

Potash WORKS

North America's premier publication
dedicated to the promotion,
production and distribution of potash

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LOOKING BACK AT 2022:
A year in the potash industry

Helping industry produce premium potash

Building a gender-balanced workforce at Jansen

Potash cooling comes full circle

HOW MOVING BED HEAT EXCHANGE TECHNOLOGY CAN HELP IMPROVE YOUR OPERATIONAL ENERGY CLIMATE

BY IGOR MAKARENKO

Potash operations worldwide are in the midst of wide-sweeping modernizations that are being increasingly fueled by producers' collective pursuit of a net-zero future.

Cleaner, more sustainable alternatives to traditional practices are emerging throughout the potash production process chain, ranging from sustainable extraction methods to water recycling and everything in-between.

As such, today's technologies are being expected to do more – and how they do it is just as important.

Moving bed heat exchangers (MBHEs) based on vertical plate technology have long been prevalent at the cooling stage of potash operations around the world – favoured for being robust in their design, efficient in operation, and consistent in producing a high-quality finished product.

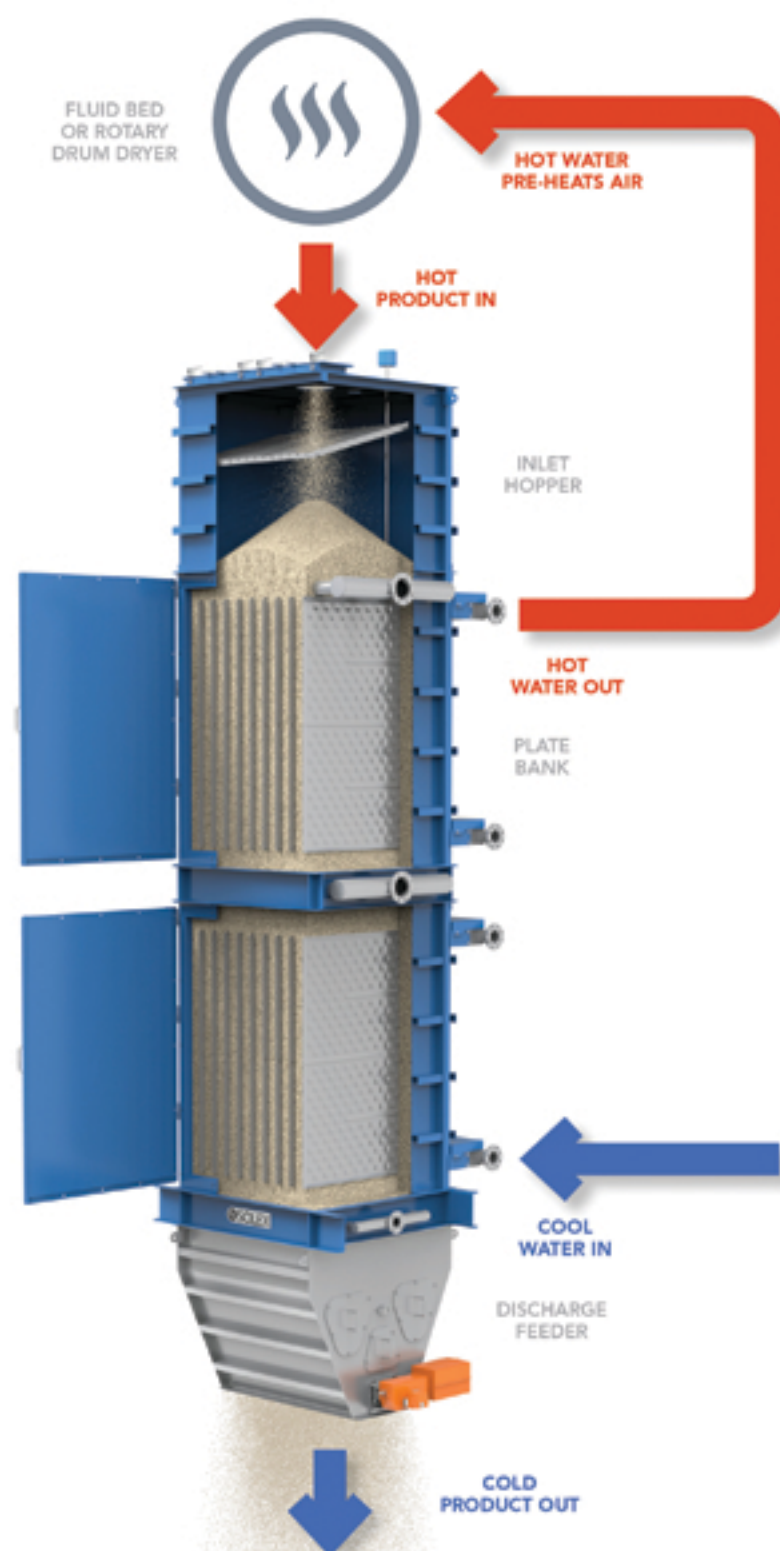
More recently, these MBHEs are providing potash producers with an important opportunity to recover energy for use elsewhere in the plant. And in doing so, they are further cementing a compelling OPEX case at a time when the industry needs it the most.

