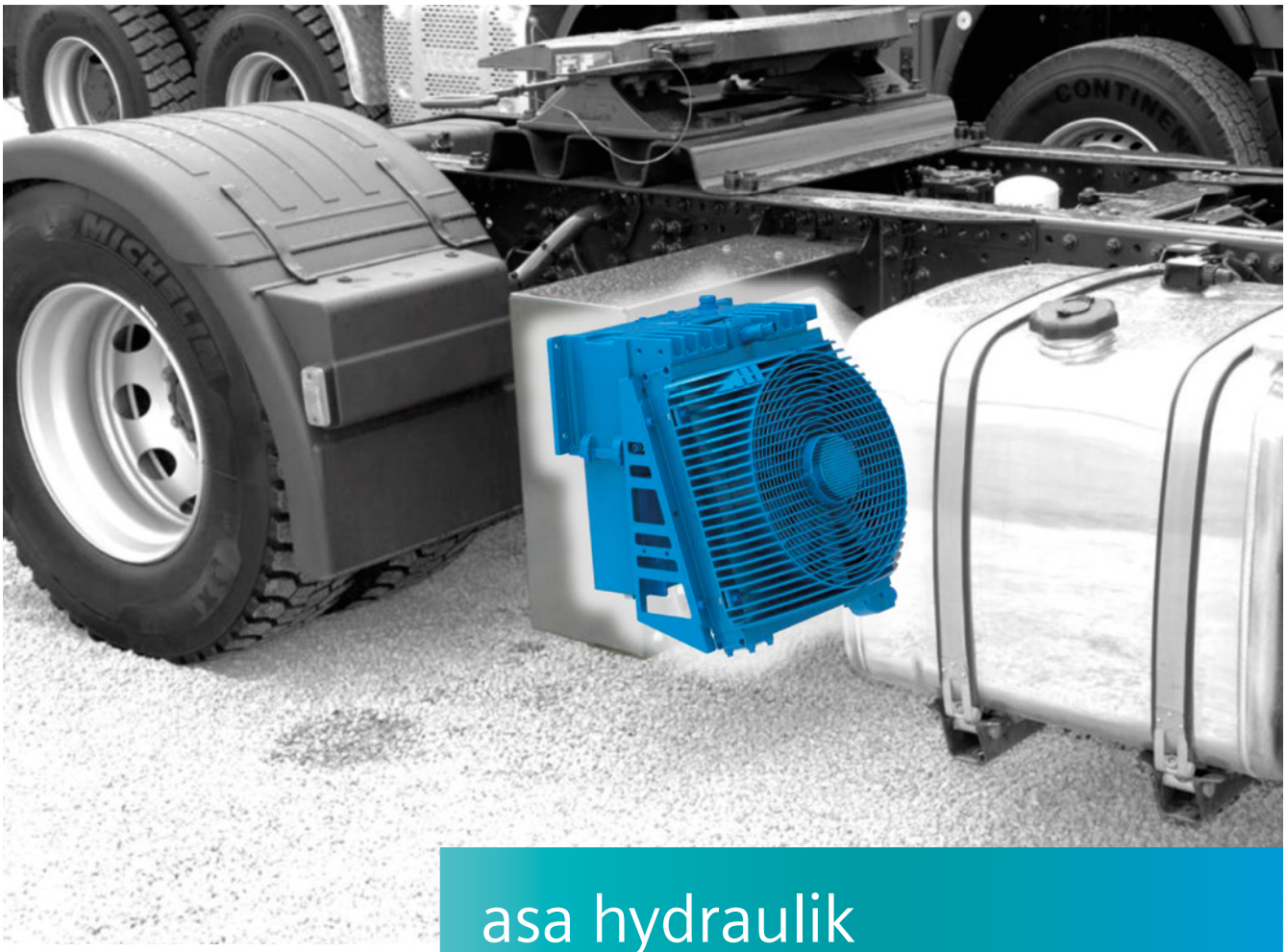

asa hydraulik

Industrial and automotive supplier uses Simcenter 3D to verify and optimize thermal system designs

Siemens Digital Industries Software solution enables asa hydraulik to develop cutting-edge cooling products for electrical applications

Keeping media streams flowing

Stationary equipment such as combined heat and power generation facilities, mobile construction, agricultural machinery and trucks and locomotives require a reliable flow of fuel, air and lubricants as well as heat and coolant.

asa hydraulik GmbH (asa hydraulik) specializes in the design, production and test of thermal systems, connection technology and fluid controls for engine-powered systems. These include standard and custom radiators, tank accessories such as steel and rubber compensators, valves and vibration absorbers as well as pumps and filters.

