Kraft Energy Systems, Inc., Fort Worth, TX 76137, U.S.A.

Concrete curing environment for pavers and other architectural and landscaping products at Northfield Block, IL, USA

Northfield Block, an Oldcastle company with locations throughout Illinois, has been in business since 1949. It has built a reputation on aesthetically pleasing and quality products. After Oldcastle acquired Northfield in 2002, the division began a new growth phase and now touts a total of 6 location sites with 12 production plants ranging from the manufacturing of architectural and landscaping products to the addition of secondary processing and decorative stone. In 2005, Northfield Block began construction of a big board plant on a "green-field site in Morris, IL designed to specialize in high-end landscape products. The management team required a curing system and curing chamber that would fit into their quality-driven approach of manufacturing value-added concrete products.

As the Northfield management team began researching and discussing which supplier best addressed each curing specification, it was quickly determined that Kraft Energy Systems, Inc.'s ability to provide a turn-key insulated and galvanized pallet storage rack and curing system solution, reputation and over twenty years of concrete curing experience was the ideal fit for Northfield. Thus began the relationship between Kraft Energy Systems, Inc. and Northfield Block.

Upon analysis by Northfield Block management and Kraft Energy Systems and based on the diversity of products produced for the regional market it was determined that the appropriate solution would need to meet 5 independent parameters:

1) control of the curing temperature,
2) control of the relative humidity (independent of temperature),
3) constant circulation to prevent temperature differences in the chambers
4) enough curing time to allow for in line secondary processing and
5) insulation to reduce energy costs.

Just as importantly, the complete system including chambers, controls, automatic doors and curing equipment as well as project installation supervision and commissioning had to meet very specific project budget constraints.

Based on this information, it was decided that tall deep galvanized racks would be most efficient. Based on Northfield Block's experience with steam, the required concrete product mix and local climate, it was decided that relative humidity control was paramount and would need to be adjustable and monitored throughout the system. The maximum curing temperature was designed based on the cementitious content as well as the curing duration – generally the longer the duration and larger the chamber the lower the curing temperature requirement.

Circulation was required to produce consistent product characteristics such as color, strength and durability no matter where the product was located in the tall deep racks. Quality steel skinned insulation panels were selected for the outside surfaces of the curing chambers to provide a clean bright atmosphere in the plant and to prevent damage. The individual chambers were insulated using temperature and moisture resistant soft sided economical insulation panels for ease of installation and a high level of durability.

With the Quadrix System, Northfield Block could optimally cure over 50 different types of product and meet the specifications required. What made Quadrix the best choice was that it allowed Northfield Block to independently control curing temperature and curing humidity while maintaining constant air circulation which eliminated condensation and increased product uniformity. The curing precision that the system provides is in a category of its own, because it is engineered to create an ideal and consistent concrete curing environment for pavers and other architectural and landscaping products.

The Quadrix system

The system incorporates a stainless steel air heating unit for curing temperature control, a vapor generator unit for humidity control and the addition of carbondioxide and a stainless steel radial air circulation unit for continuous air movement in the curing chambers in order to prevent

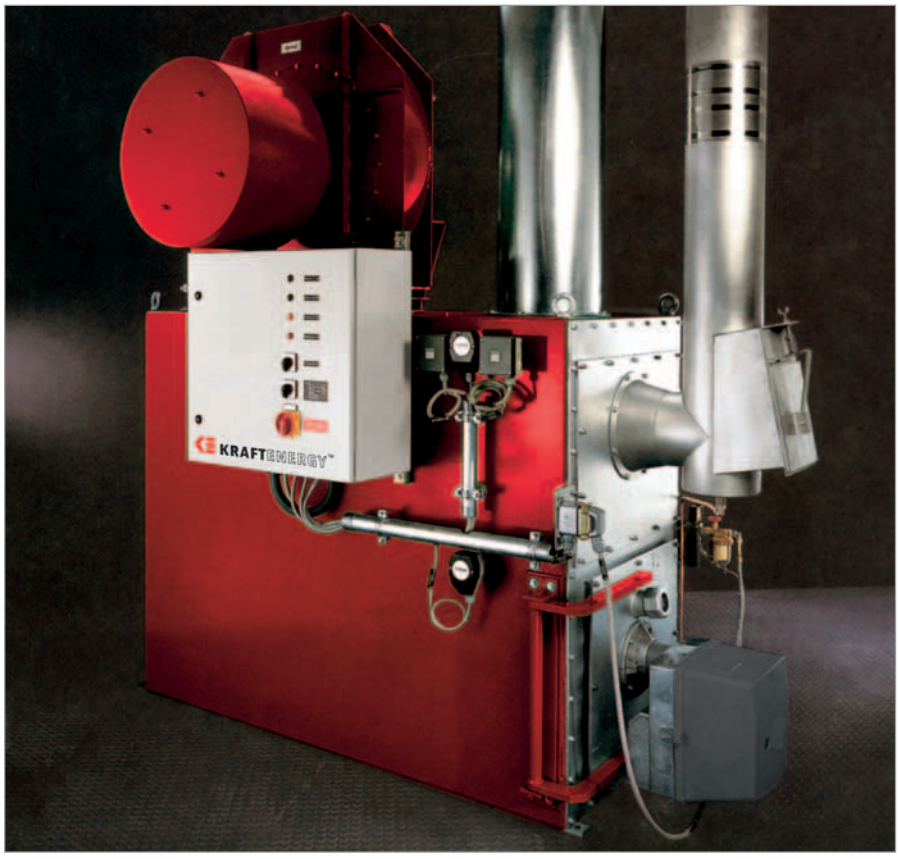
Kraft Energy's high performance ducting system for the circulation element of the Quadrix Curing System.

