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Genest Concrete Upgrades to Vapor Curing and Roller Pigeon-Hole Doors

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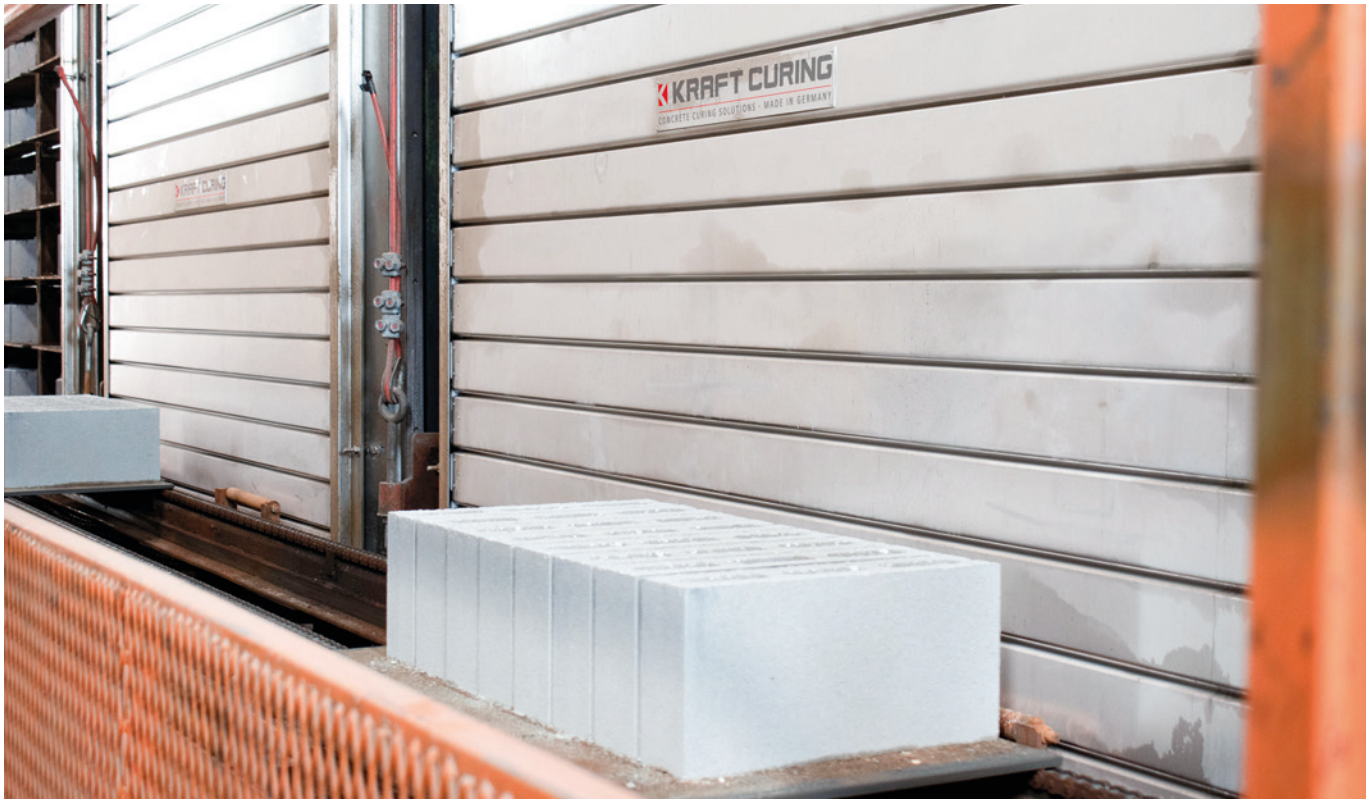
In the town of Sanford Maine, USA, Genest Concrete has been in business since 1927 as a family-owned concrete products producer and has grown into one of New England's largest manufacturers and distributors of concrete landscape and building products for builders, architects, and homeowners. They produce high-end pavers, segmental retaining walls, CMUs and architectural blocks and are innovative in creating unique products like Comfort Block.

Comfort Block (www.comfortblock.com) is a very special building system that not only is fire-resistant and designed to withstand severe weather but also contains up to three layers of integrated insulation for energy efficiency. The Comfort Block system replaces traditional mortar with adhesive for faster, more efficient wall construction and provides an integrated utility channel/cavity which simplifies the installation of the electrical conduit after construction. Like all Genest products, Comfort Block is manufactured with the company's low-carbon formula G-mix, which contains at least 5% recycled content and half the cement of typical concrete blocks. The block plant has been in operation for decades using a boiler based curing system. Due to 60% lower operating costs, safe low-pressure operation – eliminating the need for annual inspections, and higher concrete quality through the controlled addition of heat and humidity, leaders at Genest Concrete decided to look into replacing the boiler system.

