Harry F Bader

Combustibility of nitrile differs from natural latex

Some manufactures are switching over to nitrile latex from natural rubber latex as an answer to the protein allergy problem which is inherent to products made from NR latex. Although nitrile latex is not extremely difficult to process it is different and therefore has a different set of problems to overcome.

How does the combustibility of nitrile differ from natural latex? Under what conditions? Temperatures?

Narayana Murthy
—Chennai

At Akron Rubber Development Laboratory Inc. we recently performed a DSC (Differential Scanning Calorimetry) analysis on films from both NR and nitrile latex. We established the melting point of NR at 216.7°C and nitrile at 283.4°C. Unlike neoprene both NR and nitrile films, once ignited, will continue to burn. Considering the difference in melting points nitrile is unlikely to present the same danger of spontaneous combustion claimed to be present in NR films.

In a nitrile dip for examination gloves, the latex on the former following the dip appears to have beads of coag sweat coming through the latex that drop into the latex dip tank and cause agglomeration of latex that requires constant skimming of the tank. The sweat causes weak spots. Please comment.

Mahesh Jain
—Ahmedabad

This problem, called sinteresis, occurs when the coagulation is so fast and so tight that water is squeezed from the latex. This is usually accompanied by rather severe shrinkage of the film. (sometimes as much as 2 inches down the form). It is sometimes accompanied by rupture of the film (small cracks), which later are seen as pin holes.

This problem can be avoided or at least minimized by adjusting five process conditions.

1. Reduce the coagulant concentration. Nitrile manufacturers are recommending as high as 36% calcium nitrate. A concentration of 24% or less should be sufficient.
2. Decrease the coagulant temperature. However, beware of wet coagulant conditions.
3. Increase the surfactant in the coagulant by 0.25 to 0.5 per cent.
4. Increase the stability of the latex by lowering the temperature to 21±°C 2°C.
5. Increase the stability of the latex by increasing the stabilizer by 0.25 to 0.5 parts.

All this will slow down the coagulation and thereby reduce or eliminate the problems.

In a natural latex dip tank for condoms - there are tiny bubbles of 2 to 4 micron that are invisible to the naked eye but cause pinholes. What advice can you give?

Ramanathan
—Bangalore

I am not sure how you know there are "invisible" bubbles in the latex. Have you viewed the liquid latex under a microscope? Assuming your diagnosis is correct and small bubbles are present, I suggest you look for the source.

If you are milling your own dispersions and making your own compound, the source is likely to be in the dispersion milling process. Dispersions should be viewed under a microscope to see if they are the source of the bubbles. "Bubble busters" should be added to your dispersion recipe. These are readily available from your chemical supplier. Manufacturers are Crusader Chemicals Inc. or Air Products Inc.

If your are buying compound, present the problem to your supplier and have him search for the source.

Please see "The Latex Doctor" column in the Jan/Feb 98 issue of *Rubber Asia* for more suggestions for solving the "pinhole" problem. ■

Mr. Harry F. Bader, Vice-President, Latex Services, Akron Rubber Development Laboratory in Akron, USA, and a world authority on latex, answers questions and doubts of readers on latex and latex products.

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