

Inkjet print heads and labs-on-a-chip were the first exponents of microfluidics: involving flow of liquids inside channels with a diameter of micron-size. Microfluidic devices are made by lithographic and other processes that find their origin in integrated circuit manufacturing.

In these devices, liquids behave in a different way compared to flow in 'normal' channels. Due to the small size of the channels, 'fluid-wall' phenomena play a dominating role. Microfluidic devices find their application in fields such as pharmaceuticals and biotechnology, reducing the amount of chemicals and experimental time. A French company produces systems for microfluidics applications. Currently, they use thermal mass flow meters in their system. However, they observed that the thermal mass flow measurements in their application were too unstable and could not be reproduced. Bronkhorst suggested an alternative solution, using Coriolis technology.

- ◆ Drug encapsulation / injection
- ◆ Microbiology / cell culture
- ◆ Optics
- ◆ Electrochemistry
- ◆ Lab-on-a-chip



Flow control software "heartbeat"

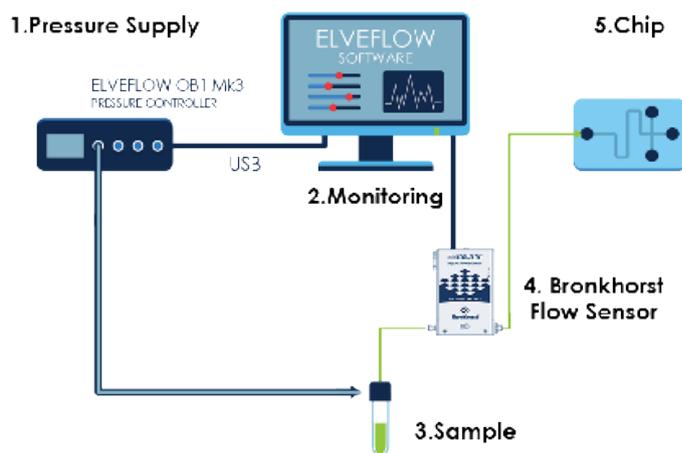
Application requirements

Far less than five mass flow meters are needed to cover the entire measurement range. Furthermore, the accuracy and repeatability of the measurement itself have to be improved, and the measurement should be more stable.

Important topics

- ◆ Use fewer mass flow meters
- ◆ Increase accuracy and repeatability
- ◆ Stable measurement

Process solution



Looking at the needs of the customer, Bronkhorst concluded that the ML120 mini CORI-FLOW mass flow meter would be able to cover the entire range needed. They proposed to the customer to test the ML120, and to compare the results with the currently used thermal mass flow meters. The customer tested the ML120 during two months to investigate whether or not this would be the right solution to their problems.

After these two months, they concluded that the ML120 was an improvement with respect to accuracy, stability and repeatability. Moreover, it was indeed possible to replace five thermal mass flow meters by one coriolis-based device, to cover the same range. They trust Bronkhorst as a very professional partner, and they decided to integrate the ML120 in their product range.

As part of a further cooperation with Bronkhorst, the customer develops a user guide for the (future) users, and a selling guide for the sales engineers. Moreover, some programming work in LabVIEW will be performed to communicate with Bronkhorst devices. ▶



Recommended Products

	<p>mini CORI-FLOW ML120 The new Bronkhorst ML120 Coriolis Mass Flow Meters and Controllers offer highest performance at the world's lowest flow rates for both liquids and gases lowest range 50...5000 mg/h up to highest range 2...200 g/h The Coriolis sensor of the ML120 shows little to no variance over a long period of operation, thus reducing the system downtime.</p>	<ul style="list-style-type: none"> ◆ Direct mass flow measurement ◆ Fast response time ◆ High accuracy (0,2% Rd for liquids, 0,5% Rd for gases) ◆ Additional density and temperature outputs ◆ Compact design with very small internal volume ◆ Easy to install (low risk of gas bubble inclusion) ◆ Multi-range: easy on-site re-ranging via digital interface (span 1:4000)
	<p>mini CORI-FLOW The unique design of the miniature Coriolis sensor features unsurpassed performance, even with changing operating conditions in pressure, temperature, density, conductivity and viscosity. Contrary to many other Coriolis flow meters on the market, mini CORI-FLOW offers integrated PID control and close-coupled control valves or pumps</p>	<ul style="list-style-type: none"> ◆ Direct mass flow measurement, for liquids and gases ◆ High accuracy, excellent repeatability ◆ Cost-effective design ◆ Compact design, with integrated PID controller for fast and stable control ◆ Now suitable for (very) low flow ranges ◆ Digital technology allows fieldbus communication and offers user configurable control characteristics
	<p>LIQUI-FLOW mini LIQUI-FLOW mini are very compact Liquid Flow Meters for ultra low flow ranges. The instruments operate on a thermal, thru-flow measuring principle, using a straight, duplex steel sensor tube with a very small internal volume (0,88 mm³, smaller on request). The instruments are particularly interesting to Life Sciences system integrators.</p>	<ul style="list-style-type: none"> ◆ Compact assembly ensures space efficiency ◆ Thru-Flow measurement ◆ Attitude insensitive ◆ Fast and accurate measurement ◆ Easy to clean due to negligible dead volume ◆ Straight sensor tube reduces risk of clogging ◆ Duplex steel sensor (W1.4462) ◆ High pressure rating 1000 bar (15000psi)
	<p>EL-FLOW Prestige The EL-FLOW Prestige is the next generation of Bronkhorst MFM's / MFC's for gases. Nearly all core components have been redesigned and many improvements and innovations have been incorporated. Introducing the "Differential Temperature Balancing" technology, which ensures a superb sensor stability. The EL-FLOW Prestige MFC is ideally suited for dosing a tiny gas flow into the microreactor.</p>	<ul style="list-style-type: none"> ◆ High accuracy (standard 0,5% Rd plus 0,1% FS) ◆ Rangeability in digital mode up to 1:150 ◆ Extremely fast and dynamic response ◆ An on-board gas conversion model ◆ Multi-Gas / Multi-Range functionality ◆ Pressure ratings 64 / 100 bar ◆ Analog I/O-signals, RS232-connection; optional on-board fieldbus interface)

Contact information



Flow measurement in microfluidics

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