Kraft Curing Systems GmbH, 49699 Lindern, Germany

Accelerated concrete hardening system ensures consistent climatic conditions in a single atmosphere chamber throughout the year

"The impossible has become possible – now we can produce in three shifts." Those were the words of the regional director for production, Mr. Paweł Bruź, following the commissioning of the Kraft Curing Quadrix® System in the Libet S.A plant in Kalisz, Poland. The history of the company is very complex – it can look back on 20 years of experience. Libet S.A. is one of the leading companies and one of the trend-setters in the industry with a very clever marketing strategy and a very good distribution network.

Libet S.A. specialises in the manufacture of concrete paving stones and landscape products and, with a market share of around 26 % for standard pavers and 37 % for premium paving stones, is one of the largest manufacturers in Poland.

The company produces paver stones in 15 plants throughout the country and operates a total of 26 production lines. The production capacity amounts to about 14 million sq. metres of concrete products per year.

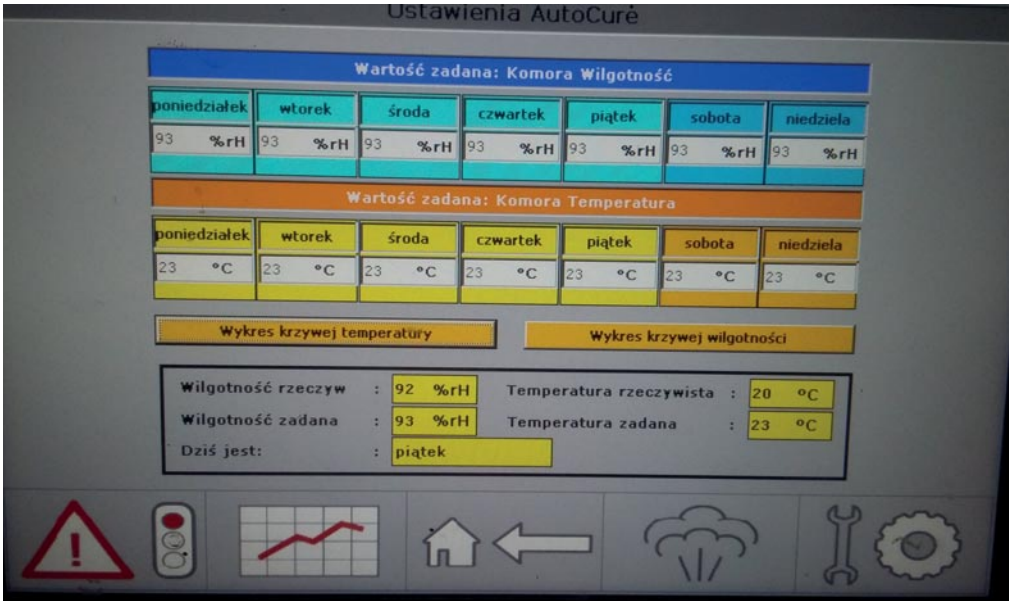
The great strengths of Libet S.A. lie in its many years of experience, advanced technology and very good market knowledge. Libet can therefore always react to the customers' wishes. Beyond that, Libet S.A. also offers advice to private customers and its products are available throughout the country. The company is very active in knowledge sharing with its customers and therefore offers numerous training courses and practical workshops for building contractors, landscape installers and architects.

The company's motto - "Change your standard to premium" - is intended to make the target groups aware that the garden is also a home and should be regarded on the same level as the interior furnishings on account of its aesthetics and functionality.

Apart from concrete paving stones, Libet's product range includes amongst other things supplementary elements for the garden made of architectural concrete, facade products and high quality concrete products with sand and gravel from Italian marble, marketed under the brand name Libet Ceramic.

Libet's public sector, commercial and private customers all have one thing in common: they want high-quality products - in terms of both aesthetics and functionality.

Thanks to the circulation of air in the transfer car area, both this area and the transfer car remain dry. No condensed water forms on the ceiling and there is no mist formation, which could lead to failure of the finger car's laser distance measuring system.



The touch panel – in this case in Polish – displays the target temperature and relative humidity according to work days. The air temperature can be increased in the case of three-shift operation and decreased in the case of single-shift operation to save energy costs.

The supply air duct above corridor no. 7 controls the warm air in the finger car area to keep the temperature constant to ± 1 °C in the entire chamber system, even in the finger car area.

Libet had the problem in the plant in Kalisz that the curing chambers were too small to allow the production to be expanded any further. Conditions meant that more than two shifts per day were impossible.

In autumn 2014, Libet S.A. contacted the Polish representative of Kraft Curing Systems GmbH, Mr. Jan Kania. By Christmas a contract had already been signed for the supply of a Quadrix system to the plant in Kalisz. The system was installed and put into operation in March - even before the actual start of the sales season. In addition, Libet carried out extensive insulation work on the curing chamber.

