

Pumping Viscous Polybutadiene Products

Viscosity:

One characteristic of liquid polybutadiene (PBD) is that viscosity is proportional to molecular weight. The more viscous the material the harder it is to handle unless done properly. Since a small increase in temperature will result in a large drop in viscosity heating is often a good way to solve some viscosity problems. To decrease the nuisance of high viscosity, most Ricon® products are available in preweighed, low melt PBD bags. This preweighed bag is then added directly into the mixer. Preweighed bags are a very convenient way to add Ricon® products to your compound. Alternately, Ricon® products can often be dispersed onto a powder carrier, which is then added to the customer's mixer. The dispersion is no longer a liquid since it is now absorbed on a carrier but in actuality has the characteristics of a powder.

Another approach to consider is that Ricon materials can be diluted with a compatible oil or a solvent in order to reduce the viscosity. If an oil is used to reduce the viscosity it will be ultimately absorbed into the rubber compound.

Examples of Common Viscous Materials:

Material	cps
Water	1
Milk	3
SAE 10 motor oil	85-140
SAE 40 motor oil	650-900
Castor oil	1,000
Karo syrup	5,000
Honey	10,000
Ketchup	50,000
Peanut butter	250,000
Shortening	1,200,000

Viscosity @25°C

Pumping Equipment For Viscous Materials:

Progressive Cavity Pumps:

One type of equipment used successfully for pumping viscous materials is the positive displacement progressive cavity pump. This pump is manufactured by companies such as the Moyno Industrial Products under the trade name of Moyno® pumps. This type of pump uses a single, external helical element rotating within a stationary double internal helix stator. This design creates progressing cavities delivering uniform, metered flow. Free from pulsations in velocity or volume, the Moyno pump runs smoothly and quietly. Its steady delivery even at low flows lends itself to metering applications. Moyno® pumps can move materials with viscosities over one million cps. For further information contact:

Moyno Industrial Products
P.O. Box 960
Springfield, OH 45501
937-327-3553

Gear Pumps

Heated gear pumps can also be used to transport viscous materials. The gear pump jacket should be heated with steam at a pressure of about 5 psi. A simple steam trap on the exit of the pump jacket would control the temperature of the pump at around 100°C (at 5 psi pressure). The pipe from the Ricon material to the pump suction should be kept to a minimum. All piping should be steam traced with tubing hooked up to 5 psi steam with a steam trap on the exit of the tubing. The piping and tubing can then be wrapped with insulation in order to retain the heat and protect personnel from the hot tubing. If pumping into an extruder, the pump can be "slaved" to the extruder so that it pumps in proportion to the output of the extruder.

For further information contact:

Zenith Pumps (pump model BLB)
5910 Elwin Buchanan Dr.
Sanford, NC 27330
919-774-7667

For equipment to pump from a 5 gallon pail or 55 gallon drum, contact the following companies:

Jesco (pump models PD, DT and BH)
6592 Arrow Dr.
Sterling Heights, MI 48314
810-254-6610

or

Sealant-it Equip. & Engineering
45677 Helm St
Plymouth, MI 48170-0965
734-459-8600

Dispensing Equipment

Viscous materials can be metered in repeatable volumetric amounts using dispensing equipment. Any viscous material can be dispensed by itself or in combination with another ingredient (Part B) using various ratios of 1:1 to 30:1. For further information contact:

Liquid Control Corp.
7576 Freedom Ave. NW
North Canton, OH 44720-0747
330-494-1313

or

Sealant Equip. & Engineering
45677 Helm St
Plymouth, MI 48170-0965
313-459-8600

Caution:

Ricon products should never be heated with electric band heaters. Hot spots created by such heating may result in autopolymerization and the generation of high heat.