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RESINS & TACKIFIERS -SINTERING-

SINTERING OF RESINS

What is sintering ?

Sintering is the solidification or re-massing of a material where the individual particles become stuck to one another. It is caused by compression and/or heating of the material. Sintering can be described as lightly compressed pieces with distinct margins that can be easily separated or free flowing resin with hardened clumps. In the worst case, the resin will revert to a single solid glassy block.

What contributes to sintering?

High temperatures, high humidity, long storage time, and high pressure all contribute to sintering. Humidity can be absorbed by the resin, and even very small quantities of moisture (<0.5%) can cause problems. Resins with low softening points have corresponding low glass transition temperature, so are especially prone to sintering.

Why is the resin I purchased in solid blocks?

This resin has experienced a change in physical state from a crystalline solid to an amorphous, high viscosity liquid. This phenomenon, called sintering, is related to the resin's softening (melting) point and environmental conditions.

My resin has a softening point of 85 – 95°C, and I know it didn't get that hot. Why did it sinter?

Softening point and glass transition point measure two different properties. Softening point is essentially a measure of the viscosity of the resin. The resin actually changes state at a much lower temperature than the softening point, but does not noticeably flow until it reaches a higher temperature. A general rule of thumb is that the glass transition temperature is 40 – 60°C lower than the ball and ring softening point.

What can I do to avoid sintering?

Avoid temperatures above 35°C, do not double stack pallets, and avoid excessive humidity. Also, use first in – first out inventory practices.

Does sintering affect performance of the resin?

No. Extensive studies show that sintering does not cause performance problems. Completely hardened resin still performs as it should.

How can I break up the sintered resin?

In most cases, dropping a full bag of resin on the floor will break up the solidified material and allow it to be handled normally. In extreme cases, it may be necessary to strike the bag repeatedly to shatter the resin. Take care to prevent dust, as there are safety issues associated with the explosive nature of dust clouds.

What can be done about sintering?

Use refrigerated freight. Reformulate the rubber compound with a higher melt point resin that yields the same performance properties. Take advantage of alternate manufacturing or warehouse locations to reduce transit time.

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