SECTION 25 3313
THERMAL UTILITY METERING INTERFACE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes metering and monitoring for interface points for utility chilled water, hot water, and steam fed to each building, and specifies interface valves.

B. Stanford University distributes chilled water, utility hot water, and steam from central production facilities on campus. This section describes the building level metering and interface control requirements for these respective utilities. Devices listed within this section are for utility metering & do not include building side instrumentation. Metering instrumentation will interface to a local Utility Interface panel within the building. Though typically not required, if the metering points are needed within the local building control system, the data can be shared via a local network connection. Consult with Stanford’s Sustainability & Energy Management team for project specific requirements. Stanford will supply the Utility Interface enclosure, internal I/O and programming for field installation by the contractor.

C. See section 16211 for building level electrical metering requirements.

D. Related Sections
   1. 25 0553 Identification

1.2 REFERENCES

A. Stanford FDG Drawing MS-10
B. Stanford FDG Drawing MS-11
C. Stanford FDG Drawing MS-17
D. Stanford FDG Drawing MS-68
E. Stanford FDG Drawing MC-01
F. Refer to 25 0000 Integrated Automation

1.3 DEFINITIONS

A. Refer to 25 0000 Integrated Automation

1.4 SYSTEM DESCRIPTION

A. Systems described below interface with the Utility Interface Panel.

B. Systems include metering for:
   1. Chilled Water Metering to include 7 devices: supply flow; supply, mix, and return temperatures; and supply, mix, and return pressures.
   2. Utility Hot Water Metering to include 5 devices: supply flow; supply and return temperatures; and supply and return pressures.
   3. Steam Metering to include 3 devices: flow, pressure, and temperature.

C. Control valves for:
   1. Chilled Water Interface Control Valve
   2. Utility Hot Water to Heating Hot Water Interface Control Valve
3. Utility Hot Water to Domestic Hot Water Interface Control Valve
4. Steam to Hot Water Interface Control Valve

1.5 SUBMITTALS

A. Product data sheets including construction materials and assembly methods

B. Valve Schedule:
   1. Indicate size, location and model of each control valve.
   2. Indicate unique tag numbers for each device, equipment item or system served.
   3. Include shut-off head required, actuator air pressure or force required to meet shut-off head,
   torque requirements for rotary valves, actual flow requirements based on equipment shop
   drawings, and calculation of actual pressure drops.
   4. Include charts, graphics or similar items used in making selections.

1.6 QUALITY ASSURANCE

A. Obtain adequate system information necessary for valve and flow meter sizing.

B. Refer to section 25 0000 for additional requirements.

PART 2 - PRODUCTS

2.1 CHILLER WATER METER

A. Magnetic Flowmeter/Transmitter
   1. Manufacturer: Rosemount.
   2. The following instruments shall be used:
      a. Flow Tube:
         1). For 3" & larger use: Rosemount Model No. 8705-T-S-A-Size-C-1-WO-NA-B3. (flanged)
         2). For smaller than 3" use: Rosemount Model No. 8711-S-S-A-TUBE SIZE (005 TO 030)
            Transmitter Option (U or R)-1-NA. (wafer)
      b. Flow Transmitter:
         1). For flow tubes mounted at 6’ or less use: Rosemount Model No. 8732E-S-T-1-A-1-NA-
            M5 (integrated display).
         2). For flow tubes mounted higher than 6’ use: Rosemount Model No. 8712E-S-R-1-A-4-NA-
            M5 (remote display).
      d. Temperature Element and Thermowell: Rosemount Model No. 0068-N-2-1-N-00-A-
         (immersion length)-T26-XA.
      f. Pressure Transmitter Manifold: Rosemount Model No. 0306-R-T-2-2-BA-1-1.

3. Calibration and Sizing:
   a. Calibrated range for the chilled water temperature transmitters shall be 30 to 80 degrees F.
   b. Calibrated range for pressure transmitters shall be 0-100 psig.
   c. Flow Tube size and calibration shall be approved by Stanford’s Facilities Energy Management
      team.

