

A Review of Synthetic Lattices in Surgical Glove Use

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Kraton Performance Polymers, Inc. conducted a comparative study on commercially available surgical gloves made of the commonly used base materials: natural rubber latex (NRL), chloroprene latex (CRL), Ziegler-Natta IR Latex, and Cariflex™ IR Latex. This study showed that Cariflex IR Latex is the material of choice to produce high quality surgical gloves.

The complete study can be obtained by visiting www.Kraton.com and clicking on the Cariflex Polyisoprene link. An excerpt from the paper follows below:

Abstract

The majority of commercial surgical gloves are still manufactured from natural rubber latex (NRL). However, NRL can lead to Type I allergic reactions, including risk of anaphylactic shock. In the race to reduce patient and medical staff allergy risks, a growing number of hospitals aim to eliminate products made from NRL, including surgical gloves. Drawbacks of NRL, including odor, and adverse allergic (Type I) reactions, led to the development of synthetic alternatives. Examples of the alternative synthetic materials used today in surgical gloves include polychloroprene latex (CRL) and polyisoprene latex (IRL). However, replacement of NRL surgical gloves by synthetic alternatives has caused in the past some concerns regarding comfort and protection. Today, as high quality polyisoprene products made of Cariflex IR Latex are increasingly used in the health care world, such concerns are disappearing.

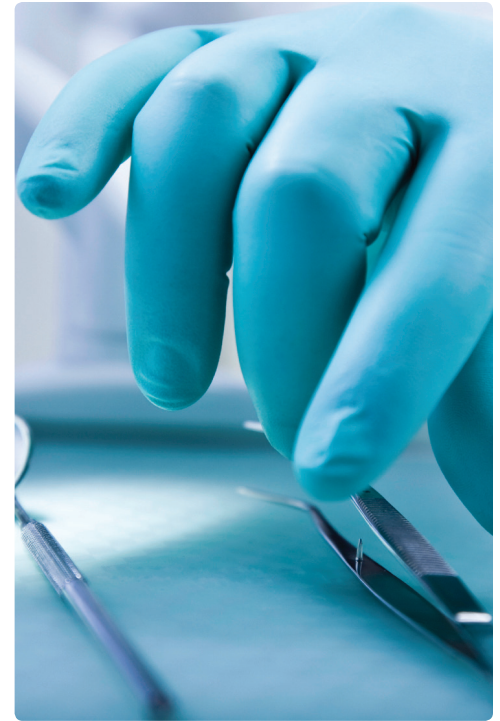
To further highlight and support this trend, we evaluated the mechanical properties of commercially available surgical gloves in the following areas: tensile strength, modulus, and puncture resistance. Based on the observations we infer that surgical gloves based on Cariflex IR Latex offer mechanical protection comparable to NRL gloves. Further, Cariflex IRL-based surgical gloves are better than other synthetics in terms of comfort and equal, or even superior, to NRL gloves.

Cariflex Polyisoprene Products

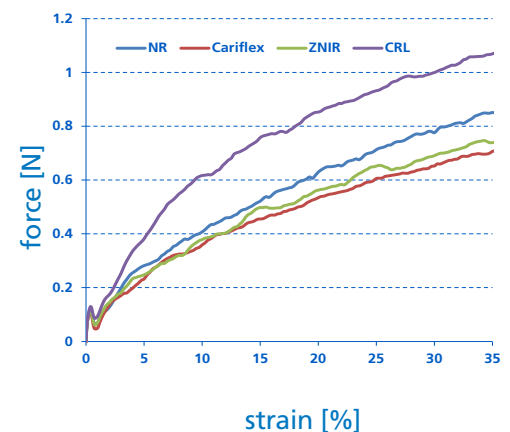
There are currently two types of synthetic polyisoprene. The most widely used industrial process to produce high-cis polyisoprene is Ziegler-Natta (ZN) polymerization; this process can yield synthetic polyisoprene with cis content above 96%. The alternative is anionic polymerization, which leads to cis content above 90%. The latter process is uniquely employed by Kraton in its Belpre, Ohio facility and branded under the name Cariflex Polyisoprene Products. A unique feature of Cariflex IR is its extreme purity and consistently high quality, which greatly simplifies manufacturing and quality control.

Summary and Conclusion

Twelve different gloves from a range of suppliers were evaluated with respect to their mechanical behavior. It was shown that all gloves met the ASTM standard for surgical gloves and offered mechanical protection comparable to NRL gloves. However, surgical gloves based on Cariflex IR Latex were demonstrated to be better than other synthetic gloves in terms of comfort and equal, or even superior, to NRL gloves.



The graph shows typical force-strain curves for NRL, Cariflex IR, ZnIR and CR Latex gloves. The low stress level of the Cariflex IR Latex gloves indicate that this material will feel the softest, and provide the most comfort, which is important in surgical gloves.



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