

Kraft Curing Systems GmbH, 49699 Lindern, Germany

## Consistent Colors, Efflorescence Prevention and Cost Reduction

“An Unexpected Solution”, this is the comment from Superbet owner Josef Zawadzki when discussing his experience with his installation this year of Kraft Curing’s Quadrix® Accelerated Concrete Curing System. Started in 1983, Superbet is a small to mid-sized company operating with highly efficient production equipment, qualified employees and well-organized operational structure. The company focuses on continual improvement and innovation.

Currently, Superbet operates 2 Omag and 1 Zenith production machines as well as a high performance ready-mix plant. The company has specialized in the production of value added products via its Feeria Color and Aqualine equipment, for which Superbet has received several awards including “Quality of the year” and “Innovation market leader”.

The name Superbet is in the Wojewod-schaften Mazowieckie, Podlaskie and Lubelskie – the area between Warsaw and the Polish border to Belarus in Łosice, Poland – very well known. Since 2012, concrete products are also exported to Belarus. As the company is operated in the name of the owner, it is very important that Superbet maintain its trustworthy reputation. The reputation stands perhaps and most importantly for product quality.

The market for concrete products has expanded over the last few years. There are a number of new products, especially in the area of value added products where customers place an especially high emphasis on quality. Often during the production of these products, complaints regarding efflorescence and inconsistent colors are received, although according to DIN and EN-BS 1338:2005, these are not defects. Customers do not accept this logic. They expect that - along with technical and functional characteristics such as strength, resistance to freeze-thaw and durability – they are also guaranteed color quality and consistency. One of the primary goals at Superbet is to understand and meet the requirements of the customers. Thus, it is important for Superbet to find solutions for problems including efflorescence and inconsistent colors. The solution came quite unexpectedly.

In early 2015, at the ZBI congress (next year ICCX Central Europe) near Warsaw, Josef Zawadzki spoke to Kraft Curing about his challenges. “I was skeptical. Many sup-



*Superbet is located in Łosice, Poland*



*Superbet is dedicated to producing high quality valued added products.*



2001 – Transfer Area with 11 individual curing chambers and insulated doors



2015 – Single Atmosphere Curing with transfer car area and open rack area curing at 30°C and 90 % rH.

pliers promise lower cement costs, better quality, higher strength and reduced efflorescence. I have stopped believing these stories, but I have a long and successful

relationship with Kraft's Polish Sales Manager, Mr. Jan Kania (who, as the Omag Sales Manager, worked with Mr. Zawadski on the Omag installation). Kraft

organized site visits to other paver producers using the Quadrix curing system, I was impressed with the results that I saw, Mid 2015, Superbet installed the Quadrix® Accelerated Concrete Curing System which is comprised of 4 main elements:

- Quadrix® Air Circulation System for +/- 1 °C and +/- 3% rH curing consistency throughout the entire curing chamber with an air speed of less than 1 m per second.
- Temperature measurement, indication and control for a consistent temperature equal to 35 °C throughout the year – every day is like summer in the curing chamber.
- Humidity measurement, indication and control for the addition of moisture when the curing humidity is too low and humidity extraction when the humidity is too high.
- AutoCure™ Automatic Climate Measurement, Indication and Control via multiple temperature and humidity sensors which provide for the perfect climate, every day, all year.

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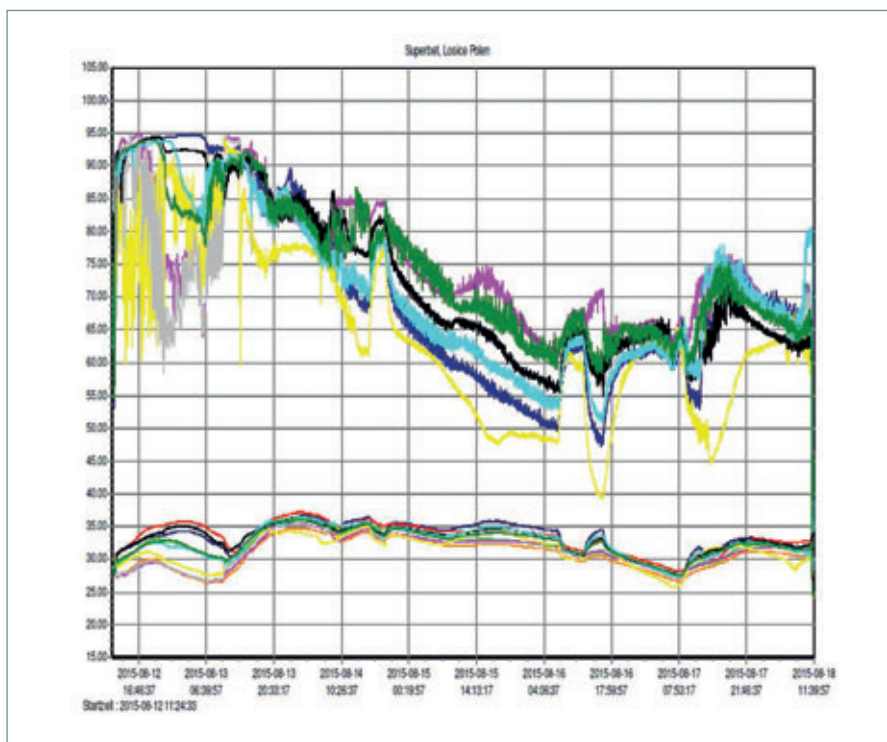
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Quadrix 300-150 Heating & Air Circulation Unit with Nautilus™ air distribution duct prior to and after



The chart indicates the curing chamber as it is being balanced – increasing temperature and relative humidity consistency

As a great deal of the system installation is completed outside of the curing chamber, the equipment could be installed during a 2-shift production schedule.

