

Thermal Energy Meters

What is a Thermal Energy Meter?

Thermal Energy Meters typically comprise a static ultrasonic flow sensor to measure fluid flow rate, and a matched pair of temperature sensors to measure the flow and return temperatures. They are supplied with a stand-alone calculator or integrator with long-life Liquid Crystal Display (LCD) and multifunctional display with access to the most important billing data.

The calculator will display energy used in Kilowatts or Megawatts, fluid flow in m³/h, and supply and return temperatures in °C. This data will be stored for up to 18 months, can be accessed from the calculator and via a communication module, and the information can be transferred to another access point.

Communication includes Wireless Meter-Bus (M-Bus), which can be connected to a fixed Building Management System (BMS) logger and/or the data can be exported by General Packet Radio Service (GPRS).

Typically used for monitoring boiler output in Residential and Industrial applications, selection is made on flow and pipe size, and the maximum flow rate should be under the nominal flow of the meter.

Conventional hot and cold-water meters should not be used for heating and cooling metering because they have moving parts that degrade over time, which in turn reduce in accuracy. Generally, mechanical water meters have an R ratio of 100. You also must be mindful of ratios when selecting thermal energy meters. Ultrasonic is typically R250, but when you get into large pipe sizes, ratios in Superstatic meters reduce to R50. All conventional water meters should be replaced with ultrasonic flow parts of the same length.

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Key Issues

- Selection of meter by expected flow range and not pipe diameter.
- Flow sensor accuracy: select a high dynamic range as this varies from 1:50 to 1:1000.
- Maximum flow rate: ensure the meter qp matches the expected maximum flow rate.
- Energy meter communication modules: select what is required by the Building Management System (BMS) or Environmental Monitoring System (EMS).
- Temperature Sensor installation: follow the manufacturer's installation instructions.
- Environmental condition.
- Flow meter installation: follow the manufacturer's installation instructions.
- Calculator installation: ensure that the orientation is correct.
- Some flow sensors can be insulated.
- Ensure that the meters are commissioned by a competent engineer.
- Recording data.

Links

- Guidance - Heat Networks: www.gov.uk/guidance/heat-networks-overview
- Guidance - Using the UKCA Marking: <https://www.gov.uk/guidance/using-the-ukca-marking>
- Heat Meter Accuracy Testing: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/576680/Heat_Meter_Accuracy_Testing_Final_Report_16_Jun_incAnxG_for_publication.pdf
- Office of Gas and Electricity Markets (Ofgem) Domestic Renewable Heat Incentive (Domestic RHI): <https://www.ofgem.gov.uk/environmental-and-social-schemes/domestic-renewable-heat-incentive-domestic-rhi>
- The Heat Network (Metering and Billing) (Amendment) Regulations 2020: www.legislation.gov.uk/uksi/2020/1221/contents/made