

# WORLD PUMPS

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## Food & beverage

# Food pumps are not just for liquids

**M**ost food manufacturers need to move products during processing. Problems can arise when the pumps used have not been designed for this. But products including powders, pastes and mixtures of liquids and solids can be pumped through suitable pipe work and equipment.

The exact requirements depend on the product itself and the processes involved. However, they tend to fall into two types, those which can be pumped and transported in pipes and those which need to be conveyed, usually by mechanical belts or similar systems. There are a number of advantages to this approach. One advantage is the ability to avoid contamination of products during processing, as well as being able to maintain processing temperatures and viscosity. It is also worth remembering that it is not just simple liquids which can be pumped.

### Assessing products

One of the issues with pumping is the potential to damage the product. The viscosity of different fluids can be affected, resulting in issues such as runny or separated sauces or unwanted churning of dairy products. For materials containing solids, for example, fruit mixtures, the wrong type of pump can easily damage the solid fraction which could reduce the quality or remove the very aspect of your product which you are trying to preserve.

Although the physical and behavioural properties of many foods are well documented, in more complex cases it is necessary to fully understand the foodstuff to be handled in order to specify the right pump for both the product and the process. It may be possible to do this with simple measurements taken in situ, or laboratory analysis may be required.



*HRS BP Series piston pump for high pressure in heavy duty applications in the food and pharmaceutical industries.*





Common uses for positive displacement pumps include cream.

The temperature of the product is important as physical properties will vary with temperature. Viscosity is a measurement of resistance to flow and is therefore an important consideration. Information on particle size is also required. These could include anything from ground spices to whole fruits or pieces of meat, and everything in between. The chemical composition, for example, the acidity of the material, will also need to be known so that the most cost effective materials can be used to produce the pump.

Amongst other things, the sensitivity of the fluid reflects how likely it is to be damaged by the impeller of the pump. The physical characteristics of some products will change after exposure to high shear stresses, which may be beneficial in some circumstances (such as turning cream into butter) but not others (for example, when wanting to produce cream). Vapour pressure will also need to be considered to prevent issues such as flashing or cavitation.

### Pump types

As well as being designed to handle your product, the pump needs to fulfil the normal requirements of food handling equipment, such as Clean-in-Place (CIP) and Sterilise-in-Place (SIP). There are many different types of sanitary pump which are suitable for use in the food industry, including rotary lobe, rotary piston, reciprocating positive displacement, progressing cavity, peristaltic hose and air-

operated double diaphragm designs. Problems arise not only because of the high costs of traditional pumps, but also because lobular pumps have low flow rates. In addition, using progressive cavity pumps can break the produce, while double diaphragm pumps result in a low pressure drop.

Centrifugal pumps are typically used for materials such as batters, oils and beverages. Common uses for positive displacement pumps include icing, dough, fruit fillings & purees, baby food, tomato paste & sauces, cream, cheese, dressings, mayonnaise, meat emulsions and many more. Many years of providing solutions to difficult heat transfer challenges in the food industry have shown us that pumping products without destroying their integrity is as important as developing heat exchange solutions which maintain product quality.

We therefore went back to the drawing board to develop a pump which could handle very delicate and viscous food stuffs without damage, while working at high pressure in heavy duty applications in the food and pharmaceutical industries. The result was a purpose designed reciprocating positive-displacement pump: the HRS BP Series Piston Pump.

### Expanding cavity

Positive displacement pumps have an expanding cavity on the suction side of

the pump and a decreasing cavity on the discharge side. Liquid flows into the pump as the cavity on the suction side expands and is forced out of the discharge side as the cavity collapses. This pump features a hygienic design which incorporates a separator fitted between the piston and the hydraulic chamber to ensure that there is no contact between the product chamber and the hydraulic oil. Once the pump is in operation, no part which comes into contact with oil comes into contact with the product.

The pump has an adjustable flow, which can range from a minimum of 300 litres/hour to a maximum of 20,000 litres/hour, and features a high pressure drop of up to 30 bar. It is suitable for a wide range of high viscosity, shear sensitive and large particle containing fluids. Clap valves allow pumping of whole fruits or vegetables, and an alternative piston pump with a pneumatic cylinder can be supplied for low pressure applications of less than 5 bar. ●

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