MAGNETIC ATTRACTION

The Food & Beverage Industry's Pull to Magmeters

By Jesse Yoder

A recent survey reviews this industry's installed base of flowmeters, the types of fluids measured, and other select issues relating to flow measurement

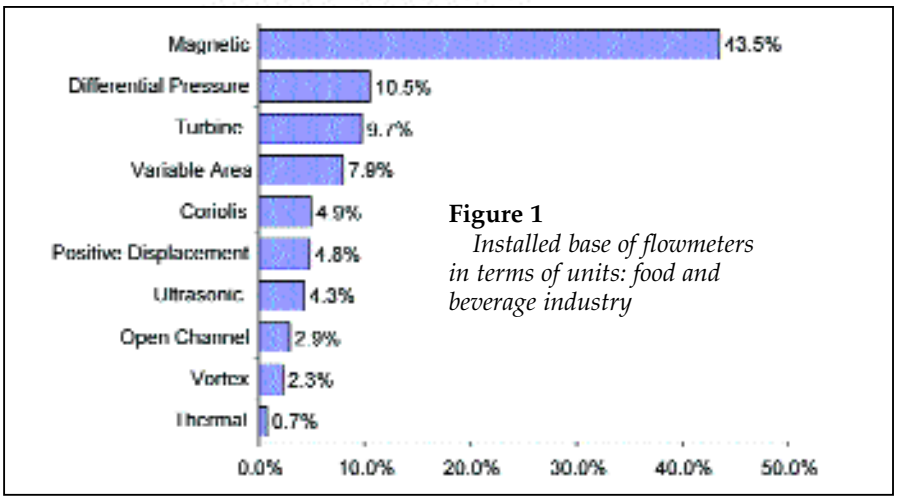

Figure 1
Installed base of flowmeters in terms of units: food and beverage industry

According to a survey of 299 flowmeter users by Flow Research and Ducker Worldwide, magnetic-type flowmeters account for 43 percent of total flowmeters used in the food and beverage industry in terms of units (see Figure 1, above). This percentage of use is by far greater than that of any other type of flowmeter. Differential pressure and turbine flowmeters constitute a distant second and third in terms of installed base (10.5 percent and 9.7 percent, respectively).

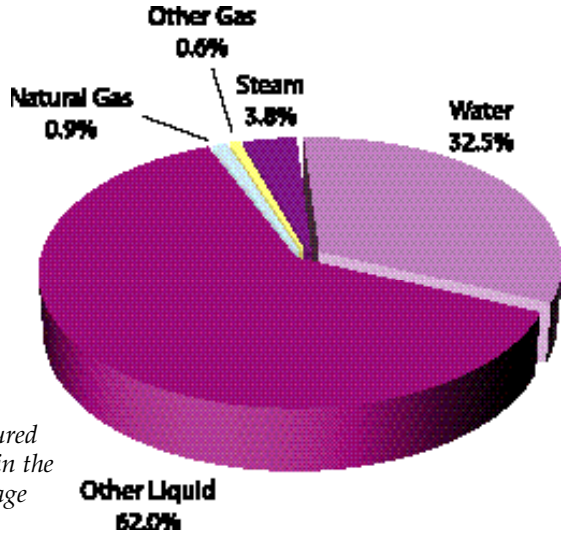

Figure 2
Fluids measured by flowmeters in the food and beverage industry

Flowmeter Applications	Survey Respondents Using Application (Percent) Total = 299
Water – measurement/flow	30.80
Liquids – measure flow	12.80
Monitor waste water/liquid	7.70
Production of beer	7.70
Measure cooking oil	7.70
Measure edible fats/oil	7.70
Measure flow of fruit juice/Control and regulate flow of juice	5.10
Sugar – measure and control flow of sugar solution	5.10
Measure volume of milk	5.10
Measure speed when beer is being bottled	5.10
Process control/Flow process	2.60
Natural gas – measure	2.60
Steam – monitor flow	2.60
Gas – monitor flow	2.60
Batch purposes/Batch control	2.60
Measure flow of ingredients when making a paste	2.60
Measure volume of cleaning fluid	2.60
Control pasteurization flow	2.60
Control volume	2.60
Conditioning juice	2.60
On decarbonization filters	2.60
Measure cod liver oil	2.60
Measure quantity	2.60
Measure beverage	2.60
Measure speed of truck cleansing	2.60
Iced water placement in truck	2.60
Remove and peel off certain substances	2.60
Measure wine	2.60
Beer placement in truck for transportation	2.60
Spirit transfer	2.60
Measure power supply	2.60

