



Harry F. Bader

The essential 4 T's of leaching

(I was asked to be a Panelist at the 2004 International Latex Conference in Akron, Ohio, USA. Questions submitted to the Panel include the following)

In dipped products, how do you know if you are leaching the product well enough or long enough?

The first step is to set up a process procedure which includes reasonable conditions covering the four factors that are an essential part of any leaching process. These are the four T's—Time, Temperature, Turbulence, Absence of Turbidity. For the first three, the more the better. The last one requires sufficient water flow so that the leach water does not become cloudy.

When the process is established, run a protein analysis to see if the result is "below detection". Make changes in the four T's until that situation of "below detection" is reached. From that time on, Process Control is the answer. As with all the essential conditions for making a good latex dipped product, Process Control results in repeated good quality. If your Process Control is ensuring conditions are the same day after day, the quality of leaching will be the same day after day.

Any recommendations for the "disposal" of old latex?

In the days when I was a Manufacturing Manager my basic rule was: "If it is liquid, use it

and if it is coagulated, dry it and send it to the landfill as rubber scrap.

For the first part of that rule, a trial was made in the lab and a recipe was sent to the Compounding Dept. with instructions on what to do and what to look for. Usually that involved blending with a fresh batch. If that is done properly, you can't tell the difference between the product from a blended batch or a regular batch.

Before you send dried latex to the landfill, check your local regulations.

What are typical levels of residual accelerators in gloves?

There is no "approved" ASTM or ISO method for measuring the amount of residual accelerators in a dipped product.

The general idea is simple.

- Cut up a sample into small pieces.
- Put the sample in an extraction medium.
- Extract for 16 hours. Concentrate the extract.
- Analyse the extract for presence of accelerators.

However, the choice of an extraction medium is the key issue. It seems logical to me that the choice should be a medium which would mimic human perspiration. Body fluids, usually perspiration, are the avenue for accelerator residue to come in intimate contact

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with skin or mucous membrane.

Typical levels of accelerators in properly processed gloves should be below the sensitivity level in a Human Draize Test. Or, they should be undetected in a synthetic perspiration extraction medium.

Where are prevulcanised latexes used and why?

Most manufacturers use latex compounds which are prevulcanized to some degree. I've encountered only one manufacturer who ignored prevulcanisation. In that case, raw latex was compounded rapidly with pre-measured amounts of the ingredients. The latex compound was allowed to thoroughly mix for no more than 30 minutes.

The compound was immediately mechanically deaerated and pressure transferred to overhead automatic refill tanks. All tanks were chilled water cooled so prevulcanisation was retarded. The fresh latex was being fed into the dip tank almost immediately.

At the other end of the spectrum are those manufacturers who purchase totally prevulcanised latex compound or which process their own totally prevulcanised compound.

Good quality merchandise can be made with any level of prevulcanisation. The important issue is that the degree of prevulcanisation must always be the same and the process conditions must be set and held constant for that degree of prevulcanisation.

Total prevulcanisation has the unique advantage of not requiring process vulcanisation. When the film is dry, it is ready to strip.

Are new products from natural rubber latex a thing of the past, considering the latex sensitivity issue, or are there likely to be some new developments coming?

I'm sure that new products using natural rubber latex will come on the market. I have several reasons for that opinion.

■ We currently have two projects in development for disposable

devices. Our customers believe if NRL is acceptable for medical gloves and condoms it will be acceptable for new products.

■ There are several projects in work for methods to remove proteins from NRL. One of these will be of low enough cost to be acceptable to manufacturers.

■ How to resolve the contact dermatitis part of the sensitivity issue has been known for decades. There is no reason for NRL products to have detectable residues of skin irritants. That should not be a deterrent to new NRL products.

In today's world, what value do you see in having regional NRL and NR sources? The question has particular value for the North American region.

I believe everyone recognizes the importance of rubber products in modern-day life. It is likely the case that natural rubber and natural rubber latex could be substituted by synthetic polymers should a national emergency occur. However, the economic impact would have a major influence on our life. North America would be better off if the country is self-sufficient in natural rubber and latex.

There are two projects that I know of which are addressing this issue.

One is the cultivation of Guayule, a desert shrub native to the southwestern United States and Northwest Mexico. A paper on Guayule was presented at the 2004 International Latex Conference in Akron, Ohio, USA which provides a thorough evaluation of the properties of the plant, the latex and the rubber.

In 1995 I was provided 2 gallons of Guayule latex. I compounded that latex and dipped medical gloves and condoms which met the requirements of ASTM D 3577-8 and ASTM D 3492. That experience satisfied me that Guayule was a potential source for natural rubber latex.

The second project is just getting started. However, at this point it looks as promising as Guayule. The future will tell if that is true. ■

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