4. Power and Wiring Requirements:
   a. A dedicated utility interface 120 VAC power circuit is required to all magnetic flow
      transmitters. The same circuit may be used for other utility metering and valves but each
      device requires a separate disconnect device.
   b. A lockable disconnect is required at each flow transmitter so that the transmitter can be safely
      serviced, Leviton 1201-2L. The transmitter shall be fed emergency power if available.
c. For remote mounted transmitters:
   1). The electrode signal cable from the flow tube to the flow transmitter shall be jacketed,
      overall shielded, 20 AWG stranded copper two conductor cable with 20 AWG stranded
      copper drain wire (Belden 8760 or equal).
   2). The coil power cable from the flow tube to the flow transmitter shall be shielded, jacketed,
      overall 14 AWG stranded copper two conductor cable with 16 AWG stranded copper
      drain wire (Belden 8720 or equal).

d. Reference MS-11 and installation manual instructions to include but not limited to bonding
   flow tube to process piping.

2.2 UTILITY HOT WATER METER

A. Vortex Flow meter with integrated Transmitter
   1. Manufacturer: Rosemount
   2. Instrumentation: The following instruments shall be used:
      c. Temperature Element & Thermowell: Rosemount Model No. 0068-N-2-1-N-00-A-(immersion
         length [typically ½ pipe diameter])-T26-XA.
      e. Pressure Transmitter Manifold: Rosemount Model No. 0306-R-T-2-2-BA-1-1.

3. Calibration and Sizing:
   a. Calibrated range for the temperature transmitters shall be 50 to 200 degrees F.
   b. Calibrated range for pressure transmitters shall be 0-100 psig.
   c. Flow Tube size and calibration shall be approved by Stanford’s Facilities Energy Management
      team.

4. Power and Wiring Requirements:
   a. Meter is loop powered from the Campus EMCS panel.

2.3 STEAM FLOW METER

A. Vortex Flow Meter with integrated Transmitter:
   1. Manufacturers: Rosemount.
   2. The following instruments shall be used:
      c. Pressure Transmitter Manifold: Rosemount Model No. 0306-R-T-2-2-BA-1-1.
      e. Temperature Element and Thermowell: Rosemount Model No. 0068-N-2-1-N-00-A-(immersion
         length)-T26-XA.

3. Calibration and Sizing:
   a. Calibrated range for pressure transmitters shall be 0-300 psig.
   b. Calibrated range for the temperature transmitters shall be 200-400 degrees F.
   c. Flow meter size and calibration shall be approved by Stanford’s Facilities Energy Management
      team.

4. Power and Wiring Requirements:
   a. Meter is loop powered from the Campus EMCS panel.
2.4 CHILLED WATER INTERFACE CONTROL VALVE

Note: The building distribution system shall be designed as a primary/secondary system with booster pump and crossover bridge (Reference Standard Drawing MS-10). In no instance shall the building booster pump be allowed to operate in series with the campus distribution system. The building booster pump shall be controlled per MS-10 and will be used in conjunction with the interface valve to ensure the building returns 58°F water to the chilled water distribution system.

A. The chilled water interface control valve shall be line sized with near zero pressure drop, normally closed (N.C.) and able to shut off against sixty (60) PSI differential pressure with no more than 0.1% of maximum flow leakage. This valve shall be a Fisher series V150 with a Bettis electric actuator including a spring return or other fail-closed capability. An electric actuated valve may share power with the chilled water flow tube. If it does not, it needs to have a dedicated utilities circuit. In either case a local disconnect at valve location is required.

B. If emergency power is available, circuit for utility interface devices should be on emergency power circuits.

2.5 UTILITY HOT WATER TO Heating Hot Water interface control VALVE

Note: The building will have one or more hot water heat exchangers to receive utility hot water and produce heating hot water and domestic hot water. Reference the building P&ID for details.

A. The utility hot water interface control valve shall be normally closed (N.C.) and able to shut off against sixty (60) PSI differential pressure with no more than 0.1% of maximum flow leakage. This valve shall be a Fisher series V150 series valve with a pneumatic diaphragm actuator and positioner. An electric actuator may be used as an alternative if it includes a spring return or other fail-closed capability. An electric actuated valve should be wired to a dedicated Utility circuit and have a local disconnect. I/P Transducers: The current-to-pneumatic (I/P) transducer shall be either a Bellofram type 1000, Control Air type 500-AC, Moore Industries type IPF, or the Fisher transducer available as an installed option with the control valve.

