

**Part 1        General**

**1.1            SUMMARY**

.1            Section Includes:

- .1            Materials and installation for piping, fittings, equipment used in compressed air systems.

**1.2            REFERENCES**

.1            American Society of Mechanical Engineers (ASME)

- .1            ASME Boiler and Pressure Vessel Code Section VIII Pressure Vessels.
  - .1            BPVC-VIII B - 2004, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 1.
  - .2            BPVC-VIII-2 B - 2004, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 2 - Alternative Rules.
  - .3            BPVC-VIII-3 B - 2004, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 3 - Alternative Rules High Press Vessels.
- .2            ASME B16.5-03, Pipe Flanges and Flanged Fittings.
- .3            ASME B16.11-01, Forged Fittings, Socket-Welding and Threaded.

.2            American Society for Testing and Materials International (ASTM)

- .1            ASTM A53/A53M-04, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2            ASTM A181/A181M-01, Standard Specification for Carbon Steel Forgings for General Purpose Piping.

.3            Canadian Standards Association (CSA International)

- .1            CSA B51-03, Boiler, Pressure Vessel, and Pressure Piping Code.

**1.3            SUBMITTALS**

.1            Product Data:

- .1            Submit manufacturer's printed product literature, specifications and datasheet for piping, fittings and equipment.

.2            Shop Drawings:

- .1            Instructions: submit manufacturer's installation instructions.
  - .1            Closeout Submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01780 - Closeout Submittals

## **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

## **Part 2 Products**

### **2.1 AIR COMPRESSOR**

- .1 General: Two stage, air-cooled, reciprocating, vertical primary tank, tank mounted, V-belt driven, heavy duty cast iron, continuous duty rating, complete with starter.
- .2 Capacity: minimum 8 litres per second (17 cubic feet per minute) of free air at 860 kPa (125 psig).
- .3 Maximum pressure: 860 kPa (125 psig).
- .4 Motor: TEFC, minimum 90 % efficiency, 208v/ 3ph / 60Hz.
- .5 Control:
  - .1 Manual control with H-0-A starter switch.
  - .2 Adjustable pressure switch, 515 kPa (75 psig) to 860 kPa (125 psig), with adjustable differential pressure.
- .6 Accessories: belt guard and pressure gauges.
- .7 Vertical tank: to CSA B51, ASME Section VIII and provincial regulations, for working gauge pressure of 860 kPa (125 psig). Capacity: 300 L. (80 US gallons).
- .8 Accessories: adjustable pressure regulator, safety valve, 125 mm diameter gauge with pressure range of 0 to 860 kPa (125 psig), drain cock and automatic condensate drain.
- .9 Provincial inspector's certificate and label.
- .10 Finish: Painted manufacturer's standard colour.
- .11 Acceptable Product: Ingersoll Rand 2475N5 or equal in accordance with B6.

### **2.2 COALESCING FILTER – PRE AIR DRYER**

- .1 Pre-filter: Coalescing/Particulate type filter, for 1 micron and larger particle removal.
- .2 Rated Pressure: 860 kPa (125 psig).
- .3 Rated minimum flow to match compressor output, with maximum 3.5 kPa (0.5 psig) loss.
- .4 Differential pressure indicator

- .5 Automatic float drain
- .6 Acceptable product: Ingersoll Rand IRGP series, or equal in accordance with B6.

### **2.3 AIR DRYER**

- .1 Heatless desiccant type dryer.
- .2 Dew Point -40°C (-40°F) for rated compressor airflow
- .3 Rated minimum flow to match compressor output, with maximum 35 kPa (5 psig) loss.
- .4 Rated Pressure: 860 kPa (125 psig).
- .5 110volt / 1 phase/ 60 hz control valves.
- .6 Acceptable Product: Ingersoll Rand TZM series or equal in accordance with B6.

### **2.4 FILTER – POST AIR DRYER**

- .1 Post-filter: Dust particle filter, for 1 micron and larger particle removal
- .2 Rated Pressure: 860 kPa (125 psig)
- .3 Rated minimum flow to match compressor output, with maximum 3.5 kPa (0.5 psig) loss.
- .4 Differential pressure indicator
- .5 Automatic float drain
- .6 Acceptable product: Ingersoll Rand IRDP series, or equal in accordance with B6.

### **2.5 MAIN STORAGE RESERVOIR**

- .1 Vertical tank: to CSA B51, ASME Section VIII and provincial regulations, for working gauge pressure of 860 kPa (125 psig).
- .2 Capacity: 1,500 litre (400 US gallons).
- .3 Automatic, electronic drain
- .4 Accessories: safety relief valve
- .5 125 mm diameter gauge with pressure range of 0 to 860 kPa (0 to 125 psig), drain cock and automatic condensate trap.
- .6 Finish: Painted manufacturer's standard colour.
- .7 Acceptable Product: Steel Fab or equal in accordance with B6.

