



Phase III Product Development

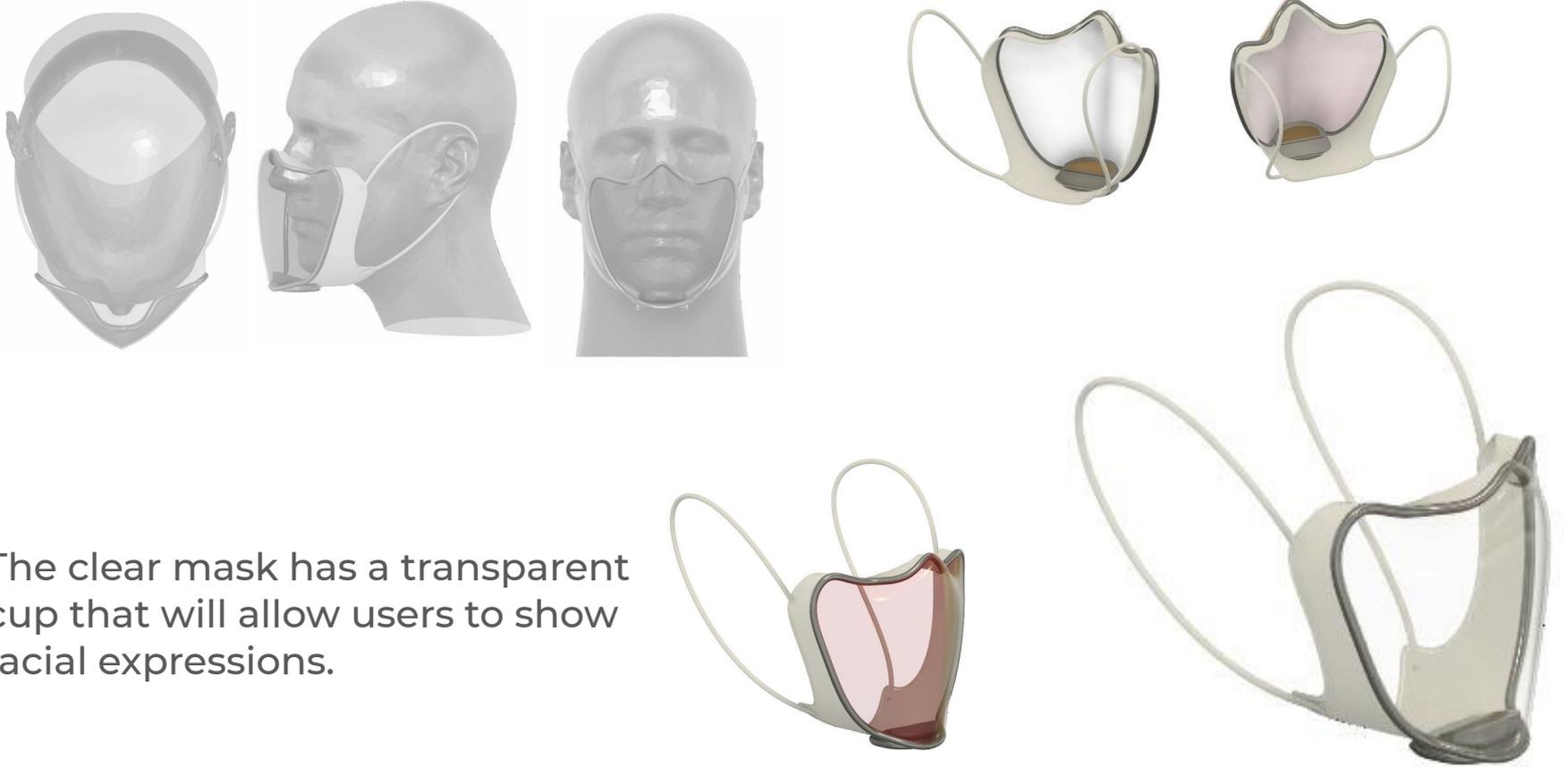
Keisha Herrera
DSID130

Design Strategies



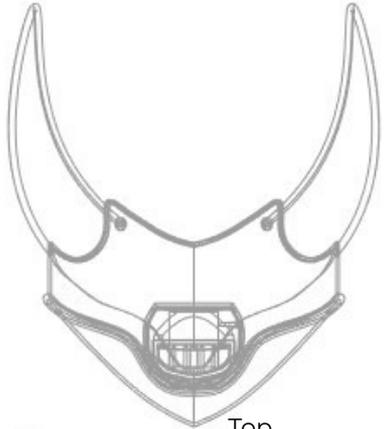
- 2. Minimize Quantity of Materials
- 5. Low Consumption Behavior
- 2. Reduced Material Impacts
- 8. Manual Disassembly