2.6 UTILITY HOT WATER TO DOMESTIC Hot Water interface control VALVE

A. The DHW interface control valve shall be a 2-way valve configured to fail closed on loss of power or signal.

B. The DHW interface valve controller shall be capable of receiving a digital input from the campus utilities network that will serve to command the valve closed in case of a utility distribution emergency.

2.7 STEAM TO HEATING HOT WATER INTERFACE CONTROL VALVE

A. The steam interface control valve shall be an industrial-grade normally closed (N.C.) valve capable of a 0.1% shut-off rating and rated for steam service. The control valve shall be a Fisher E series valve with a pneumatic diaphragm actuator and positioner. An electric actuator may be used as an alternative if it includes a spring return or other fail-closed capability and includes a manual override. An electric actuated valve shall be wired to a dedicated Utility circuit and have a local disconnect.

B. I/P Transducers: The current-to-pneumatic (I/P) transducer shall be either a Bellofram type 1000, Control Air type 500-AC, Moore Industries type IPF, or the Fisher transducer available as an installed option with the control valve.

C. Pressure-Reducing Regulator: For direct steam heating, the steam PRV shall be equipped with a 120-VAC solenoid valve to allow the shut off of steam. A relay will be tied to the Campus EMCS panel for scheduling and emergency shutoff.
PART 3 - EXECUTION

3.1 CONTROLS CONTRACTOR TO COORDINATE WITH PIPING TRADE FOR LOCATION AND INSTALLATION DETAILS.

3.2 CHILLED WATER METER
   A. The upstream and downstream runs of the flow meter shall be straight meter sized piping without taps, feed-ins, or thermowells for the following number of meter size pipe diameters:
      1. Upstream - 10 pipe diameters, minimum.
      2. Downstream - 5 pipe diameters, minimum.
   B. Meter shall be installed on the supply line before any heat exchangers or building loads.
   C. Grounding straps are provided and must be bonded to pipe on both sides of meter.
   D. Pressure transmitters that have a sensing port greater than 6’ above ground shall be mounted on a wall or pipe stand. Mounting orientation of pressure transmitters shall be as shown in MS-17.
   E. Refer to MS-10 for further details.

3.3 UTILITY HOT WATER METER
   A. The upstream and downstream runs of the flow meter shall be straight meter sized piping without taps, feed-ins, or thermowells for the following number of pipe diameters:
      1. Upstream - 20 pipe diameters, minimum.
      2. Downstream - 5 pipe diameters, minimum.
   B. Meter shall be installed on the supply line before any heat exchangers or building loads.
   C. Pressure transmitters that have a sensing port greater than 6’ above ground shall be mounted on a wall or pipe stand. Mounting orientation of pressure transmitters shall be as shown in MS-17.
   D. Refer to MS-68 for further details.

3.4 STEAM METER
   A. The flow meter shall be installed before the pressure-reduction station. Refer to MS-20. The upstream and downstream runs of the flow meter shall be straight meter sized piping without taps, feed-ins, or thermowells for the number of diameters as follows:
      1. Upstream - 20 pipe diameters, minimum.
      2. Downstream - 5 pipe diameters, minimum.
   B. Pressure transmitters shall be mounted on wall or pipe stand. Mounting orientation of pressure transmitters shall be as shown in MS-17.

3.5 CHILLED WATER INTERFACE CONTROL VALVE
   A. Sufficient upstream and downstream piping runs must be provided to ensure proper valve capacity and flow response.
   B. Refer to MS-10

3.6 UTILITY HOT WATER TO Heating Hot Water interface control Valve
   A. Sufficient upstream and downstream piping runs must be provided to ensure proper valve capacity and flow response.
   B. Refer to MS-68.
3.7 UTILITY HOT WATER TO DOMESTIC Hot Water interface control Valve
   A. Sufficient upstream and downstream piping runs must be provided to ensure proper valve capacity and flow response.
   B. Refer to MS-68.

3.8 STEAM TO HOT WATER INTERFACE CONTROL VALVE
   A. Sufficient upstream and downstream piping runs must be provided to ensure proper valve capacity and flow response.

END OF SECTION