How it works


MBHEs based on vertical plate technology start by accepting free-flowing potash into a tower-like unit at temperatures around 120°C or higher. The material, granular or fine, then slowly passes between a series of parallel plates that contain water or other heat transfer fluids flowing counter-current to the potash.

The plates transfer heat from the potash to the heat transfer fluid, cooling the potash as it slowly and uniformly flows downward, controlled by a discharge feeder. The potash exits the MBHE at a temperature of around 60°C or lower.

As the potash is cooled, the MBHE produces a hot transfer fluid that can provide low-grade thermal energy to be used



In this example, the hot transfer fluid produced in an MBHE can be used to pre-heat combustion air, via a preheater, in equipment such as a fluid bed or rotary drum dryer. Photo courtesy of Solex Thermal Science.



A decarbonized solution for potash production

**Improve your operational energy climate while
ensuring a high-quality finished product.**

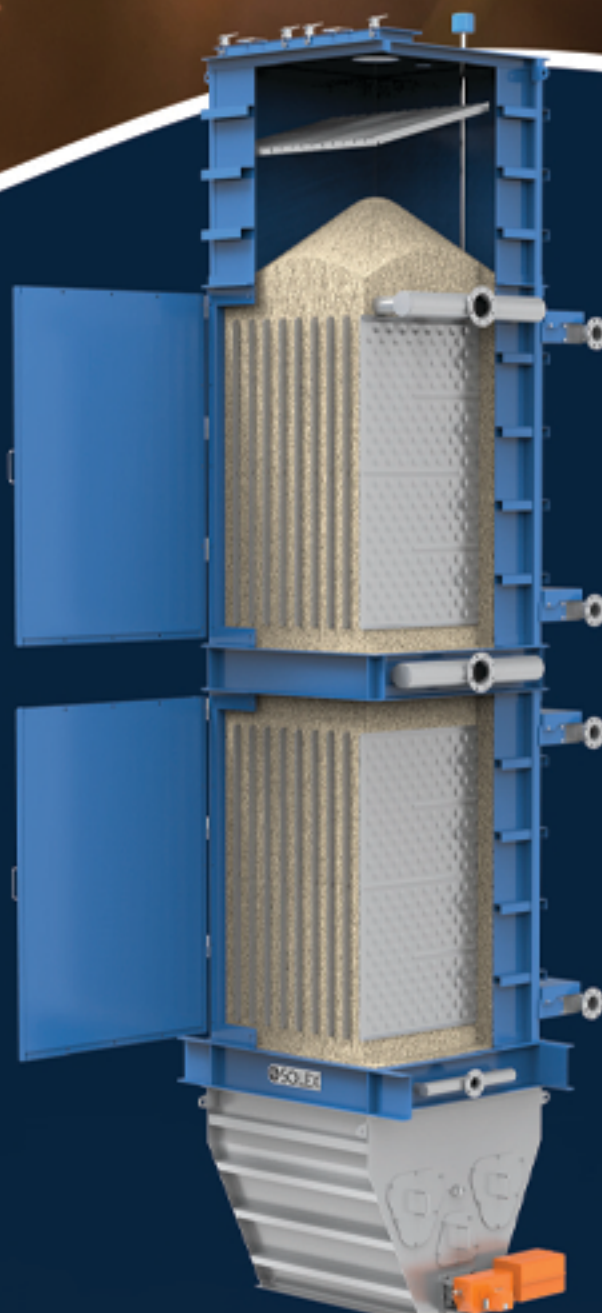
Proprietary heat exchange technology developed
by Solex Thermal Science allows you to:

- Recover and re-use low-grade energy
- Improve efficiencies at drying/cooling stages
- Reduce energy required for cooling

+ Guaranteed thermal performance
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elsewhere in the plant. For example, the fluid can be used upstream to pre-heat combustion air via an air-to-fluid preheater used in equipment such as a fluid bed or rotary drum dryer – significantly reducing the amount of natural gas needed.

Alternatively, that thermal energy can be used to pre-heat air that is used to trim dry the potash. This trim drying stage – which occurs after the potash has been processed within a rotary drum or fluid bed, and within the upper section/s of the MBHE – allows producers to meet moisture targets more efficiently.

Lastly, the MBHE does not rely on ambient air for cooling and does not need a lot of energy to get the job done. It's estimated that it takes just 170 kW to effectively cool 100 tph of potash.

In comparison, direct-contact cooling methods such as fluid beds or rotary drums require significant air-handling equipment such as high horsepower fans, air chillers, and air pre-heaters. That translates into an energy requirement of as much as 1.7 MW to cool 100 tph of potash – 10 times more than an MBHE.

Final thoughts

Reducing primary energy consumption, such as natural gas, is at the top of many potash producers' wish lists. In Canada, for example, it's estimated that natural gas represents almost 80 per cent of total energy consumed annually within the potash industry – energy that generates both direct and indirect greenhouse gas emissions.

As such, industry players in Canada such as Mosaic Company, K+S Potash Canada, and Nutrien have all pointed to ongoing investments into many different energy-use and emission-reduction initiatives meant to reduce their operating costs, improve efficiencies, and decarbonize their operations.

MBHEs based on vertical plate technology offer an OPEX-friendly solution that can significantly improve a plant's overall energy climate. In addition to cooling potash with greater efficiency, these MBHEs offer a convenient, straight-forward process of reutilizing low-grade energy that would otherwise be wasted.

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