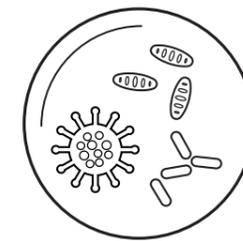




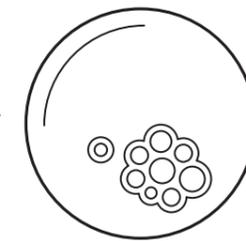
**Precise**  
**gas control**  
**for reproducible**  
**fermentation**  
**processes**

**/ When the mixture counts /** Be it a research laboratory or an experimental facility: When it comes to fermentation, gases and liquids must be precisely controlled. Only by doing so can you harvest the product you need in the required quality at the end of the process. In addition to safe and clean working methods, the reproducibility of the processes is key. Why is it so important? If you want to create an identical product at a later date, you need verified and accessible data for precise gas dosing. In addition, you should be able to selectively influence the fermentation process at any time to optimise the growth of the final product. With the right mixture, you can control gases seamlessly.

Fermentation in the **laboratory** places high demands on the bioreactors or fermenters used. Whether you are cultivating micro-organisms or cells – the materials installed must be compliant and approved, the process data documented and evaluable. Having everything under control makes all the difference for operators – which is why they insist on processes that are fully transparent.



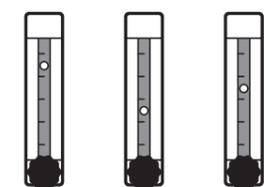
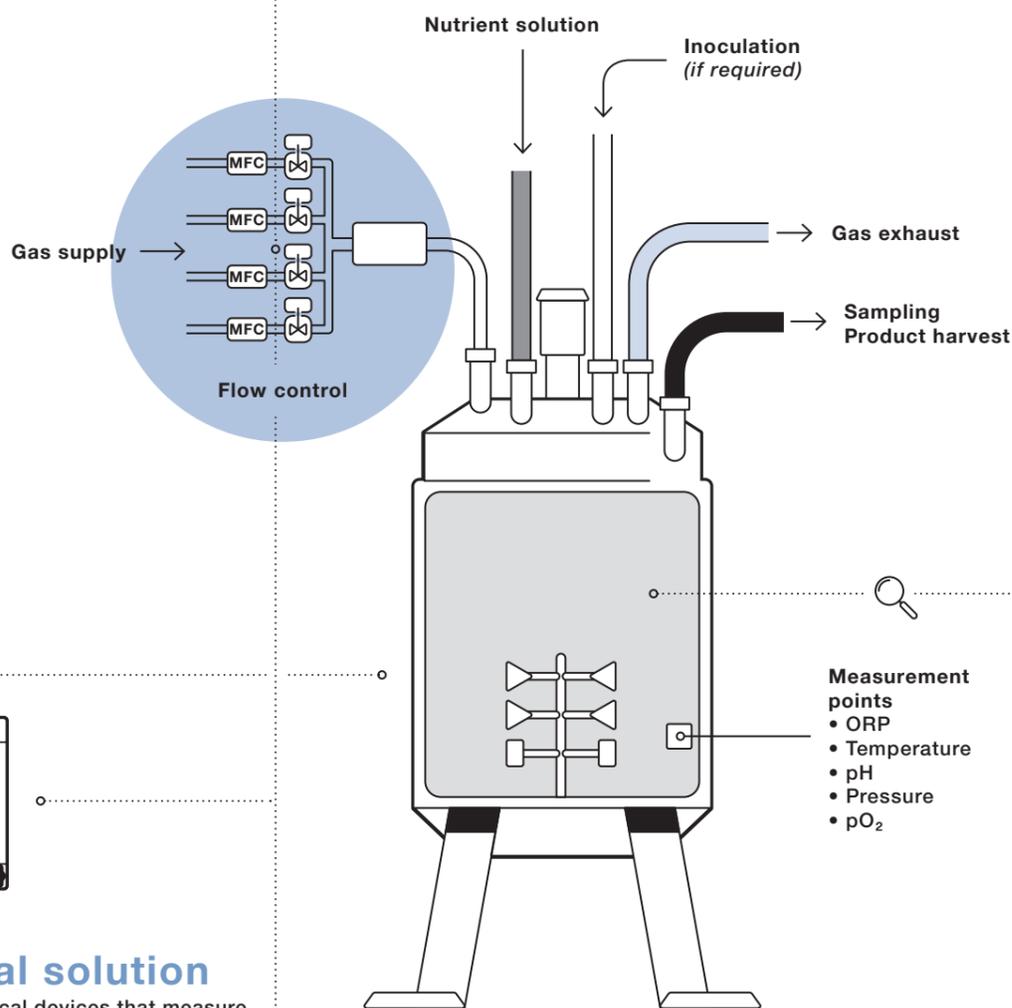
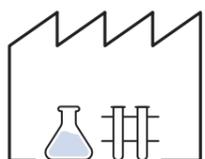
Bacteria, yeast and fungi  
in the fermenter



Cell cultures  
in the bioreactor

You want your bioreactors or fermenters to dose and control gases precisely and in a repeatable manner? Read on to learn what a difference having the right mass flow controller makes.