The company is a leading independent supplier of these critical components. With five manufacturing locations on four continents, asa hydraulik caters to global vehicle and mobile manufacturers and stationary machinery manufacturers. Headquartered in Vienna, Austria, asa hydraulik is also operating a technology center complete with vibration test bench, corrosion test chamber and wind tunnel.

Founded in 1980, asa hydraulik invests at least seven percent of its annual turnover into research and development (R&D). The company believes this policy provides it with a technological edge over its competitors. Early in its history, asa hydraulik was the first company to provide a standard cooler range, which improved cost efficiency and reduced lead times. In 1988, asa hydraulik

Figure 1: asa hydraulik is a manufacturer of thermal systems, connection technology and fluid controls for vehicles and mobile as well as stationary machinery

developed the first compact and versatile water cooling unit with an integrated filter and plate heat exchanger. In 2000, the company patented the world's first flexible connection system for radiators, followed by the asa rail system, the first flexible mounting and connection system, in 2009.

Tackling the electrification challenge

asa hydraulik's thermal systems product group includes standard radiators as well as several product lines that meet specific requirements for harsh environments or hazardous locations and the H-Ranges of kit components for semicustom comprehensive cooling systems.

Market research reveals that recent technologies used in electricity generation from renewable sources and electromobility still raise concerns related to heat dissipation.

"With nearly 40 years of experience as a technology leader in this field, we felt we should be able to find the proper answers," says Rainer Lindbichler, product manager, asa hydraulik. "In 2017, we decided to add the E-loop series to our portfolio, a new system of cooling solutions specifically designed to serve the growing electrification market."

Limited time-to-market

Designed to provide a complete system solution for the entire cooling chain, the electrification loop (E-loop) series includes all components required for cooling stationary or mobile power electronics, batteries and electric motors. With plans to unveil the E-loop series at the beginning of the 2019 calendar year, asa hydraulik had little more than 12 months to create marketable products, including design, verification and testing.

For computer-aided design (CAD), asa hydraulik has used the Solid Edge® solution from Siemens Digital Industries Software for over a decade. "This easy-to-learn 3D modeling software goes a long way towards design automation," says Dr. Jürgen Feyerl, chief technical officer, asa hydraulik. "It also comes with functionality that supports the reuse of existing designs, which is an important advantage for our modular products."

Figure 2: In 2019, asa hydraulik launched the E-loop series, a new range of cooling solutions specifically designed to serve the growing electrification market

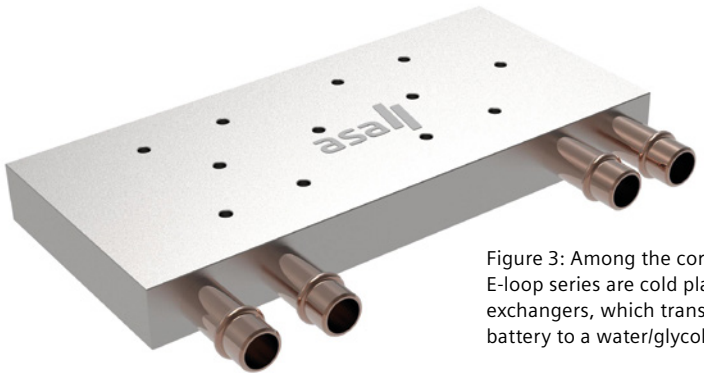

Figure 3: Among the core products of the E-loop series are cold plate heat exchangers, which transfers heat from a battery to a water/glycol circuit

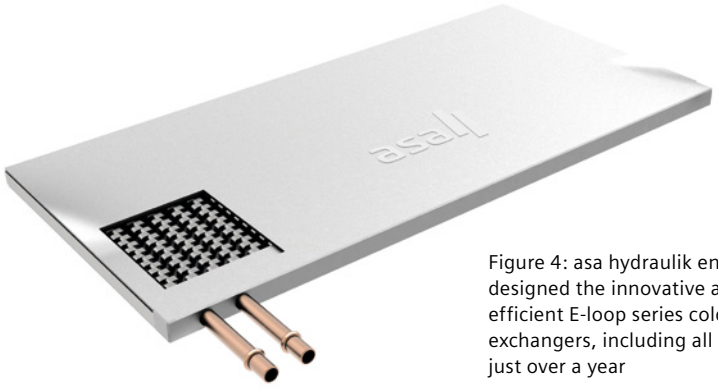

Figure 4: asa hydraulik engineers designed the innovative and highly efficient E-loop series cold plate heat exchangers, including all simulations, in just over a year

Digitalized engineering using Simcenter 3D Flow and Simcenter 3D Thermal

Designing a complex cooling system involves more than just mechanical engineering. To achieve both compact and efficient designs, engineers need to optimize their inner geometry to assure an optimal flow of air and liquids. "Verifying and improving the designs of our cooling systems using physical prototypes would not be practical," says Lindbichler. "To limit the time and expenditure involved, we use computational fluid dynamics."

