CUSTOM URETHANE FORMULATIONS: DECIDING WHAT'S BEST FOR YOUR NEEDS

So, you've decided to go with a custom urethane part/product for your application. Now that you've reached this decision, what's next? When it comes to creating a custom urethane part, it is important that it is designed and developed with precision in order to ensure the part or product will meet your unique application needs and have the longest lifespan possible. To do this, there are many factors that will need to be considered when defining the custom formulation.

3 Key Areas to Consider When Creating Custom Urethane Formulations

When designing a custom urethane part or product, there are countless formulation choices that will affect performance. Because of this, weeding through the choices to determine what is best for your part or product can often be challenging. To help with this process, below are three key areas you should consider when creating a custom formulation.

1. **Durometer:** The durometer of urethane is a measurement of its hardness, and the range of durometers at which urethane can be produced, is extremely versatile. In fact, urethane's durometer can range from as soft as a marshmallow to as hard as a bowling ball, providing a variety of options for your part or product. When determining what durometer is right for your product, there are a variety of items that should be considered, all impacted by the application of how your part will be used. For example, if you would like your custom urethane part to gain traction and grab onto something, then you would most likely need a softer durometer. On the flip side, if you are looking for a slick surface, you would need a harder durometer. Other items to consider when selecting an ideal durometer include the amount of weight the part will need to support, frequency and strength of any impact, compression and flexibility needs and much more.

2. **Physical Properties:** The physical properties and custom formulations of urethane consist of a variety of options that will greatly impact the overall performance. Each of the physical properties can be determined based on the expected application of the custom developed urethane part or product. A few key physical properties include:
    - **Compression Set:** The compression set of urethane is the measurement of a material's ability to resist permanent deformation after being subjected to a standard compressive load or deflection for a fixed period of time. This property is extremely important, which means an understanding of how much weight your part/product will be subjected to over what square footage and insight into

how much deflection is needed are key to determining the ideal compression set formulation.

- **Elongation:** The elongation of urethane is the ability to stretch without breaking. To determine the ideal elongation for your custom urethane part or product, there are many factors that come into play. Most importantly, the application of the part and product needs to be analyzed to determine if stretch/give is needed, and if so, how much. When exploring the application and identifying the ideal elongation, there are other factors, including durometer, that will play a key role, as the harder the durometer the less it can stretch.
- **Tear Resistance:** The tear resistance of urethane is the resistance to growth a nick or cut will have when tension is applied. To determine your tear resistance needs, it is important to understand if your part/product will be highly likely to get nicked or cut when in use. Some, high-wear applications will leave your part susceptible to nicks/cuts, which means you will want a higher tear resistance. Other applications may be less severe/low impact, where chances of nicks and tears are unlikely, which means the tear resistance can be low.
- **Tensile Strength:** The tensile strength of urethane is the greatest longitudinal stress which can be applied without rupture. The ideal tensile strength of a part/product can be determined by understanding how much weight the piece will be under, the amount of force that would be needed to cause the part/product to stretch and how much stretch your application needs (i.e. no stretch, some stretch, etc.).

3. **Dimensional Tolerance:** Tolerance is the allowable variation from a set dimension. With some parts/products where precision is key, it may be extremely important to have tight tolerances (little to no variation) due to the specific application in which it will be used (i.e. die cutting, seals, etc.). On the other hand, some parts, depending on their application, may have more flexibility, which means they will have lower standard tolerance needs. This means, to determine the ideal tolerance measurements, you will need to have a solid understanding of how the part/product will be used in order to determine the ability for variation when it comes to measurements/dimensions.

Turn to Custom Urethane Experts to Determine Optimal Formulation Needs

Creating a custom urethane formula for your part/product can be tricky. There are many factors, in addition to those mentioned in this article, that will impact the performance, durability, and ultimately, the lifespan of your part or product. To define your custom formulation needs, the first, and most important step, is gaining a full understanding of the application in which the part or product will be used. This usually involves detailed sketches

and designs, an understanding of the product environment and much more. Once the full picture of the application has been realized, you can turn to experts in urethane formulation for strategic guidance and to help identify the optimal formula needed. Doing this will not only ensure you create the strongest, toughest and most durable custom urethane part/product to meet your application needs, but will ensure you develop the most cost-effective formulation to achieve your goals.

About PSI Urethanes

PSI Urethanes has over 40 years of experience as a market leader and innovator in custom molded urethane. With a long history of outstanding quality, superior product performance and excellent customer service, PSI is a trusted provider of custom molded urethane parts, ranging from low quantity prototypes to full production products. Backed by a highly experienced engineering staff, PSI provides creative solutions with product design assistance, offers a vast array of specialty formulated compounds and delivers top quality parts designed to provide the best overall performance and longest lifespan. Learn more, visit www.psiurethanes.com

PSI URETHANES
10503 Metropolitan Dr.
Austin, Texas 78758
1.800.888.5156
FAX 512.837.8733
www.psiurethanes.com