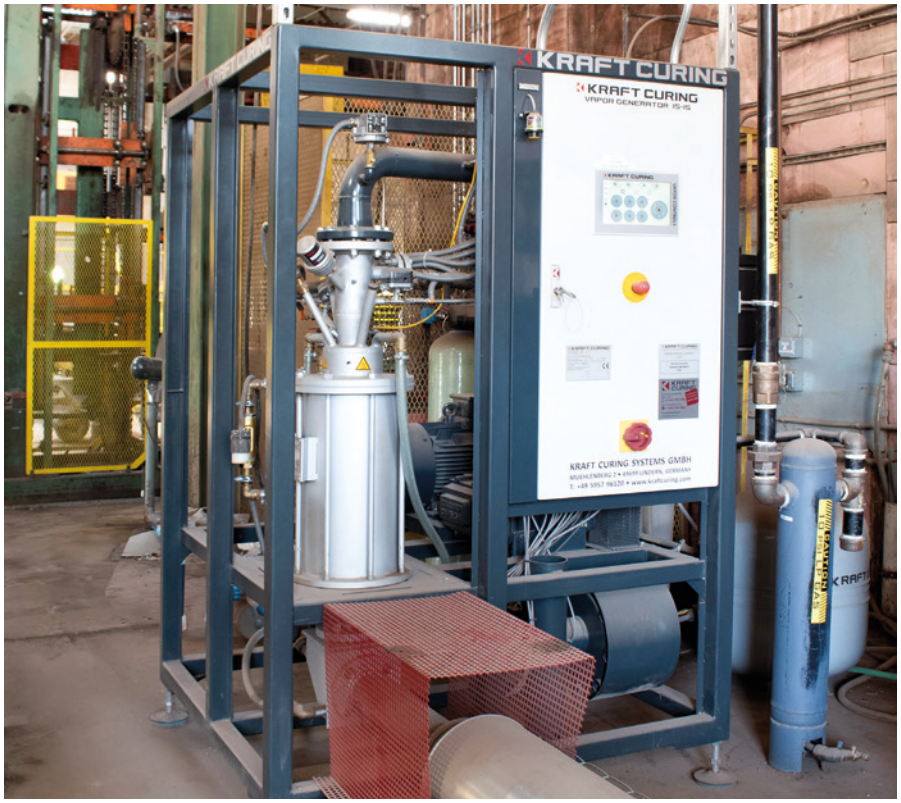
In 2022, Genest replaced the boiler and piping with a Kraft KC15-1S direct-fired vapor generator that operates at 1.5 million BTU/hour at 99% efficiency and includes a stainless-steel combustion chamber with a lifetime warranty and insulated vapor distribution pipe system. Kraft has been working with



Cured Thin Block moving down the ABC conveyor

Kraft Pigeon-Hole Roller Doors on the ABC System

gas powered vapor systems since 1990 that have low CO_2 emissions overall, as the CO_2 is primarily absorbed directly by the concrete products in the curing phase. CO_2 curing benefits the concrete products through added strength and can improve compressive strength by up to 20% in the first 24 hours. CO_2 curing also saves on cement in the mix as it is a more efficient curing process and can reduce the carbon footprint of the concrete operations.



Kraft Vapor Generator 15-1S Replaces Old Boiler System

The accelerated concrete curing system includes AutoCure software to automatically control the chamber temperature. A color HMI touch screen allows operators to change curing parameters as required while in the plant. The service remote access allows customer access through the Access Anywhere mobile app to control and monitor the automatic curing while away from the plant. The curing process may be monitored and changed remotely. Temperature sensors in the curing chambers provide temperature data to the control system. Based on curing temperatures, motorized stainless steel valves open and close to maintain the desired set-point temperature.

The direct-fired vapor generator, in conjunction with chamber temperature sensors and motorized control valves, accelerates concrete strength gain and increases concrete quality through the controlled addition of heat and humidity, providing harder corners and edges and reduces cement consumption. Controlled curing also provides more uniform colors, reduces effloresce and overall provides more consistent quality while reducing hardening time.

After the retrofit was completed, owners Chris Genest and Matt Genest were pleased with the results and looked to continue to update and upgrade their plant with further improvements.

The chamber and rack system in the Genest plant is a somewhat unique system called the ABC system. It includes a gantry system which raises the "wet-side" block supply conveyor belt and the "dry-side" block return conveyor guiding pallets of blocks into and out of the curing chamber via small openings through "pigeon-hole" doors. It is a first-in, first-out (FIFO) system with the wet-side feeding to a dry-side – one pallet of wet (green) blocks enter the chamber and then pushes a pallet of dry (cured) block out of the chamber.

The plant was recently modernized, including a state-of-the-art packaging line, and since the chambers and racks were still in good condition, Genest decided to keep the unique system, upgrade the ABC conveying equipment and turned to Kraft Curing to replace the finicky pigeon-hole doors with modern door replacements.

Kraft designed replacement insulated motorized aluminum roller doors and introduced an automatic chamber exhaust system. Adding an exhaust system to the curing system was critical to establishing the ideal curing curve; after the curing phases of pre-set, ramp and soak, the exhaust phase is used to finish the cycle and exhausts all of the warm wet air from the chamber, effectively drying the chamber surfaces and concrete products while preventing vapor from escaping into the production plant, which could lead to condensation and water dripping on equipment (safety and operational issues) and operating personnel (nuisance).

The exhaust cycle at the conclusion to curing provides many benefits for the concrete block including harder corners and edges, less crumbling and waste on the dry side packaging line and even (straight) splits for split face block.

At the conclusion of the active curing, the exhaust system is activated by the exhaust ventilator and opening the motorized front and rear doors. The fresh air enters the curing chamber from front and back, absorbing moisture from the blocks, racks and inside surfaces of the chamber before being exhausted from the top of the chamber.
The fully retrofitted curing system has been completed since Spring of 2024 and is operating daily, providing consistent curing temperatures. A consistent curing environment provides reliable block strengths – allowing for the possibility of saving a significant quantity of cement due to not having to factor in the effects of seasonal temperature changes.

Kraft Curing Vapor Control Valves to Control Temperature in each Chamber

A View of the Yard at Genest in Beautiful Maine

Drastic Color Difference Between the Green Blocks and Cured Blocks

According to Chris Genest "The upgrades to the plant required that we address the deficits in our curing chambers. Kraft's curing system has allowed us to provide a better-quality product, lower our fuel consumption and reduce the material cost." ■

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FURTHER INFORMATION

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