



## CASE STUDY

# Total quality from switchgear cabinet to bathroom

### Modular chillers from Pfannenberg

*Duravit, a worldwide manufacturer of design bathrooms, is based in Hornberg in Germany's Black Forest region and stands for top quality and intelligent use of technology. In the bath furniture production at the Schenkenzell plant, the process cooling system for an edge banding machine needed to be replaced. For this Duravit chose a chiller from Hamburg-based cooling specialist Pfannenberg, which is now doing its job of maintaining the right temperature. "The Pfannenberg unit is top quality. You just switch it on and it works. It was delivered quickly, and the sales team put a lot of effort into it. The entire process was very smooth", says Peter Brüstle, responsible Electrician at Duravit.*

With 5,700 employees worldwide and a revenue of EUR 380 million in 2013, Duravit is a leading global vendor of ceramic sanitary equipment, bath furniture, showers and bathtubs, whirlpool and wellness systems, shower WCs, saunas, kitchen sinks and accessories. Duravit makes top-grade bath furniture at the Schenkenzell site.

One of the production operations is edge banding. A twelve-year-old chiller for the subsystem switchgear cabinets of an edge banding machine in the Schenkenzell plant needed to be replaced.

## First comes the advice

The sanitary equipment specialist turned to the consulting engineering firm Konrad Weinmann for advice. As a sales partner and distributor for a wide variety of renowned manufacturers, this family-owned business acts as a Pfannenberg Competence Centre (PCC) when it comes to switchgear cabinet and process cooling, as well as visual and audible signaling technology.

PCC technical sales staff member Philipp Weinmann was already familiar with the Duravit plant in Schenkenzell, and as an expert in thermal management of switchgear cabinets he knew exactly what the case was about. In cooperation with Vincent von Wieding, business development manager chiller at Pfannenberg, he performed a needs analysis and personally visited the site.

At the end of this process the decision was clear: the new chiller for the switchgear cabinets of the edge banding machine would be a Pfannenberg type EB60 with a custom configuration.

Brüstle comments: "We already had some Pfannenberg chillers in use at various places in the Schenkenzell plant. When the existing chiller for our edge banding machine had to be replaced, it was clear that we needed a new solution. In the end we chose the energy-efficient solution from Pfannenberg due our good experience with them in the past."

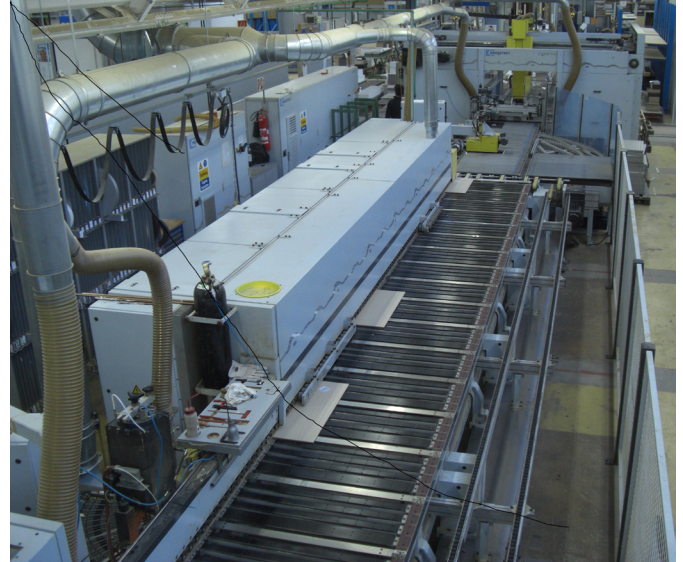
## Reliable cooling capacity

The edge banding machine and feed unit glues edging to bath furniture. With double-sided gluing and four sides to be handled, each item passes through the machine twice – and thousands of items are processed per day.

Due to high dust levels in furniture manufacturing, a closed-circuit cooling system with water refrigerant is the ideal solution for thermal management of switchgear cabinets. In the summer the ambient temperature can rise to 40°C when bright sunlight shines through the glass roof of the Schenkenzell factory building. This makes a reliable, high-performance cooling solution especially important.

The EB60 WT CE chiller (WT stands for water refrigerant, and CE means that it is certified for the European market) has a rated cooling capacity of 6 kW and delivers a continuous flow of chilled water. The water is used to cool the electronic components inside the switchgear cabinets

distributed over the 50 m length of the machine, including variable speed drives and controllers. The modular switchgear cabinets are integrated into the machine as pull-out subcabinets.



