SUCCESS STORY TWIN²SIM SALZBURG UNIVERSITY OF APPLIED SCIENCES (AT)

The future of building technology is data-based.

A major undertaking.

The Salzburg University of Applied Sciences (FH) was founded in 1995 and offers a variety of bachelor's and master's degree programs for more than 3,000 students annually. In 2021, the Salzburg University of Applied Sciences implemented the Twin²Sim research project at the Kuchl campus. Twin²Sim represents the largest research investment made by the Salzburg University of Applied Sciences since its founding. Consisting of a test bench, several test rooms, and a multifunctional laboratory, Twin²Sim offers researchers in construction and building technology unique research and practical opportunities.

A number of different Belimo devices are installed at Twin²Sim, including pressure-independent characterised control valves (PIQCV), pressure-independent 6-way control valves (EPIV), and flow sensors. This installation is used to research heating and cooling systems under different conditions and with the use of different facades. TB D+H carried out the HVAC planning for this project, and the MCR planning was the responsibility of TB Novias, and R+S Systems GmbH supervised system integration.

BUILDING TYPE
University of Applied Sciences

PROJECT
New building

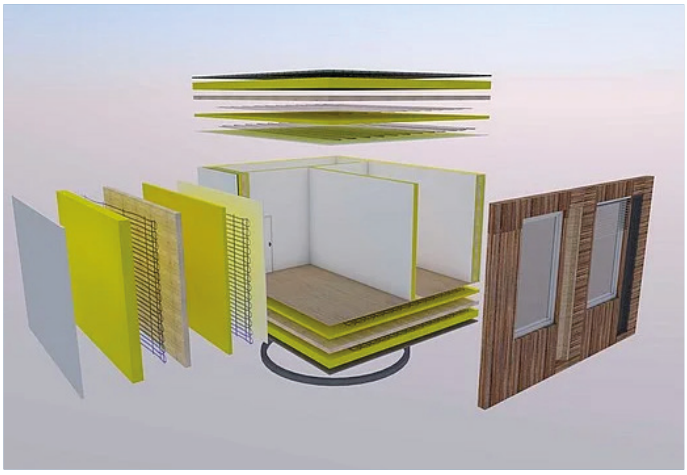
TRADE
Heating, ventilation and cooling technology

PRODUCTS
Pressure-independent characterised control valves (PIQCV) with BACnet-actuator, electronic pressure-independent 6-way control valves (EPIV), flow sensors, Belimo Energy Valves

BELIMO

Developing sustainable building solutions.

Twin²Sim designs, researches and further develops solutions in the field of technical building systems, components, building envelopes and multifunctional facades. How do different building materials behave under various weather conditions in long-term comparison? How do heat, humidity, or noise affect comfort in internal rooms? How can we operate buildings at maximum energy efficiency? These and other questions are investigated at Twin²Sim in both short-term and long-term research projects. All parameters are tested under real-life environment conditions to achieve results that are as precise as possible. The data collected is mapped in a digital twin, hence the name of the Twin²Sim building. This can be used to simulate various scenarios and develop new models.



Shell structure of the building envelope test bench at Twin²Sim

The ground floor of the building accommodates test rooms for building technology and facade construction, along with a multifunctional laboratory for small experiments. An outstanding feature at Twin²Sim is the rotary building envelope test bench on the first floor. Constant temperature conditions are imperative to ensure that the influence of the test objects on the room can be evaluated. Therefore, all exterior surfaces are heated or chilled on two levels, and the energy used for this purpose is measured. In addition, temperature, humidity, heat flow, solar radiation, wind, and other physical parameters are recorded, if necessary, in the exterior and interior spaces and on the building components themselves.

Reliable data through precision.

In Twin²Sim, the energy flows of the heating, ventilation and cooling systems are empirically analysed in addition to the daylight quality, sound insulation and building component deformation. The reliability of the collected data is decisive for the research carried out under

"Working together with Belimo, we developed the best possible hydronic solutions for our applications."

Prof. DI Dr. Markus Leeb,
Research Group Head Smart Building,
Salzburg University of Applied Sciences

FH Salzburg

ZENTRUM ALPINES BAUEN

real-life conditions to ensure true findings and to develop innovative solutions. For the heating, ventilation, and cooling systems at Twin²Sim, this means that energy flows are measured precisely and can be controlled to meet requirements based on the data collected.

The heating and cooling energy for the building is measured and controlled by 3-way Energy Valves. Vertical radiators, thermal building component activation (concrete and wood), and underfloor convectors provide the heating and cooling in the test rooms on the ground floor. For this, electronic pressure-independent 6-way control valves (EPIV) ensure reliable monitoring and control of energy. "We decided to use the 6-way EPIVs because they enable us to measure and control the heating and cooling energies simultaneously using only a single device," explains Markus Leeb. Furthermore, the 6-way EPIVs make it possible to supply individual rooms independently.

Eight heating and cooling circuits supply the necessary heating and cooling to the facades and the ceiling of the building test bench on the first floor. Pressure-independent control valves (PIQCV) from Belimo are used for this purpose. Flow sensors from Belimo were installed to measure the flow rate accurately. The flow rates in all of the heating circuits of the various layers are measured in combination with the supply and return temperatures. "The flow sensors measure even the smallest values with the utmost precision, which enables us to achieve reliable data at all times," confirms Markus Leeb.

Electronically pressure-independent 6-way control valve (EPIV) in one of the test rooms

Making shared visions happen.

Markus Leeb has a positive view of the collaboration with Belimo: "The quality and reliability of the products from Belimo were what convinced us." He could also imagine working with Belimo on future projects and emphasising the flexibility he experienced with the company. "We were in constant communication with one another. New ideas and last-minute adjustments were also implemented without any problems. I could sense the commitment of the Belimo project managers at all times," adds the researcher.

PIQCV and flow sensors supply the building test bench

All inclusive.

Belimo is the global market leader in the development, production, and sales of field devices for the energy-efficient control of heating, ventilation and air-conditioning systems. The focus of our core business is on damper actuators, control valves, sensors and meters.

Always focusing on customer value, we deliver more than only products. We offer you the complete product range for the regulation and control of HVAC systems from a single source. At the same time, we rely on tested Swiss quality with a five-year warranty. Our worldwide representatives in over 80 countries guarantee short delivery times and comprehensive support through the entire product life. Belimo does indeed include everything.

The "small" Belimo devices have a big impact on comfort, energy efficiency, safety, installation and maintenance.

In short: Small devices, big impact.

- 5-year warranty
- On site around the globe
- Complete product range
- Tested quality
- Short delivery times
- Comprehensive support

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