

## It's getting hot with Carlisle

### Process boost with polymer bitumen equipment from Keil Anlagenbau



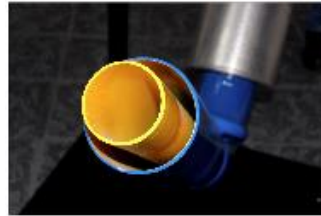
**Hot and liquid – that's how it should be: The company Carlisle CM Europe is coating roofing membranes made of EPDM with polymer bitumen at the location in Waltershausen, Germany. The coating material must be stored and processed in a constant temperature between 160 and 180 °C. However, this was only one of many requirements. Also, several complex processes had to be combined. The new equipment by Keil Anlagenbau was able to master this task, and it improved the manufacturing process altogether.**

Carlisle CM Europe is a leading manufacturer of roofing and sealing membranes in Europe. The manufacturing site, which was opened in September 2018, is located in Waltershausen, Germany. The company manufactures its own polymer bitumen for the coating of roofing membranes. Raw bitumen and oils are mixed with polymers including minerals during the production process. The finished material is transported to the coating equipment and forwarded thus to a subsequent manufacturing process point. To enhance its production capacity, Carlisle required another equipment unit. A higher degree of automation than the present technology could provide was one of the requirements, and an increased transparency and reproducibility of processes were to be ensured by means of a large number of sensors and improved visualization. The company Hans-Jürgen Keil Anlagenbau GmbH & Co. KG from Bohmte-Hunteburg was awarded the contract to make the conceptual design of a corresponding equipment and to install it, and to train the operators.

The implementation of the task brought several challenges to the team of experts with Keil, as several processes were to be interconnected and controlled. First, different materials with deviating characteristics need to be combined. Second, a high temperature must be maintained during the entire production process. The components or the overall mass normally

cures at low temperatures. A third special feature: The finished polymer bitumen must have an extremely high degree of homogeneity without undissolved solid inclusions. This is how the Keil equipment works:

### Two are better than one (hot)



As continuous heating of the product is required, all equipment components are heated by means of material contact such as tanks, pumps and pipe systems. Mr. Ingo Wassum-Paul, CEO with Keil, (to the right) and Mr. Kai Schäfer, head of sales (to the left) demonstrate this at the model in figures. 01a and 01b: All pipelines wear a double-jacket. The system allows the transfer of thermal oil, kept at a constant temperature between 160 and 190 °C. The delivery scope includes a thermal oil equipment for the thermal oil supply. A high degree of safety was observed by the Keil experts by means of increased fire protection.



The temperature of the entire process is automatically controlled at the thermal oil secondary station (Fig. 02). The users have been combined according to functional affinity in separately regulated heating loops.

### Each material is different – each process reflects diversity

Polymer bitumen contains liquids and solid material. These components differ because of their storage, manner of transport and the productions conditions. This is how Keil Anlagenbau tackled the demanding task:

#### Component 1: Raw bitumen



The raw bitumen is delivered in hot fluid form by a truck. Subsequently, it is transferred into a heated and insulated tank (Fig. 03). From there, it is pumped by the equipment through the pipelines into a mixing vessel. The accurate dosage is done according to the receipt. The containers are filled by means of a gas displacement system, so there are no emissions into the environment.

#### Component 2: Process oil



Process oil is stored in an underground tank (Fig. 04). A desired dosage travels now through the pipelines into the mixing vessels. The tank equipment and the filling point have been designed and constructed fulfilling the requirements of the German Water Resources Law (WHG) and the Regulation on Facilities Handling Substances hazardous to Water (AwSV).

### **Component 3: Resin**



Resin ingredients are delivered as small flakes, just about in finger-nail-size, packed in sacks. First, the flakes are loaded into a collecting tank. As the resin flakes easily stick together, the Keil engineers installed a bucket conveyor system (Fig. 06) for a smooth transport into the mixing vessel.

### **Component 4: Polymer**



The polymer is delivered as granulated material in BigBags (Fig. 07), and discharged at several discharge stations. It is conveyed pneumatically by means of pressurized air into a receptacle. Time and volume-controlled, the solids are transferred from there for the mixing process. They are dosed continuously. The polymer is not added directly into the mixing vessel but by means of continuous feed into a liquid mill during recirculation process. The polymer material is crushed and worked into liquids previously pumped from the mixing vessel.

### **Component 5: Mineral filling material**



The mineral delivered from the truck is stored in an external silo. Its position is further away from the equipment. By means of pneumatic transfer, it travels through a pipeline into a receptacle and from there into the mixing vessel during a continuous dosing process. Also, the filling material is added inline to the liquid components and into the equipment. (Fig. 08).

### Watch this: What happens in the mixing vessel?



The mixing vessel has been equipped with a coaxial agitator mixing the mass in several stages (Fig. 09). To prevent detrimental emissions entering the environment, the entire equipment operates with an environmentally friendly gas displacement system. When the mixing vessel is filled, the gas is pressed out of the vessel. This is conveyed back into the discharge container, the raw-material storage tank.



Up to the time of adding the finished polymer mix to the production process by means of the discharge pumps (Fig. 11), the mixing vessel functions as a storage tank for the production.

Carlisle, the commissioning company, is very satisfied with the result. The overall project manager, Mr. Bruno Bauer, says: “We have received everything – the systems, solutions and services - from one single source with Keil Anlagenbau – the entire range from concept to engineering and programming to the implementation, training and follow-up support.” A high level of traceability and transparency of production are features to be mentioned quite especially regarding the quality aspect. “Also, we are very pleased about the eco-friendliness of the equipment. Thanks to the gas displacement system, only minimal amounts of emissions are released during the entire process.” It is even possible to follow up the batches with this system. Mr. Ingo Wassum-Paul, CEO with Keil, sums up: “We are happy and proud to have not only assisted Carlisle with its processes but to have improved our customer in the production of polymer bitumen with our equipment. We would like to meet a challenge like this again.”

#### Key project data:

- Invest volume: ca. EUR 3,5 million
- December 2016: Order placement
- January until July 2017: Equipment engineering
- July until September 2017: Manufacture of modules and system components in workshop Bohmte-Hunteburg
- November 2017 until March 2018: Equipment installation in Walterhausen
- April until June 2018: Commissioning

## **Brief company profiles**

### **Hans-Jürgen Keil Anlagenbau GmbH & Co. KG**

Keil Anlagenbau has been responsible for efficiency in the industrial process technology for over 40 years now. The company plans, manufactures and maintains storage tank farms, recycling, supply, dosing- and process equipment. The range of our customers extend over several branches. Chemical, automotive, colors and paints industries, PUR recycling, film manufacturers, manufacturers of construction materials, insulating foam, adhesives, rigid foam and soft foam are only a few of the economic sectors that Keil Anlagenbau has been active in for many years.

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### **CARLISLE® Construction Materials GmbH**

The company CARLISLE® Construction Materials GmbH is part of the European CARLISLE® Construction Materials Group (CCM Europe). Together with the affiliates in the Netherlands, UK and Romania, it generates a gross annual turnover of more than 120 million Euro. This makes CCM Europe the biggest European EPDM producer in this sector. The Group employs about 500 staff members and concentrates on the development, production and sales of high-quality products for the divisions of sealing of roofs, facades and frontages and other building sealings.

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