

1. GENERAL

1.1 General

- .1 For additional information, refer to Section 21 05 01 – Common Work Results for Mechanical and Division 1 - General Conditions of the Contract.
- .2 For a list of applicable codes and standards, refer to Section 21 05 01 – Common Work Results for Mechanical.
- .3 The mechanical Subcontractor shall be responsible for coordinating all aspects of this work.
- .4 Locations of equipment, ductwork, pipework, and all associated appurtenances indicated on the Drawings are approximate only. The Contractor is responsible for checking and coordinating the locations of equipment, ductwork, pipework, and all associated appurtenances and shall make any necessary adjustments in positions to conform with the architectural features, other services, symmetry and lighting arrangements.

1.2 Scope of Work

- .1 The scope of work for this section includes, but is not limited to, the following:
 - .1 Materials and procedures for the provision and installation of domestic water piping and associated appurtenances.

1.3 Related Work

- .1 This Section may not contain all materials, equipment and requirements required for the completion of this project. This Section is to be read in conjunction with the remaining Sections of Division 21, 22 and 23 any and all related works.
- .2 Division 1 forms an integral part of Division 10, 21, 22 and 23.
- .3 Related Requirements:
 - .1 Section 21 05 01 – Common Work Results for Mechanical.
 - .2 Section 22 42 01 – Plumbing Specialties.
 - .3 Section 23 05 23.01 – Valves – Bronze.
 - .4 Section 23 05 29 – Hangers and Supports for HVAC Piping and Equipment.

1.4 References

- .1 Except as specified herein, the latest edition of the standards listed below form a part of this Specification to the extent referenced in this Section. Where earlier editions of standards are adopted as referenced in applicable codes, those shall govern. The publications are referred to within the text by the basic designation only.
- .2 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.

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- .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.
 - .3 ASTM International Inc.
 - .1 ASTM B 88M, Standard Specification for Seamless Copper Water Tube (Metric).
 - .4 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
 - .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .6 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
 - .1 MSS-SP-80-03, Bronze Gate, Globe, Angle and Check Valves.
 - .7 National Research Council (NRC)/Institute for Research in Construction
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC) 2010 as amended by Manitoba Regulation 32/2011.
 - .8 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

1.5 Action and Informational Submittals

- .1 Refer to Section 21 05 01 - Common Work Results for Mechanical.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and data sheets for equipment and systems and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS MSDS - Material Safety Data Sheets.
- .3 Shop Drawings
 - .1 Submit shop drawings to indicate materials, finishes, methods of anchorage, number of anchors, dimensions, construction and assembly details and accessories.
- .4 Certificates:
 - .1 Submit certificates signed by the manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Instructions:

- .1 Submit manufacturer's printed installation instructions.

.6 Manufacturer's Field Reports:

- .1 Manufacturer's field reports specified.

1.6 Closeout Submittals

- .1 Refer to Section Section 21 05 01 – Common Work Results for Mechanical.

1.7 Delivery, Storage and Handling

- .1 Refer to Section Section 21 05 01 – Common Work Results for Mechanical.

1.8 Quality Assurance

.1 Performance Requirements

- .1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards.

2. PRODUCTS

2.1 Piping

.1 Domestic cold water systems, within building.

- .1 Above ground: copper tube, hard drawn, type L: to ASTM B 88M.

- .2 Buried or embedded: copper tube, soft annealed, type K: to ASTM B 88M, in long lengths and with no buried joints.

2.2 Fittings

- .1 Cast bronze threaded fittings, Class 125: to ANSI/ASME B16.15.

- .2 Cast copper, solder type: to ANSI/ASME B16.18.

- .3 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

- .4 NPS 2 and smaller: wrought copper to ANSI/ASME B16.22 or cast copper to ANSI/ASME B16.18; Suitable for operating pressure to 1380 kPa.

2.3 Joints

- .1 Solder: 95/5 tin-antimony alloy.

- .2 Teflon tape: for threaded joints.

- .3 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

2.4 Ball Valves

- .1 NPS 2 and under, screwed:
 - .1 Class 150.
 - .2 Bronze or Forged Brass body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle as specified Section 23 05 23.01 - Valves – Bronze.
- .2 NPS 2 and under, soldered:
 - .1 To ANSI/ASME B16.18, Class 150.
 - .2 Bronze body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with socket solder ends as specified Section 23 05 23.01 - Valves - Bronze.

