Searching for a Natural Rubber Alternative for Disposables

The Project: Find an alternative for natural rubber for the fabrication of medical device disposables.
The Solution: A synthetic polyisoprene latex was selected that offered the chemical equivalence and performance properties of NRL.

By Philippe Henderson

Many medical device component manufacturers have to adjust their product formulations to meet growing market demand for protein-free alternatives to natural rubber and natural rubber latex (NR/NRL). As simple as this may sound, this change not only requires the use of unfamiliar raw materials, but also requires new processes and a certain amount of trial and error before manufacturers discover the best NR/NRL alternatives for their formulations. One thing they can agree upon is that not all NRL alternatives are created equally.

Cindy Harry, executive director of sales and marketing at Kent Elastomer Products (www.kentelastomer.com), said that their development staff continually researched and experimented with NRL alternatives before finding the one that worked best for their disposable medical products. NRL had excellent properties for medical applications, but finding an alternative that worked best was a challenge. Thermoplastics worked in many areas, but memory and strength were below standard. Polychloroprene had good strength when compared to NRL, but offered poor

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tear resistance and an opaque color. It also crystallized, became stiff, and lost flexibility. Though this occurred rarely and could easily be reversed, polychloroprene could not be used in all applications.

Kent Elastomer Products manufactures medical components such as ultrasound probe covers using Cariflex polyisoprene products, a synthetic polyisoprene latex from Kraton Performance Polymers.

Finally, Kent Elastomer found Cariflex polyisoprene products, a synthetic polyisoprene latex from Kraton Performance Polymers (www.kraton.com)–the inventor of styrenic block copolymer (SBC) chemistry. The material offered the chemical equivalence and performance properties of NRL, which led Kent to deem it one of the best, all-around replacements for NRL.

"In the end, Kent selected Cariflex IR due to its superior performance attributes. Cariflex IR also eliminated the problem of translucency and hysteresis. Cariflex IR dips great and is very close to natural rubber latex in its ability to provide a great barrier for fluids, purity and hysteresis in a natural rubber protein-free formulation. These attributes are essential to our products," said Harry.

Cariflex IR was easy to incorporate into Kent's manufacturing process, which is often the most complex and expensive production component in this business. "Out of all the products we tested, Cariflex IR was easy to use in our formulations, and allowed us to use existing equipment with minimal

production challenges during the transition," she continued.

The end products produced by Kent Elastomer Products and other medical device component makers must pass stringent tests to meet specific guidelines as dictated by governments, healthcare, and consumer advocate groups before they can be used by consumers. These organizations include the Occupational Safety and Health Administration.

Kent Elastomer has served a variety of markets including medical, dental, food/beverage, sports/recreation, laboratory, and industrial for over 50 years. Some of their products include probe and sheath covers and other disposable covers for medical procedures that serve as a barrier to contamination, disease, and infection. "For Kent Elastomer Products, the decision to replace natural rubber latex for some of these business sectors with a natural rubber protein-free alternative was easy," Harry added.

Natural rubber had been the product of choice because of its strength, elasticity, ability to serve as a protective barrier, and a price that could not be beat. "But you can't put a price on the health and well-being of people, and the industry was forced to find alternatives to natural rubber, which was once considered the only option," said Richard Brennan, VP, Cariflex Polyisoprene Products.

NR products have played an integral role in providing effective barrier protection for millions of healthcare and food service employees as well as patients and consumers. Some applications include condoms, anesthesia devices, protective gloves, and food service applications.

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"Kraton Performance Polymers recognized the industry need for a natural rubber, protein-free alternative and developed Cariflex polyisoprene products to answer this call. Our product also offers very low odor and impurity levels and meets the highest pharmacopeia standards," he continued. Natural rubber latex products are not for everyone and they can cause complications including minor reactions, latex hypersensitivity, and in some cases, anaphylactic shock.

"It makes sense to change the formulations of products historically made with natural rubber to a natural rubber alternative like Cariflex IR. Hospital and food service workers as well as patients and consumers depend on the industry to provide them with devices that protect their health and well-being. The demand for protein-free alternatives is increasing and the price differential with NRL is narrowing. In our opinion, it's not worth the risk not to switch," Brennan concluded.

Philippe Henderson is the global industry manager for Cariflex polyisoprene products at Kraton Performance Polymers. He holds a Ph.D. in Organic Chemistry, obtained with "la plus grande distinction" (highest honors), from the Université Catholique de Louvain in Belgium.