The edge banding machine in Duravit's Schenkenzell plant runs about 4,500 passes a day.

## Individually adaptable and easy to service

A special feature of Pfannenberg's EB series is their modular architecture, which makes them easy to adapt to individual applications. Duravit chose the following standard options from the 30 option packages available for the EB60: flow monitor with individual alerts, level monitoring for the tank, thermostat, 6-way Harting connectors for power and signal connections, transport castors, and inlet filter monitoring with pressure sensors. In addition, Duravit opted for an especially high-performance pump with rated pressure up to 5 bar, instead of the standard 3 bar with 35 litre flow volume in 50 Hz operation.

The chiller's flow monitor keeps an eye on how much water is flowing through the cooling circuit, and the thermostat measures the water temperature.

If the cooling water flow is too low or the refrigerant temperature is too high (risk of overheating) or too low (risk of condensation), the chiller sends an alert to the machine's operator console so that damage to the electronic components of the edge banding machine can be avoided and high machine availability can be achieved.



The refrigerant tank (the chilled water contains 20% of the Pfannenber Protect refrigerant) is also monitored by a sensor so that service personnel are informed promptly when the tank needs refilling. Pressure sensors also monitor the air flow through the inlet filter. This enables preventive maintenance and reduces the need for wear parts.



The EB60 WT CE chiller, with a cooling capacity of 6 kW, cools the twelve subsystem switchgear cabinets along the edge banding machine.

The alerts are made possible by chiller's ability to exchange control signals with the edge banding machine through the Harting connectors. The HMI display makes EB60 operation convenient for users, who can also view fault messages and causes on the display.

"A decisive factor for us was that the EB60 is very easy to maintain. For example, the filter mats only have to be cleaned every two to three weeks, despite the high dust level. The unit was installed six months ago, and we haven't had to replace the filter mats yet. Thanks to the various alerts, we can perform preventive maintenance to increase our machine availability", says Brüstle.



The EB60 features very high operational reliability, low maintenance and easy servicing.

## Modular and energy-efficient chiller technology

In a closed-circuit system, switchgear cabinets or electronic components are cooled by pumping cold water at a defined supply temperature through the switchgear cabinets in a pipe system.

After passing through the switchgear cabinets, the water flows back to the chiller at a higher temperature (return temperature). The chiller removes the temperature difference by cooling the water from the return temperature back to the supply temperature.

Thermal management specialist Pfannenber offers chiller solutions covering the capacity range from 1 to 70 kW, using water or oil as the refrigerant. Particularly in combination with air/water heat exchangers, water chillers (WT) provide an ideal system solution because all cooling tasks in a plant or machine can be implemented easily and economically using a closed-circuit pipe system.

The modular design of the EB series gives users a choice of up to 30 standard options, including UL certification. Good access from all sides enables easy and efficient maintenance. All components are rugged and top quality. In addition, Pfannenberg's ECO chiller is an especially energy-efficient chiller with load-based speed control that can reduce energy consumption by about 40% compared to the standard series.



The various alerts generated by the chiller enable Duravit technicians to perform preventive maintenance, contributing to higher machine availability.

## The facts at a glance

<b>Task</b>	<ul style="list-style-type: none"> <li>• Replace a twelve-year-old chiller for an edge banding machine to avoid machine outage</li> <li>• Cost-effective, perfect-match solution</li> </ul>
<b>Challenges</b>	<ul style="list-style-type: none"> <li>• Fast delivery</li> <li>• High ambient dust level</li> <li>• Low maintenance</li> </ul>
<b>Deployed products</b>	<ul style="list-style-type: none"> <li>• EB60 chiller with 6 kW cooling capacity</li> </ul>
<b>Success factors</b>	<ul style="list-style-type: none"> <li>• Personal advice and maintenance</li> <li>• Fast delivery</li> <li>• Modular architecture of the EB series for optimum customisation</li> <li>• General ease of maintenance of Pfannenberg chillers</li> </ul>

## Summary

The EB60 WT CE chiller with the selected additional options is a perfectly matched, optimally dimensioned solution for cooling the subsystem switchgear cabinets of the edge banding machine in Schenkenzell. The helpful monitoring and alert functions simplify maintenance and contribute to reliable and cost-effective operation of the production line. Along with individual advice and technical layout of the system, the PCC has been supporting Duravit in Schenkenzell since the commissioning of the chiller with periodic maintenance services and spare parts.

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