Diffusion Bonded Manifolds: Precise fluidic solutions for laboratory and medical technology

Plastic manifolds with multi-channel structures in a small installation space for customised applications

24. February 2026

Responsible according to press law:
Christian Österle

Download/View press release and press images.

Compact, customised manifold plates for precise fluid control: Diffusion Bonded Manifolds enable individualised, contamination-free fluidic solutions using an adhesive-free joining process. The technology complements existing standard components and is aimed in particular at applications in medical technology, diagnostics, laboratory automation and food analysis.

Since acquiring the technology from the British company Carville in 2024, Festo's product portfolio has also included diffusion bonded manifolds. The manifold blocks produced in this way are particularly suitable for customised solutions when little installation space is available and gases or liquids need to be distributed without contamination. They represent a technical alternative to conventionally tubed or machined fluidic assemblies.

Advantages and key points of the technology:

- **High integration density:** Multi-channel structures in a small installation space without unnecessary dead volumes enable compact and efficient system designs.
- **Combination with other components:** Bonded manifolds can be combined with media-separated valves from Festo such as VYKA, VYKB and VYKC and other standard components to develop functionally integrated fluidic modules. This reduces the assembly effort and the number of external hose connections.
- **Process reliability:** Precisely manufactured channels and reduced sealing points increase reliability and ensure optimised flushability.
- **Customisability:** Individual, complex channel and 3D geometries as well as interfaces can be developed on a project-specific basis and enable easy integration into customer-specific systems.
- **Manufacturing process:** Diffusion bonding is an adhesive-free joining process that joins several layers of plastic to form a dense, multi-layer duct block with high precision. The process reduces leakage points and enables reproducible, compact duct geometries.
- **Materials:** Typical materials are highly transparent or technically high-performance plastics such as PMMA (acrylic) and PEI (Ultem).
- **Other types of manifold plates:** Festo also offers simpler distributor plates made of aluminium, stainless steel and plastics as a more cost-effective variant, for example for media supply in dental units

Relevant industries and typical applications

- Medical technology and laboratory automation: point-of-care devices, sample preparation, dialysis systems, reagent management, distribution and switching functions in analysers.
- Diagnostics and life sciences: lab-on-a-chip, assay and liquid handling automation, sample distribution in analysis systems.
- Semiconductor, food and chemical industries: Applications that require compact, tight fluid interfaces and reproducible flow control.
- In addition to the transport of liquids and gases, there are also other possible applications with compressed air when lightweight, small-scale solutions are required, for example in end-of-arm applications.

Customer application: Drug testing

The Latvian company Cellbox Labs uses bonded manifolds from Festo to develop a technology that enables automated drug screening. These tests are used to test the efficacy and potential toxicity of active substances on human-like cells. In combination with disposable cell cartridges, the manifolds enable precise control of the liquid supply. "Festo's manifolds provide us with seamless, contamination-free fluid delivery, which contributes significantly to the accuracy and efficiency of our instruments," says Roberts Rimša, CTO of Cellbox Labs.

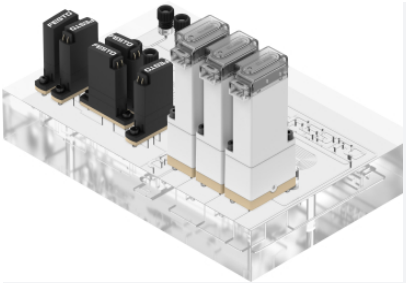
Festo as a partner for customised life science solutions

In addition to an extensive catalogue portfolio, Festo also develops a wide range of customer-specific automation solutions that are precisely tailored to the requirements of laboratories, diagnostics and bioprocess applications: from precise liquid and gas dosing to scalable, modular systems. With the help of the product portfolio of pneumatics, electrics, software and AI, Festo's experts develop the perfect seamless automation solution together with the customer.

Customers benefit from in-depth application expertise, co-engineering and validated subsystems that shorten time-to-market and increase the quality of the customer application.

Festo provides reliable global supply chains, industry expertise and certified quality to fulfil requirements such as precision, cleanroom suitability and compliance.
Further information: Customised automation solutions for life science | Festo EN

Press Images



Diffusion Bonded Manifold

Bonded manifolds can be combined with media-separated valves from Festo such as VYKA, VYKB and VYKC and other standard components to develop functionally integrated fluidic modules. This reduces the assembly effort and the number of ...

About Festo

Festo is a global player and an independent family-owned company with headquarters in Esslingen am Neckar, Germany. Festo has set standards in industrial automation technology and technical education ever since its establishment, thereby making a contribution to

sustainable development of the environment, the economy and society. The company supplies pneumatic and electrical automation technology to 300,000 customers of factory and process automation in over 35 industries. Digitalization, AI and the LifeTech sector with medical technology and laboratory automation are becoming increasingly important. The products and services are available in 176 countries. With about 20,600 employees in over 250 branch offices in around 60 countries worldwide, Festo achieved a turnover of around €3.33 billion in 2025. More than 8% of this turnover is invested in research and development. In this learning company, 1.5 % of turnover is invested in basic and further training. Festo Didactic SE is a leading provider of technical education and training and offers its customers worldwide comprehensive digital and physical learning solutions in the industrial environment.