SECTION 22 05 19

METERS AND GAGES FOR PLUMBING PIPING

**PART 1 GENERAL**

* 1. **SECTION INCLUDES**

1. Water meters.
2. Pressure gages
3. Pressure gage tapings.
4. Stem type thermometers
5. Dial thermometers
6. Thermometer supports
7. Test plugs
8. Static pressure gages
   1. **REFERENCE STANDARDS**
9. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2013.
10. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014.
11. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014.
12. AWWA C700 - Cold-Water Meters -- Displacement Type, Metal Alloy Main Case; 2015.
13. AWWA C701 - Cold-Water Meters -- Turbine Type, for Customer Service; 2012.
14. AWWA C702 - Cold-Water Meters -- Compound Type; 2010.
15. AWWA M6 - Water Meters -- Selection, Installation, Testing, and Maintenance; 2012.
16. UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.
17. UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service; Current Edition, Including All Revisions.
    1. **SUBMITTALS**
18. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.
19. Samples: Submit one of each type of instrument specified.
20. Project Record Documents: Record actual locations of components and instrumentation.
21. Maintenance Materials: Furnish the following for Employer/Owner's use in maintenance of project.
22. Extra Gage Oil for Inclined Manometers: One bottle.
23. Extra Pressure Gages: One of each type and size.
    1. **FIELD CONDITIONS**
24. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.
    1. **METERING**
25. Metering or Sub-Metering shall be provided in accordance with the Utility Providers recommendations and as described in this specification and on the drawings.
26. Metering devices shall be in accordance with the International Organization of Legal Metrology (OIML) Recommendations (OILM-R).
27. Where an electrical and energy metering system (EEMS) is being provided by the contractor, it shall incorporate all electrical, water, gas and energy metering and provide monitoring and billing information to comply with the requirements of CIBSE Guide TM39 or other approved, internationally recognized guidance document.
    1. **QUALITY ASSURANCE**
28. The manufacturer must have at least 10 years of experience in the design and manufacture of specific equipment being supplied.
29. Qualifications: Execute Work of this Section only by skilled tradesmen employed by a qualified Plumbing Subcontractor and regularly engaged in the installation of plumbing equipment.
30. Standards: In addition to the requirements indicated on the Design Drawings, or specified in Division 01 General Requirements and Specification, the Work shall be in accordance with the following standards, codes and relevant statutory requirements.
31. National Electrical Manufacturers Association, NEMA Standards.
32. American National Standards Institute, ANSI Standards.
33. BSI Group, (BS) British Standards.
34. Provide testing and inspections in accordance with General Requirements Division.
35. Preconstruction Testing/ Reports
36. Submit reports of independent tests demonstrating that the products and systems comply with the specified performance requirements.
37. Where test results for a material or product are not available, undertake testing to show compliance with the Specification at an independent testing laboratory acceptable to the Engineer.
38. The provision of testing data or the carrying-out of tests does not relieve the Contractor of his responsibilities regarding the performance requirements, durability or service life requirements.

