Volume VIII: The World Market for Turbine Flowmeters

Turbine flowmeters excel at measuring steady, high-speed flows of liquid and gas. They are widely used in utility applications to measure the amount of water used in commercial and industrial buildings. Turbine meters are also used for hydrocarbon measurement, and to measure the flow of industrial liquids. This 500-page study reveals the major suppliers worldwide, how large the market is, and which segments are either growing or declining.

Operating Principle

Turbine meters have a spinning rotor with propeller-like blades that is mounted on bearings in a housing. The rotor spins as water or other fluid passes over it. The rotor turns due to the force of the current. Flowrate is proportional to the rotational speed of the rotor. A variety of methods are used to detect the rotor speed, including a mechanical shaft and an electronic sensor.

Turbine meters differ according to the design of the spinning rotor. Several variations include paddlewheel meters and propeller meters. Paddlewheel meters have a rotor that has an axis of rotation that is parallel to the direction of the flow. Many paddlewheel meters are insertion devices. Propeller meters have a rotor that is suspended in the flowstream.

This study includes the following types of turbine flowmeters:

- Axial
- Jet (Single jet and multi-jet)
- Paddlewheel
- Pelton wheel
- Woltman

In addition, it includes the following meters that are somewhat difficult to classify:

- Compound
- Fire service meters

Paradigm Case Applications

Turbine meters are used to measure the flow of both liquids and gases. Paradigm case conditions for turbine flowmeters include clean gases or clean low-viscosity liquids flowing at medium to high speeds. Dirt or impurities in the liquid or gas can damage the meter. Turbine meters are also sensitive to viscosity. A low viscosity fluid is best for a turbine meter. Straight run prior to the meter is recommended, since turbine meters are sensitive to swirl and to flow profile effects. Turbine meters for liquid and gas require different designs, due to the different densities involved.

Market Segments

Even though turbine flowmeters are losing ground to new-technology flowmeters in some market segments, they still remain a viable choice for steady, medium to high-speed flows. While the first turbine meter was invented in 1790, these meters were not widely used in industrial markets until after World War II. Since that time, turbine meters have become solidly entrenched in the water, gas, oil, and industrial liquid flow measurement markets.

Municipal Water. While turbine meters are not as widely used for residential applications, they are widely used for commercial applications, especially for larger buildings. Turbine meters pick up for commercial utility applications where positive displacement meters leave off. Positive displacement meters for commercial applications are limited to the 1 ½ inch and 2-inch pipe sizes. Turbine meters for commercial applications, by contrast, start at 1 ½ inches and go up to 8, 10, 12, or even 16 inches. While there is some overlap with positive displacement meters at the low end in terms of pipe size, most turbine meters are used for line sizes that are larger than positive displacement meters can accommodate. This is true for turbine meters used for commercial utility applications. Positive displacement meters for industrial applications come in larger line sizes.

Gas. Turbine meters do face challenges from new-technology meters in gas flow measurement. For industrial gas measurement, one challenge is from ultrasonic meters. Ultrasonic flowmeters are becoming accepted for custody transfer gas flow measurement, especially for larger size pipes (12 inches and above). In 1998, the American Gas Association (AGA) issued its AGA-9 report, outlining criteria for using ultrasonic flowmeters for custody transfer of natural gas. This has resulted in a major boost for ultrasonic flowmeters, mainly at the expense of turbine and differential pressure (DP) meters.

Oil and Industrial Liquids. For oil and industrial liquids measurement, turbine meters also face challenges from new-technology meters. For oil measurement, the main challengers are Coriolis and ultrasonic meters. For industrial liquids, magnetic flowmeters are also replacing turbine meters for some applications. Positive displacement meters are very widely used for oil and hydrocarbon measurement, especially for custody transfer applications. Positive displacement meters are made for larger sizes for industrial applications than for commercial utility applications, and so are a viable alternative to turbine meters in these contexts.

There are several reasons why turbine meters will continue to maintain their wide usage for gas, oil, and industrial liquid applications. One is that turbine meters have a significant cost advantage over ultrasonic meters, especially in the larger pipe sizes. Their price may also compare favorably to DP flowmeters, especially in cases where one turbine meter can replace several DP meters. Users who are already familiar with turbine technology, and who don't want to spend the extra money required to invest in a new technology, are likely to stay with turbine meters.

