Turbine Flow Meters Will Never Be The Same

Measurements & Control, February 1997
Author: Ron Madison

With the advent of modern microprocessor technology and the development of advanced fluid conditioning techniques, it is safe to say that turbine flow meters will never be the same. Enhancements to turbine flow meter systems are producing a flow sensing device that is smaller, easier to install and more accurate than ever before. These advanced meters, which utilize powerful microprocessors to achieve wider turndown ranges and faster signal conditioning, are able to provide common, user-selectable K-factor outputs. This will allow for complete interchangeability of spare meters without the need to adjust ancillary electronics.

New turbine meter systems will also take advantage of advanced linearization techniques, enabling them to output "real-time" corrected K-factor flow data in as little as 7.5 ms with an accuracy of ±0.1% of reading over the repeatable range of the flow meter. Turndown ratios to 100:1 are possible with enhanced digital resolution in the low flow range of the turbine meter, where traditional linearization techniques are inadequate.

Whereas in the past turbine flow meters had to be paired with costly external linearizers and amplifiers to attain the desired range and accuracy, they are now incorporating integral electronics that perform all necessary linearization and signal-conditioning functions. The reduced meter size made possible by this integral design approach will permit turbines to be installed in applications where space is limited and where electronics previously had to be remotely mounted at an additional cost.

In addition, microprocessor technology now allows turbine meters to operate on a wide VDC power input and provides simultaneous analog and frequency outputs. This will be particularly useful in the automotive and aerospace industries, where varying power supply voltages are encountered in a variety of test-stand and on-board applications, and among industrial users who will continue to require standard 4-20 mA analog outputs.

Enhancements to the turbine flow meter system will not only eliminate the need for bulky remote electronics but for external flow-straightening devices as well. Flow straighteners are used to condition the fluid under test prior to its entrance into the flow meter in order to minimize shifts in K-factor and extend rangeability. Traditional flow straightener designs require additional piping, or straightening vanes, both upstream and downstream of the meter. Additional end-fittings are necessary to accommodate the user's piping scheme. This results in increased hardware and installation costs.

In the future though, turbine meter manufacturers will offer new types of miniaturized flow straighteners built into the body of the flow meter. Such flow straighteners will eliminate the need for installation modifications and provide a fluid conditioning solution in applications where limited space does not allow for added piping.

While it is doubtful that significant improvements can be made to the basic mechanical design of the turbine meter, minor enhancements to rotor fabrication will be made. New types of ceramic bearings that produce less friction and do not require lubricants will also be developed.

The turbine flow meter remains an exceptionally accurate and reliable flow sensing device that has proven its usefulness in many different applications. Users can be assured that larger turbine flow meter manufacturers that possess superior R&D capabilities will find new ways to make the turbine's performance even better than it is today.

FTI Flow Technology Inc.
8930 South Beck Ave
Suite #107
Tempe, AZ 85284

Telephone: +1 480 240 3400
Fax: +1 480 240 3401
E-mail: ftimarket@ftimeters.com •
www.ftimeters.com