

SECTION 15121

METERS AND GAUGES FOR PLUMBING

PART 1 –GENERAL

1.1 SUMMARY

- A. Section includes positive displacement meters, , pressure gages and pressure gage taps, thermometers and thermometer wells, static pressure gages, filter gages, expansion tanks for water systems, strainers, and pump suction fittings..

1.2 REFERENCES

- A. ASME (American Society of Mechanical Engineers) - Boiler and Pressure Vessel Codes, SEC VIII-D - Rules for Construction of Pressure Vessels.
- B. ASME B40.1 (American Society of Mechanical Engineers) - Gauges - Pressure Indicating Dial Type - Elastic Element.
- C. ASTM E1 - Standard Specification for ASTM Thermometers.
- D. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers.
- E. ASTM A105 - Forgings, Carbon Steel, for Piping Components.
- F. ASTM A126 - Grey Iron Castings for Valves, Flanges, and Pipe Fittings.
- G. ASTM A216 - Steel Castings, Carbon, Suitable for Fusion Welding, for High Temperature Service.
- H. ASTM A395 - Ferric Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
- I. AWWA C700 (American Water Works Association) - Cold-Water Meters - Displacement Type, Bronze Main Case.
- J. AWWA C701 (American Water Works Association) - Cold-Water Meters - Turbine Type, for Customer Service.
- K. AWWA C702 (American Water Works Association) - Cold-Water Meters - Compound Type.
- L. AWWA C706 (American Water Works Association) - Direct-Reading Remote-Registration Systems for Cold-Water Meters.

M. AWWA M6 (American Water Works Association) - Water Meters - Selection, Installation, Testing, and Maintenance.

N. UL 404 (Underwriters Laboratories, Inc.) - Gauges, Indicating Pressure, for Compressed Gas Service.

1.3 SUBMITTALS

A. SEE: Section 01330 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit for manufactured products and assemblies required for this Project.

1. Manufacturer's data and list indicating use, operating range, total range, accuracy, and location for manufactured components.
2. Submit product description, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes.
3. Submit schedule indicating manufacturer, model number, size, location, rated capacity, load served, and features for each specialty.
4. Submit electrical characteristics and connection requirements.

C. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures, application, selection, and hookup configuration. Include pipe and accessory elevations.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 01770 – Closeout and Turnover Procedures: Closeout procedures.

B. Project Record Documents: Record actual locations of actual locations of components and instrumentation.. Submit inspection certificates for pressure vessels from Authority having jurisdiction.

C. Operation and Maintenance Data: Submit instructions for calibrating instruments, installation instructions, assembly views, servicing requirements, lubrication instruction, and replacement parts list.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience and with service facilities within 100miles of Project.

- B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.6 PRE-INSTALLATION MEETING

- A. Section 01330 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week prior to commencing Work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Protect systems from entry of foreign materials by temporary covers, caps and closures, completing sections of the work, and isolating parts of completed system until installation.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install instruments when areas are under construction, except for required rough in, taps, supports and test plugs.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 WARRANTY

- A. Section 01770 - Execution Requirements: Product warranties and product bonds.

1.11 MAINTENANCE SERVICE

- A. Section 01770 - Execution Requirements: Maintenance service.

1.12 MAINTENANCE MATERIALS

- A. Section 01770 - Execution Requirements: Spare parts and maintenance materials.

PART 2 –PRODUCTS

2.1 POSITIVE DISPLACEMENT METERS (LIQUID)

- A. AWWA C700, positive displacement disc type suitable for fluid with bronze case and

cast iron bottom cap, hermetically sealed register, remote reading to AWWA C706.

B. Meter: Brass body turbine meter with magnetic drive register.

1. Service: Cold water.
2. Nominal Flow as required by project.
3. Pressure Drop at Nominal Flow: maximum 10 psi.
4. Maximum Flow: 150 percent of nominal flow.
5. Maximum Operating Pressure: 400 psi.
6. Accuracy: 1-1/2 percent.
7. Maximum Counter Reading: 10 million gallons.
8. Pipe Size: as required by project.

2.2 PRESSURE GAGES

A. Gage: ASME B40.1, UL 393 with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.

1. Case: Cast aluminum or Stainless steel.
2. Bourdon Tube: Brass or Type 316 stainless steel.
3. Dial Size: 4 inch diameter.
4. Mid-Scale Accuracy: One percent.
5. Scale: Psi.

2.3 PRESSURE GAGE TAPS

A. Needle Valve:

1. Brass or Stainless Steel, 1/4 inch NPT for minimum 300 psi.

B. Ball Valve:

1. Brass or Stainless Steel, 1/4 inch NPT for 250 psi.

C. Pulsation Damper:

1. Pressure snubber, brass with 1/4 inch NPT connections.

D. Siphon:

1. Steel, Schedule 40 or Brass, 1/4 inch NPT angle or s straight pattern.

E. STEM TYPE THERMOMETERS

F. Thermometer: ASTM E1, adjustable angle, red appearing mercury, lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device.

