

# PRINTING FLEXIBLE PARTS WITH MULTIPLE MATERIALS

## SOFTWARE/**PRODUCT**/FINISHING

### OVERVIEW

This Best Practice describes printing flexible parts on Connex™ 3D Printers using two flexible materials—one for the part's core and one for its coating.

The core material affects the part's rigidity (shore value) and its memory speed. The coating material affects the elongation-at-break and color.

Increasing elongation-at-break, for a given shore value, increases tear resistance.

Practical applications include:

- Realistic simulation of rubber elastomers
- Impact resistance testing
- Semi-rigid, soft-touch parts
- Complex assemblies of flexible parts
- Parts with varying degrees of flexibility

#### Reference materials:

- Documents
  - Connex User Guide

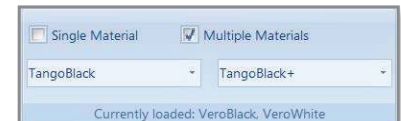


Figure 1: Core material – TangoBlack™; coating - TangoBlackPlus™.



Figure 2: "Coat with" button on the Model Toolbar.

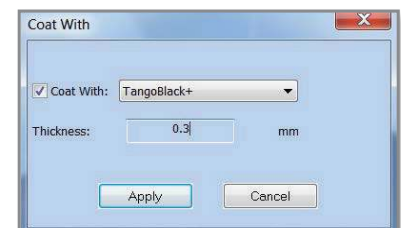


Figure 3: Selecting the coating material.

## RECOMMENDATIONS

### A. Select Appropriate Core Materials

Use TangoBlack as the core material to increase memory speed.

Use TangoGray™ as the core material to increase rigidity and tear resistance.

### B. Select Appropriate Coating Materials

TangoPlus™ and TangoBlackPlus have high elongation-at-break values. Use either of them as the coating material to enhance tear resistance. This will also bring the elongation-at-break value close to that of parts printed with TangoPlus materials alone.

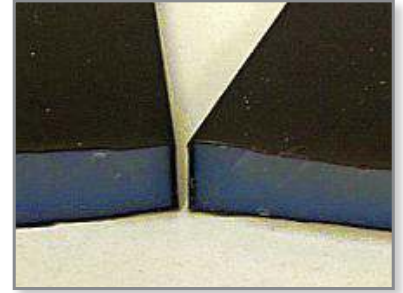


Figure 4: Two 8-mm-thick models printed with TangoGray and coated with TangoBlackPlus.

#### Recommended Core/Coating Material Combinations

| Core Material | Coating Material | Benefits   |
|---------------|------------------|--|
| TangoBlack    | TangoBlackPlus   | <ul style="list-style-type: none"> <li>• Increased tear resistance</li> <li>• Increased elongation at break</li> <li>• Soft touch</li> </ul> |
| TangoBlack    | TangoPlus        | <ul style="list-style-type: none"> <li>• Increased memory speed</li> <li>• Increased tear resistance</li> </ul>                              |
| TangoGray     | TangoBlackPlus   | <ul style="list-style-type: none"> <li>• Increased tear resistance</li> <li>• Increased elongation at break</li> <li>• Soft touch</li> </ul> |
| TangoGray     | TangoPlus        | <ul style="list-style-type: none"> <li>• Increased memory speed</li> <li>• Increased tear resistance</li> </ul>                              |

### C. Select a Coating Thickness

For best results, a coating material thickness of 0.3 mm is recommended. The coating thickness does not affect the external dimensions of the object, which remain unchanged. The coating layer replaces part of the main model material.

## NOTES ON APPLYING COATING TO PARTS

### A. Shore Values in Thin Parts

Because the coating material thickness remains constant, thin parts may have lower Shore A values than expected.

If a part's thickness is below ~0.8 mm, the core material will not be printed at all. The entire part will be printed using the coating material.

### B. Applying Core and Coating Materials

See the section on "Coating Objects" in the appropriate User Guide for your Connex 3D Printer.

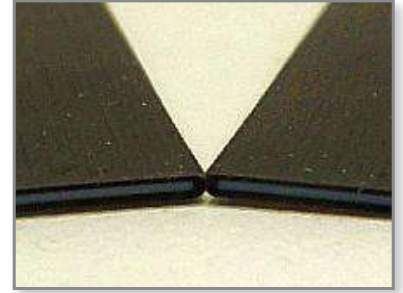


Figure 5: Thin parts showing core and coating materials.

## CONTACT:

To obtain more information on this application, contact:

**Stratasys Application Engineering**  
[stratasys.com/solutions-applications](http://stratasys.com/solutions-applications)

Stratasys | [www.stratasys.com](http://www.stratasys.com) | [info@stratasys.com](mailto:info@stratasys.com)

|  |  |
|--|--|
| 7665 Commerce Way<br>Eden Prairie, MN 55344<br>+1 888 480 3548 (US Toll Free)<br>+1 952 937 3000 (Intl)<br>+1 952 937 0070 (Fax) | 2 Holtzman St.<br>Science Park, PO Box 2496<br>Rehovot 76124, Israel<br>+972 74 745-4000<br>+972 74 745-5000 (Fax) |
|--|--|

### ISO 9001:2008 Certified

© 2015 Stratasys. All rights reserved. Stratasys, Stratasys nautilus logo, PolyJet, Connex, TangoPlus, TangoBlack, TangoBlackPlus and TangoGray are trademarks of Stratasys Ltd. and/or its subsidiaries or affiliates and may be registered in certain jurisdictions. All other trademarks belong to their respective owners. BP-PJ-PrintingFlexibleParts-EN-05-15

The information contained herein is for general reference purposes only and may not be suitable for your situation. As such, Stratasys does not warrant this information. For assistance concerning your specific application, consult a Stratasys application engineer. To ensure user safety, Stratasys recommends reading, understanding, and adhering to the safety and usage directions for all Stratasys and other manufacturers' equipment and products. In addition, when using products like paints, solvents, epoxies, Stratasys recommends that users perform a product test on a sample part or a non-critical area of the final part to determine product suitability and prevent part damage.

