

POLYJET MULTI-MATERIALS FOR IMPACT RESISTANCE

SOFTWARE/PRODUCT/FINISHING/MATERIAL

OVERVIEW

Impact resistance, or toughness, is defined by the relative susceptibility of plastics to fracture under stresses applied at high speeds. In materials science and metallurgy, impact resistance is a material's resistance to fracture when stressed. It is defined as the amount of energy per volume that a material can absorb before rupturing.

Many of today's appliances have to endure impact due to how they are used, accidents, safety requirements and more. The impact resistance of plastics can be improved by adding a soft material coating on top of hard plastic materials.

Listed below are examples of typical applications within given industries:

- **Consumer Goods:** Binocular protection, plastic container coverings, all-terrain personal equipment.
- **Consumer Electronics:** Outdoor equipment for all-terrain purposes, laptops, outdoor GPS equipment.
- **Defense:** All-terrain electronic equipment.
- **Toys:** Baby toys, video game consoles, joysticks.

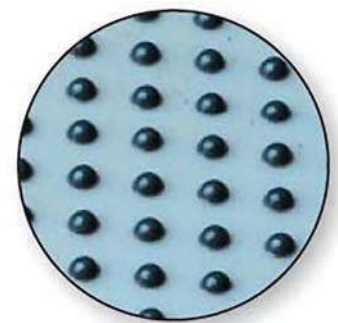
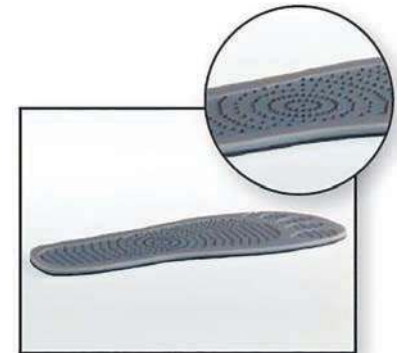
The ability of PolyJet™ Connex™ 3D printing technology to combine flexible and rigid materials can be used to produce various coating thicknesses and also different Shore values of the coating material. Tests can be performed on the parts to measure the impact resistance obtained by the coating. By using the mixed tray option (rigid and soft materials printed separately on the same tray), you can print various design versions with different coating structures, assemble the coatings on the rigid parts and test them to optimize your design.

1. RECOMMENDATIONS

- Save your design in separate STL files according to the different parts. This is recommended for flexible areas as well as for rigid parts. Later the parts can be printed in different color tones to visually separate the different areas of the model.
- Label each part that you evaluate with its relevant Shore value. Labeling will help you easily determine which Shore values received the highest toughness score in your evaluation criteria tests.
- Design your model in such a manner to enable the mounting of flexible parts on your full assembly of rigid and flexible parts. You can then use the Connex system's ability to print up to nine different Shore values in one build process and assemble each part on the model for evaluation.



Figure 1: VeroWhite™ and TangoBlack™ coating results.



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- **Coating:** Use the Objet Studio™ software to coat parts with various thicknesses from 0.3mm to 3mm with one mouse click. You can use any one of the different digital materials as the coating material. For example, to achieve a desired degree of flexibility, use a flexible material from the Tango™ family as a thick coat (~3 mm) and a rigid material as the core (Figure 1).

**CONTACT:**

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