This master should be used by designers working on Port of Portland construction projects and by designers working for PDX tenants (“Tenants”). Usage notes highlight a few specific editing choices, however the entire section should be evaluated and edited to fit specific project needs.

SECTION 230519 - METERS AND GAUGES FOR HVAC PIPING

1. GENERAL
	* + 1. DESCRIPTION
				1. This section describes water meters, water-flow meters, thermometers, and pressure gauges.
			2. RELATED WORK SPECIFIED ELSEWHERE
				1. Section 230523, General Duty Valves for HVAC Piping
			3. REFERENCES
				1. AWWA: American Water Works Association
			4. SUBMITTALS
				1. For each item specified herein, submit product/material data; shop drawings; operation and maintenance data; as-constructed data; operation and maintenance manuals; and as-constructed drawings.

Water flow meters: Include graph of output signal versus gpm for each device.

Use only if Commissioning Section 019100 is included in the contract.

* + - * 1. For each item specified herein, submit commissioning plans and schedules; checkout, start up, operational, functional and final acceptance test plans, procedures, checklists, and reports; and operation and maintenance training plans.
1. PRODUCTS
	* + 1. THERMOMETERS, WATER
				1. Acceptable Manufacturers: Ashcroft, Weiss, Trerice, Marshalltown-Tempco inc., or equal.
				2. Description: Direct drive 4 1/2-inch dial type, stainless steel case, separable sockets, stem length to penetrate minimum of half pipe diameter, adjustable face, extension necks where required to clear insulation.
				3. Range:

|  |  |  |
| --- | --- | --- |
| System | Temperature ºF | Graduations (ºF) |
| Chilled water | 25-125 | 1 |
| Heating water | 30-240 | 1 |
| Condenser water | 25-125 | 1 |

* + - 1. THERMOMETERS, AIR
				1. Acceptable Manufacturers: Ashcroft, Weiss, Trerice, Marshalltown, or equal.
				2. Description: Direct drive 4 1/2-inch dial type, stainless steel case, separable sockets, stem length to penetrate a minimum of 12-inch, duct flange, adjustable dial face.
				3. Range: 25ºF to 125ºF range with 1ºF divisions.
			2. WATER METERS
				1. Acceptable Manufacturers: Badger, Sparling, or equal.
				2. Description:

Disc type meter, bronze split casing, magnetic drive.

Heavy duty gear train, completely sealed, circular meter, totalize in cubic feet with sweep hand.

Comply with AWWA performance standards.

* + - 1. PRESSURE GAUGES
				1. Acceptable Manufacturers: Marsh, Ashcroft, Weiss, Trerice, or equal.
				2. Description: 4 1/2-inch dial, molded black polypropylene turret case.
				3. Range:

|  |  |  |
| --- | --- | --- |
| System | Pressure (psi) | Graduations (psi) |
| Chilled Water | 0-100 | 1 |
| Heating Water | 0-100 | 1 |
| Condenser Water | 0-100 | 1 |
| Low Pressure Steam | 0-30 | 1 |
| High Pressure Steam | 0-160 | 1 |

1. EXECUTION
	* + 1. INSTALLATION - GENERAL
				1. Provide water meters, thermometers, and pressure gauges where shown on the drawings.
				2. Install all devices as required and as recommended by the equipment manufacturer.
				3. Extend all connections, wells, cocks, or gauges to a minimum of 1 inch beyond insulation thickness of the various systems.
				4. Locate all instruments so that they may be conveniently read at eye level or easily viewed and read from the floor or from the most likely viewing area, e.g., platform, catwalk, etc.
				5. Install instruments over 6'-6" above floor, to be viewed from the floor, with face at 30 degrees to horizontal.
			2. INSTALLATION - PRESSURE GAUGES
				1. Provide instrument gauge cock at inlets.
				2. Locate pressure gauge taps for measuring pressure drop or increase across pumps, coils, etc., as close to the device as possible.

Choose one of the following two articles. Use Commissioning if Section 019100 is included in the contract; otherwise use Testing.

* + - 1. COMMISSIONING
				1. Commission items specified herein.
			2. TESTING
				1. Check out, start up, and test items specified herein.

END OF SECTION 230519