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

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.

Controlling process temperatures

Modular Process Control Platform for Heating and Cooling

We make ideas flow.

bürkert
FLUID CONTROL SYSTEMS

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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.

COMPREHENSIVE CONTROL OVER PROCESS TEMPERATURES

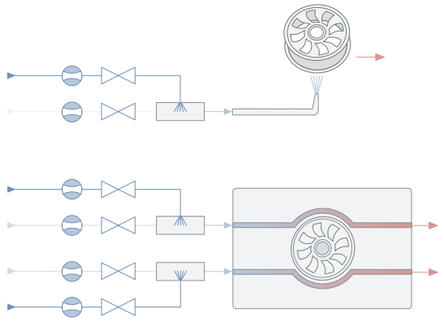
In many industrial processes, temperatures must be controlled exactly to ensure the required quality levels. Various thermal transfer media are used to cool and heat, including air, water, oil or mixtures of these substances. Process temperatures can be regulated reliably on the basis of the flow values and with the aid of an intelligent solution. To help you keep a cool head, Bürkert provides a simple and flexible solution for your industrial applications the Modular Process Control Platform for Heating and Cooling.

ALUMINIUM DIE-CASTING
AUTOMATED TEMPERATURE CONTROL

In the manufacture of aluminium pressure die-cast parts, the tool temperatures have a significant influence on product quality. And for cost-effective manufacturing, cycle times and reliability are also important factors in addition to quality. Here, automated systems are especially well placed to achieve precise temperature control with short cycle times. This necessitates highly dynamic control systems that can cope quickly and reliably with the heating up and cooling down rates of the thermoregulation process. They must be capable of controlling the process temperature by means of exactly regulated coolant quantities during cooling with water, air or a mixture of the two. The Modular Process Control Platform in the form of a process temperature control system fulfils these requirements completely, making for a game-changing simplification of cooling processes in die-casting manufacturing.

YOUR ADVANTAGES

- **Modular platform allows for flexible adaptation to customer requirements**
- **Ready to install: preassembled process control path or fully equipped control cabinet**
- **Exactly reproducible cooling profiles with the aid of coordinated valve and sensor technology**
- **Close-to-process placement thanks to compact design**



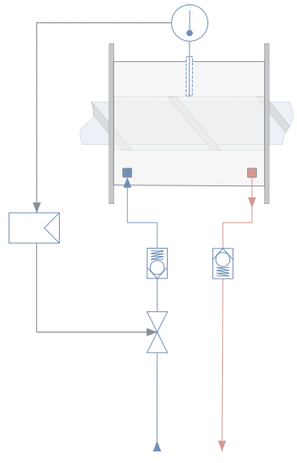
Air-water cooling for production of aluminium wheel rims

FOODSTUFFS EXTRUSION
ENSURING OPTIMAL PRODUCT QUALITY

Extrusion is the central process in the production of many foodstuffs and feedstuffs. Extruders knead, mix, cook and portion cereals, cornflakes and pasta, textured proteins, vitaminized rice and pet foods, for instance. Along with sophisticated technology and a lot of processing know-how, temperature control represents a decisive factor. To ensure that the products have a uniform quality, consistency and taste, the processing temperatures have to be carefully and reproducibly controlled. For instance, any cooking process needs to be timed very exactly. Generally, several different product recipes are involved, so the process temperature regulation also has to be flexible and it must be possible to automate it reliably. Finally, high levels of operating and product safety as well as energy efficiency across the whole process are important goals as well. The robust valve technology in the Modular Process Control Platform can fulfil these requirements in all respects.

