KENT ELASTOMER PRODUCTS, INC.

# Innovative Alternatives for Silicone Shortages and Price Hikes

## One Ohio company collaborates to offer relief.

### KEY TAKEAWAYS

Shortages in the global supply of silicone have resulted in escalating prices – up to 30% price hikes according to Rubber & Plastics News. While there are traditional responses to help mitigate a shortage in supply, one company from Ohio seeks out collaboration with other suppliers to provide an alternative solution for silicone product manufacturers.

First, it is helpful to understand how the silicone shortage came to be. There are two main causes:

**• China uses more.**

In 2002, China consumed just 7% of the silicone it produced. In 2017, China consumed 40% of its own production, greatly impacting (and reducing) the amount of silicone it could export.

**• Stringent environmental regulations.**

China forced noncompliant Chinese silicone manufacturers to shut down their plants. This drove up costs. Also, environmental violations in Germany contriute to silicone shortages.

Because of this, manufacturers around the globe are challenged to secure reliable, steady sources of silicone at any price.

Makers of medical products with silicone components have traditionally responded to shortages and price hikes with these six strategies:

**1.** Raise prices.
**2**. Absorb the reduction to margin.
**3.** Diversify suppliers and sources.
**4.** Reexamine which markets to pursue.
**5.** Extend polymer life through the reclaim process.
**6.** Create new formulations or return to old ones.

Forward thinking companies seek to create a direction that frees them from the shackles of shortages and price hikes over which they have no control.

This innovative but basic approach is to *leave silicone behind*. Replace it with a part made with a new compound – like **thermoplastic elastomer (TPE).**

Medical manufacturers seeking this option can count on suppliers like Kent Elastomer Products (KEP) and compound manufacturers to develop drop-in replacement parts that are made of TPE, not silicone.

Why does this work? As silicone prices have spiked, TPE materials and processing are currently about one-third the cost of silicone and processing.

The thought of making a change to a product in a heavily-regulated industry is daunting to many procurement and materials sourcing leaders. It is worth examining – with help from experts in the supply chain – since the newest science behind TPE performance is a great match with silicone in some ways.

## Here are three logical steps in determining whether TPE is a good replacement compound for silicone:

### STEP 1 Consult with trusted supplier partners to participate in the solution

Today's best practices require procurement leaders to leverage their network of partnerships made up of suppliers, researchers and scientists. Together, they provide a deep and wide knowledge base to do a market analysis on all next-step options in best responses to situations like the silicone shortage and corresponding price hikes.

Suppliers can test to determine components necessary for product performance. For example, TPE doesn't always replicate the performance of silicone. Manufacturers of medical products can leverage supplier expertise to determine if a TPE replacement part will preserve product integrity.

Kent Elastomer Products (KEP), a supplier of medical and food grade tubing, has worked closely with its suppliers of specialized polymer materials. KEP President Bob Oborn regularly forms triad partnerships comprised of KEP, affiliated suppliers and KEP customers in order to solve problems like component replacement in medical applications. KEP leverages great relationships to provide medical manufacturers with consulting services that extend beyond the traditional definition of a supplier.

"The silicone shortage challenges medical customers in new, different ways," Oborn says. "Then they bring those challenges to us."

With both elastomer manufacturing and polymer science expertise, KEP and its partners help customers outsmart the silicone shortage by testing and developing new materials that replace silicone components while preserving – and often improving – product integrity.

"Our solutions are more than just replacing parts in medical applications," states Oborn. "We combine all areas of expertise for solutions that take into account market analysis, business forecasting and other aspects of the product beyond what components are used and how it performs."

"Program and regulatory managers are concerned with costs in both time and money to file a new 510(k) to the FDA for approval to alter the product components," states Oborn. "Our research and expertise can help customers examine every component of the product. A silicone part may be over engineered but serves an equivalent function, such as a fluid pathway or connector. A lower-priced TPE replacement compound may fulfill the same function."

And if FDA approval is needed?

"We help medical manufacturers understand all aspects of our supply chain plus how every stage of the product lifecycle are interconnected," states Oborn. "The set fee cost required by the FDA versus the long-term return on investment is the real number they need to know before deciding on whether to switch compounds."

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In addition, manufacturers can learn quickly whether a new compound meets pricing and performance demands.

