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**PART 1        GENERAL**

**1.1            SUMMARY**

- .1    Section Includes:
  - .1        Materials and installation for piping, fittings, equipment used in compressed air systems.
  - .2        Sustainable requirements for construction and verification.

**1.2            RELATED SECTIONS:**

- .1    Section 01 33 00 - Submittal Procedures.
- .2    Section 01 45 00 – Testing and Quality Control.
- .3    Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4    Section 01 78 00 - Closeout Submittals.
- .5    Section 22 05 01 - Common Work Results for Plumbing.
- .6    Section 23 08 01 - Performance Verification of Mechanical Piping Systems.

**1.3            REFERENCES**

- .1    American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME).
  - .1        ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.
  - .2        ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3        ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4        ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.
- .2    American Society of Mechanical Engineers (ASME)
  - .1        ASME Boiler and Pressure Vessel Code Section VIII Pressure Vessels.
    - .1            BPVC-VIII B BPVC Section VIII - Rules for Construction of Pressure Vessels Division 1.
    - .2            BPVC-VIII-2 B, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 2 - Alternative Rules.
    - .3            BPVC-VIII-3 B, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 3 - Alternative Rules High Press Vessels.
  - .2        ASME B16.5, Pipe Flanges and Flanged Fittings.
  - .3        ASME B16.11, Forged Fittings, Socket-Welding and Threaded.
- .3    American Society for Testing and Materials International (ASTM)

- .1 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A181/A181M, Standard Specification for Carbon Steel Forgings for General Purpose Piping.
- .4 Canadian Standards Association (CSA International)
  - .1 CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .6 Province of Newfoundland and Labrador
  - .1 Boiler Pressure Vessel and Compressed Gas Regulations.

#### **1.4 SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet for piping, fittings and equipment.
  - .2 Submit WHMIS MSDS. Indicate VOC's for adhesive and solvents during application and curing.
- .3 Shop Drawings:
  - .1 Submit shop drawings to indicate project layout including layout, dimensions and extent of piping system.
    - .1 Vertical and horizontal piping locations and elevations and connections details.
    - .2 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
    - .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
    - .4 Instructions: submit manufacturer's installation instructions.
    - .5 Closeout Submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

#### **1.5 QUALITY ASSURANCE**

- .1 Pre-Installation Meeting:
  - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations.
    - .1 Verify project requirements.
    - .2 Review installation conditions.
    - .3 Co-ordination with other building subtrades.

- .4 Review manufacturer's installation instructions and warranty requirements.
- .2 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
  - .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
  - .4 Separate for reuse and recycling and place in designated containers Steel, Metal, Plastic waste in accordance with Waste Management Plan (WMP).
  - .5 Handle and dispose of hazardous materials in accordance with Regional and Municipal regulations.
  - .6 Divert unused metal materials from landfill to metal recycling facility as approved by Owner's Representative.

## **PART 2 PRODUCTS**

### **2.1 COMBINATION FILTER-REGULATOR**

- .1 Factory assembled, heavy-duty with mounting bracket and low pressure side relief valve.
- .2 Maximum inlet pressure: 1034 kPa.
- .3 Operating temperature: minus 18 degrees C to plus 52 degrees C.
- .4 Filter element: 5 micron. Bowls: polycarbonate.
- .5 Pressure range in regulator: 34 kPa to 900 kPa.
- .6 Gauge range: 0 kPa to 1500 kPa.

### **2.2 PIPING**

- .1 Piping: to ASTM B88, Type K drawn copper rated for 1200 kPa.
- .2 Fittings: Wrought copper fittings to ANSI B16.22
- .3 Unions: Factory-fabricated bronze assembly, rated to 1725kPa working pressure at 82 degrees C.
- .4 Dissimilar metal junctions: use dielectric unions.

- .5 Joints:
  - .1 Brazed or soldered.
  - .2 Solder: to ASTM B32, lead free, with non-corrosive flux.
  - .3 Brazing Alloy: American Welding Society (AWS) classification A5.8 BCuP.
  - .4 Rated for a minimum of 2068kPa working pressure at 82 degrees C.

## **2.3 BALL VALVES**

- .1 Three piece design or top entry for ease of in-line maintenance.
  - .1 75mm and smaller: Brass bodied with brazed connections. Full ported, three piece with Teflon seat seals.
  - .2 To withstand 1034 kPa maximum pressure.

## **2.4 CHECK VALVES:**

- .1 75mm and smaller: To ASTM B61, Bronze body with non-metallic discs, rated for 1034kPa.

## **2.5 PRESSURE GAUGES**

- .1 To be manufactured specifically for compressed air service.

# **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 COMPRESSED AIR LINE FILTER**

- .1 Install on discharge line from refrigerated air dryer.

## **3.3 MAIN AIR PRESSURE REGULATORS**

- .1 Install at air compressor station.
- .2 Install additional regulators on connections to equipment as indicated.

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

- .1 Install shut-off valves at outlets, major branch lines and in locations as indicated.
- .2 Install quick-coupler chucks and pressure gauges on drop pipes.
- .3 Install unions to permit removal or replacement of equipment.

- .4 Install tees in lieu of elbows at changes in direction of piping. Install plug in open ends of tees.
- .5 Grade piping at 1% slope minimum.
- .6 Install compressed air trap and pressure equalizing pipe at moisture collecting points. Drain pipe to nearest floor drain.
- .7 Make branch connections from top of main or quick branch drop pipe if using aluminum piping system.
- .8 Install compressed air trap at bottom of risers and at low points in mains, piped to nearest drain. Distance between drain points to be 30 m maximum.
- .9 Provide drain from refrigerated air dryer.

### **3.5 FIELD QUALITY CONTROL**

- .1 Site Tests/Inspection:
  - .1 Testing: pressure test in accordance with requirements of Section 22 05 01 - Common Work Results for Plumbing, for 4 h minimum, to 1100 kPa, with outlets closed and with compressor isolated from system. Pressure drop not to exceed 10 kPa.
- .2 Manufacturer's Field Services:
  - .1 Have manufacturer of products supplied under this Section review work involved in handling, installation/application, protection and cleaning of its products, and submit written reports, in acceptable format, to verify compliance of work with Contract.
  - .2 Provide manufacturer's field services, consisting of product use recommendations and periodic site visits for inspection of product installation, in accordance with manufacturer's instructions.
  - .3 Schedule site visits to review work at stages listed:
    - .1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
    - .2 Twice during progress of work at 25% and 60% complete.
    - .3 Upon completion of Work, after cleaning is carried out.
- .3 Obtain reports within three (3) working days of review and submit immediately to Owner's Representative.
- .4 Verification requirements include:
  - .1 Materials and resources.
  - .2 Storage and collection of recyclables.
  - .3 Construction waste management.
  - .4 Resource reuse.
  - .5 Recycled content.

- .6 Local/regional materials.
- .7 Certified wood.
- .8 Low-emitting materials.

### **3.6 CLEANING**

- .1 Refer to Section 23 08 01 - Performance Verification of Mechanical Piping Systems.
- .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 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**