

Kraft Curing Systems GmbH, 49699 Lindern, Germany

A company with tradition and innovation harnessing cutting-edge curing technology – Betonwerk Lintel

■ Sönke Tunn, Kraft Curing Systems GmbH, Germany

Betonwerk Lintel GmbH & Co. KG, located in the heart of picturesque Weserbergland countryside not far from Porta Westfalica, manufactures concrete pavers, kerbs, retaining wall blocks, slabs and other concrete products in North-West Germany. The company recently invested in a new production line in order to meet the evolving demands of its customers and to further optimise its manufacturing processes. The new line is equipped with state-of-the-art technology and enables the company to produce even more efficiently to a greater standard of quality. To upgrade its new production line, Betonwerk Lintel GmbH & Co. KG installed a modern curing chamber from Kraft Curing Systems GmbH. The curing chamber ensures uniform, controlled and, especially, accelerated curing (hardening) for concrete products, resulting in improved product quality and durability and the ability to secondary process within 24 hours after production.

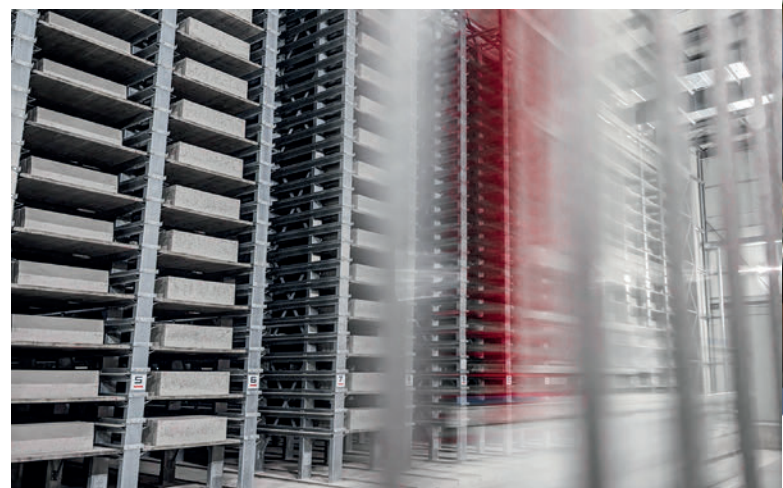
The curing chamber from Kraft Curing Systems GmbH was customised to Betonwerk Lintel requirements. The curing chamber is equipped with a range of innovative features to optimise the curing of concrete products and includes an innovative rack system for storing the products during hard-

ening. The rack boasts high-quality Magnalis galvanisation protection with a ten-year corrosion warranty. The steel structural design, allowing for installation exterior of the production building, facilitates warm air distribution by supply and returning the warm air via the columns and beams of the rack structure. This concept is patented by Kraft Curing and has proven itself many times over. The rack system's heated supports and the resulting optimised air distribution supply the entire chamber with heat and humidity uniformly.

An efficient variable output burner, with a maximum output equal to 150 kW/h (500,000 Btus/h), was selected to heat the air as required with a total air circulation within the chamber equal to up to a total output of 60,000 m³/h. The complete curing system is named Quadrix (as it encompasses four important parameters; temperature control, humidity control, air circulation and insulation) and accelerates the curing process through the controlled addition of heat and moisture. Specially developed aluminium radial ventilators and a stainless-steel heat exchanger allow the system to work with high levels of humidity. Such systems have been specially optimised for use in concrete production facilities with the stainless-steel housing insulated to reduce heat loss and prevent condensation.



The Lintel Group banks on curing technology from Kraft Curing Systems GmbH



The curing rack structure serves to distribute warm air



The Quadrix curing system accelerates the curing process through the controlled addition of heat and moisture

The warm and/or humid air is distributed in the chamber via a total of 118 outlets, located at the floor, and a total of 104 return ducts at the chamber ceiling. This design takes advantage of warm air's natural tendency to rise and ensures the exchange of to insure temperature and humidity uniformity within the entire curing environment.

The system includes a warm air distribution system installed in the transfer car area - an area subject to very dynamic air flow, usually 3°C (5°F) cooler than the rack area where products are curing. It is essential to keep this area warm to prevent condensation (puddles and drips) and fog (affecting the transfer car and light sensors/reflectors). The ducts located here are installed along the plinth and routed to the floor. The floor in this area remains dry even with temperatures of over 30°C and relative humidity of 85% and more. Ventilators installed in the transfer table travel area help to accelerate the distribution of the warm air.

