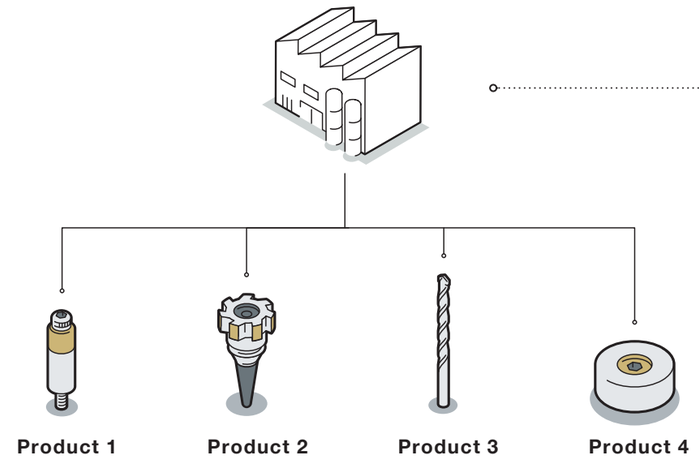
Continuous flow measurement and control for precise coatings

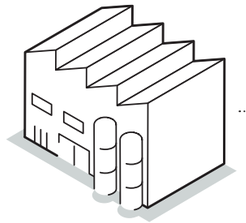
/ Measurable quality / Tools or metal surfaces are coated using CVD processes. CVD stands for “Chemical Vapour Deposition”. It is a thin-film technology that deposits a fine yet durable and resistant layer of film on the tool surface. To guarantee exact dosing of microscopic quantities of the liquid, the upstream dosing system must provide a constant level of precision throughout. Bürkert offers mass flow meters based on the Coriolis mass flow measuring principle to measure or control the flow of media with this level of precision. This principle ensures highly accurate measured values – and thus the quality that helps maintain long-term competitiveness. Another advantage: Coriolis measures the mass flow directly, independent of the actual medium – therefore, the device can be used flexibly for any kind of liquid.

Whether for machining, cutting, punching or forming, or made of steel or carbide: Tools are coated to make them hard wearing and durable. CVD processes are characterised by excellent adhesion and contour conformity of the layer, even with intricate geometries.



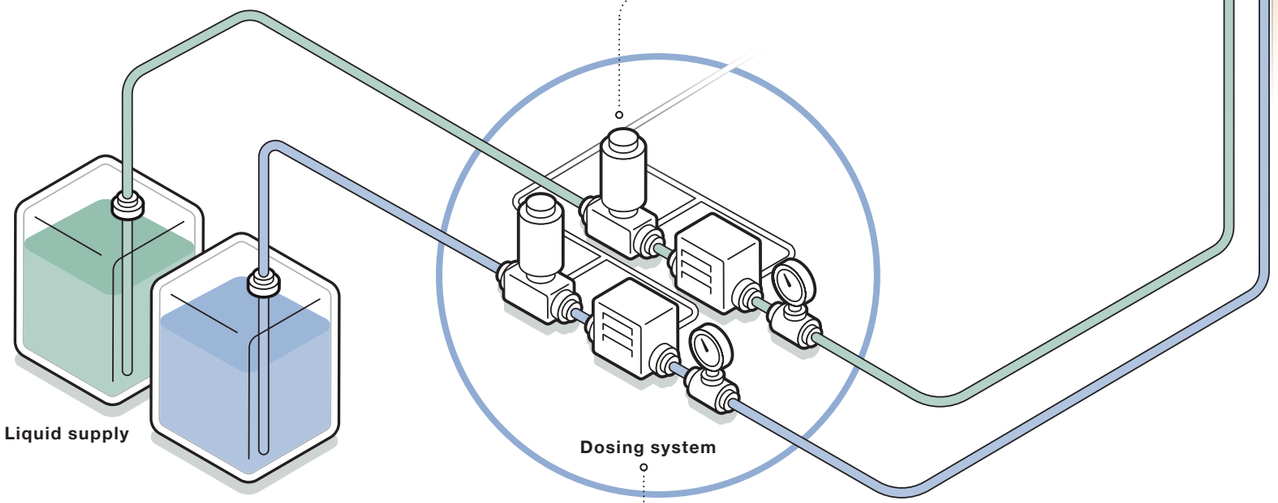
Do you want to ensure consistent and reliable processes over a long period of time? Discover below how mass flow meters and controllers with a Coriolis sensor facilitate this.