Mockup



The clear mask has a transparent cup that will allow users to show facial expressions.

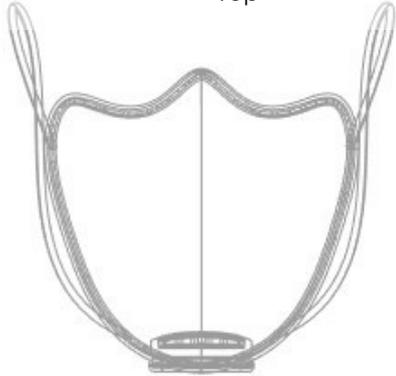
Details



Top



Side

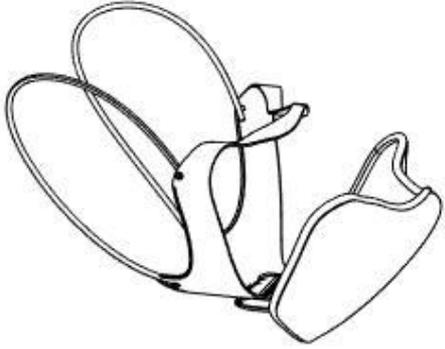
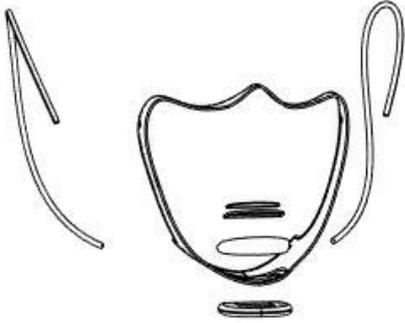
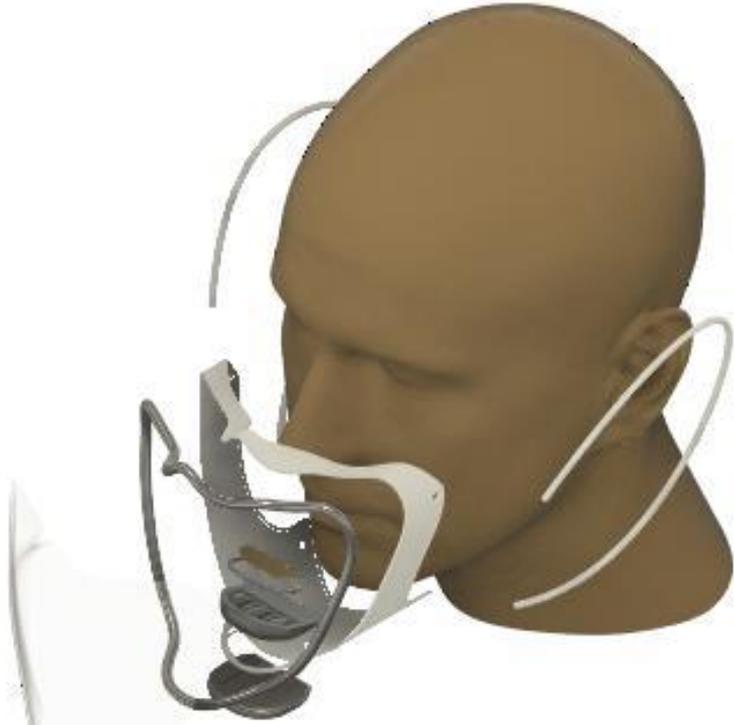


