

SPECIAL SPECIFICATION

SECTION 15211S

RECIPROCATING AIR COMPRESSORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Reciprocating air compressors.
- B. Air receiver and accessories.
- C. Aftercooler.
- D. Refrigerated air dryer.
- E. Pressure reducing station.
- F. Pipe valves and fittings.
- G. Accessories.

1.02 RELATED SECTIONS

- A. Section 13085S – Seismic Protection
- B. Section 15060S - Hangers and Supports.
- C. Section 15070S - Vibration **Limits and Control**.
- D. Section 15210S - Process Air and Gas Piping.
- E. Section 15950S - Testing, Adjusting and Balancing.
- F. Section 16220S - Motors and Controllers.

1.03 REFERENCES

- A. ASTM A 53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- C. ASME Code for Unfired Pressure Vessels.

1.04 SUBMITTALS

- A. Include certified data for each unit and accessory system indicating the following:
 - 1. Air compressor performance curves at summer design condition.
 - 2. Intercooler performance at summer design condition.
 - 3. Air dryer performance at minus 40 degrees F dew point at 125 pounds per square inch gage.
- B. Indicate components, assembly, dimensions, weights and loadings, required clearances, location and size of field connections, intake air filter outline, blow-off silencer outline, main motor drive data, aftercoolers, control panel and electrical and pneumatic schematics.
- C. Provide operation and maintenance manual.

1.05 QUALITY ASSURANCE

- A. Provide air receivers meeting requirements of ASME Code for Unfired Pressure Vessels and carry ASME approval stamp.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Ingersoll-Rand.
- B. Nash.
- C. Ohio Chemical & Surgical Equipment Co.

2.02 TYPE

- A. Provide simplex compressor unit consisting of air-cooled motor compressor, air receiver, after cooler, refrigerated air dryer, pressure reducing station, spring isolators and operating controls.

2.03 COMPRESSOR CONSTRUCTION

- A. Construct compressor unit with cast iron housing and head, heat treated forged steel or ductile iron shaft, aluminum alloy connecting rods, aluminum pistons with non-lubricated carbon rings, high-strength alloy suction and discharge valves. Statically and dynamically balance rotating parts.
- B. Equip compressor with oil pressure switch to automatically shutdown compressor in event of oil pressure failure.
- C. Provide compressor with automatic capacity reduction equipment consisting of suction valve unloaders. Lifting mechanism operated by [oil pressure gas discharge pressure solenoid valve centrifugal force]. Provide for unloaded compressor start.
- D. Mount motor and compressor on one-piece ribbed cast iron or welded steel base with provision for V-belt adjustment.

2.04 AFTERCOOLER

- A. Provide air compressor with air aftercooler suitable for operation under 135 pounds per square inch-gage working pressure.
- B. Construct with removable tube nests of non-ferrous metal tubes and corrosion resistant tube plates, safety valves, pressure gage, moisture separator, moisture drain valve, water inlet piping with automatic water valve, automatic condensate trap and overflow piping with open funnel.
- C. Aftercooler capacity to cool discharge air to within 12 degrees F of ambient air temperature with compressors operating at specified capacity.

2.05 AIR DRYER

- A. Provide refrigerated air dryer of self-contained mechanical refrigeration type complete with heat exchanger, refrigeration compressor, automatic controls, moisture removal trap, internal wiring and piping, and full refrigerant charge.
- B. Provide air inlet and outlet connections at same level and factory insulated.
- C. Heat exchangers to consist of air-to-air and refrigerant-to-air coils. Provide centrifugal type moisture separator located at discharge of heat exchanger. Provide

heat exchangers with automatic control system to bypass refrigeration system on low or no load condition.

- D. Refrigeration unit of hermetically sealed type to operate continuously to maintain specified 21 degrees F dew point. House unit in steel cabinet provided with access door and panel for maintenance and inspection.
- E. Provide dryer with air inlet temperature gage, air inlet pressure gage, ON/OFF switch, high temperature light, power on light and refrigerant gage.

