

**Part 1 General**

**1.1 SUMMARY**

- .1 Section Includes:
  - .1 Materials and installation for piping, valves and fittings for gas fired equipment.
- .2 Related Sections:
  - .1 Division 01 – General Requirements.
  - .2 Section 23 05 05 – Installation of Pipework.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM):
  - .1 ASTM A47/A47M 99 (2004), Standard Specification for Ferritic Malleable Iron Castings.
  - .2 ASTM A53/A53M 04, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
- .2 Canadian Standards Association (CSA International):
  - .1 CSA W47.1 03, Certification of Companies for Fusion Welding of Steel.
- .3 Canadian Standards Association (CSA)/Canadian Gas Association (CGA):
  - .1 CAN/CSA B149.1HB 00, Natural Gas and Propane Installation Code Handbook.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
  - .1 Material Safety Data Sheets (MSDS).

**1.3 SUBMITTALS**

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet for piping, fittings and equipment.
  - .2 Indicate on manufacturer's catalogue literature following: valves.
  - .3 Submit WHMIS MSDS in accordance with Division 01 – General Requirements and Division 21 – Common Work Results for Mechanical. Indicate VOC's for adhesive and solvents during application and curing.
- .3 Test Reports: submit certified test reports from approved testing agent indicating compliance with specifications for specified performance characteristics and physical properties.
- .4 Closeout Submittals: submit maintenance and engineering data for incorporation into manual in accordance with Division 01 – General Requirements.

## **1.4 QUALITY ASSURANCE**

- .1 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Division 01 – General Requirements.
- .2 Construction requirements: in accordance with Division 01 – General Requirements.
- .3 Verification: contractor's verification in accordance with Division 01 – General Requirements.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Materials and products in accordance with Division 01 – General Requirements.

### **2.2 PIPE**

- .1 Steel pipe: to ASTM A53/A53M, Schedule 40, as follows:
  - .1 NPS 1/2 to 2, screwed.
  - .2 NPS 2 1/2 and over, plain end.

### **2.3 JOINTING MATERIAL**

- .1 NPS 1/2 to 2: Screwed fittings: pulverized lead paste.  
Note: Where pipes will be concealed, pipes and fittings shall be welded.
- .2 NPS 2-1/2 and over: Welded fittings: to CSA W47.1.
- .3 Flange gaskets: non-metallic flat.
- .4 Brazing: to ASTM B837.

### **2.4 FITTINGS**

- .1 Steel pipe fittings, screwed (NPS ½ to 2), flanged or welded (NPS 2-1/2 and over):
  - .1 Malleable iron: screwed, banded, Class 150.
  - .2 Steel pipe flanges and flanged fittings: to ASME B16.5.
  - .3 Welding: butt welding fittings.
  - .4 Unions: malleable iron, brass to iron, ground seat, to ASTM A47/A47M.
  - .5 Bolts and nuts: to ASME B18.2.1.
  - .6 Nipples: schedule 40, to ASTM A53/A53M.

## 2.5 VALVES

- .1 Provincial Code approved, lubricated ball type.

## 2.6 NATURAL GAS SUB-METER

- .1 The Natural Gas Sub-Meter shall be CSA/ULC certified, temperature compensating, and positive displacement diaphragm type with the following features:
  - .1 3-chamber design.
  - .2 Wearless orbital valve.
  - .3 One piece, seamless, convoluted diaphragm.
  - .4 Neoprene gasket.
  - .5 Lubrication Free Bearings.
  - .6 EZ-VU adjustment port.
  - .7 Tamper Resistant Design.
  - .8 Instrumentation compatible.
  - .9 Easy turn (ET) top for simple installation.
  - .10 Reversible top mount index.
  - .11 Index drive: 0.3 cubic meter/revolution.
  - .12 AMR/AMI compatible (all meter reading systems that use a reading initiator).
  - .13 Meets ANSI B109.1 and ANSI B109.2.
  - .14 Product approvals: Canada AG-0298, AG-0385.
- .2 Size, Capacity, Performance:
  - .1 Meter units: Metric - Cubic Meters.
  - .2 Meter Capacity: 62.58 cubic meters/hour @ 13.8 kPa with a pressure drop of 0.52kPa.
  - .3 Max pressure: 172 kPa.
  - .4 Temp range: -34°C to +49°C.
  - .5 38 mm (1-1/2") pipe connections.
- .3 The meter shall be c/w a pulse device that will send a pulse signal to the BMS. The pulse device shall have the following features:
  - .1 Maximum Switching voltage: D.C.: +/- 30 volts.
  - .2 Maximum Switching current: D.C.: +/- 0.01 amps.
  - .3 Maximum Switching watts: D.C.: 0.30 watts.
  - .4 Minimum voltage breakdown: D.C.: +/- 150 volts.
  - .5 Contact resistance: 0.5 ohms.
  - .6 Open circuit resistance: > 100,000,000 ohms.
  - .7 Maximum rate contact closure: 1000 pulses/sec.
  - .8 Maximum bounce time: 0.2 ms max.
  - .9 Resistance: 100 ohms standard electric throughput resistance for interference suppression. Custom series and parallel values available.

- .10 Temperature:
  - .1 -40°C to +115°C

- .4 Wiring from pulse device to BMS shall be supplied and installed by controls contractor. Coordinate on site.

### **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 PIPING**

- .1 Install in accordance with Section 23 05 05 Installation of Pipework, CAN/CSA B149.1, supplemented as specified.
- .2 Install drip points:
  - .1 At low points in piping system.
  - .2 At connections to equipment.

#### **3.3 VALVES**

- .1 Install valves with stems upright or horizontal.
- .2 Install valves at branch take offs to isolate pieces of equipment, and as indicated.

#### **3.4 FIELD QUALITY CONTROL**

- .1 Site Tests/Inspection:
  - .1 Test system in accordance with CAN/CSA B149.1 and requirements of authorities having jurisdiction.
- .2 Obtain reports within 3 days of review and submit immediately to Departmental Representative and Engineer.
- .3 Verification requirements in accordance with Division 01 – General Requirements.

#### **3.5 ADJUSTING**

- .1 Purging: purge after pressure test in accordance with CAN/CSA B149.1.
  - .1 Pre Start-up Inspections:
    - .1 Check vents from regulators, control valves, terminate outside building in approved location, protected against blockage, damage.
    - .2 Check gas trains, entire installation is approved by authority having jurisdiction.

**3.6 GROUNDING**

- .1 Provide Grounding for natural gas piping system within the boiler room. Ground the new piping for boiler HB-1 to HB-4.

**3.7 CLEANING**

- .1 Cleaning: in accordance with Section 23 08 02 - Cleaning and Start Up of Mechanical Piping Systems, supplemented as specified.
- .2 Perform cleaning operations as specified in Section and in accordance with manufacturer's recommendations.
- .3 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION