

Variable area flowmeters offer economy and value

Just because sophisticated 'high-tech' instruments are available, it does not mean we have to use them: simple meters can offer many advantages over more costly and technical types.

Although flowmeters may seem to be a modern invention, basic types were evident as far back as the early Roman era. They were often used for measuring water flow to households. The mathematical foundations of flow theory were evolved during the 17th century. Flow rate is a product of the velocity of a fluid and volume.

Today, there are many types of flowmeters: variable area, positive displacement, ultrasonic, and mass flowmeters, to name a few. Each type has its special features. There is no universal, or perfect flowmeter appropriate for all industries. The right flowmeter for the job is the one that will perform adequately in that application, and at a reasonable expense. The variable area flowmeter offers many advantages over some more costly and technical types, making it the meter of choice for many flow measurement applications.

Tapered

The meter (fig. 1) comprises a vertically tapered tube through which the fluid to be measured is passed, from the smaller end up to the larger. As the fluid flows through the tube, it forces an indicator (float) upward. The clearance space (area) between the float and tube increases as the float approaches the top of the meter. This increasing area requires a larger amount of fluid to force the float higher. By varying the taper of the tube, the mass of the float, and the length of the tube, different flow ranges can be calibrated.

The variable area flowmeter must obviously be plumbed into a piping system the right way: that is, with the narrow part of the taper at the bottom. Usually printed on, or next to, the tube are the flow increments (scale). The flow rate can be read by matching the increments on the tube with the edge of the float.

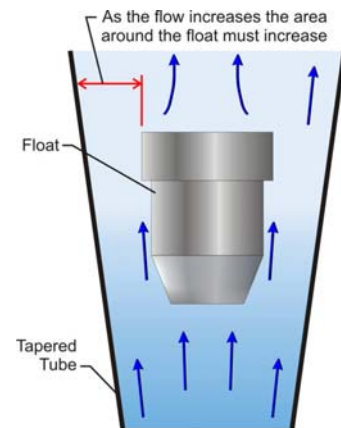


Fig. 1

Competitive

In recent years, variable area flowmeters have become very competitively priced. Because the meter offers such value, more and more manufacturers of water treatment systems are including them as part of their standard package. The makers of ultra filtration equipment (reverse osmosis systems) use them to measure output through the membrane, and also to measure reject. The meters play a critical role in helping to monitor the efficiency of the system.

Ultra pure water is used extensively in the manufacture of printed circuitry (cleansing of computer chips, particularly). Flowmeters are used both in the manufacturing and management of deionised water.

Solar-panel manufacturers recommend certain flow rates for optimum performance. Variable area flowmeters allow the installer and user to monitor flow economically, thus enabling critical process adjustments to be made.

Flowmeters offer an advantage over pressure gauges in filtration systems because they measure actual flow; as the filter becomes saturated (full), the flow rate drops. Just a glance at the flowmeter tells the operator if the filter needs cleaning, replacement of cartridges, or if there may be another problem, such as a tear in the filter material or a broken pipe.

Although variable area flowmeters offer good value, and are easy to install and use, they may not be suitable for all flow measurement applications. The water processing, and wastewater treatment industries will usually select meters designed for use with water. These meters may not be suitable for use with other liquids.

Compatibility

Be certain to check chemical compatibility. Don't just rely on compatibility charts, do your own testing. Many flowmeter manufacturers are willing to provide material sample kits.

Specific gravity ('weight') of the liquid affects meter reliability and accuracy. Viscosity, the degree to which a fluid resists flow under applied force, also affects accuracy, as does elevated temperatures. Flowmeter manufacturer Blue-White Industries recommends that you seek assistance from your supplier, to ensure you select the right flowmeter for your particular application.

Accuracy & repeatability

Without a good working knowledge of what these terms mean in the real world, you can easily overbuy, or under buy a Flowmeter. In plain terms accuracy, really means error. Avoid being misled by all the different code, or terminologies used in the flow industry. Flowmeter manufactures may simply say 2% accurate, you need to question that statement, 2% of what, indicated flow, or 2% of full scale. These two seemingly similar accuracies are very different, and could be costing you extra money. Repeatability is different than accuracy, and in many cases more important to industry. Repeatability is the meters ability to reproduce flow rates (consistently) under the same conditions. Repeatability is paramount in the processing industry where tracking flow changes is so important.

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