2.06 AIR RECEIVER

- A. Provide vertical or horizontal receiver stamped ASME rated for working pressure of 125 pounds per square inch. Flange or screw inlet and outlet connections, welded steel construction.
- B. Fittings to include adjustable pressure regulator, safety valve, pressure gage, drain cock automatic condensate trap, **and 1/2" thick Grinnell fig. 55 vertical lugs; four minimum for hanging air receiver from structure above.**
- C. Tank Finish: Epoxy phenolic, two coats total, 10 to 12 mil dry film thickness inside and out.
- D. Provide automatic sump drain valve; Wilkerson Model 5101-8, float operated.
- E. **Provide a minimum of four hangers for each air receiver. Each hanger will be 3/4" diameter A36 all-thread rod connected to the structure above with Grinnell UFS Beam Clamp, fig.228, size 2. Connect rod to lugs with Grinnell forged steel clevis, fig. 299, 3/4" tap size.**

2.07 PRESSURE REDUCING VALVE

- A. Provide pressure reducing stations complete with automatic reducing valve and bypass, and low pressure side relief valve and gage.
- B. Valve capacity suitable to reduce pressure from 200 pounds per square inch to 30 pounds per square inch. Pressure reducing valve to be adjustable upward from reduced pressure.
- C. Provide valves with bronze or semi-steel bodies with stainless steel springs, stems and seats.

2.08 CONTROLS

- A. Pressure switch to cutout at 100 pounds per square inch with minimum differential of 20 pounds per square inch.

- B. Compressor regulation to the through lead-lag switch with time delay relay.
- C. Provide electrical alternation set to operate each compressor for 12 hours. In the event one compressor fails, another compressor automatically maintains air pressure

2.09 PIPE VALVES AND FITTINGS

- A. Pipe and Fittings:
 - 1. Schedule 40, ASTM A 53, Grade B, galvanized steel pipe with 150 pound galvanized malleable iron fittings.
 - 2. Use Type K, hard drawn copper water tube with wrought copper fittings conforming to ASME B16.22.
- B. Unions: Provide 150 pound galvanized malleable iron, ground joint unions with bronze seat.
- C. Gate Valves:
 - 1. Provide 150 pound bronze body, solid disc, union bonnet, rising stem.
 - 2. Product: Stockham "B120".
- D. Ball Valves:
 - 1. Provide 150 pound bronze body, stainless steel ball with teflon seats.
 - 2. Products:
 - a. Jenkins "32-".
 - b. Stockham "S217-BR-R-T".
- E. Check Valves:
 - 1. Provide 300 pound bronze swing check.
 - 2. Products:
 - a. Jenkins "962A".
 - b. Stockham "B364".

2.10 ACCESSORIES

- A. Moisture Traps: Provide float operated moisture traps, 200 pounds per square inch, 30 by 30 mesh screen, full 1/4-inch drain orifice, self cleaning drain seat; Wilkerson Model X-1-04-MOO.
- B. Quick Couplings: Provide 1/2-inch aluminum bronze hose couplings.
- C. Filter, lubricator and regulator.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install compressor unit on concrete foundation with sole plates and isolators. Level, grout and bolt in place.
- B. Make air cock and drain connection on horizontal casing.
- C. Install line size gate valve and anti-return valve on compressor discharge.
- D. Install replaceable cartridge type filter silencer of adequate capacity for each compressor.
- E. Place shutoff valve on water inlet to aftercooler. Pipe drain to floor drain.
- F. Connect condensate drains to nearest floor drain.
- G. Install valved bypass around air dryer. Factory insulate inlet and outlet connections.
- H. Install valved drip connections at low points of piping system.
- I. Install takeoffs to outlets from top of main with shutoff valve after takeoff.
- J. Install compressed air couplings, 3/8-inch female speed couplers and pressure gages where outlets are indicated.
- K. Install tee pieces instead of elbows at changes in direction of piping. Fit open end of each tee with plug.
- L. Install a capped drip leg 6 inches long at the base of the vertical riser and at the ends of main piping runs with a valved drain pipe at the nearest floor or hub drain.

3.02 CLEANING

- A. Wash and flush all piping, tubing, valves and fittings with a hot solution of sodium carbonate and TSP. Mix in equal proportion of one pound to three gallons of water.
- B. After cleaning, care must be taken in storage, handling and installation of all materials to prevent grease, oil or dirt being introduced into the air system.

END OF SECTION