Front



Section View and Orthos
Total of 12 components designed for manual
disassembly

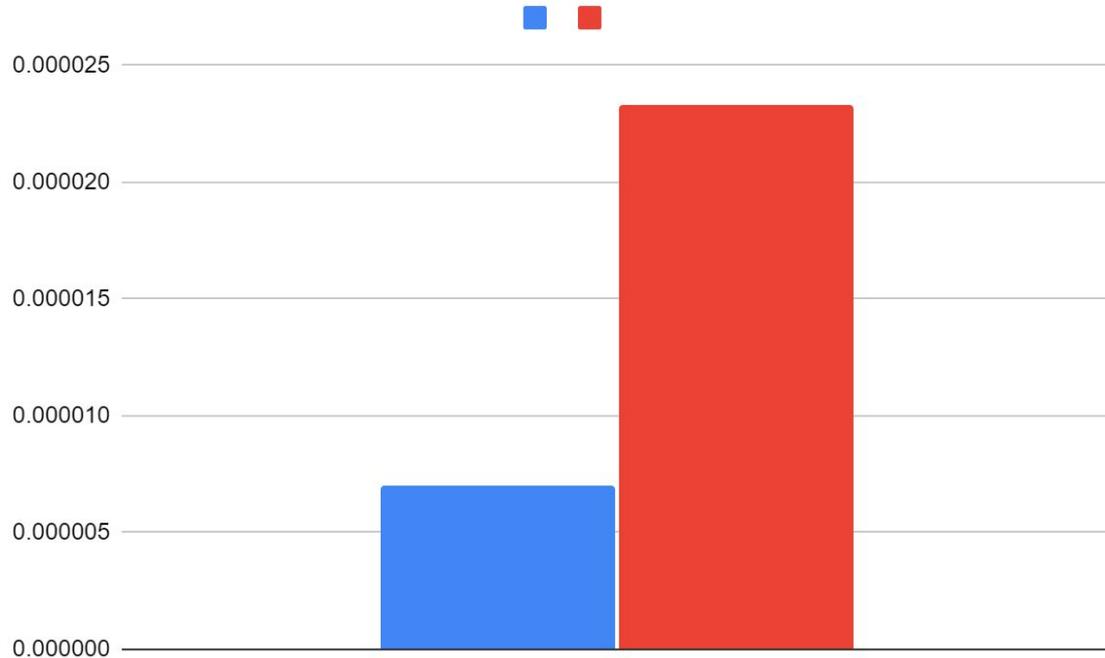
Exploded View



Magnetic Frame on
Clear Cup

All the parts would clip into the main mask frame.
Made from Silicone

Total Impacts For Each Design



Clear Mask

13 Total Parts

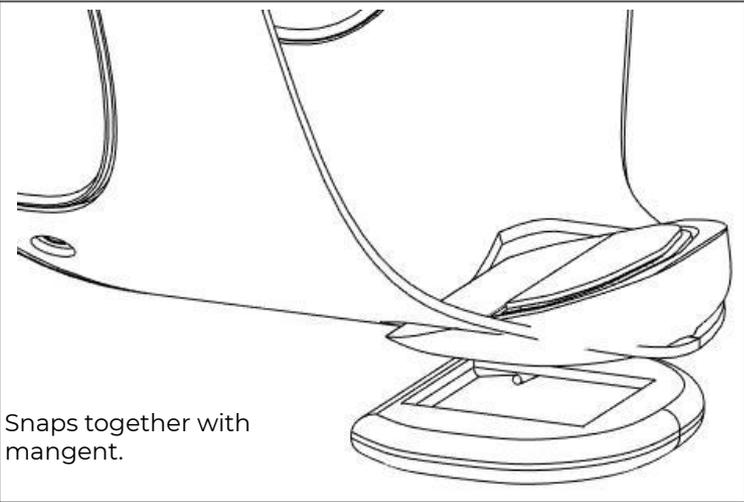
Impact/Hour 0.0000070

LCA Original Q5 Electric Mask

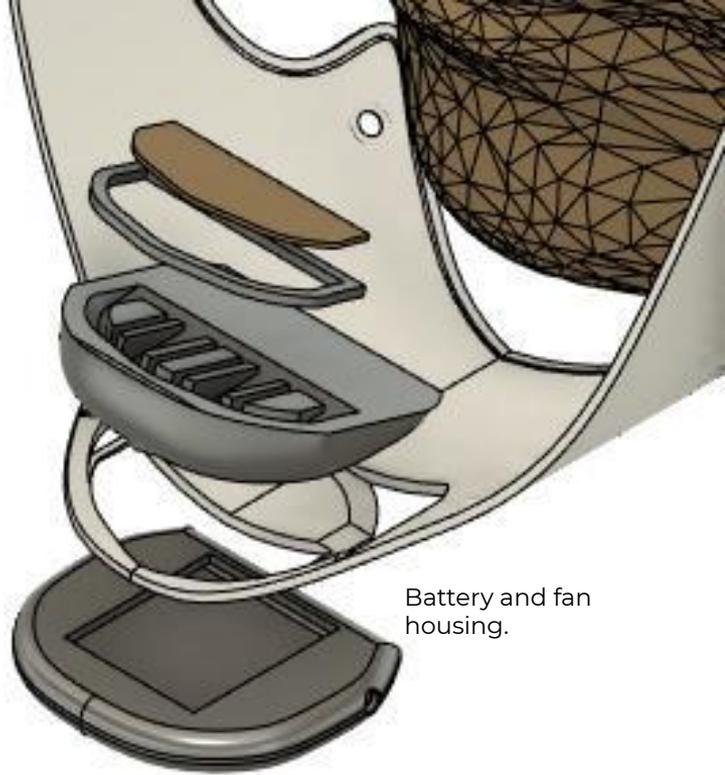
23 Parts Total

Impact/Hour 0.000023

Detail Sketches



Snaps together with magnet.



Battery and fan housing.