"Together, we learn from the customer how a material or product is required to perform," states Oborn. "We can quote a cost within a day, creating a compound in a week that matches the temperature variance or other performance requirements. We also work closely with R&D partners to bring forth an all-new custom compound that meets the application's requirements."

Bonus benefit: Silicone alternatives like TPE meet many fairly-new green and sustainability standards. TPEs can be endlessly recycled while silicone does not biodegrade or decompose (in our lifetimes).

### STEP 2 Determine whether the medical application requires silicone

Once trust with supply chain partners is established, medical manufacturers will have more reliable insight into whether silicone should be replaced from the medical application – or if silicone is still the best solution.

"What makes silicone a desirable compound is its extraordinary ability to withstand exposure to chemicals and extreme heat and cold," says Oborn. "In those cases, we recommend that manufacturers recommit to using silicone as part of their medical application."

Beyond that, Oborn states that KEP will take a close, hard look at the product to examine what it does and where it is used. "If the product is commonly used in ambient room temperatures, or the component is used as a fluid connector or pathway, then it may be over-engineered," states Oborn. "Another compound, like TPE, will reliably perform at a lower cost."

He adds that KEP's customers have been surprised to discover all the great improvements to TPE performance in recent years.

For example, a product designed with silicone to provide a specific feel to the touch may achieve the same result with an alternative. TPEs offer flexibility through chemistry. Depending on the compound, TPEs can produce a range of tactile finishes – from silky smooth to slightly tacky to very grippy. It is also possible to add additional surface texture to a finished product. Adding surface texture can make the harder grade TPEs feel softer to the touch.

But old habits are hard to break. Because silicone is biologically inert and will not support bacteria growth, it has a long-standing track record of use in the medical industry. For these reasons, silicone has been the natural choice for many medical applications.

However, procurement decision makers are learning from suppliers like KEP that recently-developed medical-grade TPEs can rival silicone in biocompatibility performance. Also, TPE's lower production costs make a persuasive case for their use in many single-use products and pharmaceutical-grade delivery tubing.

## STEP 3 Vetting supplier partnerships for real change and positive impact

The global economy is fiercely competitive. Rules change constantly. Strong relationships with vertically-integrated supply chain partners yield benefits beyond evaluating silicone vs. TPE.

Though KEP and their integrated suppliers are separate companies, they often partner to provide customers a seamless singular resource for high quality compounds, manufacturing and strategic solutions.

"Customers challenging us to come up with solutions get the full power of the people we trust and work with, too," asserts Oborn. "That includes our suppliers who regard themselves as problem-solving partners willing to re-think, re-evaluable and come up with improvements to product and process."

There are many strengths to look for in suppliers that will make them credible and valuable partners who can support end-to-end product development – from market analysis to evaluating both regulatory and performance requirements.

Best practices begin with prioritizing a supplier dedicated to Lean Manufacturing. Such a supplier displays a commitment to continuous improvement. This results in faster turnaround times, reduced waste and efficiency gains.

Procurement decision-makers can gain invaluable insight into suppliers by touring facilities and witnessing firsthand how organized, efficient and transparent they are.

How can you determine how well a supplier might help with a switch from silicone to TPE? Ask to see case studies and references about similar problem solving with other customers and projects. Even where nondisclosure agreements exist, insightful conversations can reveal a supplier's proven innovation skills.

Today, the silicone shortage means product engineers cannot rely on longstanding, traditional relationships based on the idea that "things have always been done this way. "They are also reexamining every part in applications to find ways to eliminate or reduce costs anywhere they can.

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**The most innovative approach is to leverage the brainpower of the supply chain.**

### In conclusion

Given the current state of silicone availability, performance characteristics and alternatives, here are the best next steps for any company managing a medical application or plastics commodity. Build relationships with vertically-integrated manufacturers and compound producers. This multiplies your problem solving power to:

- **Examine every component in all products that contain silicone.**
- **Establish the cost associated with the use of silicone in each product.**
- **Determine if silicone is the absolute necessary compound required for this application. If it is not, then consider the TPE options explained in this article.**

The silicone shortages have resulted in much scrambling for an alternative compound, leading proactive product engineers and sourcing managers to reexamine more than just the components of their application. In the search for a part, they find partners.

*Researched and reported by the materials, production and executive leaders at Kent Elastomer Products.*