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WHITEPAPER

Converting from Fiberglass to Thermoplastics

Fiberglass—Established History

Fiberglass has been used in commercial and industrial applications for a variety of reasons, including its ability to resist chemicals and corrosion. Fiberglass can be formed into large items, such as boat hulls, storage tanks, and piping, as well as smaller parts used in commercial applications. The basic method for producing fiberglass parts is understood by most engineers and designers, making it a common process in many applications.

Fiberglass fabrication is typically done in open molds. An initial gelcoat is applied to the inside of the mold to provide a decorative finish to the outside of the final part. The inside of the gelcoat is layered with fiberglass strand, balsa wood, or fiberglass mat. The fiberglass is saturated with an epoxy resin, which is typically hand rolled to remove any trapped air and ensure the resin is evenly distributed, then set to cure. In many applications, the part requires surface finishing and painting to meet aesthetic requirements. Due to this process, fiberglass parts have limited dimensional and tolerance control. The layered build up and the required use of resins results in parts that are relatively heavy for their size.

Thermoplastics—Proven Reliability

Thermoplastics offer manufacturers an alternative to fiberglass because they are robust, wear-resistant, and will not chip, crack, splinter, or fray. Parts made from thermoplastics retain the materials' mechanical properties and durability, which decreases replacement and out-of-service costs.

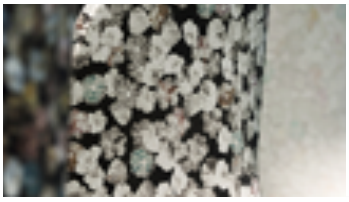
Compared to similarly-sized fiberglass parts, thermoplastics are lighter, reducing the weight of finished assemblies. Lighter-weight finished assemblies can reduce fuel and energy consumption in transportation applications. These weight savings have been shown to increase the lifespan of transportation components such as brake and propulsion systems.

The Evolution of Design

The need for lighter parts with more complex geometries and tighter tolerances has grown as designs have evolved. This improves the fit and finish when mating parts. Manufacturers are looking to suppliers to deliver finished sub-assemblies that easily snap into place or require minimal assembly time. Suppliers who can deliver these finished sub-assemblies will find receptive customers.

Thermoplastic materials have continued to advance to meet the needs of designers for improved aesthetics and provide options to fulfill regulatory requirements. Increased regulatory requirements have led to the development of thermoplastic materials that meet smoke, fire, and toxicity regulations.

Thermoplastics Provide Enhanced Design Options



Today's thermoplastics come in a wide range of standard colours and finishes, and can be matched to nearly any colour. Since the colour is integral to the part, there is no need for secondary finishing and painting, and scratches are virtually unnoticeable. New processes allow designers to develop integrated patterns and textures to enhance the look and feel of the finished part.

Thermoplastics are recyclable and contain no VOCs, making them an environmentally sound solution that supports end-of-life recyclability and life-cycle design. The thermoforming manufacturing processes do not outgas VOCs or create any hazardous waste to dispose of.

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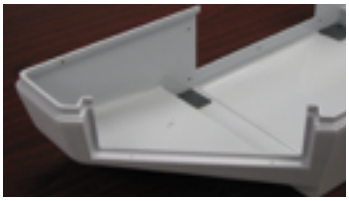
Recycling and disposal options for fiberglass are limited. Most fiberglass components are disposed of in landfills. The fiberglass manufacturing process requires special protective equipment due to airborne particulates and hazardous resins.

Advanced Capabilities from Thermoplastics



To produce a finished part, thermoplastics are pressure or vacuum formed over a mold. This process allows the formed part to be produced with complex geometries, undercuts, and different surface finishes. Fasteners and hardware can be integrated into the part during forming or attached post forming using an adhesive, depending on the specific design requirements. Integrating hardware in the finished part can eliminate secondary operations, which reduces assembly time while still benefiting from the lighter weight and design freedom that thermoplastics offer. These factors result in reduced manufacturing, finishing, and assembly time.

Benefits of thermoformed components:

- Superior aesthetics with a greater choice of colours, textures, and finishes
- Ability to form complex geometries
- Integration of functions into one part
- No finishing or painting
- VOC-free and recyclable

Most thermoformed parts are made on a single tool, providing high-quality parts with tight tolerances. This tolerance control leads to an enhanced fit and finish of the final part or assembly.

When to Consider Thermoplastics

Thermoplastics can help you reimagine designs, replace heavier fiberglass components, and improve the overall aesthetics of the finished design. Thermoplastic materials are impact-resistant, provide excellent resistance to graffiti, chemicals and staining, and can be cleaned without worry of discoloration. Thermoplastics exceed many regulatory compliance and safety standards, making them ideal for many applications such as:

- Production runs ranging from 10 to 1,500 units
- Short component part lead time
- Larger parts that would otherwise require assembly
- The need for improved durability and weatherability
- Improved design aesthetic qualities

SEKISUI KYDEX

SEKISUI KYDEX offers a range of thermoplastic materials manufactured in nearly any colour to match your design and application. Our designLab® and FSTLab™ are available to help you enhance your designs, ensuring they meet regulatory compliance and safety standards.

For more information on how to convert your design to thermoplastics using our appLab™, or to learn more about SEKISUI KYDEX and our line of KYDEX® and ALLEN® Thermoplastics, contact your local representative or visit us at **www.kydex.com.**

appLab™ designLab® FSTLab™

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