Charging port and indication light

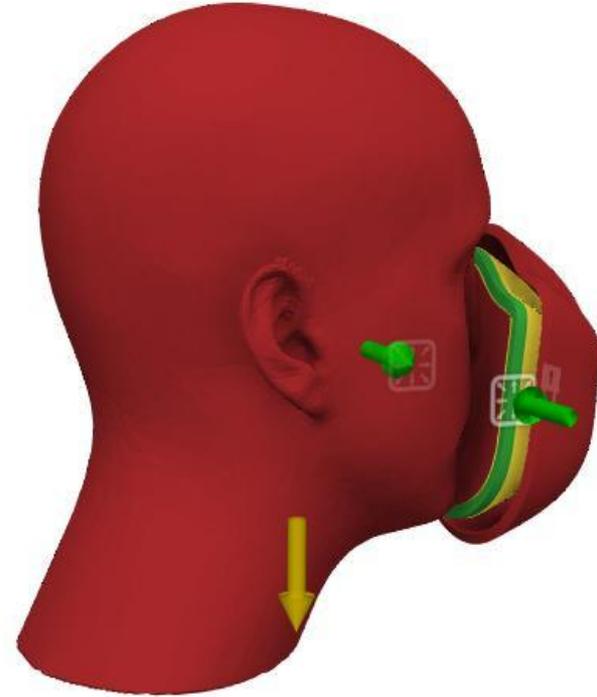
Generative Design



Preserves

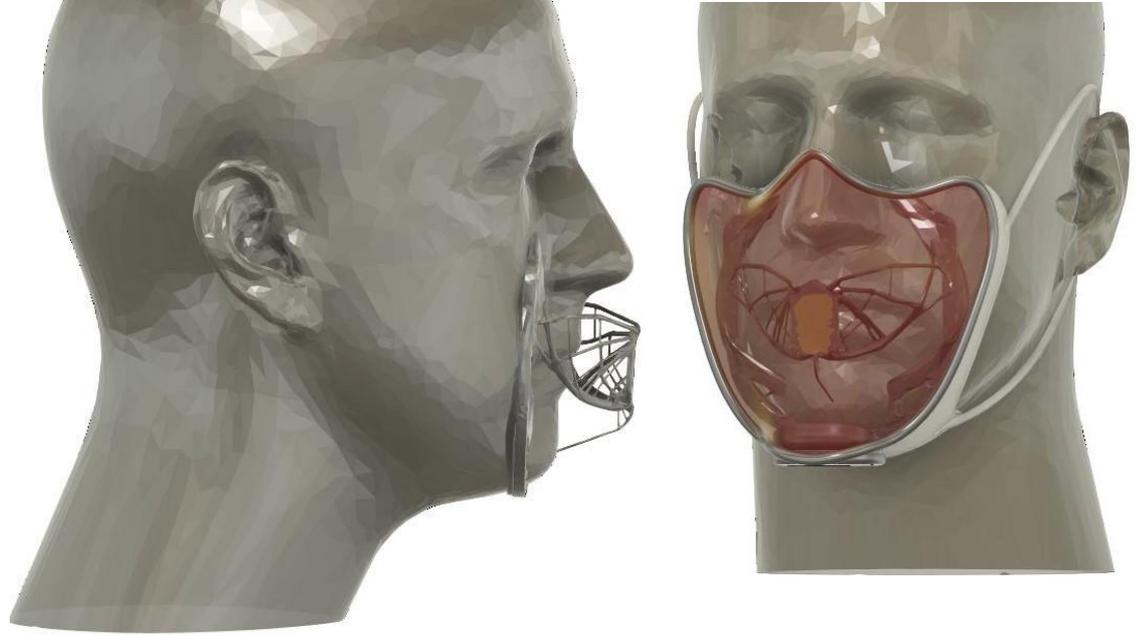


Starting Shape



Obstacles

Generative Design



This would be a face bracket that would keep the fabric from touching the mouth. Made from secondary abs plastic.



Made of recycled materials.
ie. paper pulp packaging
Mycocomposite
(mushroom packaging)

Biodegradable Packaging



7. Transitional Systems

8. Optimized End-of-Life

Reusable Shipping Container

Creating a product that won't go to the landfill or controlled incineration offsets the total impact.



Mask nests inside of mushroom packaging.



Friendly Packaging reminds users to compost.



Valnux 

Small Production Capability

Valnux 

MC 1018801

NATURALS

A biodegradable thermoplastic produced from discarded walnut shells. Chile is the second-largest walnut exporter in the world. The waste shells used here derive from organic plantations of the Valparaiso region. The majority of walnut waste is currently burnt as an alternative for firewood or used to replace groundcover in gardens. Instead, the shells are now upcycled to create a material that exhibits naturally occurring antibacterial and antimicrobial properties. These properties are made possible by juglone, a molecule naturally present in walnut shells. It is also fully compostable and does not alter the organoleptic properties when in direct contact with food. The process of making the material uses the traditional plastic infrastructure, but it is made with a bio-plastic from vegetable sources and agglomerating crushed shells into previously designed and fabricated molds. The resulting material has a natural appearance and is a brown color due to the walnut waste being used. The company has produced its first B2C