by Jesse Yoder, Ph.D.

An Industry Standard Faces New Competition

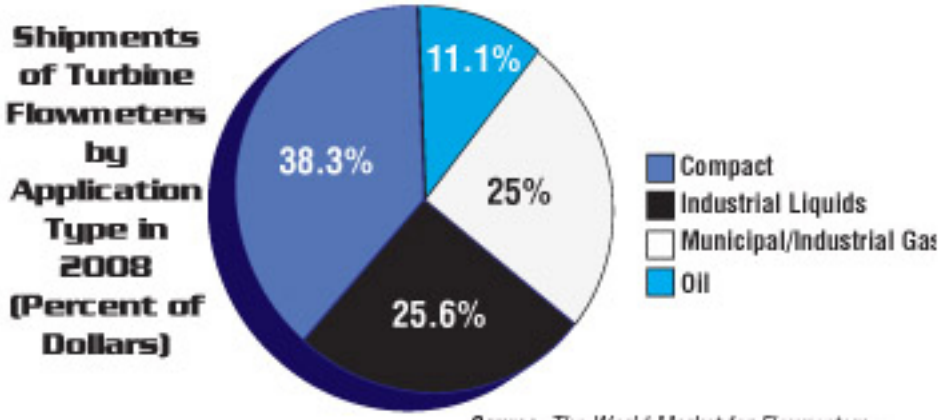
Principle of Operation: Turbine flowmeters have a spinning rotor with propeller-like blades that is mounted on bearings in a housing. The rotor spins as water or other fluid passes over it. The rotor turns due to the force of the current. Flowrate is proportional to the rotational speed of the rotor. 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 with an axis of rotation parallel to the direction of the flow. Many paddlewheel meters are insertion devices. Propeller meters have a rotor that is suspended in the flowstream. These meters are used mainly for liquid applications.

Axial turbine meters have a rotor that revolves around the axis of flow. Most flowmeters for oil measurement and for measuring industrial liquids and gases are axial flowmeters. Axial meters differ according to the number of blades and the shape of the rotors. Axial meters for liquids have a different design from axial meters for gas applications.

Technology & Market Trends: One major growth factor for turbine flowmeters is the large installed base of turbine flowmeters worldwide. Because they have been around longer than new-technology meters, turbine flowmeters have had more time to penetrate markets in Europe, North America, and Asia.

Installed base is a relevant growth factor because often when ordering flowmeters, especially for replacement purposes, users replace like with like. The investment in a flowmeter technology is more than just the cost of the meter itself. It also includes the time and money invested in training people how to install and use the meter. In addition, some companies stock spare parts or even spare meters for replacement purposes. As a result, when companies consider switching from one flowmeter technology to another, there is more than just the purchase price to consider. The large installed base of turbine flowmeters worldwide will continue to be a source of orders for new meters in the future.



Source: *The World Market for Flowmeters, 2nd Edition, published by Flow Research Inc.*

Turbine meters are specified by approval bodies for use in custody transfer for utility measurement in residential, commercial and industrial applications. These organizations include the American Water Works Association (AWWA, *www.awwa.org*), the American Gas Association (AGA, *www.aga.org*), and the International Standards Organization (ISO, *www.iso.org*) in Europe. These approvals have been in place for many years.

The approval of a standard by the American Gas Association for using turbine flowmeters for custody transfer of natural gas has been a significant factor in the use of turbine meters for gas applications. However, now turbine meters face competition from ultrasonic meters, and a report on the use of Coriolis flowmeters has also been approved by AGA (Report #11). Differential-pressure meters are also widely used for natural gas flow measurement. So while turbine meters have enjoyed an advantage in the past, based on their approvals, this advantage is diminishing as new-technology flowmeters are approved for custody transfer of natural gas.

News & Notes: Even though turbine flowmeter suppliers are not as active in releasing new products as many suppliers of new-technology meters, there is still a significant amount of activity in the turbine flowmeter marketplace. Suppliers have introduced new ceramic ball bearings to increase the durability of turbine meters. McCrometer (*www.mccrometer.com*), for example, released a new reverse-helix propeller meter in April 2008. This meter is designed to operate in difficult-to-measure liquids such as those containing sand and inorganic debris. And in March 2009, Emerson Daniel (*www.daniel.com*) introduced the Series 500 Liquid Turbine Flowmeter. This meter is designed for tanker truck offloading, and it can be used as a check meter at loading points in marketing terminals. FC

Jesse Yoder**, Ph.D., is president of Flow Research, Inc. in Wakefield, Mass., a company he founded in 1998. For more on Flow Research's coverage of turbine flowmeters, visit* ***www.flowturbine.com*.*