

MORE THAN A HEAT EXCHANGER

When dealing with Solex for your cooling, heating or drying of bulk solids, you get more than a heat exchanger. You get a custom engineered solution that is designed using advanced thermal and flow property evaluation methods.

GUARANTEED THERMAL PERFORMANCE

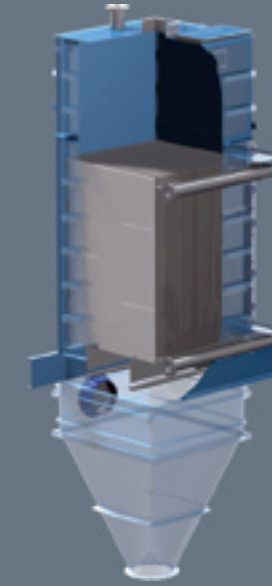
Every project undergoes a detailed three phase engineering assessment to ensure optimal heat exchanger design and sizing. The three phase assessment process includes, Lab testing, Theoretical Modeling, and where necessary, Pilot Testing. This detailed engineering process results in a heat exchanger design that comes with guaranteed process and thermal performance.

ABOUT SOLEX

Sorex Thermal Science is a privately held company specializing in the science of heating, cooling and drying bulk solids. Sorex has extensive experience, having designed and installed more than 250 heat exchangers in more than 43 countries world wide.

The company holds the patents to its exclusive SIGMA Series cooler, ALPHA Series heater, and DELTA Series dryer technologies designed specifically for use with free flowing bulk solids such as sugar, fertilizer, chemicals, plastics, biosolids, minerals, and many other types of granular, crystals and powders. The original cooler technology was invented more than twenty years ago, and acquired by Sorex in 1999.

The company's strength is in the rich knowledge and experience of its people. The world leading innovations produced by Sorex come from a committed team of employees who have been involved in the development and application of the exclusive bulk solids heat exchanger technology since its inception.



*Sorex's SIGMA Series
Bulk Solids Cooler*

WORLDWIDE TECHNICAL SUPPORT

Sorex heat exchangers are designed to provide guaranteed performance and are backed by on-site world wide technical support to ensure that every cooler, heater and dryer meets your process requirements.

Technical services are provided directly by qualified Sorex technicians, including start-up and commissioning, warranty and on-going after sales support.



WORLDWIDE CUSTOMER SUPPORT TEAM

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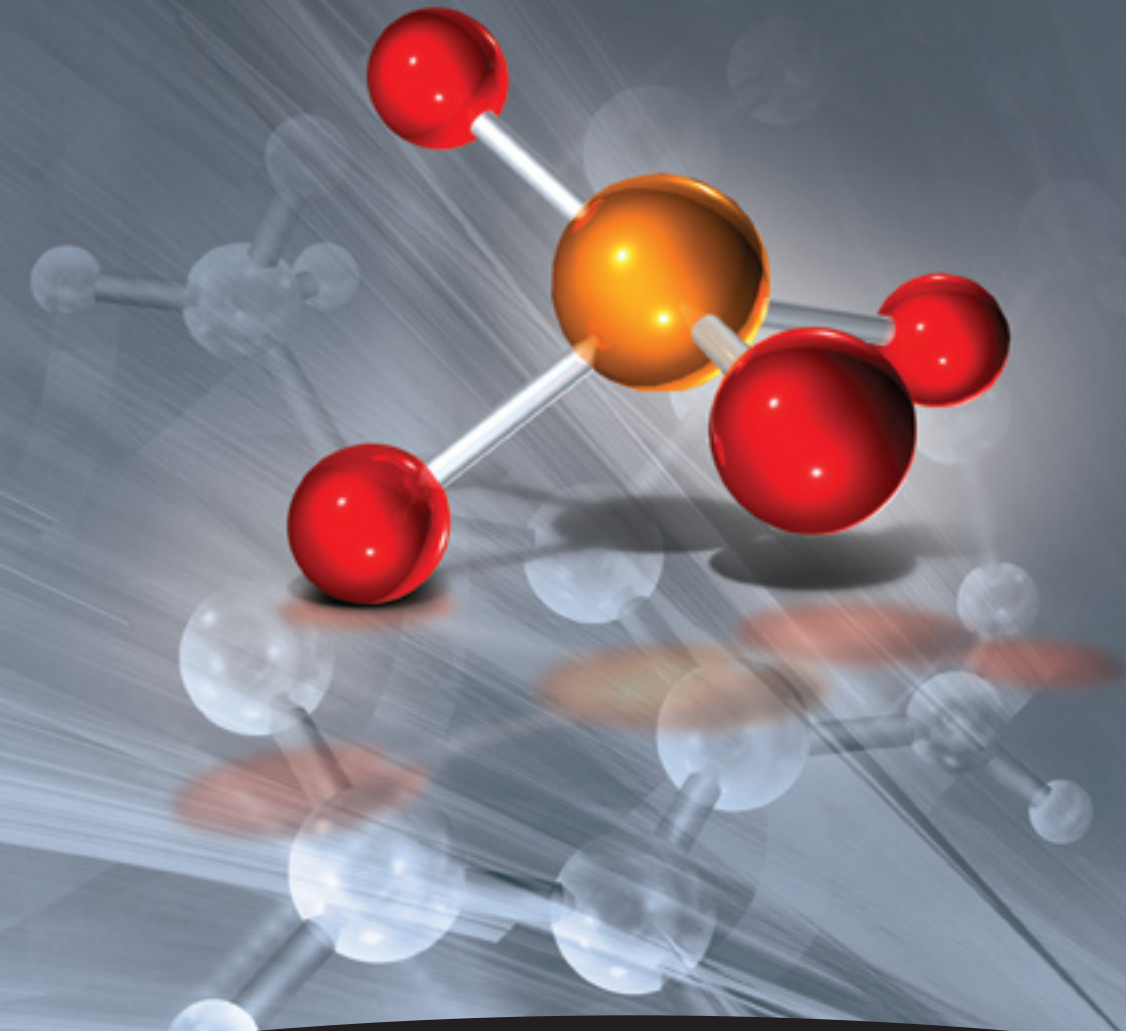
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PHASE 1: LAB TESTING

Lab testing evaluates the flow characteristics and thermal properties of the bulk solid material.