3. EXECUTION

3.1 Application

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 Installation

- .1 Install in accordance with NPC as amended by the Manitoba Plumbing Code Regulation and local authority having jurisdiction.
- .2 Assemble piping using fittings manufactured to ANSI standards.
- .3 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
- .4 Buried tubing:
 - .1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.
 - .2 Bend tubing without crimping or constriction. Minimize use of fittings.

3.3 Valves

- .1 Isolate equipment, fixtures and branches with ball valves.

3.4 Pressure Tests

- .1 Conform to requirements of Section 21 05 01 - Common Work Results for Mechanical.
- .2 Test pressure: greater of 1.5 times maximum system operating pressure or 860 kPa.

3.5 Flushing and Cleaning

- .1 Flush entire system for 8 hours. Ensure outlets flushed for 2 hours. Let stand for 24 hours, and then draw one sample off longest run. Submit to testing laboratory to verify that system is clean with copper levels within the Canadian Drinking Water Standards. Let system flush for additional 2 hours, then draw off another sample for testing.

3.6 Pre-Start-Up Inspections

- .1 Systems to be complete, prior to flushing, testing and start-up.
- .2 Verify that system can be completely drained.
- .3 Ensure that pressure booster systems are operating properly.

3.7 Disinfection

- .1 Flush out, disinfect and rinse system to the requirements of the City of Winnipeg Construction Master Specifications.
- .2 Upon completion, provide laboratory test reports on water quality for Contract Administrator approval.

3.8 Start-Up

- .1 Timing: start up after:
 - .1 Pressure tests have been completed.
 - .2 Disinfection procedures have been completed.
 - .3 Certificate of Substantial Completion has been issued.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
 - .1 Establish flow and ensure that air is eliminated.
 - .2 Check pressurization to ensure proper operation and to prevent water hammer.

3.9 Cleaning

- .1 Refer to Section 21 05 01 - Common Work Results for Mechanical.
- .2 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

1. GENERAL

1.1 General

- .1 For additional information, refer to Section 21 05 01 – Common Work Results for Mechanical and Division 1 - General Conditions of the Contract.
- .2 For a list of applicable codes and standards, refer to Section 21 05 01 – Common Work Results for Mechanical.
- .3 The mechanical Subcontractor shall be responsible for coordinating all aspects of this work.
- .4 Locations of equipment, ductwork, pipework, and all associated appurtenances indicated on the Drawings are approximate only. The Contractor is responsible for checking and coordinating the locations of equipment, ductwork, pipework, and all associated appurtenances and shall make any necessary adjustments in positions to conform with the architectural features, other services, symmetry and lighting arrangements.

1.2 Scope of Work

- .1 The scope of work for this section includes, but is not limited to, the following:
 - .1 Materials and procedures for the provision and installation of plumbing specialties and accessories, including backflow preventers, vacuum breakers, hose bibbs and sediment faucets, water meters, and, hose reel and hose.
 - .2 This Section may not contain all materials, equipment and requirements required for the completion of this project. This Section is to be read in conjunction with the remaining Sections of Division 21, 22 and 23 any and all related works.
 - .3 Division 1 forms an integral part of Division 10, 21, 22 and 23.
 - .4 Related Requirements:
 - .1 Section 21 05 01 – Common Work Results for Mechanical.
 - .2 Section 22 11 16 – Domestic Water Piping.

1.3 References

- .1 Except as specified herein, the latest edition of the standards listed below form a part of this Specification to the extent referenced in this Section. Where earlier editions of standards are adopted as referenced in applicable codes, those shall govern. The publications are referred to within the text by the basic designation only.
- .2 American Society for Testing and Materials International (ASTM).
 - .1 ASTM B 62, Specification for Composition Bronze or Ounce Metal Castings.
- .3 American Water Works Association (AWWA).
 - .1 AWWA C700, Cold Water Meters-Displacement Type, Bronze Main Case.
- .4 Canadian Standards Association (CSA International).

.1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

1.4 Action and Informational Submittals

.1 Refer to Section 21 05 01 - Common Work Results for Mechanical.

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets for equipment and systems and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit copies of WHMIS MSDS - Material Safety Data Sheets.