Note: total of percentages are greater than 100 percent due to possible multiple responses in survey.

Figure 3
Flowmeter application usage in the food and beverage industry

Magnetic Flowmeter Popularity

Magnetic flowmeters are popular in the food and beverage industry because they are nonintrusive, thereby interfering very little with the liquid being measured. While Coriolis meters are also used, those designed around curved tubes may have cleaning issues. Magnetic flowmeters, which keep the flow in a straight line, can be readily cleaned with procedures known as clean-in-place (CIP) and steam-in-place (SIP). With these procedures, the flowmeters are flushed with very hot water or steam for several minutes until clean.

Magnetic flowmeters are also widely used in the food and beverage

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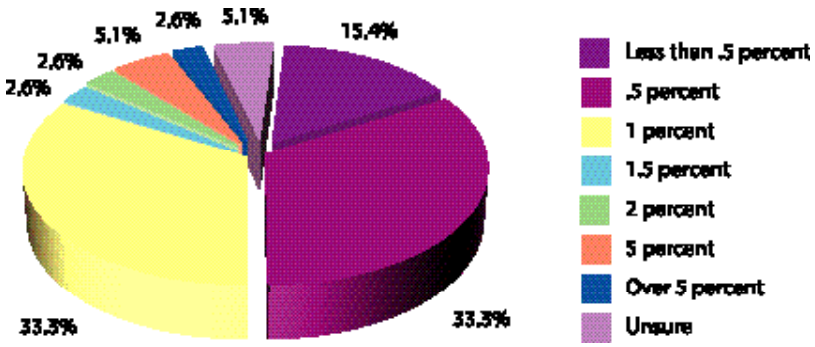

Figure 4
What degree of accuracy do you require in your flowmeters?

industry because they have a number of different linings suitable for sanitary applications. Lining options often represent a significant consideration when purchasing flowmeters. Types of liners include hard and soft rubber, polyurethane, Teflon, PFA, and ceramic. Liners are selected based on a number of factors including cost, temperature and pressure range of the liquid, and the caustic nature of the liquid. For example, PFA and Teflon are quite tolerant of high temperatures, while polyurethane performs better at lower temperatures.

Fluid Measurement Requirements

Popularity of magnetic flowmeters is also attributed to the fact liquids constitute the largest percentage of fluids measured in the food and beverage industry. Figure 2 (see page 36) illustrates how end users responded when asked what type of fluid their flowmeters are measuring. Almost 95 percent of fluids measured by flowmeter are either water or other type of liquid. Gas and steam flow measurement accounts for the

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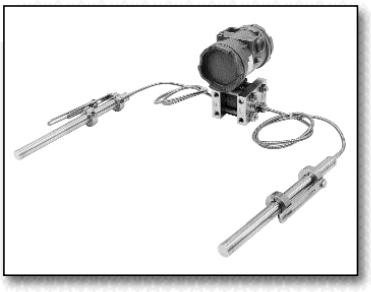

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remaining proportion, according to survey results.

When evaluating application suitability, magnetic flowmeters are uniquely qualified with regard to liquid measurement requirements. Due to conductivity limitations, magnetic flowmeters are unable to measure steam and gas flow. And, by selecting the most appropriate liner, this type of flowmeter can manage a variety of temperatures, pressures, and caustic materials. Magnetic flowmeters are also able to measure liquid flows with a high degree of accuracy, often in the range of ±0.5 percent.