Earlier, asa hydraulik had used the services of ACAM Engineering, an Austrian engineering company specializing in predictive engineering and part of ACAM System automation, a Siemens Digital Industries Software partner. Using various forms of simulation, they analyze the digital twins of their customers' designs to predict and optimize future product properties.

"This expertise and the software technology used are key factors in the successful design of our products," says Feyerl. "As we started the E-loop series design project, we decided to enhance our in-house capabilities and invest in the required software."

Based on a requirement specification reflecting asa hydraulik's needs, the thermal system design specialists evaluated leading simulation software products. "Three made it into our shortlist," says Lindbichler. "They all fulfilled our technology requirements and we decided in favor of the solution with the best price/performance ratio: Simcenter 3D."

To calculate air and media flows as well as temperature progression throughout their designs, asa hydraulik engineers use Simcenter™ 3D Flow and Simcenter 3D Thermal software. This package is part of the Simcenter portfolio, a comprehensive suite of simulation software and test solutions from Siemens Digital Industries Software. Although not limited to fluid behavior, the software is centered on

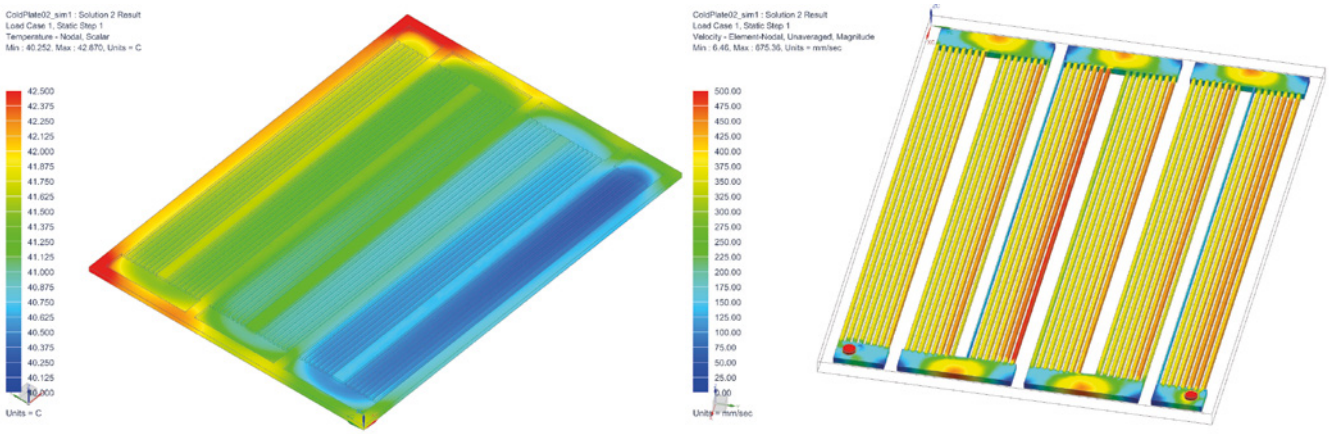

Figure 5: asa hydraulik uses Simcenter 3D Flow and Simcenter 3D Thermal from Siemens Digital Industries Software for computational fluid dynamics (CFD) simulations, optimizing their designs for temperature progression (left) and flow velocity (right), among other criteria

computational fluid dynamics (CFD) to solve and analyze problems that involve fluid flows by successive approximation using numerical analysis and data structures.

Among the selection criteria were the support from the ACAM simulation experts, who are also using Simcenter 3D Flow and Simcenter 3D Thermal and are familiar with asa hydraulik's design issues. Another is the software's built-in, fully parametric 3D feature-based CAD modeler that allows for creating and modifying geometries directly within the software. Simcenter 3D offers full compatibility and associativity with Solid Edge.