This phase consists of the following tests:

Material Characteristics

Material characteristics of the product sample are tested to determine particle size distribution, bulk density, moisture content and angle of repose.

Flowability - Optimal Plate Spacing

Flowability testing determines the optimum heat exchanger plate spacing to ensure that the material will flow without bridging or blocking. This test work is carried out in a transparent test chamber fitted with heat exchanger plates. The material flow pattern is observed at various plate spaces to determine the critical clear space required between the plates that allows free and uniform product flow.

Mass Flow

Mass flow testing (shear cell testing) is carried out to determine material flow characteristics to ensure that mass flow (uniform velocity) is obtained in the equipment, particularly in a mass flow discharge hopper. Shear cell testing is conducted by Solids Handling Technologies (Joe Marinelli). The Solex mass flow hopper design is based on mass flow principles of Jenike & Johanson.

Thermal Properties

Determining the thermal characteristics of a bulk solid material is critical for heat exchanger design. The two key variables that define the thermal property of a material are; Thermal Conductivity, and Specific Heat.

Thermal conductivity testing provides the measure of how well a material conducts heat. The thermal conductivity of a bulk solid is dependant on base material composition, size distribution and temperature. Since the thermal conductivity is sensitive to many variables, Solex measures this in its lab using an advanced hot wired method.

Specific heat defines the thermal capacity of the material. The specific heat values are normally readily available for most materials and testing is not usually required to obtain the necessary data.



Lab testing at Solex's Calgary facility

PHASE 2: THEORETICAL MODELING

Solex uses its proprietary thermal modeling software, ThermaPro, to accurately predict product temperature profiles of the bulk solid material at each point through the heat exchanger.



ThermaPro, the proprietary thermal modeling software developed by Solex, provides 100% accurate predictions of final product temperatures based on material thermal properties and process requirements.

The Problem

Producers of bulk solids need to feel confident that the final material temperature exiting the heat exchanger will meet their process requirements. Conventional heat exchanger equations for calculating heat transfer do not allow for the variables that exist in a bulk solids heat exchanger, making it difficult to calculate final product temperatures.

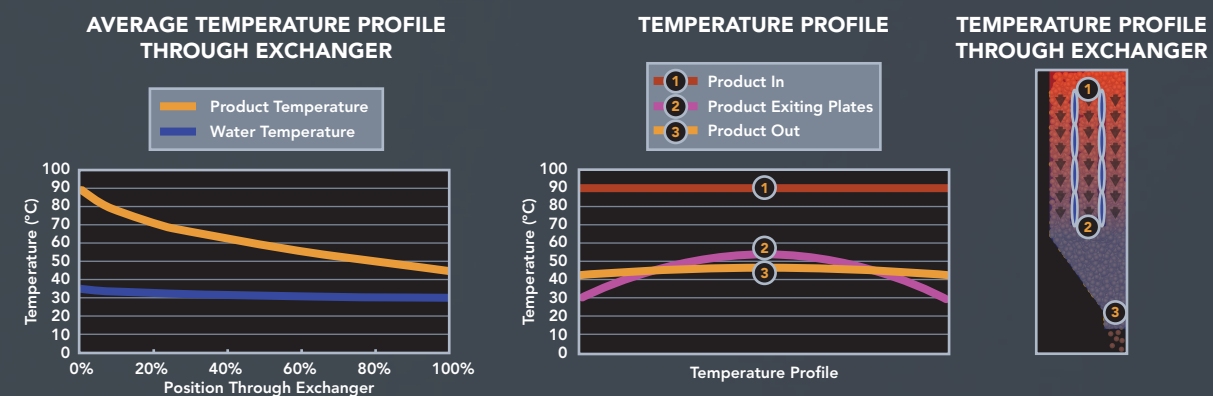
The Solex Solution

As world leaders in the science of bulk solids heat exchange, Solex developed its own proprietary thermal software program to solve the equations that define the heat transfer of a moving bed of bulk solids passing with uniform velocity between water cooled plates.

This modeling software performs detailed thermal calculations based on inputs of key process and material parameters, such as:

- Product flow rate
- Product temperature
- Heat transfer media temperature
- Material bulk density
- Material specific heat
- Thermal conductivity
- Heat exchanger plate spacing

The Solex thermal modeling software accurately generates product temperature profiles of the bulk solids material at each point through the heat exchanger. The temperature profile provides customers with a guaranteed thermal performance and accurate predictions of product temperatures.



PHASE 3: PILOT TESTING

When necessary, on-site pilot testing is performed to verify the operability of the Solex heat exchanger under true process conditions.

Pilot testing verifies the performance of the Solex heat exchanger under true process conditions. Pilot testing is performed with test units that closely duplicate full size equipment.

Pilot testing helps to confirm the following:

- Validation of thermal performance
- Product flowability under true process conditions.
- Performance over an extended time period.
- Successful operation through typical plant cycles including possible upsets.
- Successful operation with a typical product mix in a plant that produces more than one product.



THE RESULT

Guaranteed thermal and process performance.
Stable final product temperatures are guaranteed!