**/ Consistent quality /** A bioreactor or fermenter must deliver consistently high quality in the laboratory. To do this, it must maintain optimum conditions for the respective final product inside.



**Conventional solution**

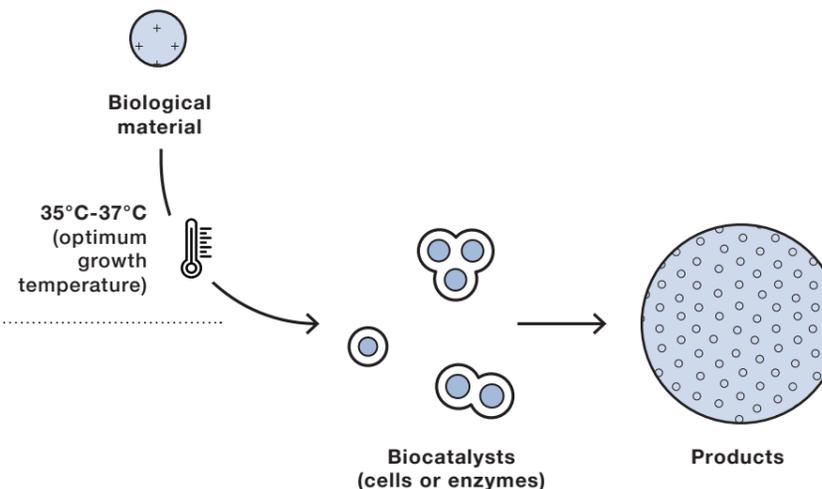
Rotameters are mechanical devices that measure the flow rate of a fluid in a closed tube. However, the principle used is based neither on mass-flow nor volume-flow measurement. They must be precisely calibrated and only function at the pressure and temperature for which they have been set.



**Approval** To ensure the quality of the final product, the components used must conform to the applicable approvals.

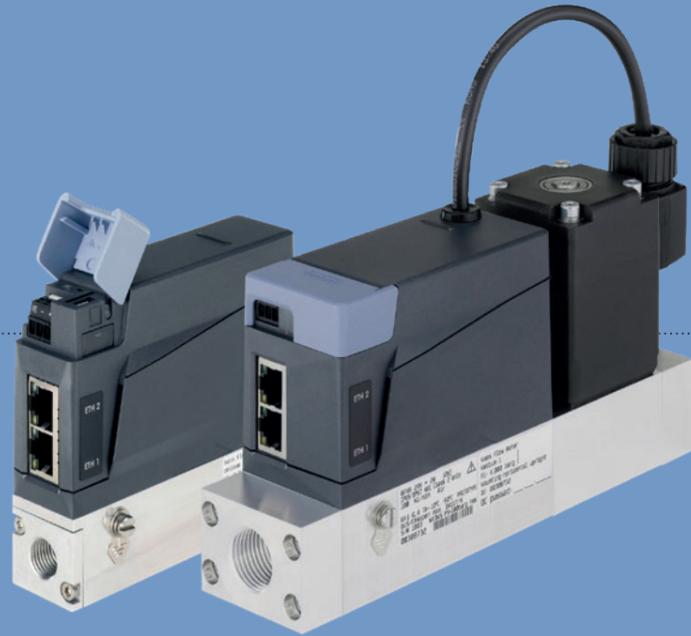
**Gas supply**

The fermentation process uses four gases: oxygen O<sub>2</sub>, nitrogen N<sub>2</sub>, carbon dioxide CO<sub>2</sub> and air. To ensure optimum product growth, control of these gases must also be optimised.



**Fermentation** is used in biotechnology to describe the conversion of biological materials with the help of biocatalysts (e.g. enzymes or cells) and optimum temperature conditions.