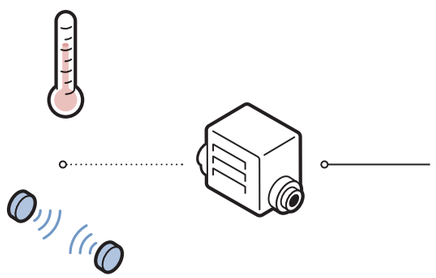
/ Tailored coating of tools / The increasing number of variants and shorter product life cycles obviously impact on cost pressure – while the demands placed on the design and service life of tools continue to grow. High-precision tools coated with a hard-wearing and top-quality finish promise success.



Plant engineers

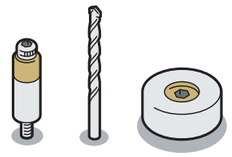
Time and cost pressure are increasing. The more variants produced, the more complex procurement and service activities for existing systems become. Versatile and easy to maintain components facilitate work activities.





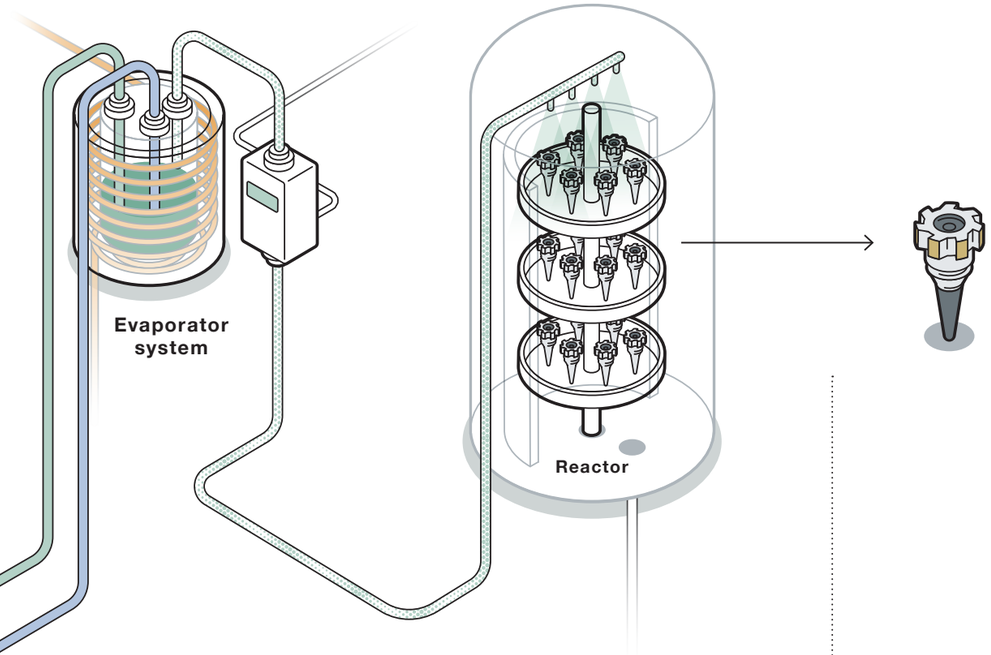
Conventional processes

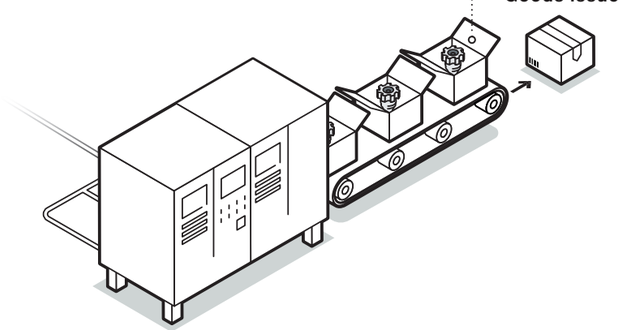
Flow measurement in the tool coating process can be carried out, for example, using a thermal measuring principle or an ultrasonic flowmeter. These measuring methods are not equally suitable for each and every liquid, and as such the results may be inaccurate or prone to errors.