YOUR ADVANTAGES

- **Placement close to the extruder is possible due to the compact design.**
- **High degrees of operational safety and system durability thanks to robust valve technology that can withstand back pressure stresses.**
- **Easy-to-service modular construction**



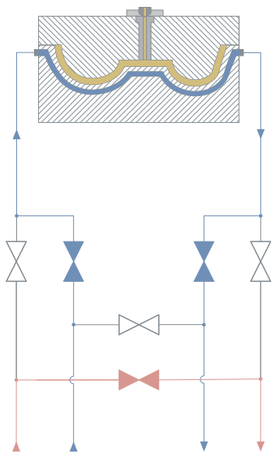
Exact temperature regulation in an extruder unit

INJECTION MOULDING
PLASTIC PARTS WITHOUT POST-PROCESSING

One of the major challenges in injection moulding is to produce parts that need no post-processing, i.e. they fall from the die ready for use. Typical examples include LCD screen frames, phone and laptop casings and similar items. An important contribution towards achieving this aim is made by variothermal control of the injection moulding tool. Only with this technique is it possible to produce plastic parts without distortion, with the right size and with high surface quality regarding gloss, haptic properties and lack of weld lines. The main temperature regulation challenge is to enable rapid changes between hot (approx. 180–200°C during the injection phase) and cooler temperatures (80 – 120°C). Of course, this should be achieved with low cycle times as far as possible. The secret is to place the valve switching station close to the tool, so the transition from hot to cooler temperatures involves only a very small exchange of water within the system. The Modular Process Control Platform meets these demands.

YOUR ADVANTAGES

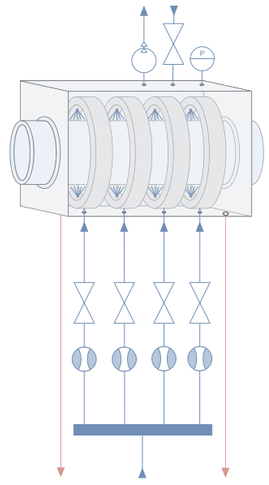
- **Compact design allowing for placement close to the tool**
- **Safety: welded, leak-free valve connections**
- **Durability: high degree of temperature resistance**
- **Reduced cycle times thanks to low internal volumes**



Variothermal, close-to-tool temperature control for injection moulded plastic parts

EXTRUSION & CALIBRATION
PROFILE ACCURACY WITH TEMPERATURE CONTROL

Extrusion techniques are now widely used in the manufacture of many products: plastic window frames, aluminium rails as brackets, cable ducts and cosmetics bottles, as well as many kinds of plates, pipes and profiles with constant cross-sections. Irrespective of whether the item to be manufactured is of metal, plastic, carbon fibres or any other material, it must have a uniform profile without either distortion or variations in the dimensions. The decisive factor in achieving this involves maintaining the correct process temperatures exactly and in a reproducible manner. This is where the Modular Process Control Platform is at a clear advantage. As a complete process temperature regulation system, this solution automates the controlled heating of the extruder sections and targeted cooling in the subsequent calibration stations. This allows highest levels of quality to be achieved in a straightforward way, because the number of cooling points and nozzles can be varied, and each can be equipped with a dedicated, decentralized control unit.



Controlled cooling and vacuum calibration of extrusion profiles

YOUR ADVANTAGES

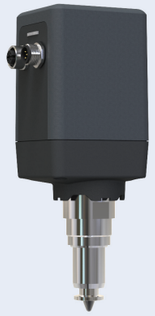
- **Reliable and safe – leak-free construction**
- **Can be adapted to the required cooling circuits through modular design**
- **Highly dynamic temperature control thanks to compact design**
- **Ready to install: preassembled process control path**
- **Easy to service: preset parameters and pretested control paths**

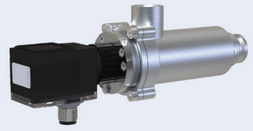
MODULARITY TO SUIT YOUR CONTROL TASK

In many applications, exact temperature control of industrial processes is vital. And depending on the current ambient conditions, the demands made on the temperature regulation systems vary considerably. The Modular Process Control Platform from Bürkert is well able to meet these requirements in all respects, and it can be ideally adapted to suit your process. Whether your control system is to be powered electrically, pneumatically or manually – a tailored actuation and control system (on/off or continuous) is available. It is also no problem to replace the actuators as required. Last but not least, the modular platform for process control covers a range of measurement techniques: for coolant flows (ultrasound and paddle wheel), air volumes (thermal sensor) as well as pressures and temperatures. All sensor variants deliver reliable measurement values and can easily be integrated into your system, irrespective of the application.