Air distribution duct located inside the chamber was installed during off-production hours.

In addition, warm moist air that escapes from the chamber through the wet/dry side product openings can be a nuisance in the production area; causing fog and condensation to form on building steel and drip on equipment, control cabinets and personnel. Kraft Curing’s exhaust hoods eliminate this issue by capturing the air via aluminum

hoods and circulating it back to the curing chamber.

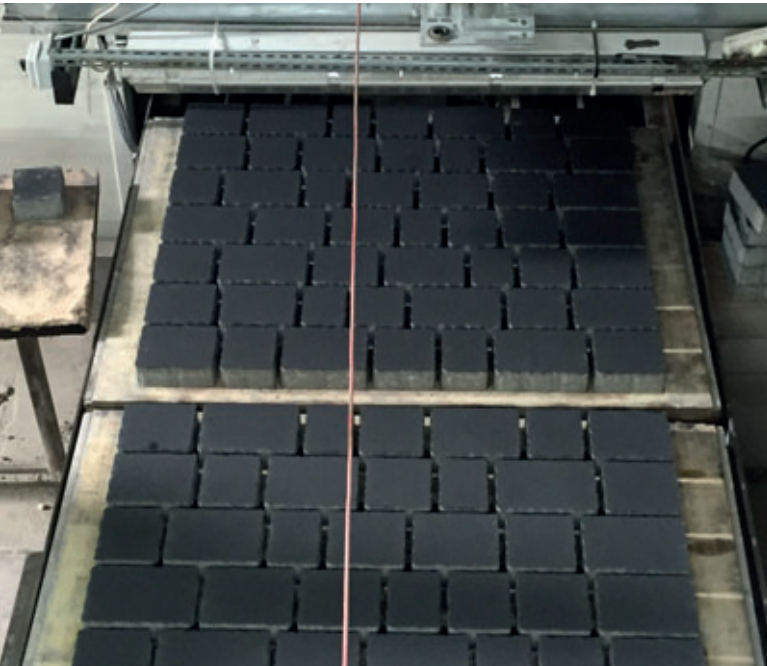
Windows or closed circuit cameras provide for visual inspection of the elevator and lowerator operation. After many years of access to these critical areas, many operators feel more comfortable with the ability to have visual access to the elevator and lowerator.

A double hung insulated door provides access for a forklift truck into the transfer car area, while an insulated personnel door with safety interlock provides access for operating personnel.

Additional windows may be added for greater visibility of the transfer car area. In such cases where this is requested, Kraft Curing offers heated insulated windows to prevent heat loss and condensation, which impairs visibility.

As in most cases, the insulation team consisted of 5 customer supplied installers and 1 Kraft Curing engineer. The installation duration for the curing system was a total of 11 days. This did not include insulation of the chamber and transfer car area, which had been completed previously.

Upon installation completion, equipment commissioning, customer training and system balancing and climate data logging required an additional 5 days. During this time, the chamber is slowly heated to the desired curing temperature and relative humidity – usually between 35 °C and 40 °C and between 85% and 95% rH.



*Superbet paver products exiting the curing chamber: high quality, high early strength, strong consistent colors without efflorescence.*

While the chamber is slowly heated and moisture controlled, a total of 20 temperature and humidity loggers are located and record the climate throughout the chamber.

The air distribution system is balanced according to the results and a temperature and humidity graph is produced for the customer as proof of the consistency of the curing environment. The chart indicates the curing chamber as it is being balanced – increasing temperature and relative humidity consistency prior to raising the temperature and relative humidity.

Since the installation of the new curing system Superbet has seen the following results:

- Completely consistent colors
- Higher early strengths
- No efflorescence
- Reduced complaints
- No handling issues after 8 hours curing
- No condensation
- No equipment issues due to the curing climate
- 5% cement savings
- €0.03 per m<sup>2</sup> energy costs

“As the owner of Superbet, the satisfaction of our customers is extremely important. My wife and I are very satisfied with our investment in the Quadrix System. We have experienced a noticeable improvement in color consistency and reduction in efflorescence therefore a cost reduction through less complaints. Our customers are very pleased with our products and are happy to recommend our products. The key to success is customer satisfaction and increasing our product consistency plays a significant role in the quality of our products.”

When asked his opinion of the Quadrix curing system, Wojciech Gatecki – Production Manager for over 9 years – stated „We see

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## PRODUCTION PALLETS FOR THE CONCRETE INDUSTRY

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Behind the succes of Superbet is the hard work and dedication of Mr. Josef Zawadzki, Mrs. Jolanta Rola-Zawadzki and Mr. Wojciech Galecki, Production Manager.



Attention to Quality and Detail throughtout the Superbet operation includes the order and cleanliness of the stock area. All cubes are palletized, professionally packaged with the Superbet logo, protection foil and all layers are separated to allow for air circulation and to protect the surface from blemished caused by transportation.

a consistent climate (temperature and humidity) throughtout the curing chamber, regardless of the season. The compression strength testing we have done has shown that there are no differences in strength regardless of which level the product is

located in the curing chamber. We utilize less cement than previously with lower curing temperatures. After 8 hours, our products are hard enough to cube. This allows us to operate in 3 shifts – even at the end of the production season. Although we have

not completely ended our study in cement reduction, our results so far are very gratifying.” As a result of these benefits, Józefa Zawadzki has placed an order for a Quadrix System for the 2<sup>nd</sup> Qmag production line. ■



Superbet's show garden

FURTHER INFORMATION

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