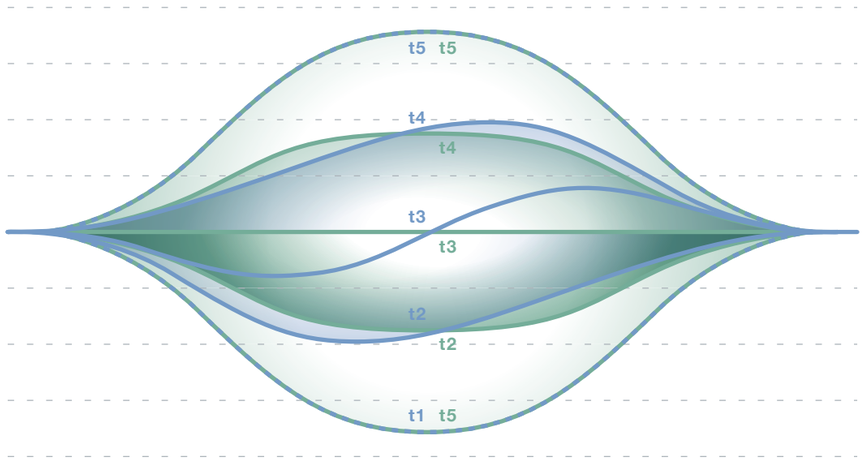
Coating specialists

The offered range includes as many tools of varying quality categories as possible. Cost pressure is high, which is why long-term savings in the coating process are very lucrative.





/ Flow measurement using the Coriolis principle / Whether for coating tools or other metal surfaces: Consistent quality is the top priority. When using the mass flow meter (MFM) or mass flow controller (MFC) Type 8756, you can measure and optionally control flow values constantly and reliably over a long period of time, since the robust design makes the devices particularly resistant to vibration. Measurement of the liquid mass is not dependent on the medium, temperature and pressure, which is why the device, once set, can be used for any kind of liquid.



Tube vibrations when liquid is flowing

Tube vibrations without medium

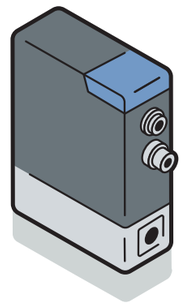
How the Coriolis principle works

Bürkert flowmeters use a measurement tube which is first made to vibrate, see deflection at time t1 in the illustration above. Detectors at the start and end of the measurement tube pick up the timed deflection at the corresponding point. If a liquid flows through the tube, the tube is deflected differently at both ends at time t2. The difference of the deflection at varying points in time, for example at t2, t3 or t4, allows conclusions to be drawn about the mass flow.

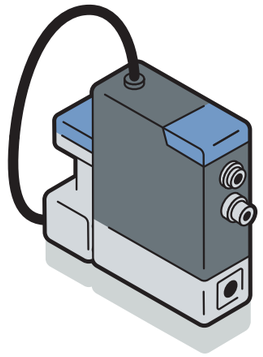
Advantages

Coriolis is a universal measuring system for mass and density. It operates independently of conductivity, inlet/outlet sections, flow profile, medium density, pressure and temperature.
Moreover, it delivers exact results and has no moving parts.

