design shall include provisions for servicing of all bearings (including outer orbital bearings) for extended compressor life. Compressors with bearings that are not serviceable shall not be permitted.*

3.03 AIR-COOLED AFTER-COOLER:

- A. *Air-Cooled After-Coolers are provided for each compressor and are sized to provide an approach temperature of 20F. Each unit is constructed of copper tubing with metal headers, and is to be mounted integral to the compressor enclosure.*
- 3.04 CONTROLS:**
- A. *Each unit sequenced with a circuit card logic controller with digital display. Controller to have four display modes to monitor the operation of the unit. Operating Mode to display the compressor running status, unit run hours, and system pressures. Caution Mode to indicate high temperature shut down status, high current draw, and failure of temperature switch. Service Mode to inform user when scheduled maintenance interval is reached. Set Mode to allow user to adjust some of the parameters of the operational mode such as start/stop pressures. Compressors are sequenced on and off based on the air demand of the system creating a highly energy efficient system to the user. 4-20 MAMP signal for compressor status and general failure (dry contacts) standard. Magnetic Motor Starters with Fusible Disconnect Switches and Power On Lights are also included.*
- 3.05 RECEIVER TANK / DRYERS / PURIFICATION / PRESSURE REGULATION / MONITOR PACKAGE**
- A. *The following to be mounted, piped, and wired on a common skid.*
- 3.06 RECEIVER TANK:**
- A. *The ASME, National Board registered 120 Gallon, 200 PSIG working pressure, vertical air receiver tank is provided with pressure regulator, sight gauge, by-pass piping, pressure gauge, relief valve, and FDA approved epoxy liner.*
- 3.07 TWO AIR DRYERS – (EACH 40 SCFM RATED INLET –40°F PRESSURE DEW POINT @ 100 PSIG):**
- A. *The dryer system shall consist of two heat-less desiccant dryers with isolation and by-pass plumbing. The twin tower dryers shall be sized in accordance to the maximum calculated demand (40 SCFM). The design shall be carbon steel ASME certified vessels. Inlet switching valves and purge exhaust valves are high performance integrated block style of straight flow-through design. The integral pinch type valve is made of high strength rubber to ensure long trouble free service life. A high surface area purge control includes a purge exhaust muffler to reduce noise level within OSHA standards. Automatic On-Demand Purge Savers on Dryers will be controlled by the Dew Point Monitor Contacts.*
- 3.08 FILTRATION / PRESSURE REGULATION STATION --- SET FOR 100 PSIG DELIVERY PRESSURE:**
- A. *The filtration systems shall consist of a single X series pre-filter rated for 0.01 micron filtration with an efficiency exceeding 99.9999% D.O.P. (Validated), a Z series 1 micron filter with an efficiency exceeding 99.9999% D.O.P. (Validated), and a A series activated carbon filter. Filters without validation shall not be used (except for A series activated carbon filter). All filters shall have a differential pressure gauge with color change indicator and automatic drain valve (except for A series activated carbon filters). Downstream of final filters shall be a dual-line pressure regulating assembly consisting of two pressure regulators with pressure gauges, inlet and outlet isolation ball valves, and pressure relief valves.*
- 3.09 CARBON MONOXIDE MONITOR:**
- A. *The carbon monoxide monitor provides warning to the user of air supplied respirators alarming and metering the presence of carbon monoxide. The monitor is provided with a NEMA 12 enclosure. In addition to the audible/visual alarm, the meter displays the concentration of CO in the compressed air. The meter operates from a 110 VAC supply. Alarm points are set at 10 PPM.*
- 3.10 DEW POINT MONITOR:**
- A. *The system integrated hygrometer shall be equipped with a Centigrade and Fahrenheit LCD display dew point monitoring device with high dew point alarm contacts. The dew point sensor*

(probe) shall be of a rugged Hyper-Thin-Film Aluminum Oxide type, and installed so that the monitored air flow is downstream of the dual line pressure regulator assembly. The sensor probe shall be able to be easily calibrated in the field, and without the need for any special calibration equipment. The monitor shall be interfaced with the desiccant dryer system in such a way that it will provide automatic control of the desiccant tower purge cycle based on actual dew point of the system. In the event the automatic purge control fails, the desiccant dryers shall continue to operate based upon a fixed time cycle.

PART 4 - EXECUTION

4.01 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.**
- B. Install valved drip connections at low points of piping system.**
- C. Install take-offs to outlets from top of main, with shut off valve after take off. Slope take off piping to outlets.**
- D. Install compressed air couplings and pressure gauges where outlets are indicated.**
- E. Install tees instead of elbows at changes in direction of piping. Fit open end of each tee with plug.**
- F. Identify and label piping system and components.**

4.02 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 15010.**
- B. Compressed Air Piping Leak Test: Prior to initial operation, clean and test compressed air piping in accordance with ANSI B31.1.**
- C. Repair or replace compressed air piping as required to eliminate leaks, and retest to demonstrate compliance.**
- D. Cap (seal) ends of piping when not connected to mechanical equipment.**

END OF SECTION