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 220519 - METERS AND GAUGES FOR PLUMBING PIPING

1. GENERAL
	* + 1. DESCRIPTION
				1. This section describes water meters, water-flow meters, natural gas meters, thermometers, and pressure gauges.
			2. REFERENCES
				1. AWWA: American Water Works Association
			3. SUBMITTALS
				1. For the following items, 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 project manual.

* + - * 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, or equal.
				2. Description: Direct drive 5-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) |
| Domestic cold water | 25-125 | 1 |
| Domestic hot water | 30-180 | 2 |

* + - 1. WATER METERS
				1. Acceptable Manufacturers: Hersey Model HD, 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.

The following article is for Tenant use only. Delete if not applicable.

* + - 1. WATER METERS (REMOTE READ/REVENUE GRADE)
				1. Acceptable Manufacturer: Badger Meter – Recordall, No Substitutions.
				2. Meter Base Description:

Disc type meter, bronze split casing, lead free construction, magnetic drive.

Heavy duty gear train, completely sealed, circular meter.

Comply with AWWA performance standards.

Meter base size shall be based on maximum water flow rate anticipated and as indicated on drawings.

* + - * 1. Meter Output Description:

Provide meter with pulse output capability, Badger - Recordall Transmitter Register (RTR).

Measure pulse output in cubic feet.

RTR shall have dial and odometer read out with cubic feet registers.

RTR shall have two conductor output for field connection.

RTR shall be provided with the meter base.

Provide meter with pulse output capability, Badger HR-LCD Pulse.

Pulse output shall be measured in cubic feet.

Shall have LCD display read out with cubic feet registers.

Shall have two-conductor output for field connection.

Shall be provided with the meter base.

Shall have low-voltage control power connection.

The following article is for Tenant use only. Delete if not applicable.

* + - 1. NATURAL GAS METERS (REMOTE READ/REVENUE GRADE)
				1. Acceptable Manufacturer: Elster American Meter – AL-425, AL-800 or AL-1000, No Substitutions.
				2. Meter Base Description:

Aluminum case, molded convoluted diaphragms, security seals that indicate tampering.

Suitable for 10-psig maximum natural gas pressure.

Temperature compensated meter.

Comply with ANSI B109.1.

* + - * 1. Meter Output Description:

Provide meter with pulse output capability, Elster American Meter – Remote Volume Pulser (RVP).

Temperature compensated.

Index description: 5 cubic feet, 6-digit odometer.

Volume per output pulse: 5 cubic feet.

UV protected index cover.

Provide RVP with the meter base.

* + - 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) |
| Domestic Water | 0-160 | 1 |
| Compressed Air | 0-160 | 1 |

* + - 1. VACUUM 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 (in-Hg) | Graduations (Hg) |
| Vacuum | 0-30 | 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.

The following article is for Tenant use only. Delete if not applicable.

* + - 1. INSTALLATION - WATER METERS (REMOTE READ/REVENUE GRADE)
				1. Pipe insulation shall not cover the RTR or HR-LCD Pulse read out.
				2. Read out shall be readily viewable from floor level and not obstructed by other items.
				3. Where the water meter is concealed behind walls, ceilings, etc., place a blue dot and meter number on the outside of the obstruction.
				4. Place a numbered tag on the meter. Coordinate meter tag number with the Port.
				5. Coordinate meter installation location with the Port, other trades, and shop drawings prior to installation.
				6. Provide wall space for installation of a Port-furnished control panel for interface to the meter-reading system. Allow approximately 12" x 12" x 6". Provide a 120 VAC circuit for use by the Port to power the control panel.
				7. Coordinate connection of all wiring with other trades.
				8. Test and verify, by flowing of water, that the pulse output and dial or LCD output are properly functioning.

The following article is for Tenant use only. Delete if not applicable.

* + - 1. INSTALLATION – NATURAL GAS METERS (REMOTE READ/REVENUE GRADE)
				1. RVP read out shall be readily viewable and not obstructed by other items.
				2. Where the natural gas meter is concealed behind walls, ceilings, etc., place a yellow dot and meter number on the outside of the obstruction.
				3. Place a numbered tag on the meter. Coordinate meter tag number with the Port.
				4. Coordinate installation location with the Port, other trades, and shop drawings prior to installation.
				5. Coordinate connection of RVP wiring with other trades.
				6. Test and verify, by flowing of natural gas, that the RTR pulse output and dial output are properly functioning.

Choose between Commissioning and Testing articles. Use Commissioning if Section 019100 is included in the project manual; 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 220519