**PART 2 PRODUCTS**

1. **WATER METER**
2. Water meters on the incoming mains water supply shall be approved by the local authority, and installed in accordance with the local authority requirements.
3. Water meters shall be Approved water meters and shall be provided to monitor the water consumption of landlord and tenant systems within the building. Water meters shall be installed in accordance with the requirements of the local authority.
4. Water meters shall each be provided with a solid-state flow transducer mounted in the pipework, accurate to ± 2% of the flow range. Gas meters shall be installed by the contractor.
5. Water meters shall generally be of the volumetric semi-positive displacement type, conforming to BS.EN 14154-1 or other approved, internationally recognized Standard + A1, Class C or Class D. Multi-jet turbine type water meters may be used provided they conform to BS.EN 14154-1 + A1 Class C or other approved, internationally recognized. Meters conforming to Class A or Class B may only be used if specifically agreed with the Engineer.
6. Meters shall generally be of the “dry dial” type. Where meters are to be installed in a location that will be subject to climatic change, including all external meters, they shall be of the “wet dial” type.
7. All components used in the construction of the meter shall be approved by the WRAS or KIWA or other approved internationally recognized accreditation and testing agencies.
8. Pipework on either side of the meter shall be properly supported, incorporating isolating valves on the inlet and outlet of the meter, with flat faced unions and 1.5mm thick washers to facilitate future replacement of the meter.
9. Meters for specialist applications such as contaminated water or irrigation applications shall be of a type suitable to the application in question.
10. All water meters shall be provided with a pulsed output for Building Controls monitoring and shall provide the option for a serial communications interface using an approved industry standard protocol.
11. Where an electrical and energy metering system is being provided, the water meters shall communicate with this system via a dedicated data communications network using an approved industry standard protocol.
12. Water meters shall be located and orientated to allow easy reading of the dial.
13. All water meters shall be clearly labelled, stating the service and/or area which they are metering.
14. **PRESSURE GAGES**
15. Dial type pressure gauges shall be black cased Bourden type to BS EN 837 or an equivalent approved international standard. They shall be provided with a plain glass front, 150mm diameter white dial with black numbering, black casing with chrome bezel, concentric pointer and red line at the working pressure. They shall be scaled in bars.
16. The range shall be as required and generally to a range of 1.5 x the working pressure. The tube shall be of brass construction and the outlet threaded.
17. A “U” or scroll type steel siphon and gunmetal cock with insulated handle shall be supplied and fixed for each gauge. On insulated pipes the siphon shall be of such dimensions to stand clear of the insulation.
18. The complete assembly shall be screwed into a proprietary socket fitting on the pipeline or a socket, factory welded onto metallic pipework.
19. Thermometers and pressure gauges shall be of similar appearance and provided by the same manufacturer
20. **PRESSURE GAGE TAPPINGS**
21. Gage Cock: Tee or lever handle, brass for maximum 1034 kPa (150 psi).
22. Needle Valve: Brass, 6 mm (1/4 inch) NPT for minimum 1034 kPa (150 psi).
23. Pulsation Damper: Pressure snobbier, brass with 6 mm (1/4 inch) connections.
24. Syphon: Steel, Schedule 40, 6 mm (1/4 inch) angle or straight pattern.
25. **STEM TYPE THERMOMETERS**

A. Thermometers - Adjustable Angle: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device; adjustable 360 degrees in horizontal plane, 180 degrees in vertical plane.

1. Size: 225 mm (9 inch) scale.
2. Window: Clear Lexan.
3. Accuracy: 2 percent, per ASTM E77.
4. Calibration: Degrees F.
5. **DIAL THERMOMETERS**

A. Thermometers - Adjustable Angle: Dial type bimetallic actuated; ASTM E1; stainless steel case, adjustable angle with front recalibration, silicone fluid damping, white with black markings and black pointer, hermetically sealed lens, stainless steel stem.

1. Size: 125 mm (5 inch) diameter dial.
2. Accuracy: 1 percent.
3. Calibration: Degrees F.
4. **THERMOMETER SUPPORTS**
5. Socket: Brass separable sockets for thermometer stems with or without extensions as required, and with cap and chain.
6. Flange: 75 mm (3 inch) outside diameter reversible flange, designed to fasten to sheet metal air ducts, with brass perforated stem.
7. **TEST PLUGS**
8. Test Plug: 6 mm (1/4 inch) or 13 mm (1/2 inch) brass fitting and cap for receiving 3 mm (1/8 inch) outside diameter pressure or temperature probe with Nordel core for temperatures up to 176 degrees C (350 degrees F).
9. Test Kit: Carrying case, internally padded and fitted containing one 60 mm (2-1/2 inch) diameter pressure gages, one gage adapters with 3 mm (1/8 inch) probes, two 25 mm (1 inch) dial thermometers.
10. **STATIC PRESSURE GAGES**

A. 90 mm (3-1/2 inch) diameter dial in metal case, diaphragm actuated, black figures on white background, front recalibration adjustment, 2 percent of full scale accuracy.

B. Inclined manometer, red liquid on white background with black figures, front recalibration adjustment, 3 percent of full scale accuracy.

1. Accessories: Static pressure tips with compression fittings for bulkhead mounting, 6 mm (1/4 inch) diameter tubing.

PART 3 EXECUTION

1. **REFER TO SECTION 23 0519.**

**END OF SECTION**