Harry F. Bader

SR latex can be run on NR latex machines, but...

What are the major problems which occur in trying to run a synthetic latex such as nitrile or polychloroprene on a machine designed to run natural latex?

Anonymous – submitted at 2001 Latex Conference in Akron, Ohio.

The two major problems are believing that:

1 It's easy. Just put the synthetic latex in the tank and turn on the machine, or

2 It can't be done.

The truth is that nitrile, poly-chloroprene, nitrite/natural blends, polychloroprene/natural blends, nitrile/natural laminates and polychloroprene/natural laminate can be run on the same equipment if you can vary temperatures, dip speeds and line speeds on the line.

Coagulant concentrations will be different; leaching conditions will be different; latex %TSC will be different; latex precure will be different; latex viscosity will be different.

If you do proper laboratory work which will define all of the process parameters needed to produce a good glove, and if you put these parameters into place on your line, you can make good synthetic gloves on a line built for natural latex gloves.

This opinion is based upon actual manufacturing experience on lines at Seiberling in Oklahoma city, which produced nitrile, natural and chloroprene gloves on the same line.

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Why didn't the medical glove industry experience a protein allergy problem from NR latex gloves prior to the late 1980s?

Anonymous – submitted at 2001 Latex Conference in Akron, Ohio.

Prior to the disposable medical glove becoming popular, glove usage was at a much lower level. Manufacturers knew that their gloves were going to be on-the-shelf for, at least, several months before being used. They also knew that if the gloves were not properly leached during the manufacturing process, they would discolour during storage and would not be acceptable.

Therefore, gloves and other dipped products were leached. We knew residual chemicals were the primary cause of discolouration and we knew that leaching removed those residues. Proteins were being removed by that same leaching. We knew proteins were being removed because they were present in the leach tanks. We didn't suspect that they would cause an allergic reaction if they were not removed.

The need for disposable gloves caused by the HIV problem, brought many new players into the business of making gloves. None of the regulatory agencies required leaching, and discolouration during storage didn't occur because gloves weren't on the shelf long enough. Medical gloves with high protein content became the major product being used and, as a result, we began to see an increasing amount of NR latex protein allergies.

Many of the new manufacturers were not aware of the allergy problem or the contact dermatitis problem. In some cases where they were aware, they were not concerned. I've had it said to me that gloves were being made to a specification and by a method approved by the regulatory body. Since there was no mention of allergies or dermatitis in the specification and there was no objection to the method approved by their 510(k), there was no need to be concerned.

The short answer is that the allergy

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Send your questions to:

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problem occurred because inexperienced or uncaring manufacturers were sending poorly processed gloves to the market place. These gloves had high protein and chemical residue content and allergies resulted.

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We are a Gujarat-based (India) producers of latex rubber threads for general purposes and have been in the business for more than five years. Recently, we came across *Rubber Asia* and found important information from your column in that magazine. This prompted us to E-mail you about our plans to expand our unit, by diversifying into the manufacture of heat-resistant latex rubber threads. For this, we require your utmost help. Our questions are:

1. **What are the chemical formulas for the aforementioned products, that is, general-purpose as well as heat-resistant latex threads?**
2. **What is the role of water in manufacturing rubber thread?**
3. **How to control the thread diameter during the production of latex threads?**
4. **Which chemical solution is required to bring smoothness in rubber thread?**
5. **We face problems of blooming particularly in winter season. Kindly suggest remedial actions.**
6. **To make our quality still better, which filler should be used and in what quantity?**

We would like to have details on foam rubber which is being used in rubber printing in cloth (polyester, cotton, etc.). It has come to our knowledge that import of foam rubber is taking place in India (250-300 MT a month). We are eager to know the other uses of this material, i.e. its applicability to other products. Is foam rubber produced from latex? We request you to suggest some reference books or the addresses of entrepreneurs in this field, so that we can directly contact them.

Recently, we also came to hear about the Lycar Elastic. We request you to kindly inform us in detail about manufacturing the same. What is the chemical composition and at which all places the same is applied. Your prompt replies in this regard will be highly appreciated.