Secondly, turbine meter suppliers are making technology improvements to make turbine meters more reliable. Many of these improvements involve making the moving parts more reliable. By making the ball bearings out of more durable material, such as ceramic, turbine suppliers have been able to add significantly to the life of the bearings. This is important, since it is the fact that turbine meters have moving parts that causes some customers to select new-technology meters.

Turbine meters will continue to experience growth in the commercial water and gas utility markets. While new-technology meters, especially ultrasonic and Coriolis, will eventually have an impact on these markets, this impact is not likely to occur for at least two years. Standards organizations such as the American Water Works Association (AWWA) have not yet approved the use of these new-technology meters for billing purposes.

Turbine flowmeters are a traditional technology flowmeter that will be around for many years to come. Even though they face stiff competition from new-technology meters in some segments, they still remain the best solution for certain applications.

Study Highlights

As part of this study, Flow Research has contacted and interviewed nearly every supplier of positive displacement flowmeters worldwide. We have gathered detailed information about the suppliers and created a detailed description of the positive displacement (PD) flowmeter market worldwide. Highlights of the study include:

- Market size by geographic region
- Market shares by geographic region
- Market shares by application
- Average selling price by geographic region
- Shipments of turbine meters for water applications by geographic region
- Shipments of turbine meters for gas applications by geographic region
- Shipments of turbine meters for oil applications by geographic region
- Shipments of turbine meters for industrial liquid applications by geographic region
- Shipments of tuirbine meters by type (Axial, single jet, multi-jet, paddlewheel, Pelton wheel, propeller, Woltman, compound, fire service) by geographic region
- Shipments of turbine meters by liquid vs. gas by geographic region
- Shipments of turbine meters by mounting type by geographic region
- Detailed product specifications for many turbine meters
- Strategies for success
- 147 profiles of turbine suppliers

Some of the companies profiled in this study include:

Aichi Tokei Denki Co., Ltd., ABB Water Meters, Actaris Metering Systems, Aquametro AG, Arad Dalia Ltd., American Meter Company, AW Company, Badger Meter, Inc., Barton Instrument Systems, LLC, Bermad Inc., Blancett (Racine), Bopp & Reuther Heinrichs Messtechnik, Burkert GmbH & Co., Elster-Amco Group, EMCO, Emerson Brooks, Emerson Daniel, Faure Herman, Flowmetrics, Flow Technology, Inc. (FTI), FMC Energy Systems,, George Fischer Signet, Great Plains Industries, Halliburton Company, Hays Fluid Controls, Hedland Flowmeters (Racine), Hefei Instrument General Factory, Hefei Jingdake Instrument Co., Ltd., Hoffer Flow Controls, Hydrometer, Instromet International NV: Instromet, Inc., Invensys Metering Systems, Isoil, ISTEC Corporation, KOBOLD Instruments Inc., Kueppers Elektromechanik GmBH (KEM), Lake Monitors, Liquid Controls, Litre Meter, Master Meter Inc., McCrometer, Metron-Farnier, Inc., Nanchang Running Water Parts Factory , Neptune Technology Group Inc., Ningbo Donghai Group Corporation-Hengjie, Nixon Flowmeters Limited, Omega Engineering, Inc., Oval Corporation, Primary Flow Signal, RMG Messtechnik GmbH, Sappel, Seametrics, SEBA Hydrometrie GmbH, Shanghai ZIYI9 Instrument Co. Ltd, Siebert & Kühn GmbH, Solartron Mobrey Ltd., Sparling Instruments, Inc., Sponsler Co., Inc., Tecfluid, Thermo Measurement Ltd, Thermo Polysonics, Inc., Titan Enterprises, SATAM, Tokico Ltd., Tokyo Keiso Company, Ltd., Venture Measurement LLC, Wameter S.A., *and many more*.

For more information on this study, send an email to jesse@flowresearch.com. Or call us at (781) 245-3200. This study is available for immediate shipment via Federal Express.

This is the definitive study on turbine flowmeters. Order it today!