Flowmeter Applications

Figure 3 (page 37) delineates common flowmeter application usage in the food and beverage industry according to survey results. In addition to measuring unspecified types of liquids, flowmeters are also used to measure a variety of liquids such as milk, beer, cooking oil, and edible fats. These measurements are made possible by a variety of flowmeter types that take into consideration factors such as liquid viscosity, for example.

Accuracy Considerations

Flowmeter accuracy requirements rate high in level of importance among end users surveyed (see Figure 4, page 38). The majority of respondents (80%) define accuracy level needs of at least ±1 percent. Some flowmeters are used in custody transfer and billing applications. Others are used for measuring internal transfers of fluids. These results are consistent with data from other

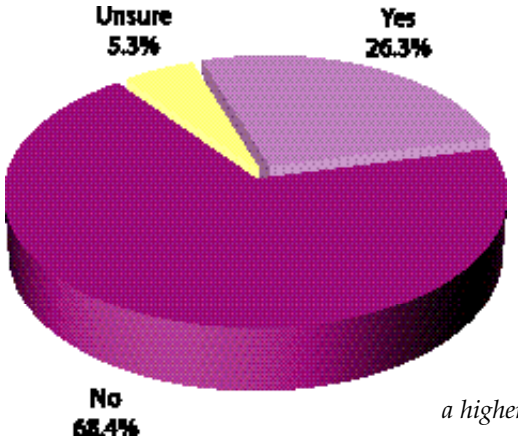
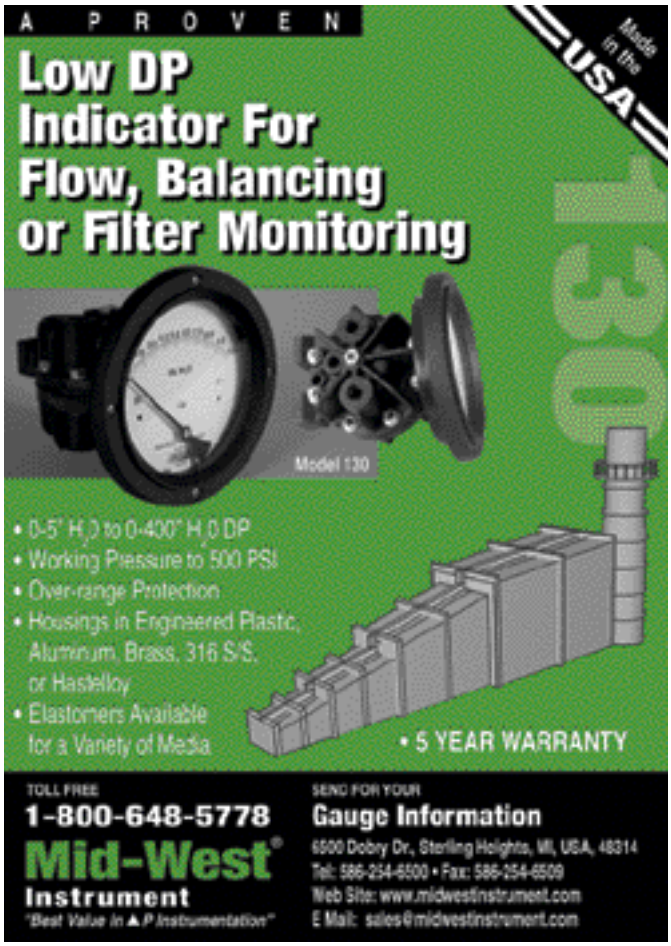


Figure 5
Would you pay more for a higher degree of flowmeter accuracy?



