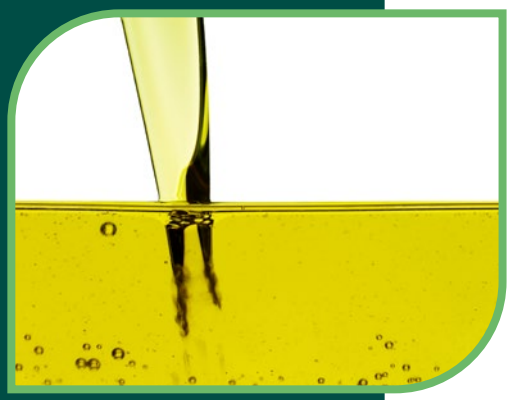
PRE-CRYSTALLIZING OIL FOR LEAK-FREE POPCORN PACKAGING

Votator® II Scraped Surface Heat Exchanger

Challenge

Consumers repetitively complained about oil leaching through the paper bag, which contained corn, dry flavorings and liquid oil. From package to microwave, the marketing feedback from the consumer was not favorable and needed to be addressed quickly to avoid potential lost market share and retail shelf space. Changing the packaging material to solve the oil seepage issue would be very costly solution and economically unfeasible. The processor turned to SPX FLOW for a solution.



Solution

SPX FLOW utilized a Waukesha Cherry-Burrell® Votator II scraped surface heat exchanger to rapidly cool and crystallize various popcorn oil slurry formulas, assessing their resistance to oil penetration through the paper bag. Field tests with a Votator II rental unit identified optimal process conditions, resulting in a high-quality product that could be efficiently packaged and shipped to diverse climates without degradation. To enhance efficiency, the process allowed excess slurry to bypass the filler, cycling through a secondary Votator II heat exchanger. This unit re-melted the slurry and gently broke down the crystalline oil structure without product degradation, enabling the slurry to re-enter the batching process. Processing the crystallized product presented new challenges, including delivering the viscous oil through existing piping and filler heads, leading to higher product-side pressure losses. Piping diameters and lengths were optimized for consistent product flow during long production runs. Additionally, to precisely control cooling and heating utilities, a “bleed and feed loop” liquid media supply method was integrated into the heat exchangers for optimal crystallization and re-melting.

“Enhanced customer experience, while reducing packaging consumption.”

Result

Drawing on our expertise in fats and oils, we proposed pre-crystallizing the slurry before depositing it into the paper bag. Rapid cooling initiated the pre-crystallization phase, creating a more stable, less liquid slurry for packaging. This solution reduced packaging consumption and enhanced the customer experience by containing oil leaching. Additionally, pre-crystallization encouraged the exploration of new flavor profiles, supporting product innovation.

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