

## The latex doctor



Harry F. Bader

# Avoid over-curing to boost tear resistance in latex films

How can you improve the tear resistance of latex films?

Anonymous - International Latex Conference, Akron

A general answer is to avoid over-curing of the film. Both tensile and tear strength will deteriorate when your product has been over-cured.

An additive which will greatly improve resistance to tear propagation (Trouser Tear) is Tylac 68060, a nitrile latex produced by Dow Reichhold. An 8-12 part addition is generally sufficient to increase Trouser Tear properties.

A word of caution. Flex resistance will decrease with this addition.

### Reducing viscosity

We are a rubberised coir manufacturing company. We want to reduce viscosity in our compounding latex (CL). Total solid contents in CL is about 54% (without changing TS, filler, chemicals) since we are spraying latex on coconut fibre. If viscosity is less, penetration of spray will increase our production. So kindly suggest a suitable ingredient or method.

R. Ravindra Nath Reddy  
Hosur Coir Foam, India

If solids content is critical, the addition of inorganic (e.g. sodium hydroxide or sodium silicate) and organic alkaline materials (ethylene diamine, urea, monoethylamine, diethanolamine or morpholine) will reduce viscosity moderately. The most effective material is ethylene di-

amine. One to three parts are suggested and are usually added as a 25% solution in water. Urea (1 to 3 phr.) may be added as dry crystals or as a concentrated (50%) solution. Sodium silicate (0.25 phr) is particularly effective if high amounts of zinc oxide are present.

As always, try this on a laboratory basis to ensure the viscosity depressant does not cause unforeseen stability problems.

### Fillers to reduce cost

We produce dipped products, mainly bladders. Please let us know if we can incorporate any filler to reduce cost (e.g. what ratio is suitable without much affecting the original properties?) as the tensile strength (TS) and elongation properties are very critical in our product. TS up to 250 kg/cm.sq. and elongation up to 850 are required.

Ashwani Magon  
Paradise Rubber Industries

A soft clay such as McNamee clay, supplied by RT Vanderbilt, is commonly used for the purpose you have outlined. It will reduce cost and it will reduce tensile strength and elongation.

How much reduction of physical properties should be established in your laboratory? I suggest an addition of 10-20 PHDR as a 50% slurry as a start for checking changes in physical properties.

### Lower latex protein limit

What is the estimated lower limit for reducing latex protein

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related issues through combinations of powder free and reduction technologies?

A.S.G - International Latex Conference.

**P**owder-free" technology does not reduce latex protein. The absence of powder prevents the protein in the latex film from being "picked up" by the powder and thus spreading throughout the area where the gloves are being used.

The lower limit which should be considered acceptable is "below the lower detection limit" of the test methods of ASTM D 5712 or ASTM D 6499.

#### Residual accelerators

What are the typical levels of residual accelerators in medical gloves?

Anonymous - International Latex Conference

**U**nfortunately, there is no generally accepted test method to determine the level of residual accelerators which can be extracted from a natural or synthetic latex glove by human perspiration.

One method being used is extraction with D.I. water or PBS with an HPLC analysis of the extract. Zero identified accelerator residues is considered acceptable.

#### Tackling crystallisation

Can the compounder affect the degree to which a polychloroprene product will exhibit crystallinity during low-temperature exposure?

A delegate - International Latex Conference.

**T**he vulcanisation temperature and the resulting "state of cure" have a major effect on crystallisation of polychloroprene products. Check with your chloroprene supplier to find out what cure temperature and time you should use with his polymer to prevent or at least minimise crystallisation.

Sulphur in the compound can reduce crystallisation as can the use of some accelerators. Here

again, contact the chloroprene supplier for recommendations.

A 3rd factor is the choice of the chloroprene polymer. Some polymers have much greater resistance to crystallisation. For complete information about the several polymers on the market, check with your chloroprene supplier and also with his competitors. All chloroprenes are not the same.

Refer, if possible, to John Carl's *Neoprene Latex* (pages 65-67).

#### Will blending help?

Can I reduce the effect of cold temperature crystallinity in my polychloroprene product by blending in some nitrile latex?

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**P**ossibly. However, that depends on the nitrile polymer and the chloroprene polymer as well as the cure system, vulcanisation temperature, and the compound recipe. It would be better to address the problem as outlined in the reply to the query above.

Also it would probably be better to tackle the problem by opting for a chloroprene polymer with a lower crystallisation rate.

#### A major difference

Is there any difference in maturing polyisoprene latex and natural rubber latex?

Jan Peters - on email

**A** major difference is that the chloroform precure system doesn't work with polyisoprene. Therefore, a switch to a swollen diameter system which works for both polymers is a likely choice.

It is possible to use N Butyl alcohol for polyisoprene and chloroform for NR. But the results are somewhat different in appearance.

Keep in mind that these "quick mix" tests are subjective.

The timing of the addition of the 'solvent' and the reading must always be the same, the latex and solvent temperatures must be the same and, most important, the person making the judgement call must always be the same. ■