products that include dishes, fruit bowls, kitchen utensils, and chopping boards. Over 30 medium chopping boards can be produced using the by-products from 1 hectare of walnut production in one season. They are also interested in co-developing future applications such as those in food packaging and more. For food packaging applications, it will be necessary for them to keep investigating various properties such as the permeability of gasses and UV filtering. To be compatible with the ecological purposes of the material, this must come from natural components. Applications include tabletop design, serveware, packaging, and other consumer products.

2-Shot Silicone Molding

Commercially Available

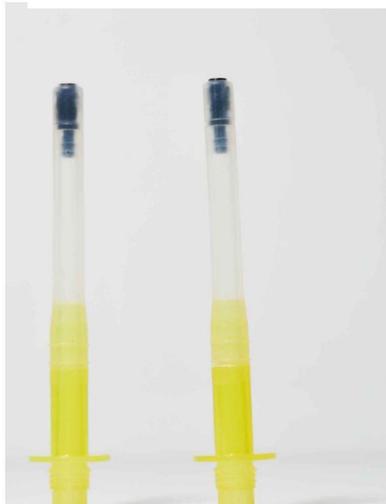
Dymotek 

MC 8081-01

PROCESS

A process to combine either two different types of liquid silicone rubber (LSR) or LSR and a thermoplastic (TP) in one molded part, eliminating the cost of secondary operations and assembly. The two-shot molding technique also provides better bonding between the different components and reduces assembly defects. Molding of parts is done by injecting a liquid silicone rubber and then a thermoplastic material on top to form an over-mold. After the polymer overmolding is complete, the composite part is cooled, the two halves of the mold are separated, and the part is ejected. Additionally, insert-molding is offered and a full range of secondary processes are also available, including sonic welding and light sub-assembly. Attachment of an external part is done via robotic assembly. The process is fully customized to the end needs of the customer, from the part profile, material selection, finishing, even automation, and packaging. Applications include complex medical parts, automotive, military, consumer electronics, and accessories.

