Kraft Curing Systems GmbH, Lindern, Germany

Engineering the Future of Accelerated Curing

April Kraft, Kraft Curing Systems GmbH, Germany

Founded in Sanford, Maine, in 1927, Genest Concrete Works Inc. has built its reputation on producing high-quality concrete products throughout New England. Today, the fourth-generation, family-owned company, managed by Matt and Christopher Genest, manufactures concrete masonry units, paving stones, retaining wall systems and architectural concrete products for residential, commercial and infrastructure applications across the region. Continuous investment has long been part of the company's philosophy. When Genest reached the point where it needed more production capacity in its paver plant, curing became an important part of the expansion plan. "We got to the point where we needed more production in our paver plant. So we needed curing, and in doing so it was an opportunity to expand our plant as well," explains Christopher Genest. Genest was already familiar with Kraft Curing Systems, having installed a Kraft direct-fired vapor generator accelerated curing system in its concrete block operation in 2023. Building on that experience, the company again selected Kraft for the new project. "Kraft Curing has been just fantastic through this whole thing," says Genest. "Michael and everybody in the organization is just a wealth of information. They really care about the end product and what they're doing to help you out. I've been talking to Michael for years, and it was an easy decision for me." The result is the first installation of Kraft® Curing Systems' patented Curing Rack System in the United States. Patented in both Europe and the United States and already implemented in Europe, the concept integrates the rack, curing chamber and air distribution system into one controlled curing environment.

Expanding Curing Without Stopping Production

For Genest, one of the most important project requirements was the ability to expand while continuing to produce. The new curing chamber, finger car, elevator and lowerator were installed as part of an addition to the existing building, allowing the main production area to remain in operation during construction.

"It was important for us to be able to continue to run while under construction," Genest explains. "And this type of system allowed us to do that." Moving the curing racks outside the existing production building also opened up valuable space inside the plant. According to Genest, the addition created more room for packaging and for employees to move around, while making the production area brighter and more open.

Genest Concrete Works installs the first patented Kraft Curing Rack System in the United States

Unlike conventional racks, the Kraft Rack System is an integral part of the curing process itself.

The foundation itself formed an important part of the chamber's thermal design

The construction itself began below the curing chamber floor. Genest incorporated foamed glass aggregate supplied by Aero Aggregates beneath the chamber slab, together with additional hydrophobic insulation at exterior slab locations and at the transitions to the production building. The insulated sandwich-panel chamber was then carefully foamed, sealed and caulked at the wall, floor and ceiling connections to reduce thermal bridges and retain heat and moisture.

Precision was equally important for the rack and rail installation. The Kraft Rack System uses a pre-levelled steel base to establish a common reference plane. Transfer car rails are mounted on structural I-beams that are chemically anchored to the foundation and supported with self-compacting grout. High-wear rail sections at the rack entrances, elevator and lowerator remain accessible for future repair or replacement without extensive concrete demolition.

Following completion of the foundation, installation of the structural steel and rail system began.

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Kraft engineered a fully integrated system in which the rack structure, chamber construction, airflow distribution, heating, humidity control and automatic process control operate as one coordinated solution.

A Curing Rack Designed Around the Climate

The central difference in the Genest installation is that the Kraft Rack is not used simply as shelving or storage. The rack structure is part of the curing system itself.

The rack columns and transfer car structure function as warm-air supply ducts. Heated air from the Quadrix® air handling system travels through the main ductwork and down through the columns before leaving adjustable registers close to floor level. From there, the conditioned air moves upward through the products and returns through the integrated air system.

Introducing warm air at floor level helps reduce temperature differences between the lower and upper rack positions. The transfer car, elevator and lowerator areas are incorporated into the same airflow concept so that these areas remain warm and less susceptible to fog and condensation.

Stabilization passages alongside the racks provide structural rigidity while also creating dedicated space for supply and return air ducting. The rack columns, cross members and shelves are manufactured from Magnelis® coated steel for corrosion protection in the warm, humid chamber environment. Self-forming fasteners and stainless steel pallet guides further support long-term serviceability.

The system is designed around maintaining a uniform curing atmosphere rather than applying heat at isolated points. Quadrix circulates a high volume of conditioned air at relatively low velocity, helping maintain consistent temperature without directing excessive airflow across freshly produced concrete surfaces.

Controlling Heat, Humidity and the Chamber Environment

Temperature and humidity are managed as one process. The Quadrix air handling system provides heating and air circulation, while Kraft's AutoFog® system introduces steam into the warm supply air through stainless steel diffusers. The moving air then distributes the added moisture throughout the chamber.