Ankur Polymers
Ahmedabad

1. As for rubber thread, the answer to question no: 1 would be: "Heat-resistant" rubber thread has in it antioxidant which provides that heat resistance. Antioxidant suppliers should be able to suggest what you should try. Also the recipe and the process must be designed to minimize free sulphur in the finished thread and optimize the degree of vulcanization.
2. Water has several roles. It reduces the protein residues as well as the chemical residues. This gives a product better age resistance and better resistance to discolouration. Reduced protein and reduced chemical residues also decrease protein allergy as well as contact dermatitis problems.
3. The coagulation bath concentration must be kept uniform at all times and the pump rate must also be kept constant.
4. Lumpy thread is usually due to the formation of latex coagulum in the latex extruder lines. The mechanical stability along with the degree of precure are the major factors in controlling the presence of coagulum.
5. If you mean sulphur bloom, control your process to minimize free sulphur in the cured thread and at the same time maximize the thread physical properties.
6. I'm not up-to-date on the latest information on fillers used in latex thread compounds.

Foam rubber: Latex is the usual raw material for making foam rubber. Natural rubber latex as well as several synthetic latices are used. The major volume of foamed rubber goes into mattresses, pillows and upholstery.

A good source of information on foamed rubber would be *The Vanderbilt Handbook* of 1954 and 1987. The 1954 edition is the best. Copies should be available from R.T.Vanderbilt (Contact: Robert Zuiowski Tel: 203-853-1400 Fax: 203-853-1452).

Lycra is the tradename for a Dupont polymer used for elastic fabrics. ▶

Search lycra.com and lycrashop.com on the Internet.

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I am interested in developing bromobutyl hand gloves by injection moulding. Kindly let me have a guidance formulation as a free technical service. I will be highly obliged if you can throw some light on this product manufacturing.

Shiva Shetty

My personal experience with both bromobutyl and with making gloves by injection moulding, is very limited.

My bromobutyl injection moulding experience was a project for pharmaceutical closures and I started with the formulation from *RT Vanderbilt Rubber Handbook 1958*, page 129. I recommend you get the handbook from the library. The section on bromobutyl is excellent and would provide a great deal of information to start your project.

Injection moulding of gloves has some interesting problems. Trapped air is a problem at the finger tips. Also, the core of the mould tends to flex, causing uneven thickness in the finger areas. If you can resolve these problems, a good product can be made.

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I am a student doing my course in Polymer Technology at Cochin University of Science and Technology. I have some queries about latex gloves. We have got some gloves for testing and there are cracks in between fingers and I hope it is due to lower wet gel strength. Could you please suggest a remedy for the same, that is to improve wet gel strength? Are there gloves made from thermoplastic elastomers and polyesters and where are they used?

Sreelekha

There are several possible reasons why NR latex gloves would have cracks between the fingers. Most of these have no relation to poor wet gel strength. Even if that is the reason, process information and compounding information would be needed before an evaluation of the problem source can be made.

There are thermoplastic medical gloves. They are used for the same purposes as medical gloves made from thermosetting polymers.

If the gloves are experiencing poor wet gel strength, something in the process is wrong. Here are some possibilities:

- The latex precure is too high.
- Accelerator level is too high.
- Sulphur level is too high.
- Zinc Oxide level is too high.
- The latex compound has too much loading.
- The coagulant is too hot.
- The coagulant needs more stabilizer.
- The leach is too hot.
- The leach is too violent.

You need to provide more information. Every situation is different. A solution is dependent upon what is wrong. If there is poor wet gel strength, that is a symptom. The cause is whatever is being done improperly.

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How can I best test the stability of my acrylonitrile latex compound?

Anonymous – Submitted at the 2001 Latex Conference in Akron, Ohio.

There are several ways to measure stability. The type of answer you want will decide what method to use.

1) Use the same method described in ASTM D 1076 for Mechanical Stability of Natural Latex. This measures time to first coagulum residue; 2) Use one of the three methods described in ASTM D 1417. These measure coagulum residue; 3) Use the chloroform precure test described in the *Vanderbilt Handbook* except substitute N-butyl alcohol for chloroform. This also works for synthetic polyisoprene and chloroprene. This is somewhat subjective, but it is a fast, easily run measure of the degree of prevulcanization. ■