

330000-Utility Metering Standard

1) General

- a) Project Engineer of Record shall submit peak building load projections to facilitate meter sizing for all utility connections during the design development phase of the project.
- b) Meters must be operational and be able to be manually read before utility systems are energized and providing service to the facility.
- c) All meter locations need to be coordinated with the Central Utilities Utility System Manager, as well as the Energy Operations Group. The meter must be located in an easily accessible and secure location. All meter displays and buttons must be read-able and reachable from the ground without using a ladder.
- d) Meter commissioning reports are due to CU/EOG and CPD&CM prior to utility system operation.
- e) All meters shall be provided per University specification by the Building Automation System (BAS) contractor for all projects. This includes, but is not limited to, the domestic water meter, chilled water meter, district hot water meter and steam meters.
- f) The BAS contractor shall be responsible for the installation of all communication connections and all power requirements to operate the meter. See meter communication installation requirements in section 6 below.

2) Domestic Water Meters:

- a) General
 - i) Water meters shall have an inline strainer assembly immediately upstream from the meter installation.
 - ii) All connections shall be flanged connection with gaskets in accordance with most recent AWWA standards.
- b) Units
 - i) Water meters shall report consumption as follows:
 - (1) *Meters sized 1.5" to 4" shall report consumption in 100 gallon intervals.*
 - (2) *Meters sized 6" to 12" shall report consumption in 1000 gallon intervals.*
- c) Meter Outputs:
 - i) Gallons-Totalized
- d) Meters shall be flange type manufactured by:
 - i) Neptune Provide catalog #
 - (1) *HP Turbine Meter: <http://neptunetg.com/products/meters/high-performance-turbine-20/>*
 - (2) *Strainer: <http://neptunetg.com/products/meters/strainers/>*
 - ii) Sensus
 - (1) *Omni T² Meters SP-W-OMT-00-0611-04-A (Integral Strainer): [http://sensus.com/documents/10157/31403/OMNI%20T2%20Specifications%20\(SP-W-OMT-00-0611-04-A\).pdf](http://sensus.com/documents/10157/31403/OMNI%20T2%20Specifications%20(SP-W-OMT-00-0611-04-A).pdf)*

3) Chilled Water Meters

a) General:

- i) Meters shall be installed on the chilled water return line at a location coordinated with Central Utilities and the Energy Operations Group.

b) Meter/Calculator Outputs:

- i) CW Energy—Ton-Days
- ii) CW Flow—GPM
- iii) CW Power—Tons
- iv) CW Volume—Totalized Volume
- v) CW Delta T—deg F

c) Electromagnetic Meters

- i) Chilled water meters shall be of the ELECTROMAGNETIC Meter type, and shall meet the following requirements:

(1) *Full Line Size*

(2) *150# Flanges*

(3) *Applicable for working pressures up to 150psig, test pressures to 225psig*

(4) *PTFE linings*

(5) *Temperature Range from -10 degC to 50 degC*

(6) *Energy Calculators, local or remote connection depending on application*

(7) *Contractors shall provide necessary Differential Pressure Transmitters and Differential Temperature Transmitters for energy calculator connection requirements.*

- ii) Acceptable Manufacturers:

(1) *Onicon:*

(a) Mag Meter Model Number: F-32BB-132 or equal. (The engineer shall pick the appropriate line size and replace the BB with that number description.)

(b) Onicon System 10 BTU Calculator-Communication Card designation to be provided by the EOG Group.

(c) Thermocouples and other components are a part of meter

(2) *Rosemount electromagnetic meter components:*

(a) E-Series Magnetic Flowmeter Transmitter

(b) 8705 Flanged Sensor-PTFE Liner

(c) Rosemount Flow Computer

(d) Wire-Wound Platinum RTD Sensor

(e) Integral Manifold

(3) *Yokogawa:*

(a) ADMAG AXF Flowmeter

a. *Condensation Proof*

b. *Integral or remote converter depending on project need*

c. *EDPM Lining is acceptable*

(b) 212 Heat Calculator

4) Low Temperature Hot Water Meters-COGEN

a) General:

- i) Meters shall be installed on the low temperature hot water return line at a location coordinated with Central Utilities and the Energy Operations Group.

b) Meter/Calculator Outputs:

- i) HW Energy—MBTU
 - ii) HW Flow—GPM
 - iii) HW Power—MBH
 - iv) HW Volume—Totalized Volume
 - v) HW Delta T—deg F
 - c) Electromagnetic Meters
 - i) Low Temperature Hot Water meters shall be of the ELECTROMAGNETIC Meter type, and shall meet the following requirements:
 - (1) *Full Line Size*
 - (2) *300# Flanges*
 - (3) *Applicable for working pressures to 250psig, and test pressures to 350psig*
 - (4) *PTFE linings*
 - (5) *Temperature Range from -10 degC to 180 degC*
 - (6) *Energy Calculators require a remote connection*
 - (7) *Contractors shall provide and install necessary Differential Pressure Transmitters and Differential Temperature Transmitters for energy calculator connection requirements.*
 - ii) Acceptable Manufacturers:
 - (1) *Onicon:*
 - (a) Mag Meter Model Number: F-32BB-133 or equal. (The engineer shall pick the appropriate line size and replace the BB with that number description.)
 - (b) Onicon System 10 BTU Calculator-Communication Card designation to be provided by the EOG Group.
 - (c) Thermocouples and other components are a part of meter
 - (d) Differential Pressure Transmitter
 - (2) *Rosemount electromagnetic meter components:*
 - (a) E-Series Magnetic Flowmeter Transmitter
 - (b) 8705 Flanged Sensor-PTFE Liner
 - (c) Rosemount Flow Computer
 - (d) Wire-Wound Platinum RTD Sensor
 - (e) Integral Manifold
 - (3) *Yokogawa*
 - (a) *ADMAG AXF Flowmeters*
 - a. *Condensation Proof*
 - b. *Integral or remote converter depending on project needs*
 - c. ***High Temp Lining is required***
 - (b) 212 Heat Calculator
- 5) Saturated Steam
 - a) Vortex Shedding Steam Meters
 - i) Saturated steam meters shall be of the Vortex Shedding Meter type, and shall meet the following requirements:
 - (1) *Full Line Size*
 - (2) *300# Flanges*
 - (3) *Stainless Steel Body*
 - (4) *Flexitallic LSI-300# Gaskets*
 - (5) *Local Transmitter Mounting*