Northfield Block's transfer car that services both of Kraft Energy's Quadrix curing areas.

condensation and to create a consistent curing environment – preventing differences in temperature and humidity.
An important and unique element of the Quadrix system is the vapor generator – offering a stainless-steel combustion chamber backed with a lifetime warranty, which in any industry exceptional. The chamber provides clean 98%+ combustion efficiency – eliminating the need for a chimney. The products of combustion provide a natural benefit of introducing a small, but effective amount of carbon-dioxide into the curing environment to prevent primary efflorescence and reduce secondary efflorescence.
Finally, by providing moisture to the curing process using warm vapor instead of cold mist, cooling of the curing room is prevented and there are no clogged misting nozzles.

Efficient installation in the Northfield Block plant

Northfield Block has two separate insulated curing areas; each with seven (7) individual chambers so that each chamber may be treated as an independent curing environment. Each of the two (2) curing areas has its own heater, vapor generator and circulation system.
One of the big benefits of the Quadrix system is that it can be installed in stages. Upon installation of Kraft Energy's curing chambers, rails, insulated walls and motorized insulated doors, the air heaters and circulation systems were commissioned as part of Phase I. Several months later, Phase II provided for the installation of the vapor generators which then completed both of the Quadrix Systems. This highly adaptable system is designed and engineered to meet all of the customer's needs, present and future.
Upon a review of the concrete products produced in Phase I verses Phase II it was determined that the final installations of the vapor generators and the circulation systems achieved higher levels of product quality. Once the vapor generator was introduced, Northfield was able to quantify the reduction in efflorescence, thanks to the introduction of the precise amount of moisture and carbon-dioxide into the curing environment from the generator.
Because the plant was reaching desired production levels and the curing system was also exceeding expectations, Northfield increased production from one shift to two ten hour shifts six days per week. The curing cycle for each chamber is set at 20 hours, with a 1 hour exhaust time, providing excellent strength gains, allowing Northfield to implement an in-line secondary process. This new process is sure to help increase market share and end-user awareness within the regions that Northfield Block serves. The flexibility of the Quadrix System enables them to continue to broaden their product line with new methods and new secondary processes due to the quality of the products coming out of the chambers.

