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“Low shear” Contherm scraped-surface heat exchanger

For shear sensitive and particulate laden food products

As the variety and number of available prepared foods increase, customers are now seeking more dynamic heat transfer solutions to keep up with consumer demand. Specifically, more and more new products incorporate large, delicate food particulates that need to maintain a consistent size, texture and flavor. As a result, Alfa Laval has invested in research and development to successfully develop a modified rotor that will produce optimum, low shear results for prepared foods containing large or soft food particulates.

A Contherm tested, customer approved solution

In order to prove the Contherm’s ability to gently process particulates in a low shear environment, dozens of pilot plant tests were performed using industrial size Contherm equipment on a variety of particulate and shear sensitive products. The objective was to identify the Contherm rotor design that best maintained the shape and texture of these shear sensitive products. Alfa Laval designed, manufactured and tested a variety of entirely new rotor concepts in order to compare the impact on particulate identity, thermal performance and clean-ability. Testing later confirmed that a 2 inch / 51 mm diameter rotor with two support pins per scraping blade consistently outperformed all other rotors tested and was considered a huge success by the customer.



Actual ½” diced potatoes – passed all “low shear” customer quality tests

Due to the testing performed and results achieved, the “low shear” rotor can be directly applied to similar applications - not just potatoes. Furthermore,



the rotor is designed to fit both newly manufactured as well as previously installed Contherm units.

Contherm scraped-surface heat exchanger “low shear” rotor features and benefits:



- Two inch/51mm rotor results in a large 36mm gap between the rotor surface and the scraping blade produces a 44% larger annular space for product and/or particulate to travel – allows for delicate, larger sized particulates
- Two support pins per blade contributes to a minimum of a 46% reduction in rotor surface area in the product zone – dramatically reducing shear and damage to the material being processed
- Each rotor can be manufactured and installed in any existing Contherm and seal configuration – no need to purchase a new unit to achieve upgraded, low shear benefits

A winning combination

Every application has its optimum conditions and Alfa Laval knows what is needed for our customers to optimize their product quality. Rotor rotational speed is a significant variable that can contribute to shear within the Contherm. All Contherm motors come with variable frequency ready motors allowing customers to determine the exact rotor speed that best fits their product and process. Customers can also combine the new "low shear" rotor technology with other proven Contherm features specific to gentle processing and high clean-ability such as the unique tangential inlet and outlets and various seal offerings to make for a winning combination for our customers.



Due to the rigorous, successful testing accomplished at the Contherm Product Center, a wide variety of ideal applications were identified – based on the nature of their ingredients and process requirements.

Food and confectionery applications



Tomato sauce with particulates

In the food industry, a number of products include ingredients that are susceptible to degradation due to shear or mechanical manipulation

– perfect candidates for our new "low shear" rotor option. For example, starch based products such as sauces, gravies, condiments, desserts, dressings, jelly confections or caramel can be negatively impacted if the equipment utilized introduces excessive mixing or shear during the thermal treatment phase. The consequence can be a breakdown of the starch which results in a reduction of product viscosity. Even in the case of tomato based sauces, too much mixing and shear can produce off colors in the finished product. In addition, products that contain particulate pieces such as soups, sauces, yogurt fruit, jams, jelly or macaroni & cheese can be easily damaged during processing and it is critical that the equipment solutions utilized provide gentle treatment in order to optimize product quality.

Health and beauty aid applications



Many health and beauty aid products such as lotions, cosmetic cream, sun block, soap and shampoo are often thick and viscous – requiring the

use of a scraped-surface heat exchanger for either heating or cooling to achieve product stabilization. Depending on the formulation, these products can be sensitive to shear as they contain emulsions and ingredients such as gum, carrageenan and/or other stabilizers. If these ingredients are overworked, the products viscosity and stand-up properties can be negatively impacted – producing a poor quality product.

Alfa Laval reserves to right to change specifications without prior notification.



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