DIVISION 15 - MECHANICAL

Section 15980 - UTILITY METERS

Introduction

Meters are required on chilled water, steam condensate, electricity and domestic water.

Part 1 - General

- Design, specify, furnish, install, and commission all utility meters required and owned by University.

- Utility meters shall be designed and specified by the project consulting engineers. Project contractor shall furnish and install all utility meters. Utility meter commissioning shall be a joint effort between the project contractor and the project consulting engineers and The University of Arizona. The University will not accept any utility meter until it has been shown to be fully functioning and operational.

- Design shall include selecting, scheduling, and specifying each utility meter as would be done for any piece of specialized equipment.

    - Flow Meters shall be selected to handle the flow range they will encounter at present design conditions.

- Meters shall be connected to the University's *EMCS* and shall be capable of fully monitoring the building energy an water usage. See the U of A Manual of Design Standards Section 15970 for further requirements.

    - Whenever possible, the meter shall be selected with analog 4-20ma output.
    - Some meters provide pulse output only. *Discuss criteria with UA Facilities Design & Construction.*

- Project control drawings and specifications shall include all the information, including, but not necessarily limited to, points, termination, and programming necessary to provide complete building energy use reporting on the University's *EMCS*.

- University of Arizona shall assist in reviewing the project contractor's utility metering submittal.

- Project drawings and specifications shall include the following utility meter information as a minimum:

    - Domestic Water, Chilled Water, Steam Condensate, and Electric Meters:

        - Type of service (i.e., chilled water, steam condensate, electric, or domestic water).
        - Size of meter, manufacturer, type, model number.
        - Location of meter, sensors, and remote readouts.

            - Meter shall be located, including dimensions of installation if a specific location is necessary for proper operation.
            - Meter or meter remote readouts shall be readily accessible and at a level (5'6") that can be read without using a ladder.

        - Accuracy and Repeatability.

    - Domestic Water, Chilled Water, and Steam Condensate Meters:

        - Range: maximum flow, minimum flow, and normal flow expected at present design conditions.
        - Maximum pressure drop allowed across the meter.
        - Installation details: details shall be complete and include all necessary information, including, but not limited to, length of straight pipe required upstream and downstream, distance required from valves or fittings, any required concentric reducers and location of temperature and pressure sensors.

- Chilled Water Meters:

    - All items necessary to allow the chilled water flow sensors to function as energy meters shall be specified and shown on the drawings and included in installation details.
    - Output of energy meter shall be in BTU's.
    - These additional items shall include, but are not limited to, temperature sensors, BTU totalizing computer, connection requirements to the *EMCS*, programming requirements and software.
    - Delta temperature transmitters shall be platinum 100 OHM RTD, 40° F shall be set at 4 ma, and 70° F shall be set at 20 ma.
    - Delta temperature sensors shall be matched pairs of calibrated sensors with an accuracy of 1° F.
    - Flow transmitter shall be selected for the expected flow range encountered at present design conditions. Particular attention shall be made to low flow conditions.
    - In buildings where utilities will be billed to the customer, an energy totalizing computer will be required.

- Steam Condensate Meters:

    - All items necessary to allow the steam condensate flow sensors to be fully functional shall be specified and shown on the drawings and included in installation details.
    - Output of meter shall be in lbs.
    - These additional items shall include, but are not limited to, flow (in lbs.) totalizing computer, connection requirements to the *EMCS*, programming requirements and software.
    - Flow transmitter shall be selected for the expected flow range encountered at present design conditions. Particular attention shall be made to low flow conditions.
    - In buildings where utilities will be billed to the customer, a flow totalizing computer will be required.

Part 2 - Products (UTILITY METER REQUIREMENTS) – *Discuss With UA Facilities Design & Construction*

- Domestic Water Meter:

    - Shall be positive displacement type water meter. For larger than 2" meters, compound meters are required to insure an adequate range is measured.
    - Meters shall read in gallons.
    - Water meters shall have a local readout as well as pulse output to report to The University's EMCS system.

- Chilled Water flow sensor:

    - Shall be vortex type, Yokagawa Model YF100 Series or insertion magnetic flow sensor Signet Model 2550, or approved equal. Where it is expected that flow velocities may be below one foot per second use the magnetic flow sensor. For piping systems eight inches or greater, hot-tap, insertion magnetic flow sensor, Marsh McBirney Model 283., or approved equal shall be installed.
    - Flow sensor shall be combined with supply and return temperature sensors per paragraphs I.H.3.
    - Meters shall be capable of local or remote reading within the building close to the meter location, as well as, provide output for flow rate to the University's *EMCS*.
    - Where an energy totalizing computer is required, it shall be Dieterich Standard, Dart II.

- Condensate Meter:

    - The steam condensate meter shall be one of the following (the engineer shall determine the best selection for each application):

        - Vortex type flow meter, Yokagawa Model YF100 Series, or equivalent. Provide analog output to the University's *EMCS*.

    - Or a Cadillac Condensate meter. Provide a local or remote readout within the building close to the meter location. Provide a pulse output to the University's *EMCS*.

  - Where a flow totalizing computer is required, it shall be Dieterich Standard, Dart II.

- Electric Meter:

  - Provide current transformers.

  - The electric meter shall be a microprocessor based metering package equivalent to Westinghouse IQ Data Plus, with the following readouts:

    - amperes in each phase
    - voltage - phase-to-phase and phase-to-neutral
    - kilowatts
    - kilovars
    - power factor
    - frequency
    - kilowatt demand, peak demand
    - kilowatt hours; shall be configured to produce a pulsed output in proportion to accumulated KWH

  - Electric meter shall be capable of interface with the University's *EMCS*.

Part 3 - Execution

- During the final phase of the project and before final close out, project contractor shall be required to prove that all utility meters are installed properly and function as designed and specified. The utility meter commissioning shall be accomplished by the contractor in conjunction with the project consulting engineers and The University of Arizona.

- Require calibration data, O & M manuals, details, etc., to be submitted after meters accepted.

End of Section 15980