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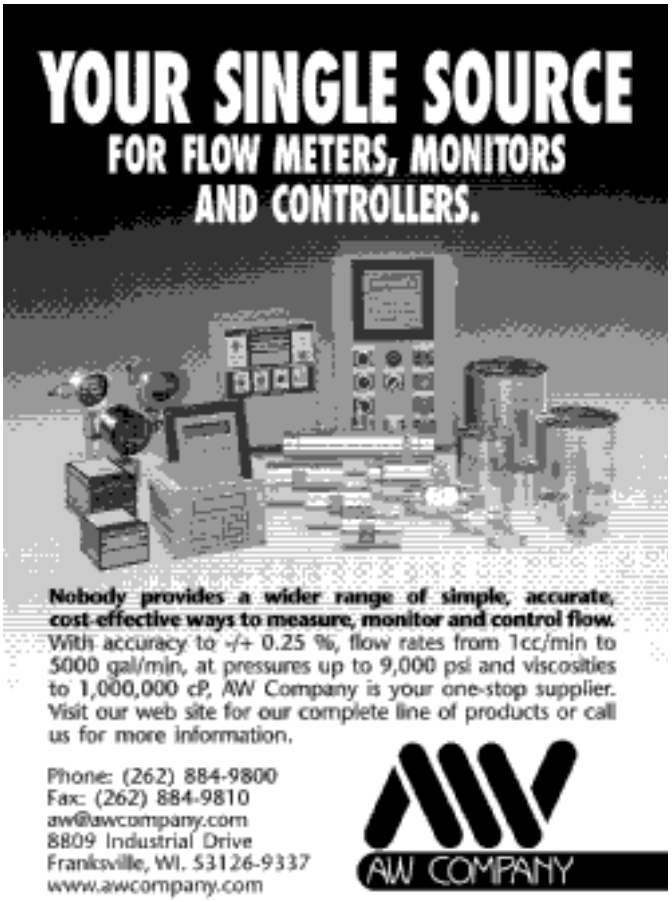

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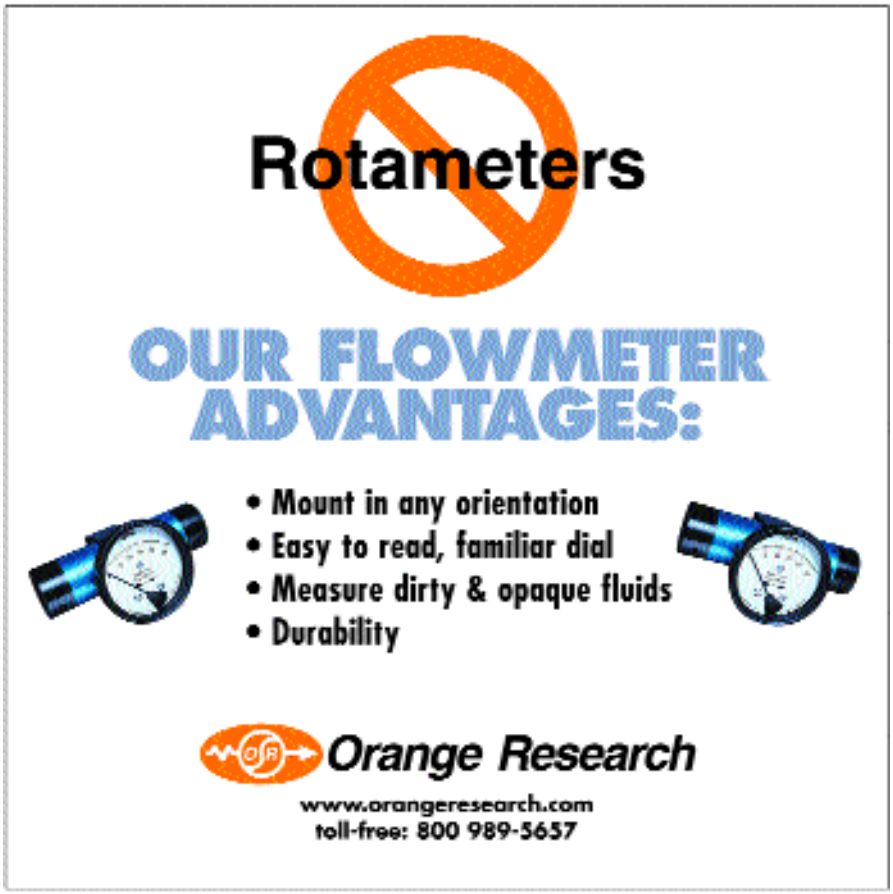