Mass flow meter
MFM Type 8756



Mass flow controller MFC
Type 8756 with micro
annular gear pump



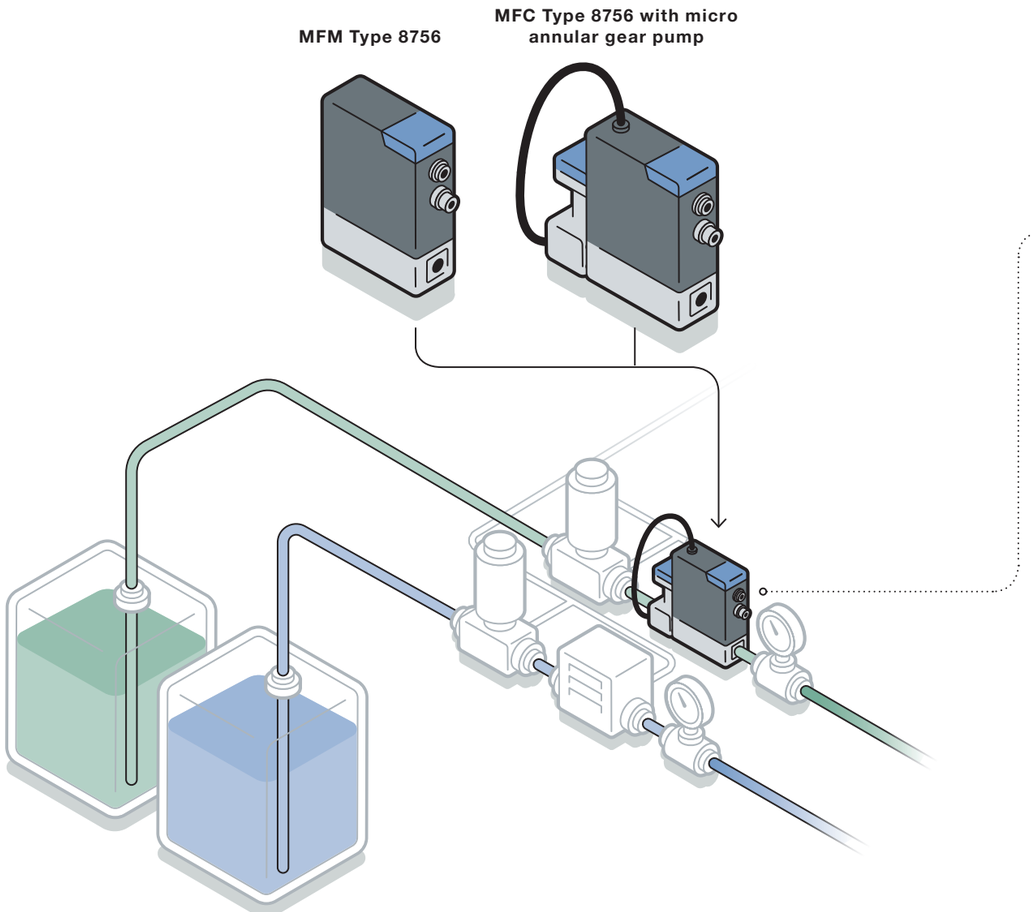
Mass flow meter
MFM Type 8756

The mass flow meter measures liquid flow rates of up to 25 kg/h. It is designed for the smallest quantities and aggressive liquids. By measuring the flow with an accuracy of 0.2% of the measured value, it is one of the most accurate flowmeters for small liquid flow rates.

Mass flow controller
MFC Type 8756 with micro annular gear pump

A mass flow controller with micro annular gear pump not only measures the flow rate but can also control it with a high degree of precision. A very high resolution and smooth operation of the pump guarantee the exact setting of a desired set-point flow rate. Due to the high-quality wetted materials, the pump can also be used with aggressive liquids.

/ Accuracy down to the last µm / Thanks to its unrivalled measuring accuracy, the MFC/MFM Type 8756 enables high-precision coating processes – and thus the chance to successfully expand the range of coatings available. Medium-independent calibration and adjustment and straightforward mass measurement offer the advantage that the device can be used for any kind of liquid. The pump is fitted directly to the MFC, thereby providing a compact and space-saving solution.



bürkert

Reliable and low maintenance

Permanent and repeatable accuracy makes the device a long-lasting success with results you can definitely rely on. Thanks to very high zero-point stability, interventions in operating processes are unnecessary.

Vibration resistant and durable

Due to the extremely robust design, external vibrations have no impact on the measured values – the best preconditions for long-term accurate and reliable measurements.

Reduced logistical challenges

Thanks to medium-independent calibration and straightforward mass measurement, you can use the device to accurately measure any kind of liquid. The logistical challenges are significantly reduced, since just one device is sufficient.

