



Harry F Bader

## Chlorine testing procedure — condom burst

**H**ow can I easily check the amount of chlorine in the chlorination solution used for detackifying the surface of "powder free" medical gloves?

Rajan Mittal  
—Ahmedabad

It is important to use a chlorine gas/water mixing unit that can be pre-set to deliver a content concentration. It is also important to use cold water to keep the chlorine in solution. As with other gases, chlorine has a reverse solubility curve. The higher the temperature, the smaller the amount of chlorine which stays in solution. If your city water supply to your chlorine mixing unit is too warm, you should use a refrigerated water source.

A simple testing procedure to verify is as follows:

1. Add 25 ml of 21/2% KI (Potassium iodide) solution to a 200 ml flask. KI must be present in excess to react with all the chlorine.
2. Add 10 ml of the chlorine water to be test (colour should be orange-brown).
3. Titrate with 0.075N Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> (Sodium Thiosulfate) solution until colour disappears.
4. Calculate chlorine content:

$$\begin{aligned} (\text{ml Cl}_2\text{H}_2\text{O}) \times \text{N} &= (\text{ml Na}_2\text{S}_2\text{O}_3) \times \text{N} \\ 10 \text{ N} &= (\text{ml Na}_2\text{S}_2\text{O}_3) \times 0.075 \end{aligned}$$

$$\begin{aligned} \text{N} &= \frac{0.075 (\text{ml Na}_2\text{S}_2\text{O}_3)}{10} \\ \% &= \frac{35.86}{10} \times \text{N} \end{aligned}$$

Example :

$$\begin{aligned} &25 \text{ ml } 2\frac{1}{2} \% \text{ KI} \\ &10 \text{ ml chlorine water} \\ &3.2 \text{ ml } 0.075 \text{ N Na}_2\text{S}_2\text{O}_3 \text{ required for colour to disappear} \\ &10 \text{ N} = (3.2) (0.075) \\ &\text{N} = \frac{(3.2) (0.075)}{10} \\ &\% = \frac{35.46}{10} \times \frac{(3.2) (0.075)}{10} \\ &\% = 0.085 \text{ chlorine} \end{aligned}$$

**O**ur competitor makes the same product. However, their physical properties and their shelf life is superior to ours. How can we improve our quality to match or exceed our competitor's?

Mahindra Aluwalia  
—Mumbai

To carry out such a plan would require a detailed development programme. A variety of raw materials and process conditions must be evaluated and both physical properties and shelf life would need to be compared. This is a great deal of trial and error. It is time-consuming, and it is expensive, even if you are quite capable and have the testing equipment to do the work in-house.

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.

Send your questions to:

'The Latex Doctor'  
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There is a short cut. A world-class rubber development laboratory can perform a recipe reconstruction on your competitor's product. That recipe reconstruction will duplicate your competitor's compound recipe, and will also give some clues as to the process conditions being used.

With that information, a compound can be made and process conditions can be defined. Trial runs to confirm that everything is performing as planned should enable a final recipe and production process conditions to be established.

The Akron Rubber Development Laboratory in Akron, Ohio, USA, is one of the laboratories with recipe reconstruction experience. Contact Harry Bader.

**C**ondoms shortly after being manufactured are tested for burst volume burst pressure. Results are excellent, well above the require-

ment. However, a few days after being packaged with a silicone oil lubricant, there is a significant drop in the burst volume. Condoms packaged without silicone oil lubricant showed no drop in burst volume. What would cause that problem?

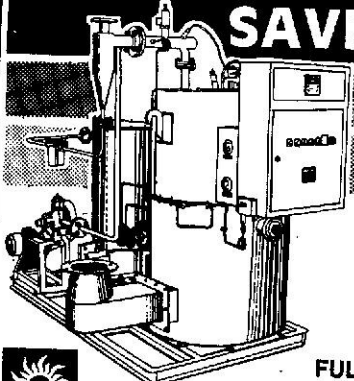
Pothen Joseph  
-Chennai

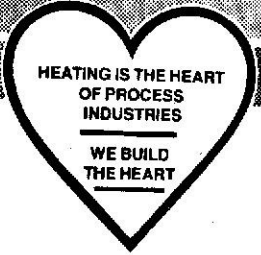
Silicone oil should not be the cause of condom degradation. It is likely there is contamination in the silicone oil.

Knowing if there was also a change in the burst pressure would be a valuable information.

However, I suggest you have the silicone oil analyzed to determine the presence of a chlorinated or petroleum-based solvent as a contaminate. Also, the silicone oil lubricant should be analyzed for the presence of copper.


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