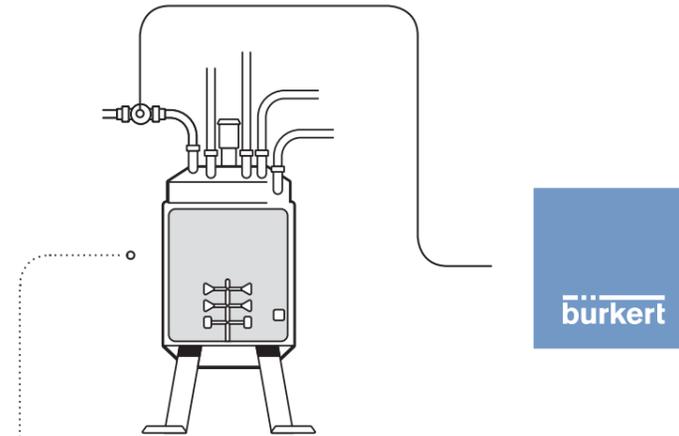
**/ Precise gas control / With mass flow controllers (MFCs) by Bürkert, the fermentation process is reproducible. With their help, you can adjust the flow rate automatically and repeatably. The devices conform to USP Class VI, FDA and can be supplied with acceptance test certificate 3.1. In contrast to the measurement with variable area flowmeters using needle valves, they guarantee high quality and identical processes. Thanks to the high turn-down ratio, you can control very small to large gas flow rates with extreme precision.**



Mass flow controllers  
Type 8741 and Type 8745  
Ethernet

**Available interfaces:**

- Industrial Ethernet: PROFINET, EtherNet/IP, EtherCAT, Modbus TCP
- Fieldbus: CANopen, RS485/Modbus (Type 8713) as well as PROFIBUS-DP (Type 8711) via a gateway
- Standard signals: 0/4 ... 20 mA, 0 ... 5/10 V (switchable)



**Biocompatible**



MFCs by Bürkert are biocompatible and conform to USP Class VI. This offers guaranteed process reliability to you, the manufacturer.

**Reproducible**



MFCs make your processes reproducible with precise and repeatable accurate sensors and proportional valve technology.

**Good to go**



With the MFCs, you can rely on compact components that are ready for immediate use. Rapid start-up is possible thanks to simple wiring and configuration.

**Scalable**



High turn-down ratio (> 100:1) allow instant adjustment of gas control to the respective process stage.

**Precise**



Direct-measuring thermal and direct-acting proportional valves make the Bürkert solution ultra-precise and ensure swift response times.

**High quality**



High-quality materials are used during production to guarantee reliable product quality.

**Available**



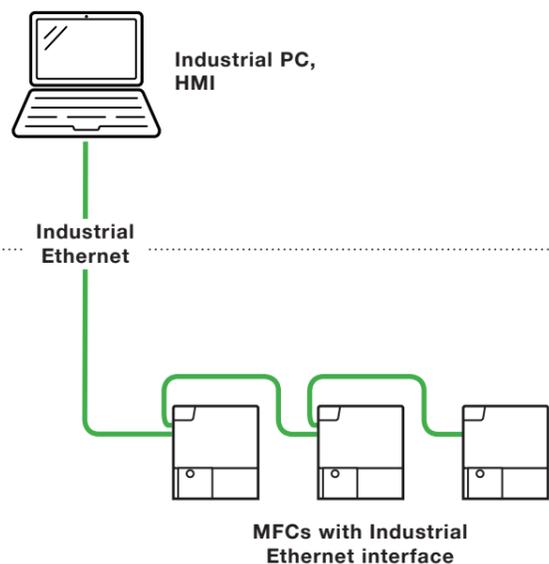
The process data is permanently available, which enables 24/7 control and monitoring of the fermentation process.

**Traceable**



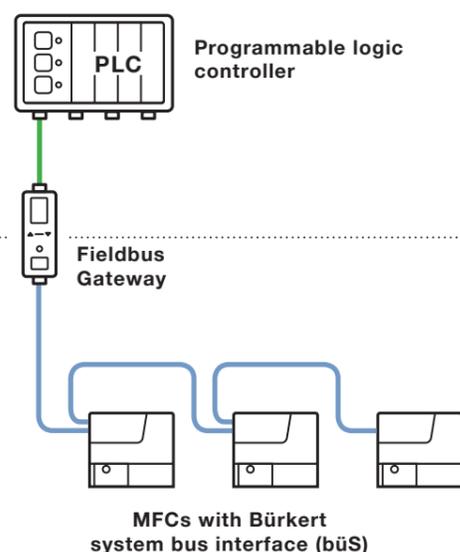
Bürkert products conform to acceptance test certificate 3.1, which means that the origin of the stainless steel used can be clearly documented and clearly traced.

**/ Simple to integrate /** No matter which communication standard you happen to use, the MFC solutions can be easily and flexibly integrated in your existing interfaces.