Wear free and long service life

The medium-resistant devices measure and control toxic and aggressive liquids without wear, which significantly enhances their average service life. All in all, this boosts efficiency and reduces costs.

Reduced procurement costs

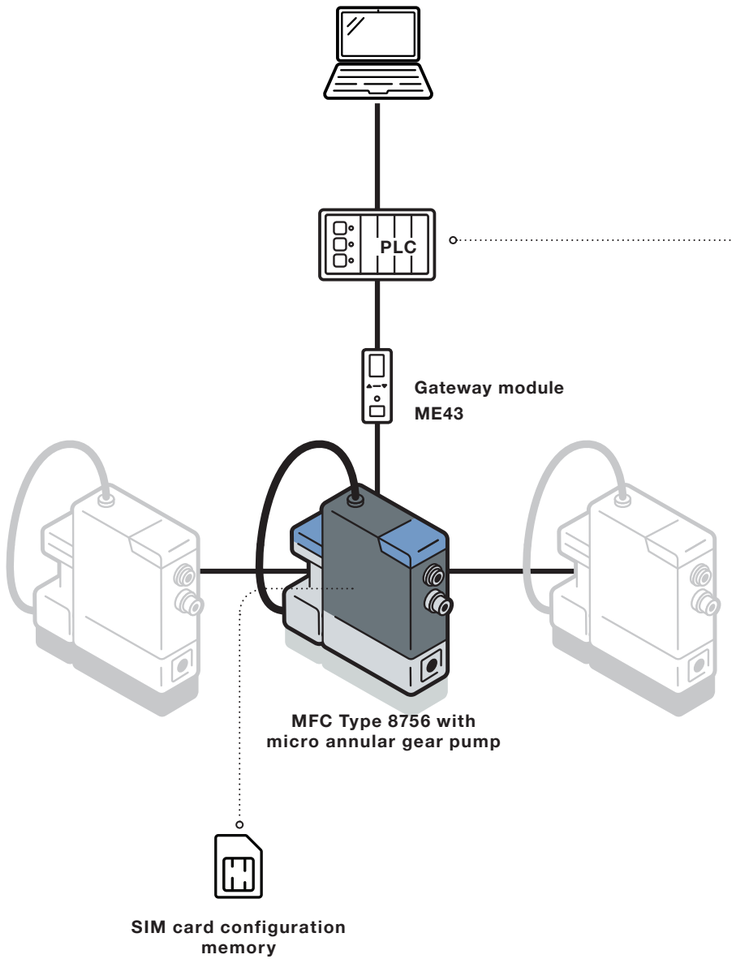
Thanks to the high measuring range provided by the devices and their constant accuracy, you need less measurement and control devices. At the same time, you are able to continuously apply precise layers.

Reproducibility saves time

The digital connection ensures the coating processes are reproducible at any time. This results in enormous time savings, since extensive re-adjustments for subsequent processes are no longer necessary.

/ Simple connection / Whether digital or analogue: The MFCs/ MFMs can be connected with very little effort to your plant via the provided interfaces. A digital connection saves time by eliminating the need for re-adjustments in subsequent projects and makes coating processes reproducible at any time.