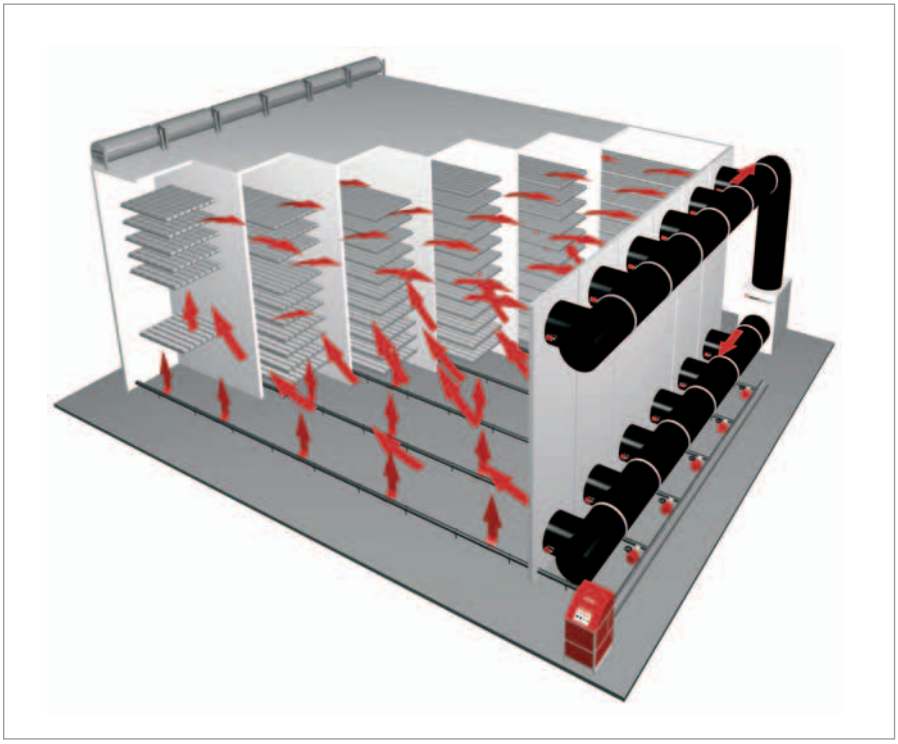


Individual Chamber Quadrix Curing System engineered by Kraft Energy Systems, Inc.

Advantages of the curing system

The revolutionary controllability of the system is one of the primary reasons that the Quadrix System is quickly becoming the cutting edge of the concrete curing industry.

The controls are user-friendly, consisting of touch screen interfaces with color pictures that are easy to learn, easy to set as well as easy to troubleshoot should, the necessity arise. According to Dennis Bollinger of Northfield he likes the "checks and balances" of the system; for example, if a steam valve is told to open by the controls, the system then verifies that the opening of the valve was completed and relays that back to the user through the interface.



Kraft Energy's Aggregate Heating System, Hot Rocks.

This redundancy in the system makes for efficient and precise control of the system. Precision in curing is important to optimize the curing cycle and therefore the hydration process of the cement.

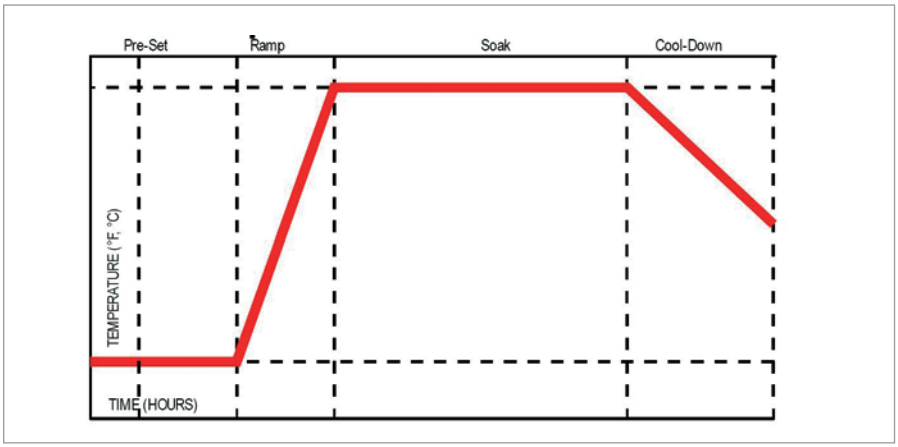
Part of any good relationship with an equipment supplier is that of the customer service department. Kraft Energy strives to provide each and every one of its customers with exceptional customer service prior to the sale, during the installation and throughout the life of the curing system. Being able to troubleshoot over the phone or even to ask what is the best curing cycle for a certain product is only just the tip of what customer service means to Kraft Energy and its personnel. "Kraft Energy's staff and their dedication to the customer keeps us growing and us listening to what the industry needs from concrete curing systems," says Michael Kraft, Vice President of Kraft Energy Systems, Inc.

Additional aggregate Heating system for Northfield Block

In addition to various curing enclosures and curing system solutions that Kraft Energy offers for the block and paver, precast, wet-cast, dry tamp, roof tile, pipe and prestress industries, Kraft Energy offers an aggregate heating system, formidably called Hot Rocks. With decades of block production experience in Illinois, Northfield Block knew that during their harsh winter months they would need to keep producing and would need help. So again, they tapped Kraft Energy to come up with a solution for them that would keep them producing and be energy efficient.

Northfield Block commissioned the Hot Rocks aggregate heating system in the fall of 2005 and as this past winter proved, with temperatures well below freezing and as low as minus 10°F in the Morris, IL, heating aggregate was of great importance to Northfield Block. During the 2006-2007 winter season, many block plants in the Chicago area had to close for multiple days at a time due to frozen aggregates while Northfield was producing. Northfield only had to close down production one day and that was due to the snow on the ground and the poor driving conditions for the fork-lifts.

With a production in excess of 5.7 million square feet annually, Northfield relies on Kraft Energy's systems, knowledge and service to keep Northfield ahead of their competition through consistently producing high-quality and uniform products.



This is a representation of a concrete curing curve, showing all phases of the curing cycle – pre-set, ramp, soak and cool-down.

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