25 05 00_UTILITY METERING REQUIREMENTS

APPLICATION

All energy utilities and water shall be metered at the individual building level (as a minimum) and metering devices shall be connected to UD Energy Management infrastructure and Building Automation Systems (BAS).

Utilities metered shall include Electricity, Natural Gas, Chilled Water, Hot Water (heating and domestic), Steam, and Water (domestic and make-up). Metering systems shall, at a minimum, accurately measure and log the main utility services to building. Utilities serving any leased or sub divided spaces, or any spaces that are, or will be, billable to separate business units, shall be metered as well. Large individual loads may also be required to be metered for data acquisition and control purposes.

Electricity, Water, and Natural Gas service feeds to buildings that require the establishment of a new account, require account changes, and/or have specific metering requirements, with the City of Newark, Delmarva Power (Pepco), or other external utility, must be coordinated with Facilities Financial Services and the UD Manager, Energy Systems, prior to account setup.

All installed metering systems shall meet, or exceed, the equipment manufacturer's installation requirements and be commissioned according to the manufacturer's and UD requirements. Metering systems shall measure and record to the accuracy, precision, and resolution required of the specific application requirements, and be approved by UD Energy Management. The A/E, or design consultant, shall provide equipment/systems information and installation requirements specific to the projects applications and requirements, and submit to UD Energy Management for approval prior to issuing documents.

Metering systems certification documents, calibration certificates and related information shall be provided to the UD Manager, Energy Systems.

ELECTRIC METERS – Building Meter (Non-Primary)

Electric meters shall be in enclosures separate from switchgear and panel boards, properly rated for local conditions. Meters located within switchgear, or similar, shall be in a separate compartment and fully accessible without requiring a shutdown of the main service. All electric meters require UD hardwired network connection. Electrical metering of main building service shall include Neutral current monitoring

1. **Meter and Enclosure**–
    a. For building main service, Schneider Electric PM8000 in accessible compartment or in factory enclosure
        i. Part Number: 9761E8000R1A
    b. For sub-metering downstream of building main service, Schneider Electric PM5560/PM5563 in factory enclosure.
        i. Part Number: 9761E5560R1A
    c. For applications with multiple downstream sub meters and/or additional Digital or Analog Inputs or Outputs required consult UD Manager, Energy Systems, for additional part numbers
2. **Current Transformers** – (4) Solid Core 5A CT's. Metering /Relay class CT's only. Specifics TBD with wire size and ratio requirements
    a. Solid Core Metering Class CT: Flex-Core: 5ARL 180RL, 19RL, 125, 126, or better
3. **Meter Enclosures** – **INTERNAL USE ONLY**
    a. This section is for internal UD use only. Any project based meter must provide Schneider Electric factory enclosures.
    b. **Meters** –
        i. METSEPM8244, METSEPM5563, METSEPM5560, METSEPM5340
    c. **Enclosure** –
        i. Hoffman: A16N12BLP with A1612PP sub plate
        ii. Provide Ground bar
    d. **Shorting Block** – (4) CT Capacity with cover and shorting screw parking
        i. Flexcore: IKU8SC, or eqv.
    e. **Current Transformers** – one (1) per phase
        i. Solid Core: Flex-Core: Model 180RL, 19RL, 125, 126.
        ii. Split Core: Flex-Core Model FC
    f. **Control Power Transformer** – IF NECESSARY
        i. 50VA, 240/480Vac to 120Vac, attached fuses and fuse pullers.
        ii. Schneider Electric 9070TF50D1 and fuse puller 9070FP1
    g. **OCPD and Disconnect** – Provide overcurrent protection and load break disconnection means for voltage inputs.
        i. Bussmann: CCP-3-30cc

ii. Automation Direct Gladiator: CFS-3PCC30

ELECTRIC METERS – Revenue Meter (Primary, City of Newark)

Meters for City of Newark Revenue/Primary service and campus wide power quality applications shall be Schneider Electric ION 7650 meters [M7650 U1 C 0 C 6 E0 A 0 A]. Metering enclosures, PT/CTs and mounting requirements will shall be coordinated with UD and the City of Newark and will be dependent on the specific scenario. Primary electric service shop drawings, installation, and/or maintenance must be approved directly by UD Energy Management, UD Electric Shop, and the City of Newark.

THERMAL ENERGY METERS – Chilled Water and Hot Water

ONICON Flow Meter/Transmitter and BTU Meter/Computer

1. SYSTEM-10 BTU Meter w/ BACnet/IP and (4) 4-20mA analog output card and BACnet/IP Card
    a. Pulse Output: Total Energy
    b. Analog Outputs: Flow Rate, Energy Rate, Supply Temp, Return Temp
2. Electromagnetic Flow meter
    a. F-3000 Flanged
    b. F-3500 Insertion
3. Temp Sensors
    a. Matched temperature probes, thermo wells, and hot taps kits as required by manufacturer.
4. All components shall be properly located and installed to insure accurate measuring of energy content of metered utility, including straight run and device vertical orientation requirements.
5. Units
    a. All energy calculations shall be shown in BTU and BTH/hr
    b. Default display and pulse value shall be Value x 1 MMBTU

STEAM METERS –

Steam meter provided shall be appropriate for the flow regime and conditions present. Metering system shall be appropriately sized and located to capture entire design flow regime. Steam shall be metered on the medium pressure (45psi) side of the system. Steam flow transmitters systems shall be differential pressure based systems capable of providing four (4) analog outputs: Mass Flow Rate, Static Pressure, Differential Pressure, and Temperature. Metering systems with mechanical movement (turbines, propellers), vortex shedding, swirl, or similar measurement mechanisms are not acceptable.

1. Meter systems:
    a. Steam Meter design basis shall be Rosemount 3051 SFC based compact conditioning orifice plates with multivariable transmitter, with Model 333U 'Triloop'.
    b. Steam Pressure system transmitter shall be configurable via Emerson Engineering Assistant 6 or Web Based configuration. No other specialized software is permitted.
2. Units
    a. Units shall be BTU and LB/HR
    b. Default totalized energy output to be Value x 1MMBTU

WATER METERS – Domestic and Make-up

1. Main water feeds to new construction or renovations that require new service from the City of Newark shall use metering as required by the City of Newark and shall be coordinated with the City of Newark, Facilities Financial Services, and the UD Manager, Energy Systems.
2. Domestic cold and hot water (not covered under Thermal Energy meters) to leased, subdivided, or otherwise separately billable spaces shall be metered and report back to the UD Energy Management System and BAS.
3. Water feeds to makeup systems (HW, CHW, Process, etc.), cooling towers, or other use that will not use sewer shall be metered report back to the UD Energy Management system and BAS.
4. Water meters shall be NSF rated for potable water where required and shall be rated for appropriate water temperature.
5. Meters shall come equipped with dry-contact for pulse output of totalized water consumption.
6. Design Basis
    a. DLJ , Seametrics, Sensus

NETWORK CONNECTIONS

1. An Ethernet connection shall be provided near each electrical meter and Ethernet equipped thermal energy or steam meters.

BASIC METER INTERCONNECTION TOPOLOGY

Output cabling: (1) 16AWG stranded, shielded, twisted pair per signal.