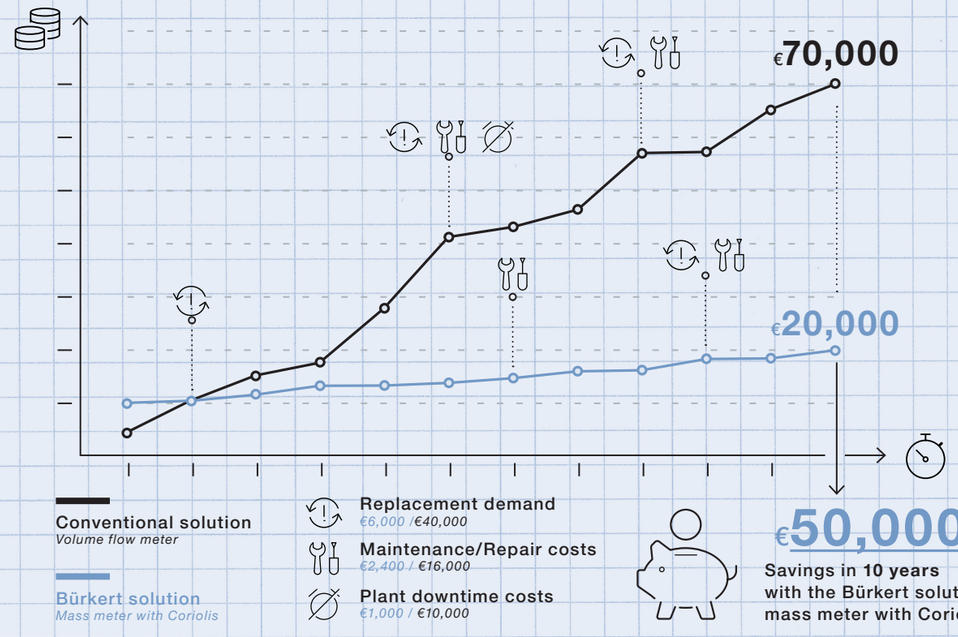
Bürkert mass flow meters and controllers come with a configuration memory. This saves all the settings, which obviously facilitates device changeover.



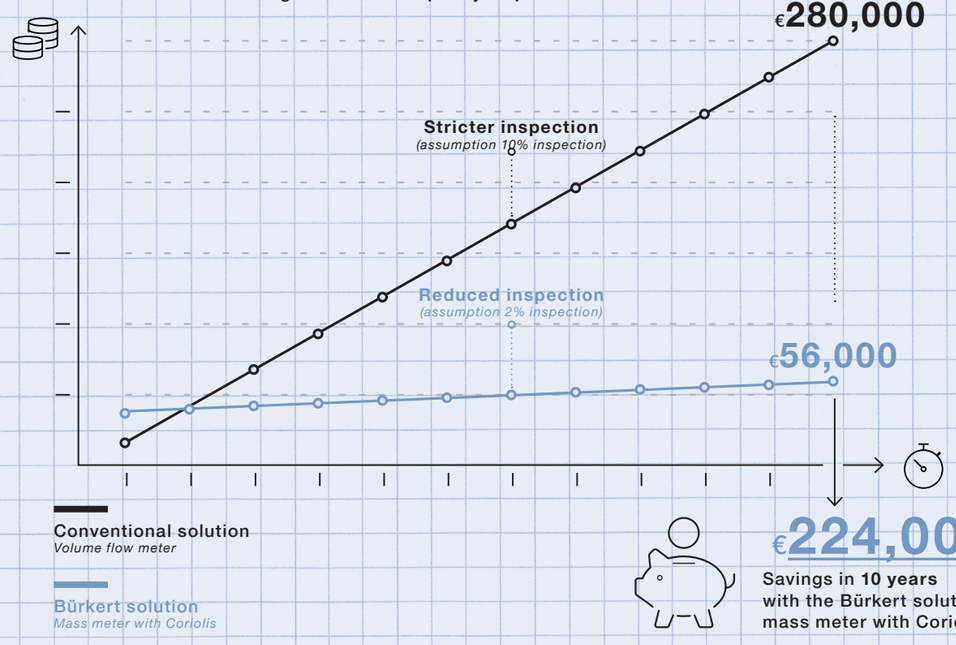
Example calculation

A smart investment in the long run: The investment is recovered much sooner if operation and quality assurance are a lot less expensive than with conventional solutions.
Assumptions: Two devices are required for initially equipping an existing plant. The plant runs 24 hours a day, the completion of one process (100 parts) takes 4 hours plus 2 hours for process changeover; this equals 4 processes and 400 parts a day. In one year, i.e. 200 working days, 80,000 parts are produced.

10-year consideration for plant operating costs



Quality assurance costs / Based on the assumption of a one per cent influence due to this flow measurement and an average €350 for the quality inspection



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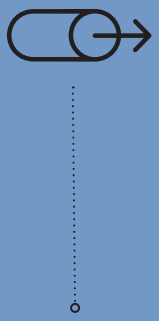

Flow measurement and control

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