1. Size: 7 inch scale.
2. Window: Clear glass.
3. Stem: Brass, 3/4 inch NPT, 3-1/2 inch long.
4. Accuracy: ASTM E77 2 percent.

5. Calibration: Both degrees F and degrees C.

2.4 THERMOMETER SUPPORTS

- A. Socket: Brass separable sockets for thermometer stems with or without extensions as required and with cap and chain.
- B. Flange: 3 inch outside diameter reversible flange, designed to fasten to sheet metal air ducts, with brass perforated stem.

2.5 TEST PLUGS

- A. $\frac{1}{4}$ inch NPT or $\frac{1}{2}$ inch NPT brass fitting and cap for receiving $\frac{1}{8}$ inch outside diameter pressure or temperature probe with:
 - 1. Neoprene core for temperatures up to 200 degrees F.
 - 2. Nardel core for temperatures up to 350 degrees F.
 - 3. Viton core for temperatures up to 400 degrees F.

2.6 STATIC PRESSURE GAGES

- A. Dial Gages:
 - 1. 4 inch diameter dial in metal case, diaphragm actuated, black figures on white background, front calibration adjustment, 2 percent of full scale accuracy.
- B. Inclined Manometer:
 - 1. Plastic with red liquid on white background with black figures, front calibration adjustment, 3 percent of full scale accuracy.
- C. Accessories: Static pressure tips with compression fittings for bulkhead mounting, $\frac{1}{4}$ inch diameter tubing.

2.7 DIAPHRAGM-TYPE EXPANSION TANKS

- A. Construction: Welded steel, tested and stamped in accordance with ASME SEC 8-D; supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible FDA approved EPDM diaphragm sealed into tank, and steel support stand.
- B. Accessories: Pressure gage and air-charging fitting, tank drain; pre-charge to 12 psig

2.8 STRAINERS

- A. Size 2 inch and Under:
 - 1. Screwed brass or iron body for 175 psig working pressure, Y pattern with $\frac{1}{32}$ inch stainless steel perforated screen.

B. Size 2-1/2 inch to 4 inch:

1. Flanged iron body for 175 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen

C. Size 5 inch and Larger:

1. Flanged iron body for 175 psig working pressure, basket pattern with 1/8 inch stainless steel perforated screen.

2.9 PUMP SUCTION FITTINGS

A. Fitting: Angle pattern, cast-iron body. Threaded for 2 inch and smaller, flanged for 2-1/2 inch and larger. Rated for 175 psig working pressure, with inlet vanes, cylinder strainer with 3/16 inch diameter openings, disposable fine mesh strainer to fit over cylinder strainer, and permanent magnet located in flow stream and removable for cleaning.

B. Accessories: Adjustable foot support, blow-down tapping in bottom, gage tapping in side.

PART 3 –EXECUTION

3.1 INSTALLATION

A. Install positive displacement meters in accordance with AWWA M6, with isolating valves on inlet and outlet. Provide full line size bypass with globe valve for liquid service meters.

B. Install one pressure gage per pump, with taps before strainers and on suction and discharge of pump; pipe to gage.

C. Install gage taps in piping

D. Install pressure gages with pulsation dampers. Provide ball valve to isolate each gage. Extend nipples to allow clearance from insulation.

E. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inches for installation of thermometer sockets. Ensure sockets allow clearance from insulation.

F. Coil and conceal excess capillary on remote element instruments.

G. Install static pressure gages to measure across filters and filter banks, (inlet to outlet). On multiple banks, provide manifold and single gage.

H. Provide instruments with scale ranges selected according to service with largest

appropriate scale.

- I. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- J. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.
- K. Locate test plugs as applicable.
- L. Provide manual air vents at system high points and as indicated.
- M. Provide drain and hose connection with valve on strainer blow down connection.
- N. Provide pump suction fitting on suction side of base mounted centrifugal. Remove temporary strainers after cleaning systems.
- O. Provide combination pump discharge valve on discharge side of base mounted centrifugal pumps where indicated.
- P. Support pump fittings with floor mounted pipe and flange supports.
- Q. Provide relief valves on pressure tanks, low-pressure side of reducing valves, heat exchangers, and expansion tanks.
- R. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.
- S. Pipe relief valve outlet to nearest floor drain.

3.2 FIELD QUALITY CONTROL

- A. Section 01450 - Quality Requirements: Testing and Inspection Services 01770 - Execution Requirements: Testing, adjusting, and balancing.

3.2 CLEANING

- A. Section 01770 – Closeout and Turnover Procedures.

END OF SECTION