In the light of previous experience, Kraft Curing Systems GmbH has abandoned the simple extraction systems available on the market and opted for centralised extraction in its curing chambers. Extraction is necessary when the curing temperature is too high or, as is more frequently the case, when the relative humidity is too high. Instead of a single point of extraction in the rear wall of the chamber, Kraft's central system extracts from 104 locations in the chamber - ensuring uniformity and allows for the incorporation of a heat recovery system in order to further reduce energy costs. Kraft's heat recovery unit saves between 30% and 75% energy



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(depending on summer or winter temperatures) and is especially effective if the humidity in the chamber is very high and needs to be extracted frequently. Retrofitting is not a problem with the centralized exhaust system such as the one installed in Porta Westfalica and was taken into account when it was designed.

The customer can control the curing chamber and all the components associated with it via Kraft Curing's AutoCure® curing control unit. The software installed in the unit not only displays temperature and relative humidity trend curves and saves them, but also indicates the operating duration and curing costs of all system components, including the burner's gas consumption, electrical consumption of all ventilators and water consumption. The 21" colour touch-screen allows the operator to keep a constant eye on the chamber's values. In addition, Lintel operators and management can view and easily make changes to the system via its remote online Access Anywhere system. The values saved in the control system can either be exported or saved and evaluated in the long-term using additional software.

Kraft Curing Systems GmbH installed the curing chamber and system with a project manager and full crew of installation supervisors, fitters and electricians. Insulating the curing chamber properly is seen as a hugely important part of this process. The curing chamber was designed as an independent building (meeting local wind, snow and seismic codes) and connected to the production building - saving Betonwerk Lintel money on the building envelope. The chamber's exterior walls are fitted with high-quality 100 mm sandwich panel insulation - maintaining a stable interior temperature while preventing the formation of condensation inside the chamber. Condensation can lead to subsequent damage to concrete products (drips and spots) and/or the chamber and rack system (corrosion).

Kraft Curing Systems GmbH equipped the curing chamber at Betonwerk Lintel with a safety passage at the rear of the chamber passages - eliminating any chance whatsoever of personnel being trapped by the finger car and allowing for a quick and safe exit from the chamber. The exit is equipped with a stainless-steel door and heating door frame (as on all



The air distribution system in the transfer car area and pit

Kraft Curing's entrances and exits). The passage is 900 mm wide with sufficient space to allow for an unincumbered exit. This standard of safety is a requirement of a Kraft Rack. The company attaches great importance to safety in the chamber area.

The collaboration between Kraft Curing Systems and Betonwerk Lintel on the chamber construction went very smooth. Both companies can look back on years of working together as partners, which is reflected in a high level of trust and mutual understanding. Conversion planning and implementation were carried out in close coordination between the two companies. Kraft Curing Systems GmbH contributed its ex-



AutoCure® Accelerated Concrete curing chamber control screen



Curing chamber as a free-standing building and stainless steel escape door

expertise in the field of concrete curing and was thus able to offer a particularly suitable solution for the requirements of the new chamber operations. The conversion was completed on time and within the planned budget. Betonwerk Lintel GmbH & Co. KG was able to start operating the chamber in mid-2023.

Betonwerk Lintel is very pleased with the new curing chamber. The chamber has proved its worth and contributes to improved quality, early strength and durability of the concrete products. The company is positioned to meet the evolving demands of its customers and to further optimise its production processes for the future with its investment in the new production line and the curing chamber. This investment contributes to ensuring that Betonwerk Lintel remains an important player in the concrete industry in the years to come.

**Kraft Curing Systems GmbH -
Expert in Curing Technology**

Kraft Curing Systems GmbH is a pioneer and the worldwide leader in the field of precast concrete curing technology. The company was founded in 1990 and is headquartered in Lindern (Oldenburg), Germany, with sales and service outlets in North America and India. Kraft Curing Systems offers a wide range of curing systems for precast concrete applications. These include vapor generators, insulated curing chambers, retractable enclosures, warm air circulation systems with moisture control, aggregate heating systems, hot water curing systems as well as many more innovative technologies. The curing systems from Kraft Curing Systems are distinguished by their high quality, efficiency, flexibility and reliability. The company placed great importance on technical support, training and comprehensive customer service and support.



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