New FCI Wet Gas Thermal Flow Meter Delivers Accurate, Stable Landfill Biogas Measurement

Green Power Initiatives at Landfills, Wastewater Treatment Plants, and On-Farm Biogas Systems

San Marcos, CA — Engineers responsible for landfill biogas recovery and green co-gen electrical energy systems will find the rugged ST80 Series thermal flow meter from Fluid Components International (FCI) with its Wet Gas MASSter™ technology delivers higher installed accuracy with more reliable measurement in this moist, dirty, demanding environment.

The efficacy of this new wet gas thermal sensor technology was recently demonstrated successfully in a Canadian landfill biogas recovery application. The wet biogas at this site included relatively high levels of entrained moisture levels at 2.5 percent to 3 percent, which had caused persistent measurement accuracy problems at one its meter installation locations.

This level of entrained moisture in the landfill's biogas and its condensation created droplets that frequently caused inaccurate or unstable variable gas flow measurements. When the existing problematic flow meter was replaced with a new FCI ST80 flow meter with its exclusive wet gas flow element, the accuracy, stability, and the repeatability of the biogas measurement greatly improved over the site's six-month test period.

The heavy-duty ST80 Series flow meters are designed for applications in industrial and plant process gas flow measurement in pipe diameters from 1 inch to 99 inches [25 mm to 2500 mm] and in temperatures up to 850 °F [454 °C]. They feature accuracy of ±1 % of reading, ±0.5% of full scale and repeatability of ±0.5% of reading.

Additionally, a flow meter with low flow sensitivity and wide turndowns is required in landfill gas applications because flow rates of biogas can vary widely based on the process' maturity and fluctuating plant process demands as well as seasonal variations in temperature and humidity. The ST80 can measure flow rates as low as 0.25 SFPS [0,07 NMPS] and provide 100:1 turndown, resulting in an optimum solution for biogas applications.

The measurement principle of thermal mass flow meters involves heat transfer caused by gas flow. Any moisture or condensate in the gas stream that intermittently contacts the sensors, however, can cause a sudden, momentary change in the heat transfer rate and result in spiking or fluctuating readings.

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The ST80 meter outfitted with FCI's unique wet gas sensor provides a patent-pending mechanical configuration that shunts entrained moisture in biogas away from the sensor that prevents condensate from reaching the sensors thereby resulting in a stable, repeatable biogas flow meter.

In addition to moisture and condensation, landfill gas and other biogases are a mixed composition of potentially explosive gases comprised primarily of methane (CH_4) and carbon dioxide (CO_2), hydrogen sulfide (H_2S) and traces of other gases. The instrumentation installed in these applications requires independent agency approvals to protect people, equipment and plants. FCI's ST80 Series has Div.1/ Zone 1 level approvals on the complete instrument (electronics, enclosures, and flow sensor elements) for global agencies, including FM, FMc, ATEX, IECEx, and more to ensure their safe application in hazardous installations.

Furthermore, the residuals and particulates in the biogas, along with the H_2S component, is a corrosive condensate that deposits itself on the pipe wall and instruments in the pipe. These particulates and residual liquids can clog or foul orifice, vortex shedding, PD, turbine and most other flow meter technology sensors. In comparison, thermal mass flow meters such as the FCI ST80 have no moving parts or orifices to clog, and their insertion-style design is easily installed in the pipe through a ball valve for simple retraction of the flow element from the pipe for periodic cleaning if needed.

The ST80 flow meter's outputs and user interface choices are extensive for interface with virtually any control system and/or set-up or configuration devices. Standard outputs include dual, NAMUR NE43 compliant 4-20 mA analog outputs, HART (version 7), Modbus 485 and a USB port. FOUNDATION Fieldbus or PROFIBUS PA or DP can be optionally added.

The ST80 meter's optional backlit LCD display provides digital and bar graph readouts of the flow rate and temperature, totalized flow, alarms, diagnostics feedback and even a user defined label/tag field. Also optional are a four-button keypad for instrument set-up and diagnostics interrogation. These buttons are activated through the glass so there is never a need to open the ST80 enclosure at the process or to remove it from the process to a safe location. The ST80 is also supplied with free FCI software for performing all set-up and diagnostics from a PC or laptop.

Fluid Components International is a global company committed to meeting the needs of its customers through innovative solutions for the most challenging requirements for sensing and measuring flow, pressure and temperature of gases.

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