

### Cooling, Crystallizing, & Re-melting Popcorn Oils

Issued By: Steve Bayse – Product Sales Specialist – Heat Exchange  
Date: February 15, 2017  
Bulletin No: HIA 1-17

**Waukesha  
Cherry-Burrell®**

#### Heat Exchanger:

Waukesha Cherry-Burrell – [Votator II 6 x 72](#) Medium Duty BWS

#### Industry:

Microwave Popcorn

#### Application:

Cooling, crystallizing and re-melting popcorn oil slurry

#### Problem:

Many consumers complained of oil leaking from the paper bags which contained a slurry of un-popped popcorn, liquid oil and flavoring. Changing the packaging material to prevent this oil absorption was too costly. The processor looked to SPX FLOW for a solution. Leveraging our history in fats and oils with scraped-surface heat exchanger technology, we proposed pre-crystallizing the slurry prior to depositing it into the paper bag. By cooling the oil slurry rapidly, the pre-crystallization phase of the oil would begin, creating a less liquid - more stable slurry for packaging.

#### Solution:

An SPX FLOW Votator II scraped-surface heat exchanger was utilized to rapidly cool and crystallize a variety of popcorn oil slurry formulas to evaluate oil penetration through the paper bag. The process was field tested using a Votator II rental unit. The team observed and recorded key process conditions which led to producing a high-quality product that could be packaged efficiently and shipped to retail outlets in various climates without degradation. In addition, the process was designed so that excess slurry would bypass the filler and be recycled through a secondary Votator II scraped-surface heat exchanger which would re-melt the slurry and gently break down the crystalline oil structure without degrading the product, enabling the slurry to be re-introduced into the batching operation.

Processing this crystallized product presented new challenges including product delivery through the existing piping and filler heads. The viscous crystallized oils created higher product-side pressure losses throughout the piping network. Piping diameters and lengths had to be optimized to consistently deliver product to the filler for long production runs. Additionally, to tightly control the cooling/heating utility sources and to facilitate optimal crystallization and re-melting operations, the scraped-surface heat exchangers were equipped with a liquid media supply method known as a “bleed and feed loop”.