To support reliable operation, AutoFog is supplied with treated water through Kraft's palletized Version Q water treatment system. The unit combines dual ion-exchange water softening with reverse osmosis for the humidification system, helping reduce mineral deposits in the equipment.

The warm floor helps maintain more consistent curing conditions throughout the rack while the conditioned air rises naturally through the stored concrete products before returning to the Quadrix unit through the integrated return-air system.

Excess moisture is removed through a central extraction system only when required. The overall curing process is coordinated through Kraft's AutoCure® control system, which manages heating, humidity, ventilation and air circulation through a single control platform. The chamber openings were also designed as part of the controlled environment. Heated air curtains at the elevator and lowerator reduce the escape of warm, moisture-laden air, while heating wire in the upper flashing helps prevent condensation above the openings. Heated door frames and insulated access doors maintain the chamber envelope at service and personnel access points.

The Genest installation incorporates Kraft's AutoFog moisture addition system.

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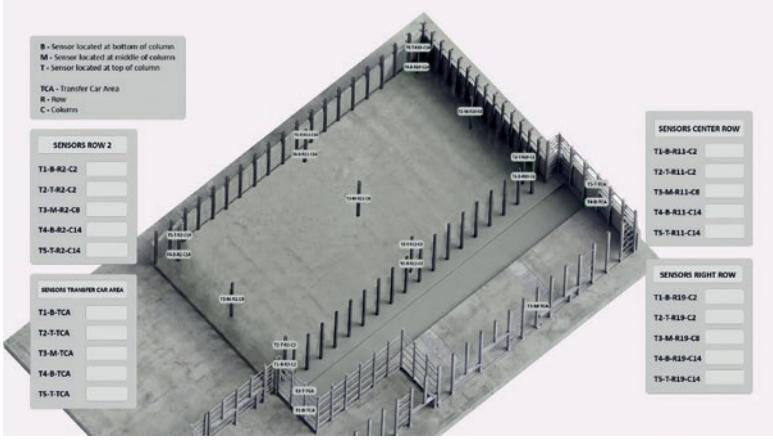
The transfer car, elevator and lowerator areas are incorporated into the same airflow concept.



20 sensors are distributed throughout the curing space

Verifying Uniform Curing

Genest is also the first Kraft project to incorporate the company's new comprehensive temperature monitoring concept. Rather than relying on one chamber temperature, 20 sensors are distributed throughout the curing space to build a temperature profile across the rack. The objective is not simply to reach the correct average chamber temperature, but to verify that products at different rack positions experience comparable curing conditions. The additional measurements allow operators to evaluate the uniformity of the curing environment and confirm that the air distribution system is performing as intended, supporting consistent color and strength throughout the chamber.

Production Flexibility and Early Operating Experience

For Genest, the most immediate benefit has been production flexibility. The company can use the curing chamber for different products while maintaining a predictable next-day production schedule. "The curing allows us to have the flex-

Air circulation throughout the curing chamber is provided by the Kraft Quadrix KC 500-250 air heating and handling unit.

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The rack columns, cross members and shelves are manufactured from Magnelis coated steel.

ibility to make anything we want, whenever we want, and to bring it out of the curing room the next day, no matter what," says Genest. "It offers us tremendous production flexibility." The early energy performance has also been notable. At the time of the interview, the curing chamber had been operating for approximately two months during the warmer season. With fresh product entering the chamber continuously, Genest reported extended periods without using supplemental fuel.

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"We've gone weeks without burning any fuel, and it stays at temperature and the humidity stays where it needs to, and the system performs beautifully," Genest says. "We don't anticipate burning any fuel until the colder months arrive - October, maybe November." The principle is straightforward: as cement hydrates, the concrete releases heat and moisture. Products entering the chamber earlier in the day contribute to the curing environment for products loaded later. The insulated foundation and chamber envelope, combined with controlled recirculation and humidity management, help retain and use that naturally generated energy before supplemental heat is required.

A Customer-Led Investment in Curing

For Genest Concrete Works, the project is more than a new curing chamber. It provided the additional curing capacity the paver operation needed, allowed the plant to expand without interrupting production, created more usable space inside the existing building and added the flexibility to bring products out of the chamber the following day. As the first patented Kraft Curing Rack System installed in the United States, the project also provides North American concrete producers with a practical example of an integrated curing concept in operation. For Genest, however, the measure of the investment is simpler: a curing process that supports the way the company wants to produce today while creating room for future growth. ■

FURTHER INFORMATION

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