"Simcenter 3D has full CAD functionality, allowing us to make modifications within the same software we use for simulating," says Feyerl. "Due to the software's full associativity with Solid Edge, feeding back successful design variations to the original models takes only a few seconds, facilitating successive design optimization."

From virtual verification to real-world success

asa hydraulik started using Simcenter 3D Flow and Simcenter 3D Thermal in 2017. Engineers received training in two stages: following initial Siemens Digital Industries Software training, asa hydraulik's engineers also took a refresher course from ACAM to cover issues that arose in the beginning phases.

"As the software's user interface has an intuitive design similar to the one our engineers are familiar with from Solid Edge, they became productive in a very short time," says Feyerl. "Using Simcenter 3D for CFD simulation also allowed us to greatly reduce the number of physical prototypes we build and analyze."

"Using Solid Edge and Simcenter 3D, we managed to create a new range of cooling products in little over a year," says Lindbichler. "CFD simulation using Simcenter 3D Flow and Simcenter 3D Thermal allowed us to optimize the E-loop series for size and energy efficiency, helping us keep the competition at bay." ■

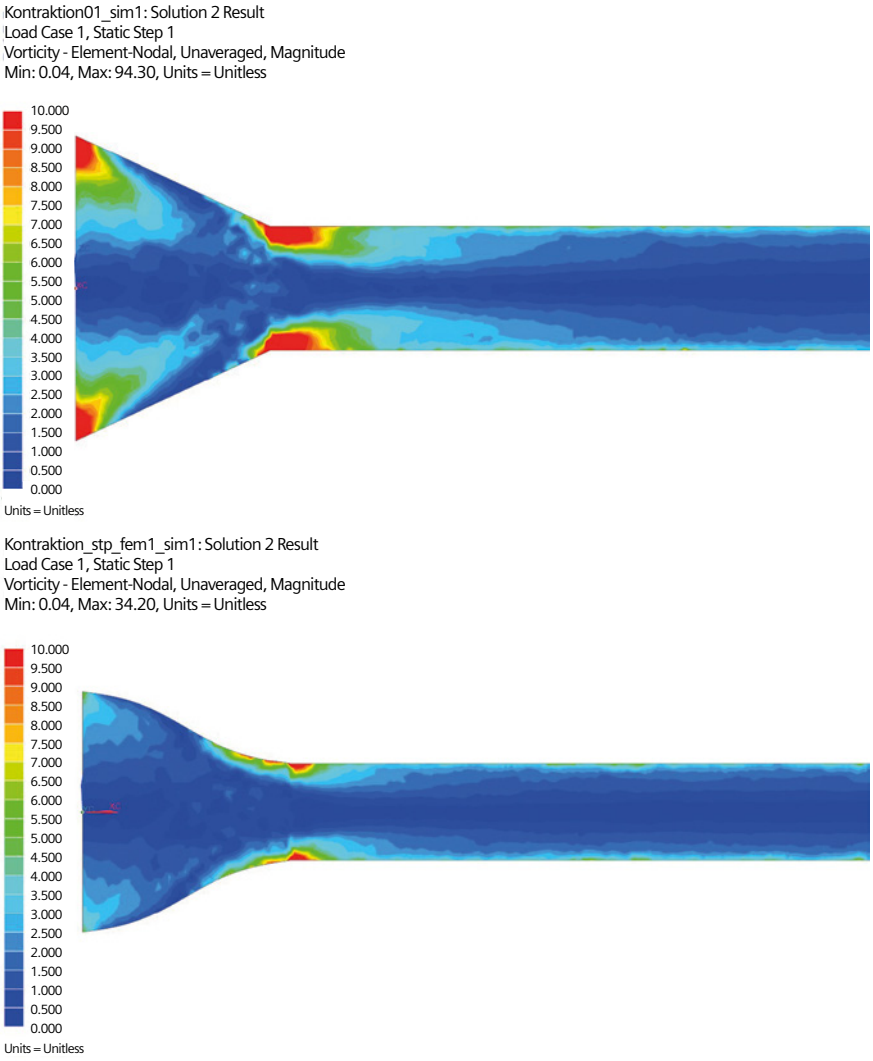

Figure 6: CFD simulation using Simcenter 3D Flow and Simcenter 3D Thermal was used to optimize the geometry of the wind tunnel asa hydraulik built at its headquarters in Vienna, Austria

"Using Simcenter 3D for CFD simulation also allowed us to greatly reduce the number of physical prototypes we build and analyze."

Juergen Feyerl
Chief Technology Officer
asa hydraulik