



Blackmer[®]



Where Innovation Flows

Chocolate

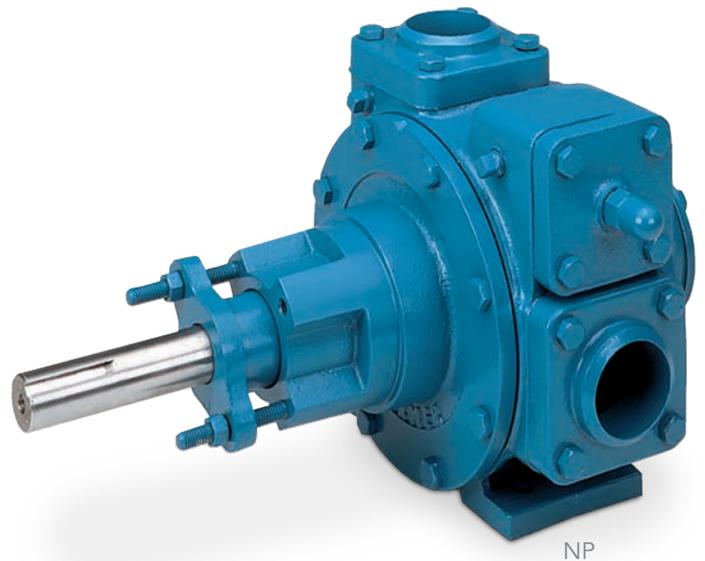
APPLICATION DOCUMENT

The Food Safety Modernization Act (FSMA), a program of the U.S. Food & Drug Administration (FDA), aims to shift the focus from responding to foodborne illnesses to preventing them. With that in mind, the FSMA's rules are designed to create clear and specific actions that must be followed at each point of the food-production chain.

One of the world's most popular foods is chocolate, which is consumed as a sweet treat or used in the manufacture of thousands of other end products, meaning that billions of pounds must be produced annually, all while satisfying the strict guidelines of the FSMA.

The main challenge in the production of chocolate – which begins during a process where cocoa beans are refined into a “chocolate liquor” – is handling a liquid that can be highly viscous, from 50,000 to 75,000 SSU (10,994.73 to 16,494.73 cP), and somewhat abrasive, while also being extremely shear sensitive. Too much shear can lead to the separation of the oils and butter in the chocolate liquor, resulting in a substandard product. Additionally, so that the chocolate is kept in the proper liquid state, it must be heated to and maintained at a temperature between 150°F (65.6°C) and 200°F (93.3°C) during production.

The Blackmer solution for chocolate handling, especially during early-stage cocoa bean processing, is the positive displacement (PD) NP Series Sliding Vane Pumps, which is part of its Iron Line. In general,



PD sliding vane pumps stand out in these types of applications because their self-adjusting vanes allow them to maintain near-original performance during the life of the pump, with dry-run and self-priming capabilities. Specific to the manufacture of chocolate, the NP pumps are constructed of ductile iron (since sugar-based liquids do not always react well with stainless steel) with metalized carbon sleeve bearings and non-metallic vanes. Flow rates for NP Series are 2 to 525 gpm (8 to 1,985 L/min). A unique head and bearing design leads to long bearing life; the design allows a small quantity of fluid to flow from the discharge side of the pump to the bearings, which creates a hydrodynamic film that helps minimize temperature rise.

In cases where stainless-steel pump construction is required, the Blackmer SNP Series Sliding Vane Pumps, part of the Stainless Line, are a proven choice. They are available in 2- and 3-inch models with flow rates from 75 to 275 gpm (178 to 1,040 L/min) with operating temperatures up to 350°F (177°C). The stainless-steel construction also enables them to be used with corrosive or caustic liquids.



Chocolate

BLACKMER SOLUTIONS

- [NP Series Sliding Vane Pumps](#)
- [SNP Series Sliding Vane Pumps](#)

COMPETITION

- **Lobe Pumps**

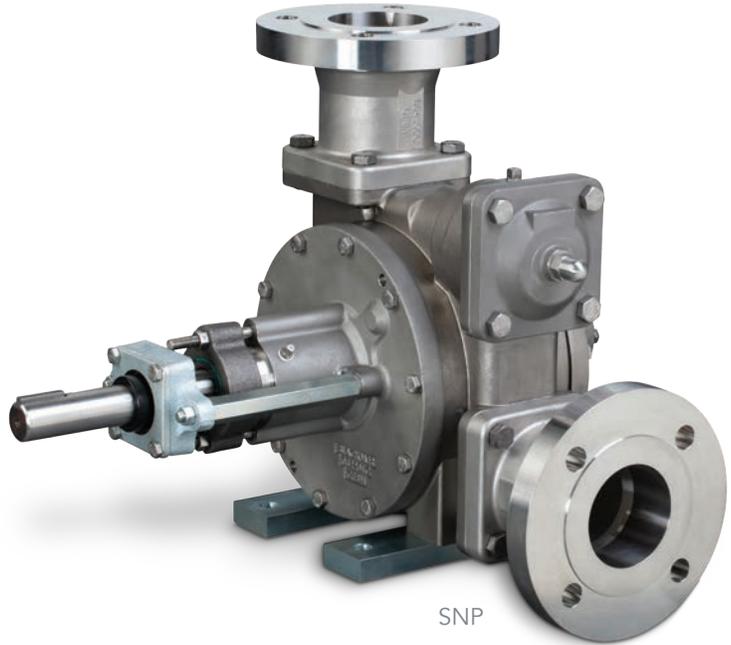
They are typically mechanically sealed and even when utilizing two mechanical seals, they will eventually fail - usually quite quickly - so they will need to be replaced frequently.

- **Air-Operated Double-Diaphragm (AODD) Pumps**

The pump's diaphragms have temperature limitations that can limit their operational window and service life.

- **Gear Pumps**

Are not self-adjusting, so they will not maintain volumetric consistency when pumping fluids with higher viscosities.

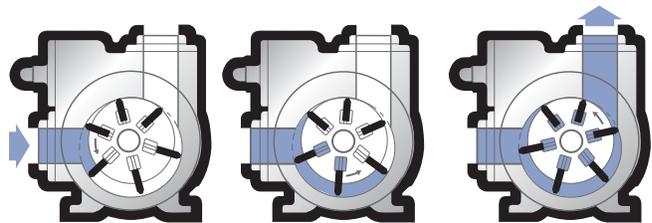


SNP

GLOSSARY

Chocolate Liquor - A concentrated cocoa bean-based solution that is used as the foundational component in chocolate production.

HOW BLACKMER SLIDING VANE ACTION WORKS



For more information on these additional solutions, visit us at blackmer.com.



PSG

1809 Century Avenue SW
Grand Rapids, MI 49503-1530 USA

P: +1 (616) 241-1611 • F: +1 (616) 241-3752

info@blackmer.com

blackmer.com

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