Materials





Suede RP

Commercially Available

Kuraray America, Inc. -Clarino Division 

MC 2463-16

POLYMERS

A premium, high-performance man-made suede fabric made from recycled plastic bottles. The material is made from a blend of 80% polyester (PET) and 20% polyurethane (PU). During production, recycled bottles are first crushed and then melted to remake them into pellets. The pellets are then extruded into yarns for further fabric fabrication and then dyeing. The resulting material is sustainable without compromising appearance, hand feel, or physical properties. It is soft and luxurious while having excellent properties with regards to abrasion, crocking, and UV. Sold as rolled goods, the maximum width measures 55 in (140 cm) and can be supplied in any color. Applications include apparel, footwear, and furniture and automotive upholstery.



ACEO® Silicones

Commercially Available

Wacker Chemical Corporation 

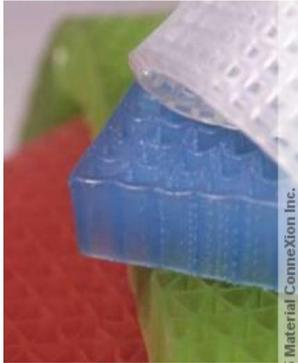
MC 6376-03

POLYMERS

The world's first 100% silicone material that can be 3D printed using ACEO's additive manufacturing technology. This specially designed silicone keeps its inherent properties, including high temperature stability, biocompatibility, elasticity and electrical strength throughout the 3D printing process, enabling a wide range of applications from automotive to healthcare to individual lifestyle products. The 'drop-on-demand' technology allows the printhead to deposit drops of silicone, or 'single silicone voxels', onto a substrate that flow together smoothly to form a homogeneous surface. For complex geometries, cavities and overhangs, the process uses an environmentally-safe support material that is easy to handle and can be washed away with just water. The printed part is then cured with a UV light to achieve the final mechanical properties. This system can achieve layer thicknesses as fine as 100 μm (3.94 mil). The initial product portfolio offers a variety of durometer hardness of silicones ranging from Shore A 10 to Shore A 80 and different colors, including black and translucent grades, are available. It can also be formulated to be electrically conductive or insulating. Certain certified silicone grades are also biocompatible, making it suitable for the medical field. Applications are for transportation (automotive, aviation, aerospace), healthcare (medical devices, prosthetics, biomodels), lifestyle (textile, eyewear, sporting goods), and electronics (switchboards, connector seals).

Materials

Materials



Intelli-Gel™/Gellycomb™

Commercially Available

EdiZONE, LLC 

MC 4056-02

POLYMERS

A unique cushioning material that is made of a highly elastomeric materials in a column construction. A wide variety of properties can be engineered by changing the formulation of the elastomer and also the dimensions of the column walls and cells. As the body sinks in, the columns buckle to allow a contoured support. Applications include commercial and medical cushioning, vibration isolation, and impact absorption.



INMOULD/POSTMOULD

Commercially Available

PSI Brand 

MC 7472-01

PROCESS

In-mold and post-mold processes that fabricate customizable, durable labels into the outer layer of molded plastic parts. The in-mold process allows labels to be fully molded into the product during the molding cycle and finished flush with the surface of the part. Post-mold labels are applied to the part after it is fully molded, using a heat and burnishing process to transfer and fully embed the graphic into the surface. In both processes, the graphics can be applied to virtually any mold temperature, saving time by eliminating the need for pre-heating and cooling. The permanent label is resistant to chemicals, abrasion and suitable for outdoor usage. The labels are 0.125 to 0.375 mm (5 to 15 mil) thick. The processes are suitable for use on a wide variety of molded parts, including rotational, injection and blow molding.

Thank you!