**2.6 END USE REGULATOR**

- .1 Factory assembled, heavy-duty with mounting bracket and low pressure side relief valve.
- .2 Maximum inlet pressure: 860 kPa (125 psig).
- .3 ¼" port size
- .4 Pressure range of regulator: 0 to 210 kPa (0 to 30 psig).
- .5 Gauge range: 0 – 210 kPa (0-30 psig).
- .6 Acceptable Product: to match existing, or Wilkerson R18 or equal in accordance with B6.

**2.7 COMPRESSED AIR HOSE AND ENDS**

- .1 Multi-purpose compressed air hose.
- .2 9.5mm (3/8") inside diameter.
- .3 Rated maximum pressure: 1380 kPa (200 psig).
- .4 Synthetic rubber tube (black) & cover (red).
- .5 Spiral, synthetic yarn reinforcement
- .6 Ferrell crimped brass male 3/8 NPT hose end fittings.
- .7 Acceptable product:  

Hose: Goodyear Horizon or equal in accordance with B6.

End Fittings: Parker or equal in accordance with B6.

**2.8 HOSE REELS**

- .1 Single hose spring return type
- .2 Capacity: 23 m (75 feet) of 9.5mm (3/8") nominal i.d. hose
- .3 Rated 860 kPa (125 psig).
- .4 Bottom vertical hose discharge mounting
- .5 Mounting bracket
- .6 4 way guide rollers
- .7 Acceptable product: Hannay N700 series or equal in accordance with B6.

## **2.9 QUICK DISCONNECT COUPLERS**

- .1 To match existing product, or Industrial Interchange Pneumatic type
- .2 Push to connect type.
- .3 Minimum body size: 6mm (1/4").
- .4 3/8 NPT female thread connection
- .5 Rated pressure: 860 kPa (125 psig).
- .6 Body: brass or zinc plated steel.
- .7 Acceptable product: to match existing City product, or Parker HF series

## **2.10 PIPING**

- .1 Piping: to ASTM A53/A53M, schedule 40 seamless black steel.
- .2 Fittings: to ASTM A-197.Malleable Iron
  - .1 NPS2 and smaller: 1030 kPa (150 psig) rated Malleable Iron – threaded type.
- .3 Unions: 1030 kPa (150 psig) rated Malleable Iron.
- .4 Dissimilar metal junctions: use dielectric unions.
- .5 Joints:
  - .1 Threaded with pipe threading compound approved for comp. air service.

## **2.11 BALL VALVES**

- .1 Three piece full port design for in-line maintenance.
  - .1 Forged steel body screwed ends, stainless steel ball and associated trim suitable for compressed air application.
  - .2 Rated for 860 kPa (125 psig) pressure.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

### **3.2 COMPRESSOR**

- .1 Install on existing concrete floor and as per manufacturer's instructions.

- .2 Connection to piping via flexible connection (braided hose), rated for 860 kPa (125 psig) service.
- .3 Initial pressure settings: 625 kPa (90 psig) start, 760 kPa (110 psig) stop.

### **3.3 MAIN AIR PRESSURE REGULATORS**

- .1 Install at air compressor station.
- .2 Install additional regulators as indicated at end use locations.

### **3.4 AIR DRYER**

- .1 Provide bypass piping to permit operation of system without dryer when outdoor temperature is above freezing.

### **3.5 COMPRESSED AIR PIPING CONNECTIONS AND INSTALLATION**

- .1 Install flexible connections where specified.
- .2 Install shut-off ball valves at outlets, major branch lines and in locations as indicated.
- .3 Install quick-coupler chucks and pressure gauges on drop pipes where indicated.
- .4 Install unions to permit removal or replacement of equipment.
- .5 Install tees in lieu of elbows at changes in direction of piping. Install plug in open ends of tees.
- .6 Grade piping at 1% slope minimum.
- .7 Make branch connections from top of main.
- .8 Install drip leg with ball valve and plug at bottom of risers and at low points in mains. Distance between drain points to be 30m. maximum.
- .9 Provide automatic drain from main coalescing air dryer.

### **3.6 FIELD QUALITY CONTROL**

- .1 Site Tests/Inspection:
  - .1 Testing: pressure test for 4 h minimum, to 1200 kPa (175 psig), with outlets closed and with compressor isolated from system. Pressure drop not to exceed 10 kPa.

### **3.7 CLEANING**

- .1 Section 15095 - Cleaning and Start-Up of Mechanical Piping System.
- .2 Cleaning: blow out piping to clean interior thoroughly of oil and foreign matter.

- .3 Check entire installation is approved by authority having jurisdiction.
- .4 Perform cleaning operations as specified and in accordance with manufacturer's recommendations.
- .5 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**