



Customer

Brock USA, Lumber City, GA

Equipment

Bulk Material Heat Exchanger (BMHX)

Application

Brockfill™ – a granular, organic wood-based product used to replace the rubber used on artificial turf fields.

Per Brock - Brockfill™ is a highly engineered wood particle infill specifically designed to improve traction and reduce artificial turf heat. It's made from a species of southern pine grown, harvested, and replanted in continuous cycles. Through an 11-step conditioning process, we created a durable, affordable, and renewable organic infill produced here in the USA.

Overview/Challenge

In 2015, Brock began working with a specialized group of universities, sports testing labs, Ph.D. scientists, engineers, horticulturists, and other sports science experts to develop a viable and sustainable solution to replace rubber infill for artificial turf. The result, Brockfill™, has been installed on 10 million ft² of turf in the US since its launch in 2019.

To market and export the new product to Europe, an additional process was required to sterilize the product per international regulations. The process involves a heat treatment that destroys invasive species such as insects and plant pathogens to prevent their spread.

Brock Requirements:

- Heat wood granules to >133°F and hold for 30 minutes
- Satisfy the international guidelines for exportation
- Select the most economical and efficient processing equipment
- Process a rate of 8 tons / hour

Carrier/CPEG Processing Equipment Considered:

- [Spiral Elevator](#) – Carrier Vibrating Equipment
- [Fluid Bed Dryer](#) – Carrier Vibrating Equipment
- [Rotary Dryer](#) – Heyl Patterson Thermal Processing
- [BMHX](#) – Carrier Vibrating Equipment

Our recommendation is on the next page.



Solution

After considering all the Carrier / CPEG thermal technologies for this application, a Bulk Material Heat Exchanger (BMHX) was recommended.

This equipment will:

Meet customer requirements for temperature and residence time and satisfy international regulations for sterilizing the material.

Offer an economical solution using highly efficient, indirect heat transfer technology without the need for an air handler or dust collection system.

Provide a compact footprint.



BMHX
Bulk Material
Heat Exchanger

Results

Brock scheduled material process testing in the Carrier/CPEG state-of-the-art testing laboratory. They arranged delivery of two super sacks of Brockfill™ and flew to Louisville, KY to witness the lab testing.

Testing with the BMHX validated the design showing that the solids could be indirectly heated to the required temperature and flow evenly through the device using a mass flow discharge feeder. The pilot testing provided Carrier/CPEG with the necessary lab analysis and data to offer a performance warranty on the proposed equipment.

Brock approved the design with the following additional specification requirements:

- PLC control system & essential instrumentation
- ASME stamped plate coils
- 304SS product contact surfaces
- Feed screw conveyor



The final production unit features a PLC-based control system that controls two independent temperature zones. The system measures and records temperatures for each zone and adjusts the thermal fluid flow to keep the lowest measured temperature for each zone at its respective setpoint. An alarm will sound when the temperature drops to near 133°F, ensuring all material is heated to the minimum specification of 133°F.



The system also controls pneumatic vibrators mounted on the unit to provide smooth flow of the material. The discharge rate is controlled by the PLC to ensure that all material has a dwell time in the unit of at least 30 minutes. The BMHX provided an economical and efficient processing solution because it has a low capital investment cost and does not require air permitting since the product is indirectly heated. Ancillary equipment such as fans and air filtration systems are not necessary.



Brock received confirmation from the U.S. Department of Agriculture that the heat treatment process and equipment meets the regulation to export Brockfill™ to Europe.

We're glad we could partner to make that happen.

For more information on BROCK USA, visit their site at brockusa.com

With Carrier's expertise on a wide variety of thermal and dry solids processing equipment, they were able to evaluate several technologies, and recommend the most economical and efficient solution to meet our requirements to expand our market overseas.

— John Shaffer,
Director of Manufacturing
and Design Services



Learn more about:
[Bulk Material Heat Exchangers](#)



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