

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 REFERENCES

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME B16.5-03, Pipe Flanges and Flanged Fittings.
 - .2 ASME B16.11-01, Forged Fittings, Socket-Welding and Threaded.
 - .3 ANSI/ASME B16.18-01, Cast Copper Alloy Solder Joint Pressure Fittings.
 - .4 ANSI/ASME B16.22-01, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 53/A 53M-04, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A 181/A 181M-01, Standard Specification for Carbon Steel Forgings for General Purpose Piping.
 - .3 ASTM B 88M-05, Standard Specification for Seamless Copper Water Tube (Metric).
- .3 Canadian Standards Association (CSA International)
 - .1 CSA B51-03, Boiler, Pressure Vessel, and Pressure Piping Code.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 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 Other details including:
 - .3 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
 - .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

- .5 Instructions: submit manufacturer's installation instructions.
- .6 Closeout Submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include data as follows:
 - .1 Valves.

1.4 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 and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 00 - Cleaning and Waste Management.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal paper, plastic, polystyrene and 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 and 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 recycling facility.

PART 2 - PRODUCTS

2.1 COMPRESSED AIR TUBING

- .1 Piping: to ASTM B 88M-05, Type L or K Copper, hard-drawn.
- .2 Fittings:
 - .1 NPS2 and smaller: to ANSI/ASME B16.22-01, Type L or K Copper, soldered.
 - .2 NPS2 1/2 and larger: to ANSI/ASME B16.22-01, Type L or K Copper, soldered.
- .3 Dissimilar metal junctions: use dielectric unions.
- .4 Joints:
 - .1 NPS2 and smaller: soldered.
 - .2 NPS2 1/2 and larger: soldered.

2.2 BALL VALVES

- .1 NPS 2 and under, soldered:
 - .1 To ANSI/ASME B16.18, Class 150.
 - .2 Bronze body, ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with NPT to copper adaptors as required.

2.3 VACUUM SYSTEM TUBING

- .1 Piping, valves, and fittings:
 - .1 Piping: Copper tube, hard drawn, type K to ASTM B88-85 furnished prewashed, degreased, and capped on both ends by manufacturer ready for vacuum service.
 - .2 Fittings: Cast bronze to ANSI B16.18-1994 or wrought copper and bronze to ANSI B16.22-1980
 - .3 Solder: Tin antimony, 95:5 to ASTM B32-83.
 - .4 Vacuum flexible tubing: To be clear plastic, 6 mm I.D. x 4.8 mm wall.
 - .5 Glass tubing: Medium wall glass tubing, 6.3 mm O.D., Pyrex Brand, Corning 2373.
 - .6 Shutoff valves to be ball valves, bronze body, suitable for 1054 kPa air pressure & vacuum service, soldered or screwed ends.

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 & VACUUM 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.
- .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.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests/Inspection:
 - .1 Testing: pressure test in accordance with requirements of Section 21 05 01 - Common Work Results for Mechanical, 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 3 days of review and submit immediately to Contract Administrator.
- .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.

3.4 CLEANING

- .1 Cleaning: blow out piping to clean interior thoroughly of oil and foreign matter.
- .2 Check entire installation is approved by authority having jurisdiction.
- .3 Perform cleaning operations in accordance with manufacturer's recommendations.
- .4 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

NEWPCC

GENERAL SERVICE COMPRESSED AIR & VACCUM

Section 22 15 00

LAB RENOVATION

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END OF SECTION