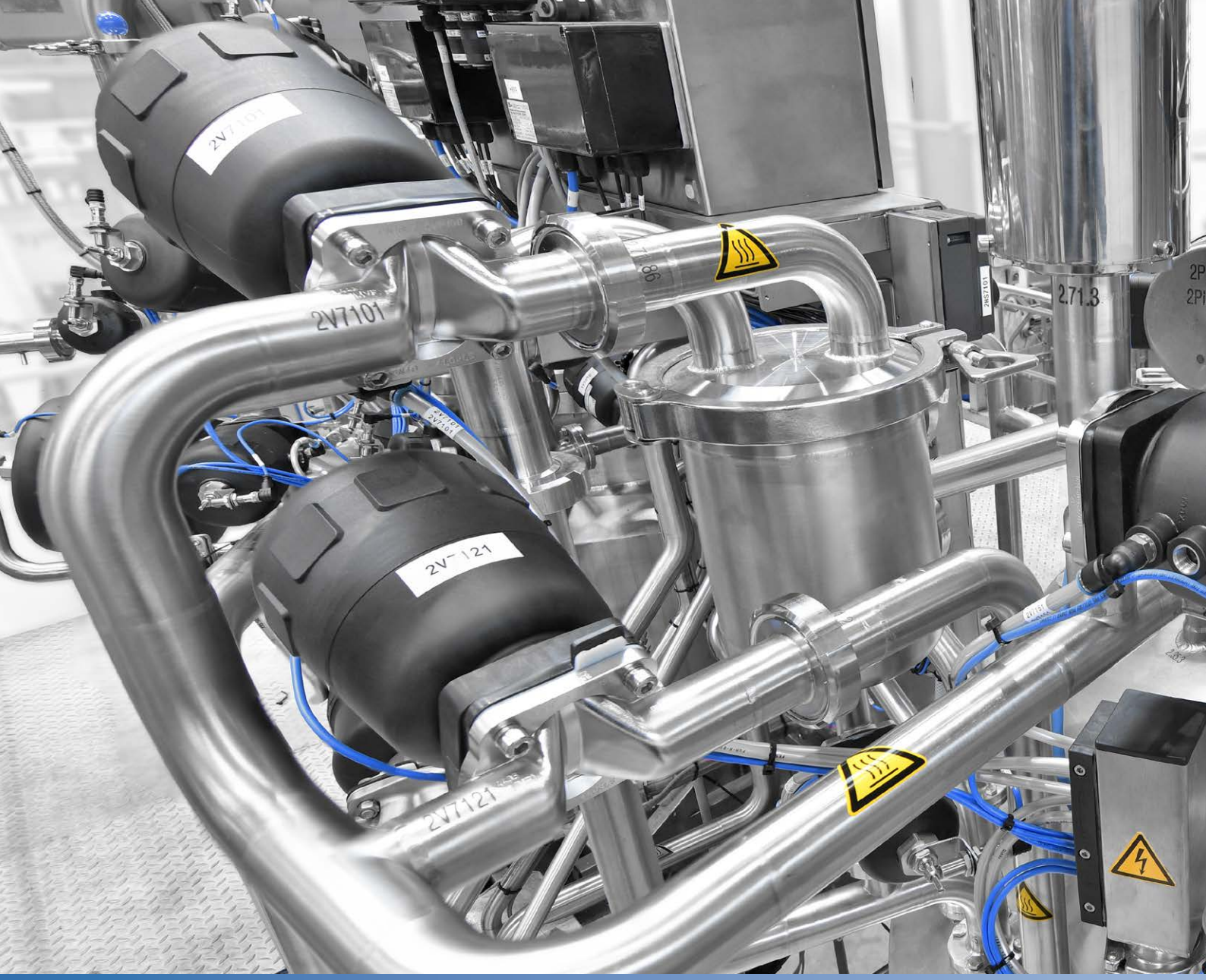

symex

Lightweight valves for efficient ointment production

We make ideas flow.

bürkert
FLUID CONTROL SYSTEMS

Diaphragm valves in a tube valve body

Diaphragm valves in particularly lightweight tube valve bodies save energy and operating costs in SIP processes and increase system availability. The system manufacturer symex, for example, uses them in innovative mixing systems for pharmaceutical products, where the focus is on maintaining the highest standards of quality, efficiency and sustainability.

Diaphragm valves are indispensable in the production of pharmaceuticals, cosmetics, food and beverages, especially when it comes to sterile processes or pharmaceutical applications. However, the diaphragm valves with conventional forged or cast bodies that are most commonly used in this context not only consume a lot of energy during production, but also require large quantities of expensive pure steam in SIP processes. At the same time, the production time is reduced because the bodies heat up and cool down slowly due to their high thermal mass. Innovative, significantly lighter tube valve bodies are a practical alternative in this case: for example, in mixing systems for pharmaceutical creams and ointments.