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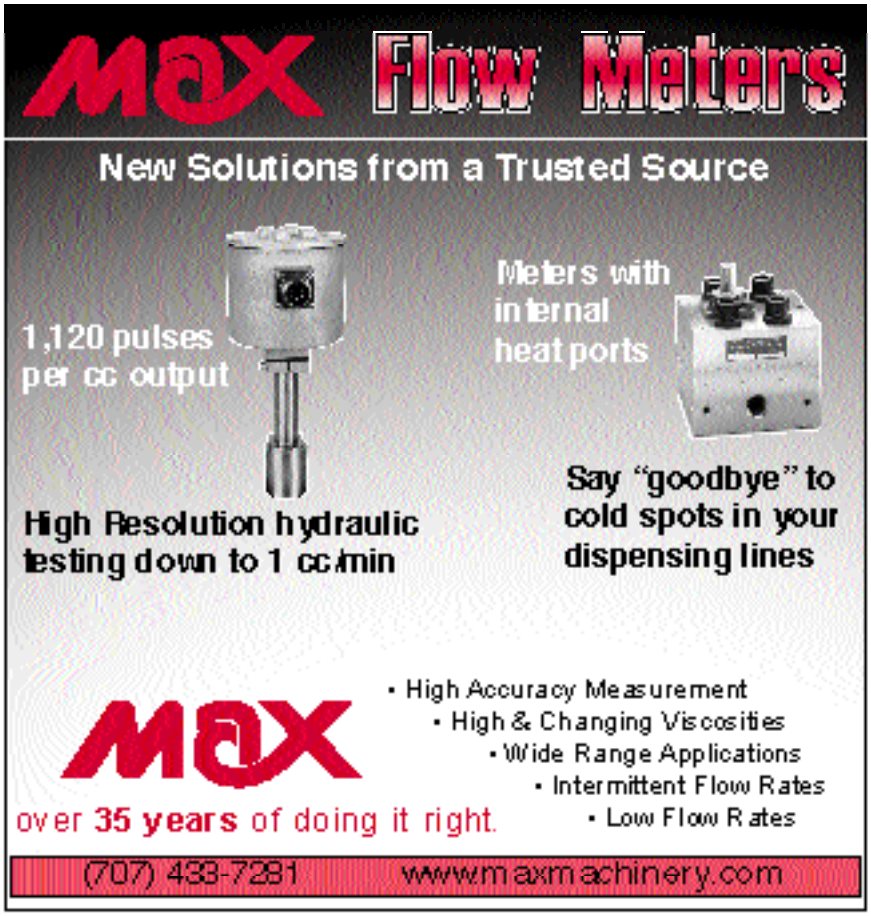

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process industries..

Balancing high accuracy requirements with cost is a challenge warranting careful consideration by users. Coriolis meters are highly accurate, but are also more expensive than most other meters on the market. When users were asked whether they would pay more for a higher degree of flowmeter accuracy, approximately one quarter affirmed. This is a compelling statistic worthy of further investigation as research and development efforts in the food and beverage industry may need to be revisited to better meet the needs of the market served. FC

Summary

The food and beverage industry is unique because of its high level of liquid measurement. For this and other reasons, magnetic flowmeters dominate the industry. There are numerous applications that focus on measuring particular types of liquids. Similar to process industries, there is a significant demand for high-level accuracy in the food and beverage industry. As indicated in recent survey data, approximately one in four flowmeter users would pay more for a higher degree of measurement accuracy.

About the Author

Dr. Jesse Yoder is president of Flow Research, which he founded in 1998. He has been a writer and analyst in process control since 1986. Dr. Yoder has written over 40 market studies and is currently completing a 12-volume series of studies on the worldwide flowmeter market. Included in this series is The World Market for Flowmeters, *which includes all flow technologies. Flow Research* (www.flowresearch.com) *offers a quarterly update service called the* Worldflow Monitoring Service. *You can contact Dr. Yoder by phone at 781 245-3200 or by e-mail at* jesse@flowresearch.com.