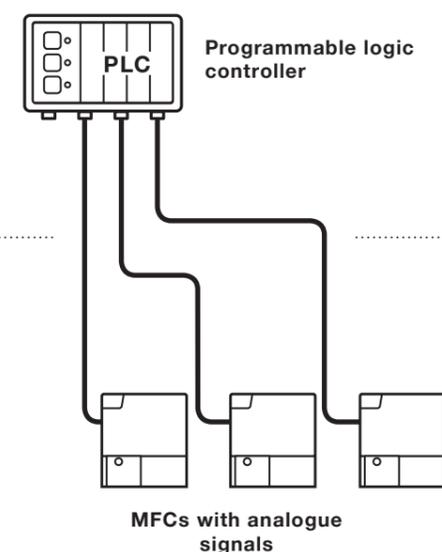
**Ethernet concept:** MFCs are connected using an integrated Industrial Ethernet switch directly at primary visualisation level.

Connection via Ethernet guarantees direct access to the field devices. No additional modules are required.



**Bürkert system bus concept:** MFCs are connected by the CANopen-based bÜS interface to the Bürkert fieldbus gateway.

This solution is suitable for applications using a large number of gas flow control circuits. Start-up is simple: Preconfigured MFC systems are available on request and can be connected using just one gateway to the PLC. Digital communication gives you permanent access to the status of your devices.

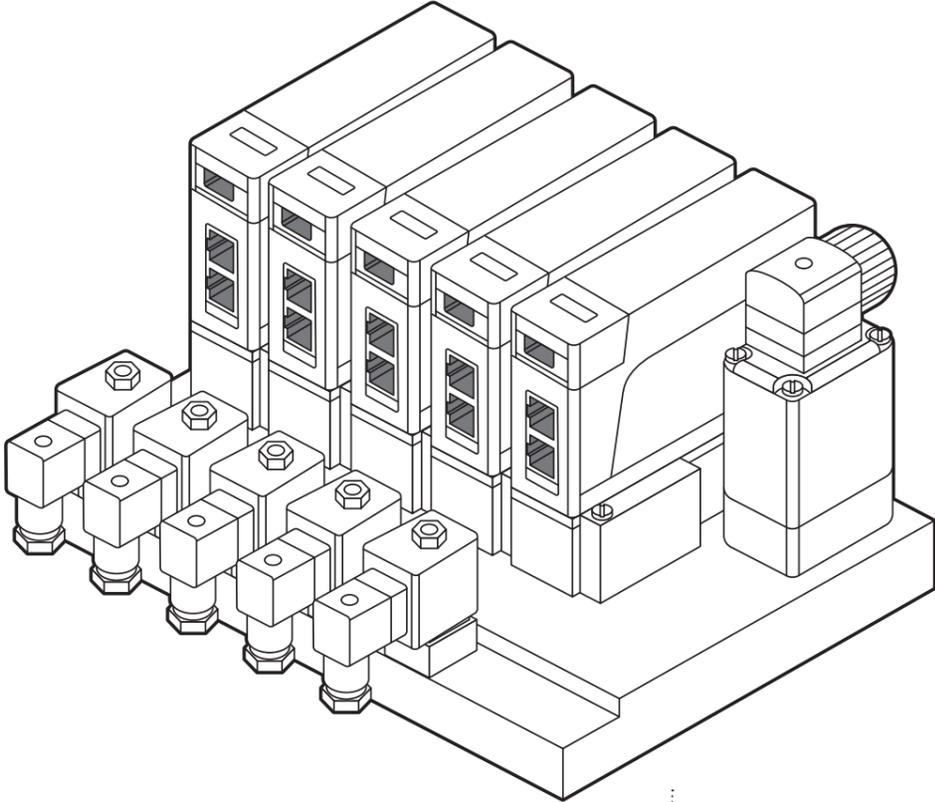


**Standard signal concept:** MFCs are connected via analogue interface to existing I/O system.

If you connect the MFCs via analogue standard signals, you can continue to use your existing automation concept. An added benefit: You can easily adapt the concept to the number of MFCs required.

**/ Plug-and-Play systems / Why install individual MFCs if you can have a bespoke complete solution directly? To suit your exact specifications, we will assemble your gas mixing unit – saving you time and expense. The compact unit consisting of mass flow controllers and valves in a space-saving configuration can be integrated in your systems in no time at all.**

**Modular gas mixing units - customised**  
You profit many times over from plug-and-play system solutions: There is no need to order, store and fit individual parts. You also save on the work associated with checking tightness, electrical function and pressure resistance. And you receive compact and user-friendly systems.





**Flow control**