

About **VARIABLE AREA FLOWMETERS**

There are many sophisticated 'high-tech' instruments available for flow measurement, but not all applications require the technology of those often costly instruments. In fact, in some applications simple flowmeters can offer many advantages over more costly and technical instruments.

Flow rate is a result of the velocity of a fluid and volume.

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. Today there are many types of flowmeters, such as: variable area, positive displacement, ultrasonic, and mass flowmeters, just to name a few. Each type has its special features and there is no universal or perfect flowmeter that's appropriate for all industries and applications. The right flowmeter for the job is the one that will perform effectively in that application, and at a reasonable expense.

The variable area flowmeter offers many advantages over some more expensive and technologically advanced types, making it the meter of choice for many flow measurement applications.

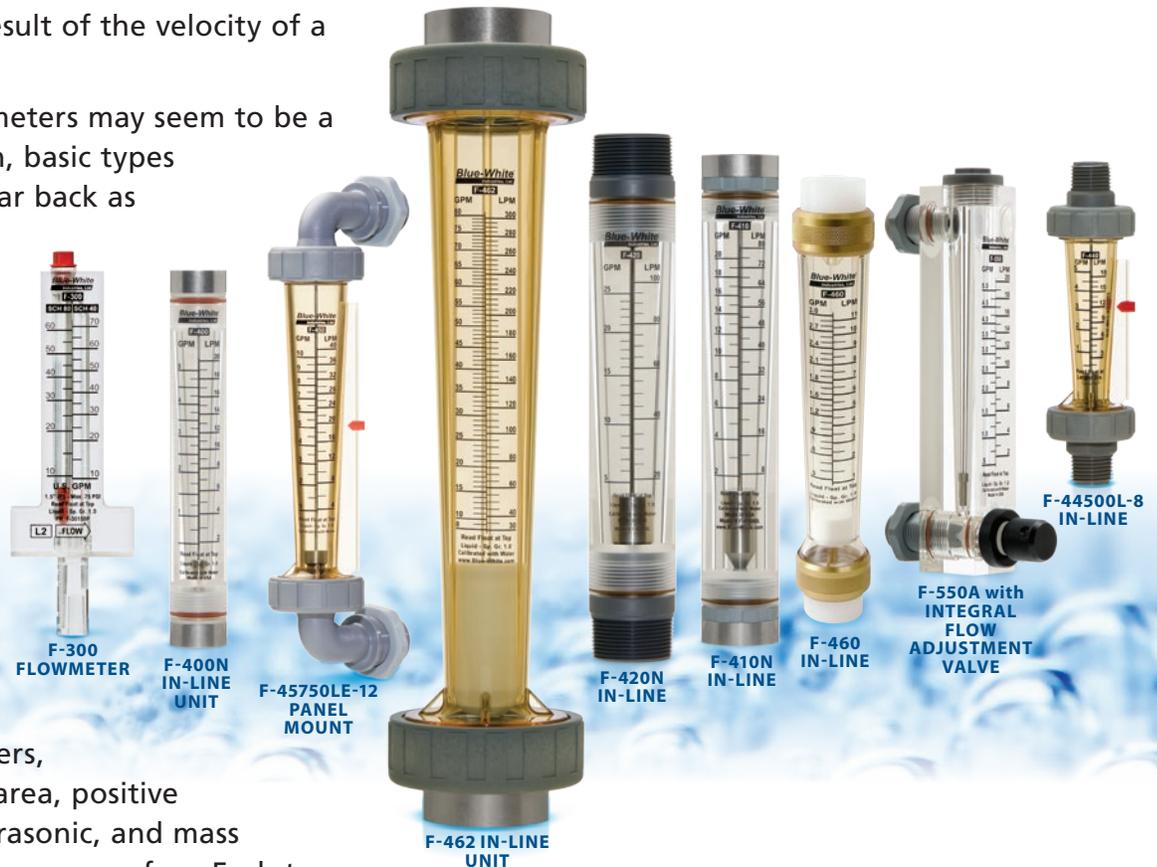
TAPERED TUBE

The flowmeter is comprised of a vertically tapered tube through which the fluid to be measured is passed, from the smaller end of the taper and up to the larger end. As the fluid flows through the tube, it forces an indicator (float) upward. The clearance space between the float and tube increases as the float moves towards 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 proper installation of the variable area flowmeter, as with all flow instruments, is critical to performance. It must be plumbed into a piping system correctly: that is, with the narrow part of the taper at the bottom.

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Typically printed onto or next to the tube is a scale with the flow increments / measurements. The flow rate can be read by matching the increments on the tube with the edge of the float.

COMPETITIVE

In recent years variable area flowmeters have become very competitively priced. Because these flowmeters have become more cost effective, more and more manufacturers of water treatment systems have begun including them as a standard accessory.

A few industries where use of variable area flowmeters is common include:

The makers of ultra filtration equipment (reverse osmosis systems) use flowmeters to measure output through the membrane, and also to measure reject. Flowmeters 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 deionized 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.

In the commercial swimming pool industry flowmeters are used to measure flow through the pool's filtration system so operators and health inspectors, can easily verify an adequate amount of

water is passing through that filtration system to ensure clean swim water.

COMPATIBILITY

Be certain to check chemical compatibility. Don't rely solely on compatibility charts, do your own testing. Many flowmeter manufacturers are willing to provide material sample kits so you can perform your compatibility test.

Specific gravity ('weight') of the liquid through the flowmeters affects flowmeter reliability and accuracy.

Viscosity, the degree to which a fluid resists flow under applied force, also affects accuracy, as do elevated temperatures.

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. Avoid being misled by the various terminologies used in the flow industry. Flowmeter manufactures may simply say 2% accurate, you need to question that statement, 2% of what? 2% of the indicated flow, or 2% of the full scale? These two seemingly similar accuracies are actually quite different, and could be costing you extra money. Repeatability is different than accuracy and in some industries may be more important. Repeatability is the flowmeters' ability to reproduce flow rates consistently under the same conditions.

Repeatability is very important in the processing industry where tracking flow changes is so essential.

In summary, it is best to have a clear understanding of your flow measurement requirements and if you're uncertain what is the best flowmeter for your application, consult an expert who can provide friendly assistance and accurate information. Blue-White has a full staff of in-house engineers to provide the assistance you may require.

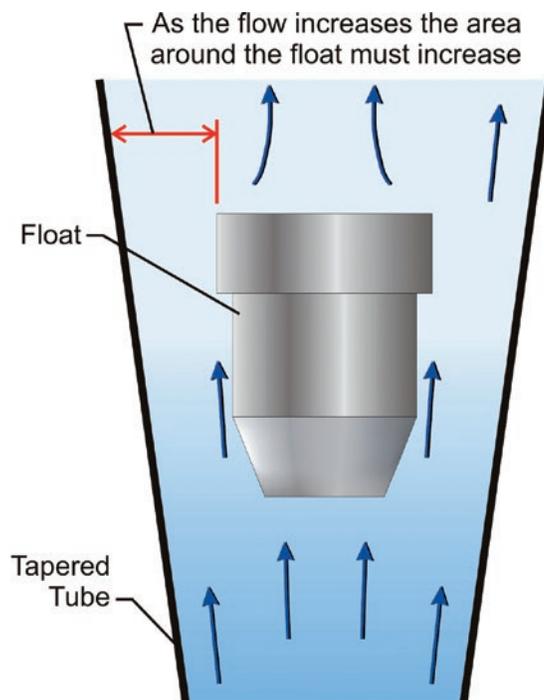


Figure 1