During the course of the work the insulating walls between the individual passages were removed along with the curtains that had closed the passages. After that the entire area in which the rack system stands was insulated to create a single atmosphere curing chamber. The finger car plus the elevator/lowerator are also located inside this atmsophere. There are two "letter-box" openings in the front wall of the curing chamber for the transport of the products into and out of the curing chamber.

The galvanized supply and return ducts are mounted above the rack system. They don't take up necessary space. The floor is dry from front to rear in every corridor despite a humidity of 95 %.

While the chamber was being retro-fitted, the company Ergo-System Stanislaw Błaszczyk from Sulechów succeeded in considerably reducing noise levels created by the production machine by installing an acoustic enclosure thus making night work – and a 3rd shift - possible.

The Quadrix® system installed at Libet in Kalisz for improving and controlling the concrete curing consists of four main elements:

- Nautilus™ air circulation system for a homogeneous ±1 °C and ±3 % relative humidity in the complete curing chamber with an air speed of less than 1 m per second.
- Temperature measurement, display and control for a constant temperature of approx. 35 °C throughout the year.
- Humidity measurement, controlled addition of moisture when necessary and extraction of air humidity if this should be too high at any time.
- AutoCure™ automatic climate measurement, display and control via various temperature and humidity sensors, which provide for a perfectly consistent climate 365 days a year.

A very important element of the Quadrix system are the extraction hoods, which are located above the production openings to the chamber on the wet and dry side. Warm, humid air from the chamber escaping through the wet/dry production openings could cause problems in the production area - mist and condensation could negatively affect the steelwork or drip on the equipment and/or operators, the control cabinet or the personnel. The Kraft Curing extraction hoods solve this problem by drawing in the air via aluminium hoods and blowing it back into the curing cham-

One of two heated hoods, installed between the lowerator and the exterior wall of the chamber, which prevents the escape of warm, moist air from the curing chamber and thereby prevents condensation dripping onto the fresh stones.

The complete Quadrix® system was installed at the rear of the insulated curing chamber. This system was equipped with an enclosure before the winter. Insulated ducts reduce the energy requirement. The heater and the flue are lined on the inside with high-quality stainless steel.

ber. In order to prevent condensation forming on the extraction hoods (which could cause spots on the surface of the fresh concrete products), they are electrically heated to a temperature of 40 °C.

Due to the closed curing chamber, the operators now no longer have a direct view of the finger car, the elevator/lowerator and the racks. However, the employees have very quickly familiarised themselves with the new organisation of the workplace and there have been no negative effects on the quality of the work.

A solution here could be to install cameras in the curing chamber and monitors in the operation booth, allowing a constant view of the working area of the finger car. However, additional windows can also be installed for a better view of the working area of the finger car. Most operators feel better if they have a possibility to keep an eye on the elevator/lowerator. Especially when they have been used to doing so for years.

In this case Kraft Curing offers heated and insulated windows, allowing a constant view of the interior without heat and humidity being lost. An insulated roller shutter offers the possibility for a fork-lift truck to drive into the area, while an insulated personnel door with a safety interlock offers access for the operators.

As already mentioned, the installation and commissioning took place in March. A few days after completion of the assembly and the connection of the propane gas, the commissioning was carried out by an engineer from Kraft Curing, assisted by one of the customer's employees.

The commissioning took five days in total and encompassed the commissioning of the system, the system settings and a slow heating up of the curing chamber to the necessary curing temperature and relative humidity - normally between 35 °C and 40 °C and between 85 % and 95 % relative humidity.

24 temperature and humidity sensors constantly supply data indicating the climatic conditions prevailing inside the curing chamber.

The system for the distribution of air in the chamber is adjusted on the basis of these measured results. The final display of the temperature and humidity serves the customer as proof of the homogeneity of the curing environment. Following the completion of the commissioning the operators were trained.

Investment pays off

The plant in Kalisz was able to switch to three-shift operation. Strength tests carried out have confirmed that the paving stones can be packaged after just 12 hours in the curing chamber. Kerbstones can be packaged after 16 hours and no longer need to be produced on a Friday so that they can harden over the weekend – which makes production scheduling much more flexible. The most important goals of the investment - i.e. the transition to three-shift operation and the resulting increase in production - were achieved. At the same time the colours of the paving stones are now more uniform, regardless of the area of the curing chamber in which the stones were placed for curing. The quality of the edges and corners of the products has also been improved. In the new situation Libet can produce the whole year round with a recipe that was actually designed for summer. The 2 to 3 % reduction of cement consumption achieved as a result in summer is an indisputable success. Libet is able to save a further 5 % cement in particular in spring and late autumn.

FURTHER INFORMATION

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