- (6) 4-20 mA outputs:
 - (a) Pressure: psig
 - (b) Temperature; deg F
 - (c) Instantaneous rate of flow: klbs/hr of steam
 - (d) Totalized flow: klbs of steam
 - ii) Acceptable Manufacturers:
 - (1) ABB:
 - (a) ABB VT4 Series Integral Display Vortex Meter
 - a. 300# Flanged
 - b. Line Size
 - c. Integral Temperature Sensor for Mass Flow Calculation
 - d. ASME B16.5 (ANSI) RF Class 300
 - e. Graphite gaskets for up to 536 deg F operation
 - f. 1 Conduit Entry 1/2 - 14 NPT
 - (2) Rosemount:
 - (a) 8800D VORTEX FLOWMETER
 - a. F Meter Style Flanged
 - b. Line Size
 - c. S Wetted Materials 316L wrought stainless and CF3M cast stainless steel
 - d. A3 Flange/Alignment Ring
 - e. Size
 - f. ASME B16.5 (ANSI) RF Class 300
 - g. E Sensor Process
 - h. Temperature Range
 - i. Extended: -330 to 800 Deg F (-200 to 427 Deg C)
 - j. 1 Conduit Entry 1/2 - 14 NPT
 - k. P Transmitter Output 4-20 mA digital electronics (HART Protocol) with scaled pulse
 - l. 100# saturated steam flow calibration
 - m. MTA Multivariable Output With Integral Temperature Sensor
 - (3) Yokogawa
 - (a) digital YEWFLO Vortex Flow Meter
 - a.Stainless Steel Vortex Flow Meter
 - b. (-D).....Integral 4 to 20 mA DC / PULSE, BRAIN
 - c. (B).....CF8M Stainless Steel Body Material
 - d. (M).....Duplex Stainless Shedder Material
 - e. (BA2).....ANSI 300# Flange Process Connection
 - f. (-2).....ANSI 1/2" NPT (F) Electrical Connection
 - g. (D).....Integral LCD Display option included
 - h. (/FF1).....FM Explosion Proof
 - i. (/MV).....Multi-Variable Option (Integral Temperature Sensor)
- 6) Meter Communication Installation Requirements
- a) All meters must be installed and working on site before project can be turned over.

- b) All network drops required for meters shall be operational before project can be turned over. Each IP Address shall be provided by the BAS contractor through email to the Energy Operations Group.
- c) All meter data shall be directly transferred from the meter (energy calculator or meter directly) into the BAS and named in the BAS per the University BAS point naming standard.
- d) The only acceptable means and methods by which to transfer meter data into the BAS shall be through direct input including the following;
 - i) 4-20mA for instantaneous data and pulse counting for totalization. Meters (and/or energy calculators) that use this method shall not require an external converter to integrate to the BAS in this method but shall directly output 4-20mA and/or pulses to the BAS. An external relay or open collector/voltage pull up circuit shall be acceptable for this method.
 - ii) Modbus RTU or Modbus over IP directly integrated to the BAS. Meters (and/or energy calculators) used in this case shall be capable of communicating Modbus without a converter or gateway that is not integral to the meter or energy calculator.
 - iii) BACnet MS/TP or BACnet over IP directly integrated to the BAS. Meters (and/or energy calculators) used in this case shall be capable of communicating BACnet without a converter or gateway that is not integral to the meter or energy calculator.
 - iv) Direct proprietary language of the BAS may be used to communicate with a meter (and/or energy calculators), where available.
- e) The BAS vendor shall provide the names and value ranges of all of the points included with the meter installation on a project to the Energy Operations Group (EOG) and Campus Planning, Design and Construction Management's Project Manager. This shall be done as early as is possible in the project to allow EOG to input points into the University PI system for remote meter reading.
- f) No calculations shall be done in the BAS for flow or totalization or any other conversions. All data must be passed as it comes from the energy calculator or meter directly through the BAS to the PI system. In other words, the BAS will only act as the conduit for information and will not calculate any metering data values.
- g) The BAS vendor shall create and/or modify a graphic through which flows and totals of each meter are displayed for each building associated with the project within their BAS.
- h) The BAS contractor is responsible to ensure that each meter is reading accurately and is scaled correctly. All start up, functional checkout, and commissioning activities will be the responsibility of the BAS contractor.

End