

## Metering Technology You Can Trust

The proper recording of measurements is the basic prerequisite for optimizing operating processes

by Hermann Hartmann

Numbers are important! Figures accompany us throughout our daily professional and private lives. Expressing production processes in figures is not only a matter for engineers; modern quality management and controlling procedures too make use of significant indicators in order to evaluate operations in a company - the term "balanced scorecard", for example, is a buzzword denoting an approach that helps to describe the effectiveness of corporate strategies. Even if the ultimate indicator of a company's success or failure is the profit and loss account produced by the finance department, the ways in which these final figures are arrived at must be as transparent as possible. And for this to be achieved, all areas of an operation, need to be depicted effectively and objectively, in order to make it possible for them to be evaluated. Within production processes, however, it is physical and analytical metering technology that offers a clear and objective instrument by which individual sub-processes can be represented.

When decisions have to be taken on the scope and type of the metering technology to be deployed in an operation, reliability is not the only essential factor: the information that the equipment can provide on the effectiveness and efficiency of the process is equally important. In the field of modern process instrumentation, the work put into the further development of systems and equipment must be guided by the precise requirements of the application concerned. The constant dialogue between the vendor and the customer and the intermeshing of equipment and application are essential factors in the constant further development and improvement of metering systems and devices. The diversity of process parameters that can be measured is constantly being extended. Whereas 30 years or so ago, the basic instrumentation of process plant in the food industry consisted only of

the thermometer and the manometer, flow metering and the measurement of ingredients are nowadays often an integral part of modern manufacturing systems.

The measurement of such parameters as conductivity, turbidity, density, speed of sound, color, filling level etc. has become state-of-the-art in production process technology. Analytical processes such as the determination of ingredients in complex blends (for example alcohol in liqueurs) or the counting of yeast cells in fermentation products are also making the leap out of the laboratory and into process technology. Infrared measuring techniques and a variety of other forms of spectrometric technology still have considerable innovative potential for industrial applications in the future.

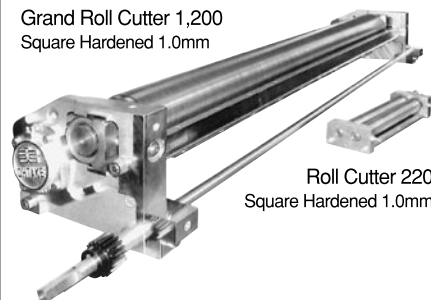
### Process indicators save money

If a manufacturing process is to be optimized by the installation of appropriate control or regulating devices, the principle still applies, as it always has, that before these parameters can be influenced it naturally has to be possible for them to be recorded reliably and precisely. In the case of the thermal treatment of a beverage, for example, not only temperature but also, amongst other things, dwell time are important influencing factors. A combined measuring unit for temperature and flow which determines the relevant measurement values and at the same time can carry out the necessary regulation measures fully automatically is just the solution needed for this process requirement.

Right from the early days, our company's strategic orientation has been towards "niche applications" in metering technology. The IZM-T™, for example, which is based on the electromagnetic flow meter principle, offers this combination of measurement functions, which also has many applications where quantities have to be officially registered. These

## Grand Roll Cutter 1,200

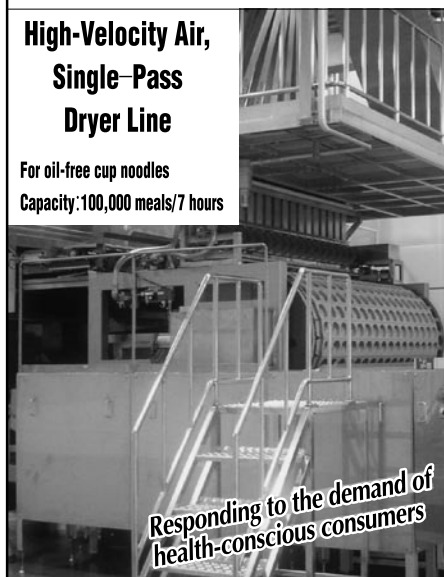
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Figure 1: Mobile volumetric metering unit for automatic filling with print-out of an official voucher

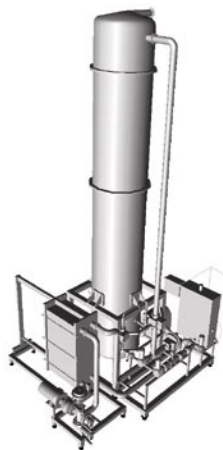


Figure 2: VARIDOX™ water deaeration equipment with integrated cooling



Figure 3: DI-LIQUIZ™ twin system in a blending plant. Photos: GEA Diessel

measuring devices can be installed on mobile trolleys for peripatetic use, offering the advantage that the metering technology can be used at practically any point in the plant. If the measurement and control elements such as butterfly valves or other types of control valve are driven by electric motors, the operator need provide no other form of supply connection than an electric socket (Figure 1).

The fully automated and precise filling of containers, tankers or other transportation vessels saves time and reduces product waste. Thus these devices demonstrably save money. We offer numerous different versions adapted to the customer's specific requirements. Mass flow meters operating on the Coriolis principle furnish a number of measurements at the same time: density, temperature, flow and volume of liquids and gases can be determined, recorded and analyzed simultaneously. In the case of mixtures that consist of only two components, such as sugar solution, this data is already enough to allow the concentration of the solution to be calculated, and thus enables an indicator of the degree of efficiency within the production train to be provided at any time. In breweries, the yield of finished beer produced from the quantity of malt employed can be determined in a similar manner.

The disproportionate rise in the cost of energy makes it more and more necessary to constantly measure and monitor figures such as actual con-

sumption per unit of output (e.g. energy costs per hectoliter of beer), so that action can be taken immediately if there is any marked deterioration in the efficiency of any individual stage in production. The design of typical modules for beverage production such as water deaeration systems (DIOX™ und VARIDOX™), continuous blending devices (DICON™) or carbonation systems (DICAR™) is constantly monitored with a view to optimizing consumption data. The quality of the metering equipment used is of crucial importance in this (Figure 2).

### Maximum process reliability

The reliability of today's meters reflects, amongst other things, the high quality of both the electronic and the mechanical components. Years ago, a metering device was typically expected to have a service life of seven years. Thanks to constant development and improvement, this figure is now far exceeded.

Should any internal defects nevertheless occur, self-monitoring mechanisms in the metering system are already able to identify and report numerous possible malfunctions, so that the operator can react immediately and prevent the production of faulty batches of product, which is expensive. It is however important that either the equipment should be so designed as to allow for production to be continued manually, or else that spare parts to replace critical components should be available at short notice.

So-called "twin systems", for their part, virtually manage their functionality themselves. Here, everything in the system is provided in tandem and operated in "master and slave" mode. Generally speaking, the machine operates using the measurement values furnished by the master. But it is also possible to take an average value from the "master" and "slave" figures, the individual values being monitored to see that they remain within the plausibility limits (Figure 3). If there should be any breakdown, the device switches over automatically from the master to the slave system, ensuring that production can continue; this ensures reliable operation even during the night shift.

### Summary

The recording of measurement values is a basic prerequisite for being able to take action to optimize production processes. Our company has been producing a variety of metering devices for many years and makes use of different measuring systems in its equipment for the food and beverage industry. For very sensitive areas within production, measurement and control systems with multiple redundancy, known as "twin" systems, may well prove to be worth while in the long term despite higher procurement costs.

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