

Bürkert Fluid Control Systems

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bürkert
FLUID CONTROL SYSTEMS

SUCCESS STORY

Bürkert < > BioSystems S.A.

Achieving more together – cooperation between specialists leads to added value and cost savings in clinical diagnosis

Washing unit of analysis instrument



Added value and cost savings in clinical diagnosis

Since the early 1980s the Spanish company BioSystems S.A. has been developing and producing dependable analysis instruments for analysis labs throughout the entire world. A young and highly qualified team at the company headquarters in Barcelona is responsible for the research and development, manufacture and marketing of an entire range of analysis instruments for medical applications. With systems that are tailored exactly to customer requirements BioSystems pursues the goal of making a substantial contribution to human health.



Bürkert valves are also used in the production of analysis instruments



The system developed by Bürkert (right) is modular and used in different analysis instruments (left)



Blood analysis on a high level

Smart efficiency – that is the motto under which the company developed a new biochemical analysis instrument with the name BA400, which is used for clinical analysis of blood samples in human medicine and which, with the help of an LED-based optical light system, can perform clinical chemistry and turbidimetric analyses, or cloudiness measurements. In close cooperation with the Bürkert Systemhaus, a modular, custom solution was developed for the dosing of liquids needed for analysis in the new device; this solution can also be used in other systems of the Spanish manufacturer.

The cooperation between BioSystems and the Ingelfingen-based fluid specialist has already existed for several years. Prior to the new development Bürkert supplied a multitude of different components for various analysis systems of the manufacturer. Numerous single components, however, result in increased costs for procurement and maintenance. The focus of development at BioSystems is not only on reliability and precision – indispensable requirements in clinical diagnosis – but also on cost efficiency and flexibility. The new BA400 analyser is therefore designed for high performance and optimal cost expenditure. To save costs and optimise processes, BioSystems engineers thought about the development of a universal modular dosing unit that is suitable not only for the new system, but also for all analysis devices of the wide-ranging portfolio.

A significant technological challenge, since the entire dosing unit consists of five integrated components: the injection unit, two or three valves, a pressure sensor and a filter on a transparent injection moulded element. Depending on the analyser version, differing numbers of dosing units are needed. For this reason it quickly became obvious that the new solution had to have a modular design, to allow single or multiple use. Another requirement in the area of microfluidics, or the control of fluids, is very high dosing precision in an extremely compact space. The BioSystems engineers therefore decided to take advantage of the extensive knowledge and expertise of Bürkert Fluid Control Systems and to work in cooperation for this new project. The company placed its confidence in the cooperation partner from Germany with the goal of leveraging synergies. The newly developed dosing unit represents a one-for-all solution that allows variation in the number and function of the valves used. It is also possible to implement versions with or without a pressure sensor, so that BioSystems can use the new dosing unit in every analysis device. The solution developed by the two partners is also more reliable and more economical than previous systems.

The dosing unit forms one of the cores of the new BA400 analysis device, which is used for in-vitro diagnosis. The user has to simply equip the analyser with the corresponding samples and reagents. The device then performs the fully automatic analysis of up to 400 tests per hour. The new device also features lower water and material consumption. This allows the analyser to operate eight hours continuously without having to fill or empty the containers.



The washing process within the instrument is essential and realised by the Bürkert system (right)



“Despite the new challenges and difficulties normally occurring with innovative developments, the two partners succeeded together in working out a forward-looking solution.”

*Francesc Grau
(Mechanics Manager, BioSystems)*

Innovative ideas flow into a customised solution

For precise and reliable measurement, regulation and control of the flow rates in the new dosing unit, BioSystems took advantage of the entire experience of the Bürkert Systemhaus. Both companies have high core competences in their respective fields. But it was the combination of their specific competences that allowed them to implement a unique and innovative solution for this high-level dosing application. A very important aspect for the Spanish engineers was Bürkert's willingness to listen carefully and to respond by developing a solution in accordance with the exact requirements of BioSystems. Bürkert offers both an extensive spectrum of standard products and corresponding experience in the design of system solutions, which made Bürkert a clear choice as suitable partner for BioSystems.

The new development is based on Type 0127 (2/2- or 3/2-way solenoid valve) and the direct-acting media separated 3/2-way Twin Power rocker solenoid valve Type 6628 from Bürkert. Both valves feature rocker technology, which ensures not only a complete back pressure tightness, good flushability and a low internal volume, but also precise switching of micro volumes with minimal temperature rise through the coil. Due to complete fluid separation, these valves can be used for aggressive media. But the fluid specialist supplied more than just the solution for the control of fluid flows.

An essential function in blood analysis is the detection and prevention of air bubbles, which can substantially corrupt the results of the analysis. Bürkert therefore avoided rough surfaces, dead

zones and sharp edges in the design of the dosing unit. A special challenge was the customer's requirement for a transparent window for visual inspection, to be placed in front of the dosing unit and beneath the structure with the valves and pressure sensor. Bürkert developed an injection moulded part with a very high surface quality and no sharp edges in the area of the dosing unit.

In each stage of the project Bürkert contributed its comprehensive experience with a high degree of commitment to find the decisive solution. Despite the new challenges and difficulties normally occurring with innovative developments, the two partners succeeded together in working out a forward-looking solution. The new one-for-all dosing unit can now be used in more than one analysis device. Large quantities mean lower manufacturing costs, so that in the end both partners benefit from the solution that was found: BioSystems due to a low-priced, universal component; Bürkert due to the larger order size from the Spanish blood analysis specialist.

In addition to the innovative technological developments, the new analysis device features a convincing formal design and visual properties. “The BA400 impresses with its dynamic curved lines, a compact and self-contained form as well as sustainable environmental properties” – that was the conclusion of the jury that awarded the device the 2014 red dot award for outstanding product design.