Sustainable processes for process engineering systems

Bürkert has been working intensively for many years on optimising body technology for diaphragm valves in order to enable more sustainable processes in process engineering systems. Today, its tube valve bodies (TVB) are already in their third generation on the market and, thanks to application experience, have been perfectly adapted for use in the pharmaceutical, food and cosmetics industries. With no weld seams in the diaphragm media area and outstanding surface quality, the Type 2103 diaphragm valves, which feature an ELEMENT actuator and control/feedback head, are now more than a technological match for conventional forged steel valve bodies. They comply with the industry's demanding regulations and, most importantly, can make a significant contribution to reducing operating costs and increasing available production time. They have now proven this in numerous applications – and this ultimately helped to persuade the system manufacturer symex that they were the right choice. As a manufacturer of mixing and homogenising systems with state-of-the-art and groundbreaking technologies to ensure maximum efficiency, flexibility, reproducibility, quality and process reliability, symex considers cutting-edge components such as Bürkert diaphragm valves to be an essential part of creating a successful overall concept.

For a Central American pharmaceutical manufacturer that wanted to expand its production capacity, symex was given the task of building a new, efficient mixing system for liquid to semi-solid creams and ointments that are subject to FDA regulations and GMP compliance requirements. The system was using mostly diaphragm valves, and symex quickly came across tube valve bodies during its market research.

About symex

Symex GmbH & Co. KG is one of the world's leading companies in customised system engineering for complex vacuum, mixing and homogenising systems in the cosmetics, pharmaceutical, chemical and food industries. As a technology leader, symex offers complete turnkey solutions for the precise homogenisation, mixing and tempering of demanding liquid and solid products. It incorporates useful digitalisation concepts to enable efficient and sustainable production – today, tomorrow and beyond. Worldwide, more than 1,000 symex systems produce products such as creams, make-up including mascara and bronzer, and pharmaceuticals such as toothpaste, ointments, cough syrups, eye drops and infusion solutions for renowned brands of leading manufacturers.

At its headquarters in Bremerhaven, Germany, symex employs around 130 people, who have been passionately committed to the development and implementation of first-class mixing systems since 1997. With strong international partners by its side, symex is also able to offer a tailor-made service – in person and in any location.

Diaphragm valves in pharmaceutical system engineering.

Weight advantages that pay off

- More sustainable production
- Reduced carbon equivalent footprint in the manufacturing process
- Increased system productivity thanks to reduction in idle times (faster heating and cooling processes)
- Easier to transport and install
- Significantly simplified design and installation in system construction, as additional supports are often eliminated
- Lower thermal mass than conventional forged and cast variants (the larger the nominal diameter, the more significant this is)

For example, with a 2-inch valve (nominal diameter 50) that is installed multiple times in the mixing systems, the weight can be reduced by up to 75%. This means that the bodies heat up and cool down more quickly, which has a positive impact on operating costs because it results in significant savings in CIP/SIP processes. The more often cleaning is required, the more the user benefits.

Less stress on the diaphragms

The lower weight of the diaphragm valves has another outcome: faster heating and cooling reduces the thermal stress on the temperature-sensitive diaphragms. As a result, they last significantly longer than is standard for other body designs. Depending on the application, they can even achieve a service life that is more than doubled, significantly extending the necessary service cycles.
The two mixing systems that symex has supplied to the Central American pharmaceutical manufacturer have a capacity of 600 and 6,000 l respectively, and have been perfectly adapted to suit products with a creamy paste consistency. A total of 221 diaphragm valves with nominal diameters from 15 to 50 are installed in them; these are exclusively versions with lightweight tube valve bodies. “We also use Bürkert diaphragm valves for larger nominal diameters”, adds Schult. “In those cases, however, we use conventional body technology because TVBs were only available up to nominal diameter 50 until recently.” TVBs are now available up to 4” ASME (nominal diameter 80).

The tube valve body helps in the design of lighter systems and more sustainable processes in the pharmaceutical, food and cosmetics industries.

The two mixing systems that symex has supplied to the Central American pharmaceutical manufacturer have a capacity of 600 and 6,000 l respectively, and have been perfectly adapted to suit the application.

Insight

Tube forming process

A piece of tube as a body

The diaphragm valve bodies are manufactured using the tube forming process, also known as hydroforming. This means that a metallic tube is formed into the valve body in a closed tool using internal pressure over several steps, including heat treatment. The advantages of the procedure are obvious: for example, the same tube materials used in the system can be used for the hydroformed valve body. There is no longer a need for any installation or welding operations of the kind that are required for a half-shell structure, and the body weighs barely more than a tube of the same length. The high precision and repeat accuracy in production are other advantages of the process. The excellent product quality that results from this is essential; ultimately, the diaphragm valves need to function reliably during subsequent operation in order to ensure process reliability in the application. This naturally also includes consistent documentation during the manufacturing process and certification for the area of application in question.

The tube valve body is available in different nominal diameters, always based on the principle that the body is made using a piece of tube.

symex
mixing technology

"We have been working with the fluidics experts for several years and value their expertise and technically sound advice. What convinced us and our customers most about the TVB was its weight advantage."

Joachim Schult, project manager at symex

Source: symex

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