Differential Pressure Flow Sensors

Liquid Natural Gas
Industry: Oil and Gas

The **Accelabar**® combines two differential pressure technologies to produce operating ranges never before attainable in a single flow meter. It is capable of generating high differential pressures at low flow rates for gas, liquid and steam at turndowns of up to 65:1 and no straight run requirements.

The Accelabar consists of a unique toroidal nozzle design and a Verabar averaging pitot. The nozzle has a patented straight run "settling distance" that accelerates, stabilizes and linearizes the velocity profile sensed by the Verabar. The Verabar located within the nozzle accurately measures and significantly increases the differential pressure output to increase the operating range (turndown). The Accelabar maintains a constant flow coefficient over the operating range with a flow measurement accuracy of ±0.75%.

Application:
A liquid natural gas plant in the Midwest needed to measure gas flow to heaters that vaporize LNG to gaseous natural gas for use during peak periods in the winter season. Approximately four weeks per year the gas feed to heaters is at high peak demand (60,000 SCFH) in a 3" sch 40 line at 80 psig/70° F. For the remainder of the time the flow is 1,000 SCFH.

Problem:
The plant must account for the gas usage over the entire range as it is part of the operating cost during LNG vaporization, as well as when it is used for plant heating. The customer could not find one meter to accommodate the entire range accurately. The previous meter was a Roots meter and was replaced because it was expensive, required high maintenance and ignored the low end of the range. The customer's operating cost was estimated and charged against the bottom line. In addition, as you can see from the photo, there was **NO STRAIGHT RUN** available which hindered a conventional meter's ability to perform accurately.

Solution:
A Model AF 3" 150-H-M Accelabar was installed immediately downstream of a pipe reduction, control valve and pressure regulator. The Accelabar had two Foxboro IDP50 high accuracy DP transmitters directly mounted to the top works of the Accelabar. Stacked outputs were required to accommodate the wide turndown in DP of 308.2" w.c. at max and 0.08" DP at min.

Result:
The Accelabar performed as advertised with a 0.75% accuracy over the entire range of 1,000-60,000 SCFH – a flow turndown of 60:1.

Application: 3" Sch 40 Natural Gas
Operating Pressure/Temperature: 80 psig/70° F
Max/Min Flow Rate: 60,000 SCFH/1,000 SCFH
Flow Turndown: 60:1

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VB-6032 (11/04)
Printed in USA