YOUR BENEFITS

- Modular design for creating valve nodes for collecting and distributing functions according to your requirements
- No installation work needed for piping between the valves
- Minimal dead volume thanks to compact design and close-to-tool placement of the Bürkert valve block
- Increased energy efficiency through reduction of heat dissipating surfaces
- Easy to service design thanks to fast replacement of individual components
- Increased precision through leak-free construction using orbital welding seams and high-temperature graphite seals that can withstand even extreme temperature fluctuations





PROFINET®

PROFIBUS®

CANopen

EtherNet/IP™

ACTUATOR VARIANTS

Electromotive

Pneumatic ELEMENT

Pneumatic CLASSIC

Manual

SYSTEM VARIANTS

Housing element

Multi-channel solution

Single-channel solution

SENSOR/CONTROLLER VARIANTS

Flow (ultrasound) 0.1 – 60 l/min

Flow (paddle wheel) 0.8 – 200 l/min

Mass flow (air) 0 – 250 Nm^3/h

Pressure

Temperature

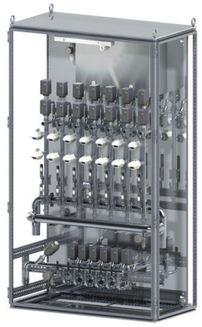
Process control

COMMUNICATION

SYSTEM EXAMPLES FOR TEMPERATURE CONTROL IN INDUSTRIAL PROCESSES

Multi-channel flow control system for controlling temperatures of plastic injection, extrusion or die casting

- Compact, modular design
- Extremely wide control range (0.1 to 20 l/min)
- Highly dynamic motor valves
- Flow measurement via ultrasound

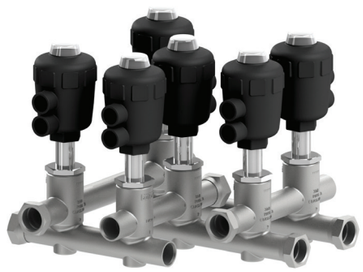


Media cabinet for temperature management in pressure-die casting processes

- Variable design for cooling circuit with water, air or water/air mixture
- Clear arrangement in control cabinet
- Easy cabling through bus communication