.3 Shop Drawings

.1 Submit shop drawings to indicate materials, finishes, methods of anchorage, number of anchors, dimensions, construction and assembly details and accessories.

.4 Certificates:

.1 Submit certificates signed by the manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Instructions:

.1 Submit manufacturer's printed installation instructions.

.6 Manufacturer's Field Reports:

.1 Manufacturer's field reports specified.

1.5 Closeout Submittals

.1 Refer to Section Section 21 05 01 – Common Work Results for Mechanical.

1.6 Delivery, Storage and Handling

.1 Refer to Section Section 21 05 01 – Common Work Results for Mechanical.

1.7 Quality Assurance

.1 Performance Requirements

.1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards.

2. PRODUCTS

2.1 Materials

- .1 Materials and resources in accordance with Section 21 05 01 – Common Work Results for Mechanical.

2.2 Back Flow Preventers

- .1 Preventers: to CSA-B64 Series, reduced pressure principle type with inlet strainer and quarter turn isolation valves.

2.3 Vacuum Breakers

- .1 Breakers: to CSA-B64 Series, vacuum breaker for hose connection at hose bibb.

2.4 Hose Bibbs and Sediment Faucets

- .1 Bronze construction complete with integral vacuum breaker, hose thread spout, replaceable composition disc, and male thread inlet.

2.5 Water Meters

- .1 Displacement type to AWWA C700.
- .2 Capacity: flow rate 6.3l/s at maximum pressure drop 69 kPa, flanged pipe connections. 50mm (NPS 2).
- .3 Accessories: remote readout device.
- .4 Acceptable Material: Neptune T-10 or approved equal.

2.6 Hose Reel HR-1

- .1 Stainless steel hose reel with hand crank, wall mounting bracket, 20mm inlet and reel connections, 23m hose capacity, maximum pressure of 207 bar at up to 99°C.
- .2 Acceptable Material: Reelcraft model HS29000M.

2.7 Hose

- .1 Low pressure water washdown hose, EPDM tube with high tensile wire braid reinforcement and Gray EPDM jacket. 20mm Ø x 15m length. Hose thread male inlet and built-in factory nozzle on outlet end. Abrasion resistant and non-marking cover. Max. 2.0 MPa water operating between -40°C and 185°C.
- .2 Acceptable Material: Goodall model N2613 Gray Washdown with built-on nozzle.

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 data sheet.

3.2 Installation

- .1 Install in accordance with National Plumbing Code of Canada 2010 as amended by the Manitoba Plumbing Code Regulation 32/2011, and the local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.

3.3 Back Flow Preventers

- .1 Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by code.
- .2 Pipe discharge from vent chamber to discharge chamber with air gap and p-trap using PVC-DWV pipe.

3.4 Hose Bibbs and Sediment Faucets

- .1 Install at bottom of risers, at low points to drain systems, and as indicated. Hose bibbs to have vacuum breaker.

3.5 Water Meters

- .1 Install water meter provided by local water authority.

3.6 Hose Reel

- .1 Install on wall in Wetwell where shown.

3.7 Hose

- .1 Install hose on hose reel and coil neatly to prevent kinking or crushing of the hose.

3.8 Start-Up

- .1 Timing: start-up only after:
 - .1 Pressure tests have been completed.
 - .2 Disinfection procedures have been completed.
 - .3 Certificate of substantial completion has been issued.
- .2 Provide continuous supervision during start-up.

3.9 Testing and Adjusting

- .1 Timing:
 - .1 After start-up deficiencies rectified.
 - .2 After certificate of inspection has been issued by authority having jurisdiction.
- .2 Application tolerances:
 - .1 Pressure at fixtures: +/- 70kPa.
 - .2 Flow rate at fixtures: +/- 20%.
- .3 Adjustments:
 - .1 Verify that flow rate and pressure meet design criteria.
- .4 Vacuum breakers and backflow preventers:
 - .1 Test tightness, accessibility for O&M of cover and of valve.
 - .2 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.
 - .3 Verify visibility of discharge from open ports.
- .5 Hose Reels, Hose bibbs, sediment faucets:
 - .1 Test flow rate and operability of valve operators.
- .6 Commissioning Reports:
 - .1 Submit report to the Contract Administrator outlining the tests conducted and the results recorded.

3.10 Cleaning

- .1 Refer to Section 21 05 01 - Common Work Results for Mechanical.
- .2 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION