

WE LEARN FROM YOU EVERY DAY –
AND THINK OUTSIDE THE BOX.

Precise media control in laboratory applications

For safe and reliable analysis in In-Vitro Diagnostics

When it comes to dealing with liquids and gases, Bürkert has become a sought-after partner all over the world. Why? Probably because we have been learning for and from our customers for more than 70 years now. This enables us to always think that crucial step ahead and around the bend.

For your added value. Let us prove it to you – we look forward to your challenge.

We make ideas flow.

bürkert
FLUID CONTROL SYSTEMS

Bürkert Fluid Control Systems

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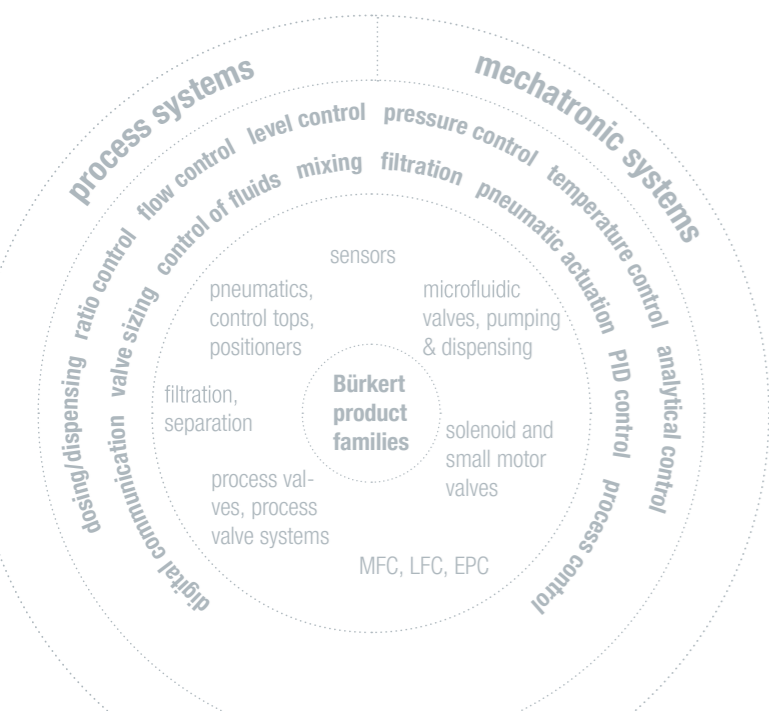
www.burkert.com

WE SPEAK YOUR LANGUAGE. FLUENTLY.

We love a good challenge. That is because we are simply fascinated by everything that flows. No matter if our customers require solutions for measurement, control or both – we always find unconventional ways of developing individual solutions.

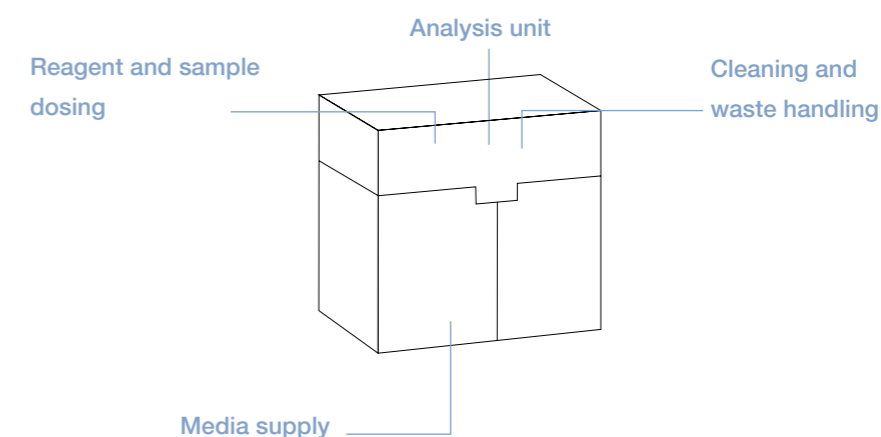
Whether it is about flow, level, pressure, dosing, analysis, filtration, temperature, mixing or the automation of processes – liquids and gases have to be measured and controlled. These are the fundamental fluidic variations upon which industrial process technology is based, and Bürkert's specialty with its expertise and entire range of solutions and services.

What makes us special? At Bürkert, we start with your fluidic challenge and draw on the basic physical principles. This way we make use of the fluidic relationships and our experience with physics, duplicating them across the most diverse applications and industries and hence solving the same or similar challenges. You in turn benefit from a deep pool of expertise, which we accumulate from multiple industries and apply individually to your needs. For the ideal solution to your specific challenge.



A SYSTEMATIC APPROACH TO RELIABLE LABORATORY APPLICATIONS

A variety of systems and components are used to precisely control, regulate and measure fluids and gases inside laboratory devices. Bürkert supplies and develops suitable components and systems for various applications. Complete solutions are also possible to ensure that everything, from your media supply to your reagent and sample dosing, as well as the analysis unit, cleaning and waste handling, is under control.



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MEDIA SUPPLY IN LABORATORY EQUIPMENT FOR MORE EFFICIENCY

To ensure the efficiency of analysis processes, the various laboratory devices require a continuous supply of various fluid and gaseous media. These are distributed to the relevant process units of the device, based on certain parameters such as pressure, flow rate and particle content. Bürkert products and solutions control the supply and distribution of media reliably – using components and systems that combine valves, pumps, sensors and filters.

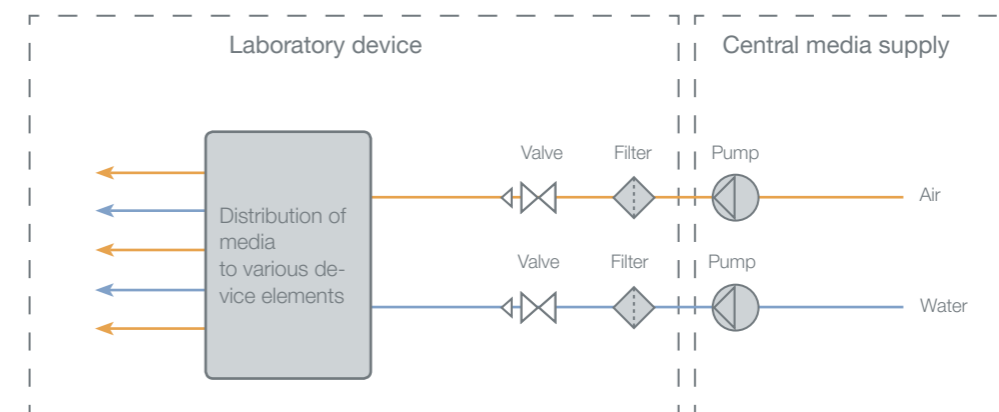
YOUR BENEFITS

- Integrated safety features to protect the device and supply source
- Design in accordance with standards and directives to provide maximum safety
- Compact system: Multiple functions combined into a single unit

A BIG SUPPLY IN A SMALL SPACE

The media supply ensures that adequate amounts of fluids and gases are distributed inside laboratory devices. Bürkert solutions represent the interface between the external media supply and the device. It is essential that the

defined parameters such as pressure, temperature and flow rate be maintained. Flawless coordination between the individual Bürkert components ensures that processes run perfectly.



Type 7615
Micro-dosing unit

- Diaphragm pump with active inlet and outlet valves, bidirectional with autonomous intake
- Precise dosing of minimal amounts of fluid with high dosing precision and reproducibility ($\pm 3.5\%$)



Type 6624
TwinPower
Rocker valve

- Optimised size-to-performance ratio enables ideal use of building space
- Equipped with gas-impermeable diaphragm that isolates the medium and actuator from one another, thereby protecting both



Type 6628
Rocker valve

- The 3/2-way valve enables high flow rates
- The established rocker technology provides absolute back-pressure leak-tightness



Type 0330
Pivoted armature
Solenoid valve

- Achieves high flow rates with an orifice of up to 5 mm
- Increased safety thanks to maintenance-free pivoted armature technology

TIME-PRESSURE DOSING FOR MORE PRECISION

To achieve reliable measurement results in a laboratory environment, the exact dosing of samples, reagents and cleaning agents is essential. This is why time-pressure dosing can be ideal for you, as it enables individually and precisely adjustable dosing volumes over a defined period.

Bürkert micro-valves are designed to maintain dosing speeds and precision and can guarantee a high level of reproducibility and repeatability. The dosing volume is individually adjustable and provides the user with greater flexibility in the dosing process.

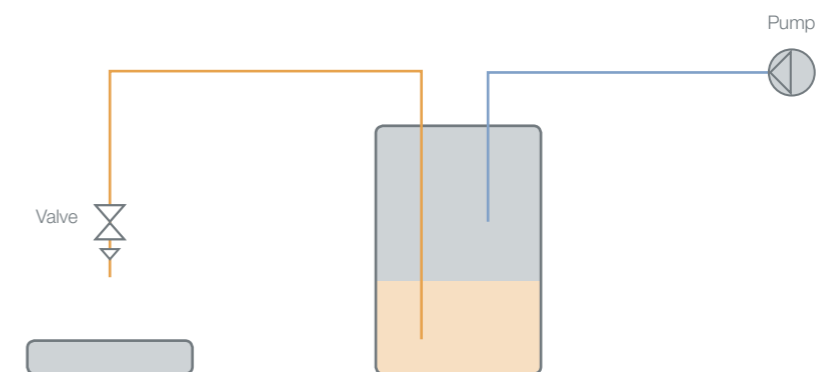
YOUR BENEFITS

- Expert advice thanks to many years of experience in microfluidic dosing
- Broad selection of suitable components of the highest quality
- Precise regulation with high switching frequency
- Components with long life cycle and excellent cleanability
- Flexible dosing processes, adapted to your application

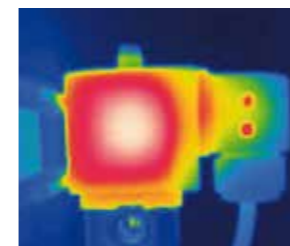
SPEED AND PRECISION FOR EXACT DOSING

With time-pressure dosing, the interaction between the pressure pump and valve allows for precision in dosing processes. Air is pumped into the container, creating pressure that transports the fluid to the valve. The valve opens

and closes at defined intervals, allowing precise dosing of medium via dosing needle. For such an application, Bürkert offers not only all standard products but will also develop appropriate complete systems, made to order.



SPECIAL ADVANTAGE



A coil always heats up during operation. To protect the medium from this heat, Bürkert valves are media separated, which means the coil and fluid chamber are separated by a diaphragm, which isolates the medium. In addition, the valves are available with integrated power reduction to reduce the heat output of the coil even more.

PRODUCTS & SYSTEMS FOR YOUR TIME-PRESSURE DOSING



Type 6650 Flipper valve

- Very fast and precise switching increases repeatability of dosing
- Enhanced safety thanks to extremely long life time of up to 200 million switching cycles



Type 6712 WhisperValve - Plunger with isolating diaphragm

- Ideal for installation in extremely small spaces or on moving parts
- Silent switching for a more pleasant laboratory working environment



Type 6724 WhisperValve Rocker valve

- Reliable media separation ensures high resistance to chemicals
- Excellent rinsability prevents cross-contamination
- Reliable dosing at high switching frequency



Type 6144 Flipper valve

- Precise and fast switching enables high reproducibility
- Less need for maintenance thanks to extremely long life cycle of up to 500 million switching cycles



MORE EFFICIENT AND RELIABLE FILLING THANKS TO MODULAR DOSING UNIT

In pharmaceutical filling systems, the continuous and reproducible dosing of defined volumes is essential, because a lack of precision can not only severely impair the quality of the product but also cause production downtime and the high costs that this entails. The speed of the filling process also affects the overall efficiency of the system, which is why a customer in the pharmaceutical industry trusts in Bürkert expertise for the optimisation of a filling system for pharmaceutical products.

Bürkert solution is a dosing unit that unifies four dosing stations in a single system. The unit combines hygienic requirements and an extremely compact design that includes four valves, a pressure sensor and an electronic PCB on a PEEK manifold in a single stainless steel housing. A dedicated digital interface enables the system to communicate using the global communication language of the customer and also makes it easy to adapt. This allows not only for convenient and fast data collection & analysis,

but also enables faults to be quickly detected. The bus communication enables a series of multiple dosing units to be easily combined. Because the product is shipped as a ready-to-install solution, this shortens the installation time, providing the customer with additional value.

AT A GLANCE

Application	Pharmaceutical filling systems
Requirement	Reliable and efficient dosing process, high reproducibility, hygienic design
Solution	Efficient and modular dosing unit
Added value	Precise, fast and reproducible dosing, digital communication, maximum quality and safety in order to prevent production downtime



3-in-1 manifold

- High throughput thanks to extremely short switching times
- Very long life cycle and low-maintenance
- Design of fluid channels ensures smooth flow for reagents and samples reducing shear forces



Manifold

- Enhanced safety, easier maintenance and fewer weak points thanks to less interfaces
- Solution made to order for each application thanks to surpassing expertise and experience



16-Fold pressure controller

- Ultra-short reaction times for high throughput
- Maximum process reliability thanks to low internal volumes and excellent rinsability
- Integrated I²C bus control and display



Micro-dosing unit

- Hygiene and FDA conformity
- Reduced workload during system service thanks to internal system check
- Design tailored to the application reducing complexity of assembly

DOSING WITH A SYRINGE PUMP FOR PRECISE RESULTS

In laboratory equipment, not only the media supply but also precise dosing is extremely important to avoid false test results. This is why it is important that small volumes of fluids are measured very precisely and the risk of cross-contamination is eliminated. In order to reliably satisfy these requirements, Bürkert applies its expertise and makes use of suitable components to offer solutions for precision dosing with ultra-short reaction times. The components are produced with chemically resistant material and can be individually combined for any application. Because the media can flow both through valves and through the syringe pump, all components are designed for optimum rinsing.

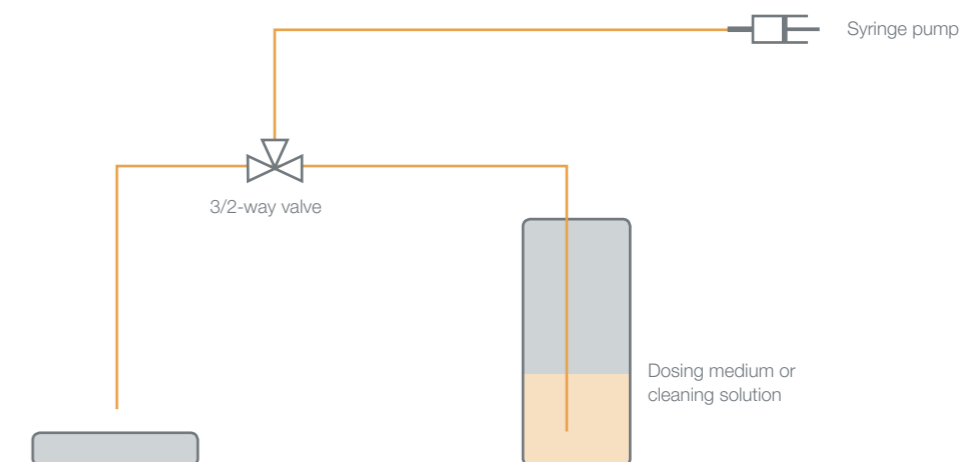
YOUR BENEFITS

- Precise dosing of low, specified fluid volumes
- Optimal rinsability thanks to product design that virtually eliminates dead volume
- Application-specific system solutions

THE RIGHT ANSWER FOR ALL CASES

For dosing using a syringe pump, the system works according to a principle of discontinuity. A defined volume of fluid is extracted in the pump cylinder by the movement of a piston and is transferred to a dosing needle in the same channel. If it is necessary to measure out a medium from a container into a cuvette, a 3/2-way valve must be posi-

tioned upstream of the pump to open the inlet or outlet channels. For dosing using a syringe pump, we do not only offer you a broad selection of components and materials, but will also be pleased to assist you with our extensive systems expertise.



**Type 0127
Rocker valve**

- Special combination of low internal volume and virtually cavity-free design
- Maximum repeatability ensures reliable dosing results



**Type 6724
WhisperValve
Rocker valve**

- Precise dosing properties ensure reliable results
- Internal volume of just 29µl and excellent rinsability ensure maximum reliability



**Type 6624
TwinPower
Rocker valve**

- Drastic reduction of installation space while maintaining performance output thanks to the TwinPower drive concept
- Excellent cleaning properties



**Type 6628
Rocker valve**

- Precise switching ensures reliable dosing properties
- Media separation enables the use of aggressive solutions

MEDIA CONTROL IN ELECTRICAL IMPEDANCE COUNTING FOR ENHANCED RELIABILITY

Electrical impedance measurement is an established method for detecting the number of blood cells in a sample. The reliability of the measurement results is greatly dependent on the media control system, which is responsible for regulating the supply and discharge of the electrolyte solution or sample. For this purpose, valves and pumps that work quickly and precisely are used. Impedance measurement enables the precise number and size of blood cells to be determined in a short time, which provides an indication of the patient's state of health. This is exactly the reason why reliable measurement is so important.

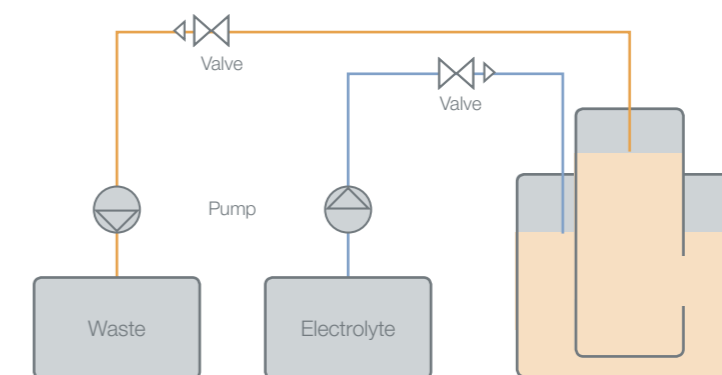
YOUR BENEFITS

- Compact system solution enables various functions to be combined into a single component
- Chemical resistance and maximum quality for low maintenance intervals
- High leak-tightness for maximum efficiency in regulating the medium

PEACE OF MIND IN ACHIEVING PRECISE RESULTS

The electrolyte solution is pumped via a valve into the impedance measurement device, into which the blood sample is introduced. Both are then passed through a cavity, small enough to permit only one cell to pass through at a time. Using an electrical field and based on the resistance

between the two measuring electrodes, the blood cells can be counted and typified, enabling not only the number of the cells but also their size to be determined. We are pleased to support you with our extensive application expertise when implementing a suitable system.



Type 6724
WhisperValve
Rocker valve

- Reliable media separation
- Excellent chemical resistance
- Excellent rinsability thanks to optimised design of fluid channels



Type 0127
Rocker valve

- Maximum reliability
- Low internal volume
- Virtually cavity-free design prevents cross-contamination
- A variety of alternative materials available



Type 6624
TwinPower
Rocker valve

- Excellent size/performance ratio thanks to TwinPower two-coil technology
- Extremely low-maintenance and reliable operation
- Excellent cleaning properties



Type 6626
TwinPower
Rocker valve

- Flow rates three to five times higher than other valves of comparable size
- Status monitoring enabled via LED for visual feedback

MEDIA CONTROL IN FLOW CYTOMETRY FOR SUPERIOR PERFORMANCE

Flow cytometry is another application for determining cell size and type. Here, blood cells in the flow cytometer are passed through an extremely narrow channel, which forces the cells to pass through individually. To ensure that this procedure can run flawlessly, a sheath fluid must be allowed to flow evenly from two sides around the cells. To ensure reliable analysis results, high-precision media control is essential - a task that Bürkert has successfully realized over many years.

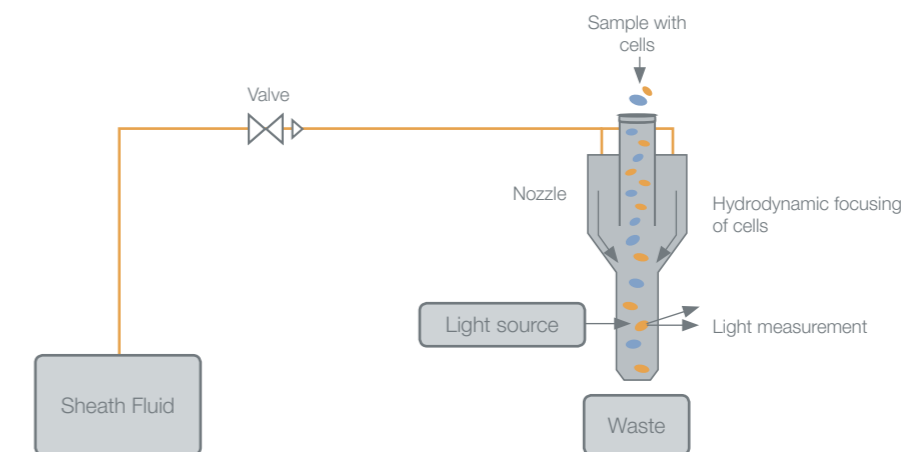
YOUR BENEFITS

- Particularly even flow through the fluid chamber enables constant encapsulation
- Optimised analysis solutions
- Chemical resistance and long lifetime of components

PERFECT FOR MEASUREMENTS

Bürkert solutions handle the supply and regulation of the sheath fluid, which is controlled as needed by a fast-switching valve. This fluid encapsulates the cells, causing them to be fed through the channel with fine precision one after the other. Once the cell size and form are determined, the used

fluid is disposed. To ensure that you benefit from optimum analysis performance in flow cytometry, Bürkert provides you with a complete solution for media control.



Type 6650 Flipper valve

- Compact size
- Very fast and precise switching
- High pressure resistance
- Extremely long life cycle



Type 6144 Flipper valve

- Compact size provides more free space in the analysis device
- Maximum quality ensures a life time of up to 500 million switching cycles



Type 6724 WhisperValve Rocker valve

- Optimum chemical resistance
- Consistent flow in fluid chamber is particularly suitable for sheath fluid



Type 0127 Rocker valve

- Maximum quality
- Low internal volume
- Optimal design, which virtually eliminates dead volume

MEDIA CONTROL FOR THE CUVETTE WASHING STATION FOR GREATER EFFICIENCY

In clinical chemistry, efficient analysis devices can be supplied with the desired samples without considerable additional effort. With over 100 glass cuvettes in a single analysis device, regular replacement is very costly and time-consuming. A cuvette wash station increases, therefore, the efficiency of a device significantly. To successfully use the cuvettes multiple times, they are washed and dried eliminating cross contamination. The precise control of the fluids also ensures that use of media and reagents is kept to a minimum. Bürkert develops customised system solutions to meet specific requirements and to provide greater efficiency in the analysis process.

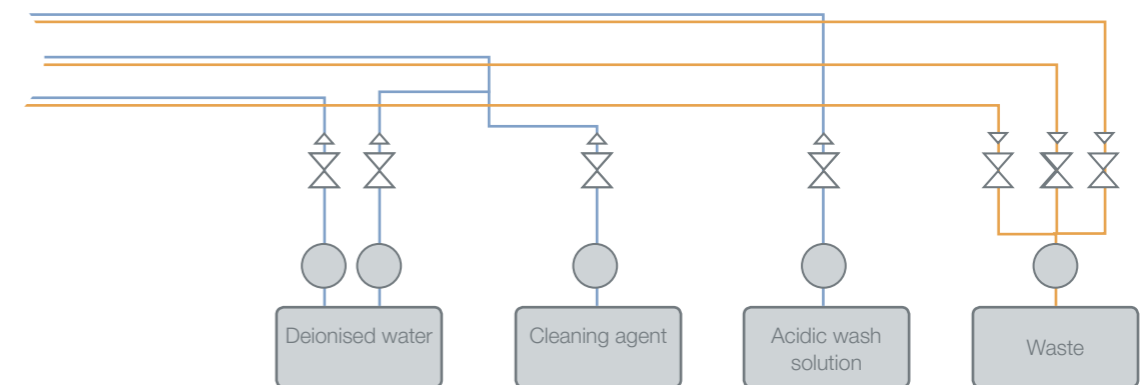
YOUR BENEFITS

- Customisable system solution
- Compact design and combination of multiple functions
- Chemical resistance: The best material, from EPDM to PEEK, for the medium being used

GUARANTEED RESIDUE-FREE CLEANING FOR RELIABLE RESULTS

During the cleaning process, the analysed solution is first removed from the cuvette using vacuum. It is then rinsed up to 15 times using a variety of fluids (water, detergent, acidic solution, alkali solution, second detergent, etc.) The valves switch with high precision and ensure that fluid consumption is kept to a minimum during the cleaning process. Once

drying is complete, the cuvette is clean, free of residues, and can be filled with a new sample again. We handle development, production, assembly and final testing for you – so that everything goes smoothly. This guarantees a customised solution with an optimised design so that all processes run reliably and efficiently.



Type 6724
WhisperValve
Rocker valve

- Reliable media separation
- Optimum chemical resistance
- Excellent rinsability thanks to optimised design of fluid channels



Type 0127
Rocker valve

- Virtually cavity-free design prevents cross-contamination and enhances reliability
- A variety of materials and fluidic interfaces are available



Type 6011
Plunger valve

- Unique combination of compact size and appropriately large orifice
- Helps reduce cost for the Waste Line



Type 6628
Rocker valve

- Optimum rinsability prevents cross-contamination
- Low internal volume with minimal media consumption
- A variety of materials and fluidic interfaces are available

MEDIA CONTROL FOR CLEANING THE DOSING NEEDLE FOR GREATER SAFETY

In laboratory testing, the precision of the analysis plays a critical role in the subsequent treatment of the patient, which is why residues in the dosing needles and contamination must be avoided at all costs. The dosing must also be highly precise and allows for no margin of error. To satisfy all of these requirements, Bürkert offers customised system solutions that precisely control the entire processes and work reliably and safely when handling the samples. The broad expertise and tested components make Bürkert a proven technological partner when it comes to media control for the analysis of blood, serum and urine.

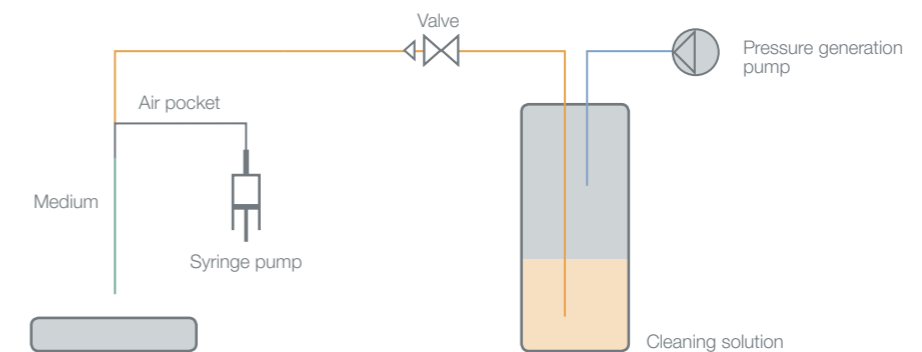
YOUR BENEFITS

- Integrated system solutions for optimised media control, distribution and dosing
- Perfected cleaning process with valves with media separation
- Maximum reliability thanks to high-quality products and 100% tested complete solutions

WORRY-FREE SAMPLE AND REAGENT DOSING

The dosing needle reliably transports the precisely defined volume of a sample or reagent and the syringe pump measures these out into a cuvette. After each process, the dosing needle is reliably purged of residues using compressed air and vacuum as well as a cleaning agent, enabling a large number of samples to be mixed and measured in rapid succession. Bürkert products and customised system solutions are excellently suitable as process com-

ponents in media control for cleaning the dosing needles. The cleaning process has been perfected with system solutions and valves with media separation, assisted by a selection of highly resistant materials. Bürkert's readiness to listen carefully and address your needs precisely before finding a solution enables you to concentrate on your most important tasks.



SPECIAL ADVANTAGE

Especially when handling biological media, it is important to prevent substances from being carried over and avoid contamination. Bürkert products offer excellent rinsability thanks to a virtually cavity-free design, optimised flow and highly precise mould design.

PRODUCTS AND SYSTEMS FOR YOUR MEDIA CONTROL



**Type 0127
Rocker valve**

- Low internal volume
- Virtually cavity-free design for excellent rinsability
- A variety of alternative materials



**Type 6624
TwinPower
Rocker valve**

- Drastic reduction of installation space without compromising on performance
- Low introduction of heat ensures minimal impact on medium



**Type 6626
TwinPower
Rocker valve**

- Flow rates three to five times higher than other valves of comparable size
- Status monitoring enabled via LED for visual feedback



**Type 6628
Rocker valve**

- Optimum rinsability reliably prevents cross-contamination
- Low internal volume with minimal media consumption



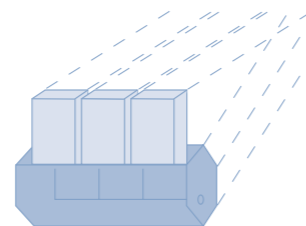
Modular system for syringe pump dosing

- Flexible and versatile system
- Reliable regulation of flow rates
- Designed to prevent and detect air bubbles



Customised valve

- Variants with specialised modifications such as
- FDA-compliant materials
 - High-pressure version
 - Extremely reduced internal volume



Your customised system solution

- Our team of experts works throughout the entire duration of the project for you
- CAD-based animations and simulations are used to validate the design even before the prototype is built
- Many years of experience with materials, mould engineering, design and production technology enable the development of a unique, customised solution



“Despite the new challenges and problems that ordinarily arise in the course of innovative developments, both partners succeeded in developing a ground-breaking solution.”

Francesc Grau,
Mechanics Manager, BioSystems

PARTNERSHIP IN CLINICAL DIAGNOSTICS FOR EFFICIENCY AND ADDED VALUE

In clinical diagnostics, reliability and precision are essential. In the development of analytical devices for In-Vitro Diagnostics laboratories, the Spanish company BioSystems S.A. also aims to maximise cost efficiency and flexibility. To meet all requirements, BioSystems has worked closely with Bürkert Systemhaus as a development partner. This gave rise to a unique customer solution for the dosing of various media, which also satisfies the highest precision requirements.

jointly developed system is also so versatile that it can be used in any model of the BA-400 analysis device, making it a genuine one-for-all solution. The result of the close partnership was a system that impressed as much with its low water and material consumption as it did with its reliability and precision.

For the BA-400 biochemical analysis device, Bürkert developed a modular dosing unit that incorporates various components: two or three valves, a pressure sensor and a filter on a transparent plastic injection unit. The fluid experts provided not only a solution to effectively control media flows, but also avoided raw surfaces, empty spaces and sharp edges in order to prevent the formation of air bubbles. A transparent window also enables visual inspection. The dosing units can be conveniently scaled, and the

AT A GLANCE

Application	Clinical diagnostics
Requirement	Dosing of reagents and samples, cleaning of dosing needles
Solution	Modular system solution with high component integration
Added value	Reliable and highly precise dosing system, flexible solution thanks to modular design, low water and material consumption

PRODUCT SELECTION TABLE

Installation width	Orifice	Max. pressure in bar														
		Vac	1	1.5	2	3	4	5	6	7	8	9	10	11	12	
		Max. pressure in psi														
		Vac	14.5	21.7	29	43.5	58	72.5	87	101.5	116	130.5	145	159.5	174	
4.5 mm	0.4 mm	6650														
	0.8 mm	6650														
7 mm	0.4 mm	6712														
	0.8 mm	6712														
9 mm	0.8 mm	6724														
	1.2 mm	6724														
10 mm	0.5 mm	6164														
	0.6 mm	6144														
	0.8 mm	6624*														
	1.2 mm	6164														
	1.6 mm	6624*														
11 mm	0.8 mm	6164														
	1.0 mm	6164														
16 mm	0.8 mm	0127*														
	0.9 mm	6106														
	1.0 mm	0127*														
	1.2 mm	6106														
		0127*														
	1.6 mm	6106														
		0127*														
	2.0 mm	6626*														
	6106															
20 mm	1.2 mm	0117														
	1.6 mm	0117														
	2.0 mm	0117														
	2.4 mm	0117														
22 mm	2.0 mm	6628														
	3.0 mm	6628														
32 mm	2.0 mm	0330														
		0121														
	3.0 mm	0330														
		0121														
	4.0 mm	0330														
	0121															
	6.0 mm	0121														
	8.0 mm	0121														

* Maximum differential pressure: 2 bar | 29 psi

Vac = Vacuum

The pressure ranges are dependent on the circuit function, power supply and materials.