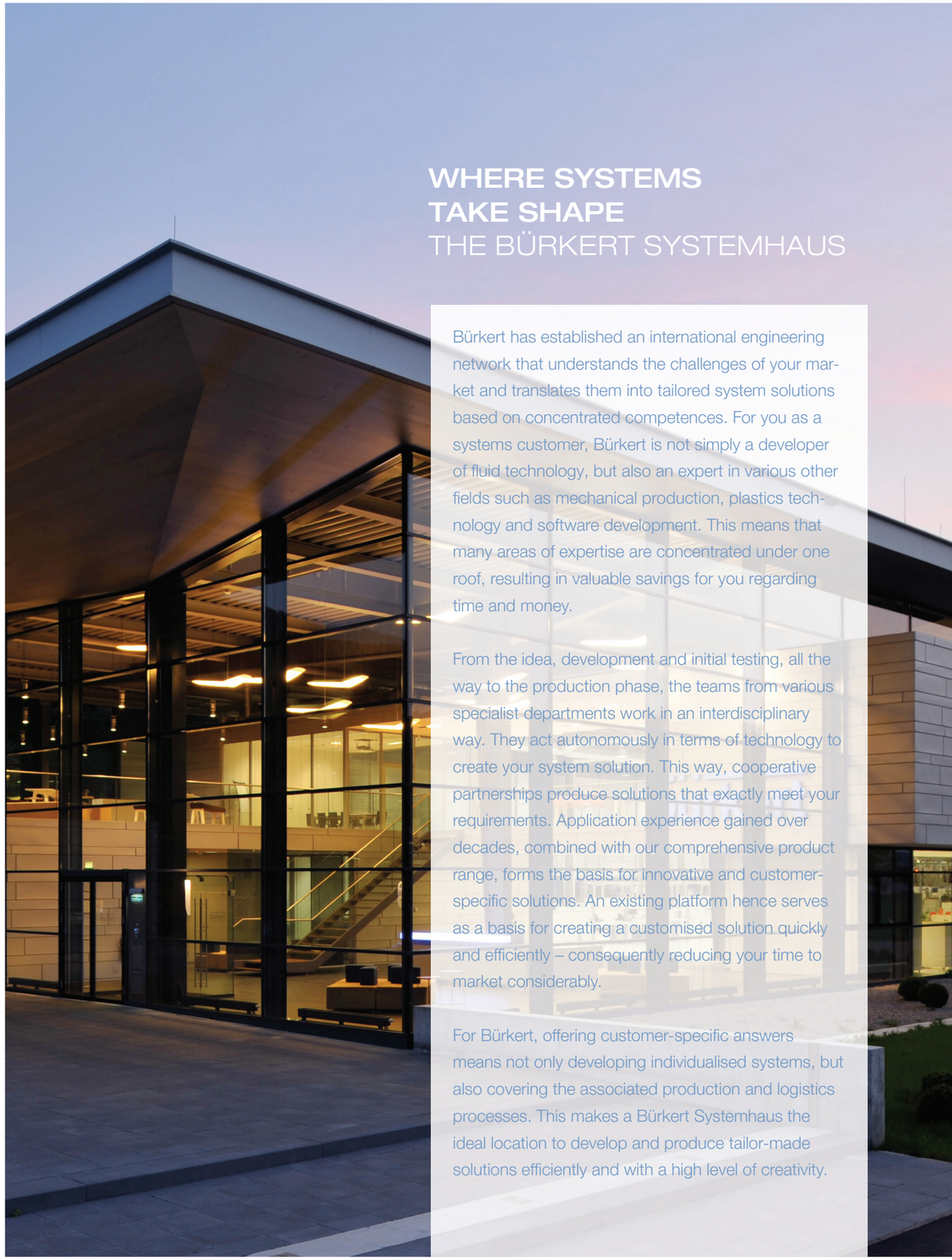
Coolant distribution system for extruder temperature control

- Welded distribution system for leak-free construction
- Complete process reliability: robust, long-life valves resistant to back pressure stresses
- Easy installation



Modular valve system for variothermal temperature control

- Welded, compact design for close-to-process placement
- Leak-free operation even with extreme temperature fluctuations



WHERE SYSTEMS TAKE SHAPE
THE BÜRKERT SYSTEMHAUS

Bürkert has established an international engineering network that understands the challenges of your market and translates them into tailored system solutions based on concentrated competences. For you as a systems customer, Bürkert is not simply a developer of fluid technology, but also an expert in various other fields such as mechanical production, plastics technology and software development. This means that many areas of expertise are concentrated under one roof, resulting in valuable savings for you regarding time and money.

From the idea, development and initial testing, all the way to the production phase, the teams from various specialist departments work in an interdisciplinary way. They act autonomously in terms of technology to create your system solution. This way, cooperative partnerships produce solutions that exactly meet your requirements. Application experience gained over decades, combined with our comprehensive product range, forms the basis for innovative and customer-specific solutions. An existing platform hence serves as a basis for creating a customised solution quickly and efficiently – consequently reducing your time to market considerably.

For Bürkert, offering customer-specific answers means not only developing individualised systems, but also covering the associated production and logistics processes. This makes a Bürkert Systemhaus the ideal location to develop and produce tailor-made solutions efficiently and with a high level of creativity.

BREYER TopLine extrusion line equipped with fluid technology from Bürkert

OPTIMAL FLUID TECHNOLOGY IN EXTRUSION LINES FOR PROCESS TEMPERATURE CONTROL

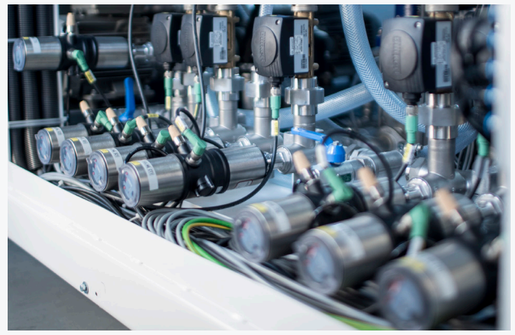
Extrusion lines produce tubes of material that can be processed further to make toothpaste tubes, cosmetic containers and other packaging items. Granulated plastic is melted in the extruder and then pressed through a suitably shaped die. The main component is the calibrator that regulates the diameter and surface quality of the tubes. The Breyer TopLine range involves several different Bürkert solutions. Together, they reliably control the entire fluid control loop. “We turned to Bürkert for help because we had already had contact with them previously,” explains Andreas Bauknecht from the development team. “Previously, we relied on several different valve and sensor manufacturers. But we wanted to find a supplier who could equip the machines with all the required fluid technology at once. It is more convenient to have just one contact partner, and solutions to problems can always be found quickly.” And Breyer passes on these benefits to its own customers: Using Bürkert fluid technology throughout means consistent handling procedures and fewer spare parts. When the hot extruded tube exits the die at a temperature of more than 200 °C, a large amount of heat energy must be conducted away at a continuous rate. The workpiece passes through a process water bath that has to be reliably maintained at 20 to 30 °C by means of a heat exchanger – and that is exactly what Bürkert control valves do very dependably, supplying the required amount of cooling water via dynamic flow adapters. Andreas Bauknecht also points out the particular advantage that the Bürkert valves still keep going throughout their full service life even under such demanding conditions. The valves used previously leaked in some cases, because they were not always able to cope with the variations in the coolant additives involved. Another plus point from Breyer’s point of view is that the vacuum valves are suitable as supplied, because such components for controlling the vacuums in the calibrator chambers are not generally available off the shelf. The modular valve system for process control is one of the reasons why the manufactured tubes consistently meet the required quality standards. It supplies the necessary flow quantities for the spray section with 8, 9 or 11 process water circuits in all variations, and at the same time it regulates the filling level in the chamber. The process water ensures (amongst other things) that the tube does not stick to anything and cools down in a controlled manner. The requirements for the flow control system are strict: It must be as consistent and precisely controllable as it can possibly be to ensure that the dimensions and appearance of the product stay the same. This even functions when the supply pump cannot deliver to full capacity because of a blocked filter, for instance. In the old, manually controlled variants this led to problems – quality issues arose regarding the product.

“Now, even if some nozzle or other gets blocked, the flow always remains correct. The great difference compared with the manual override is that this solution is fully automated. The customer can recall setting values from a storage location. This means that changing to another product is easy and fast. It is simple to reproduce things, and that makes for better process quality.”

In retrospect, the Development Department also sees the advantages that arise because “all Bürkert valves have the same connectors, the same operating principles and the same modular design, never mind whether 4 or 50 litre flow rates are involved. And it was also a good idea to select the ultrasonic flowmeter without moving parts.” That greatly simplifies the design task for the developers. In addition, the user now has a reliable record of all values and can check that the extrusion process is running correctly in the long term. Andreas Bauknecht is also impressed with the ease of installation: “The system is very compact and ready for connection. We order whole batteries, so we don’t have to assemble them ourselves – we simply receive complete, prefabricated blocks.” Altogether, the Bürkert solutions have contributed a great deal of added value, both for Breyer as well as for the end users.

“Everything in connection with the pressures and flow values is preset and correct, so we don’t need to bother about the fluid mechanics side of things any more.“

Andreas Bauknecht, Electronics Development, Breyer GmbH



AT A GLANCE

Company	Breyer GmbH
Application	Process heating & cooling, cooling control in extrusion lines
Requirements	Fluid technology from one source, exact temperature control
Solution	Modular Process Control Platform
Added value	Partner for fluid control systems, ready for assembly and use

BÜRKERT – CLOSE TO YOU

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