Harry F. Bader

MST as indicator of product strength; what makes an effective blend; changing polymers on same machine

Is there a relationship between mechanical stability and final dried film strength? — *Anonymous, International Latex Conference 2004, Akron, Ohio*

In my experience, the answer is "yes". However, MST is just one of the indicators of latex compound degradation.

Each latex compound behaves somewhat differently, and if you want to use MST as a quality control test, you would need to establish, by experimentation, what MST produced optimum-quality tensile properties

Also, you must investigate how other latex compound properties — viscosity, total solids and precure — interact with MST to predict product "strength".

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I am going to start some projects on latex dipping, latex foam and latex thread techniques. So I want all the information regarding the type of latex to be used, what they are, how to make formulatio-ns for dipping and what test methods are required to test the dipped products.

Anil on email

Your request covers a very large part of the latex business. In fact, the technology you have requested would fill a substantial book.

I suggest you perform a typical literature search as you would for a university course. I assume you have a technical background which would enable you to do this type of search.

It is likely the information you have listed can be collected. This would be Latex Consulting and the report to you would be at least three booklets. Each would cover one of the separate technologies you've listed — Latex Dipping, Latex Foam Production, and Latex Thread. These are different, except that the latex used is the same for all three.

I'd expect, considering the magnitude and the complexity of your request, the hours required would be of the order of 300-500.

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What is the estimated lower limit for reducing latex protein related issues through combinations of powder-free and reduction technologies?

Anonymous – International Latex Conference 2004, Akron

I don't know what the lower limit could be. However, I also know that "below detection limits" can be reached in ASTM D 5712 and ASTM D 6499 testing by proper product processing.

Had proper processing been used when new suppliers got into the latex business in the 1980s the latex allergy problem would not be with us. Since that didn't happen, I believe the NR latex business will continue to suffer from both a real and a feared natural latex allergy problem.

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Is there a relationship between tensile strength and barrier properties?

Anonymous – International Latex Conference 2004, Akron

Yes. Increased tensile strength can be expected from a properly cured film. The same is

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true for increased resistance to permeation. One doesn't cause the other. However, both tensile strength and permeation resistance improve for the same reasons.

Work being done on additives to improve permeation resistance will frequently void this symbiotic relationship. Tensile properties will vary independent of permeation resistance.

Someone once said a product made from natural, nitrile and polychloroprene latex will most likely exhibit the worst properties of all three. What are some of the considerations when making a blend?

Anonymous – International Latex Conference 2004, Akron

First of all, you must define the properties of the product you wish to improve.

Second, you must define the limits of the properties you wish to maintain. For example:

- Is the blend to improve resistance to oil, ozone, tear, gas permeation, etc.? The answer to this defines the choice of the polymer to blend with NRL.
- What property limits are essential? Elongation? Tensile strength? Compression set? Tension set? Oil resistance? Gas permeation resistance, etc?

With these basic needs defined, the next step would be to research available data from synthetic la-tex suppliers and from published literature. *Polymer Lattices* by DC Blackley, 1st and 2nd editio-ns; and, *Neoprene Latex* by John C. Carl (1962) are valuable sour-ces of basic compounding and blending information.

The final and probably most important step is to make small lab batches of compound to deter-mine the recipe and the process conditions necessary to produce the desired results.

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What process changes should I make when looking to introduce a dipped nitrile product on my machine designed to make natural latex items?

Anonymous – International Latex Conference 2004, Akron

It can be expected that times and temperatures will change with a change of polymers. But it can be done.

The Seiberling plant in Oklahoma City, US, operated from 1966 to 1980. We had 8 manual dip lines and 3 automatic programmed lines. We made household and industrial gloves.

The three automatic lines were of identical construction. They were built in-house to my drawings and to my specifications of line speed, tank construction, oven air velocity, oven and tank temperatures, etc. The gloves made on those lines were as follows:

- Flock lined household natural latex – 3 colours.
- Flock lined household neoprene/natural blend – 3 colours
- Flock lined household nitrile.
- Flock lined household nitrile/natural blend.
- Unlined neoprene industrial
- Unlined nitrile industrial
- Unlined neoprene/natural laminate industrial
- Unlined heavy gauge natural industrial
- Unlined heavy gauge neoprene industrial.

Line changes for glove polymer changes consisted of:

- Coagulant changes (% cal. nitrate additives)
- Latex compound changes (TSC, viscosity, precure)
- Line speed changes
- Dry and cure temperature changes.
- Latex tank temperature changes.
- Form washing changes.
- Leach temperature changes.
- Stripping condition changes.

Obviously, different polymers can be produced on the same line. However, it must be done carefully and with thoughtful, knowledgeable planning. ■