

# 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

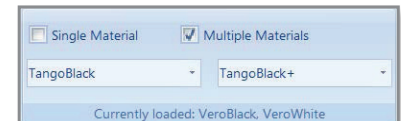


Figure 1: Core material – TangoBlack™; coating - TangoBlackPlus™.



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

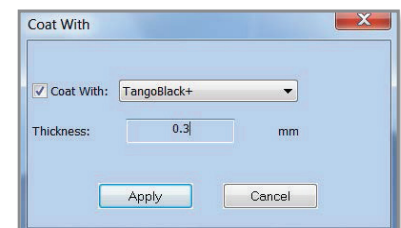


Figure 3: Selecting the coating material.

## 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.

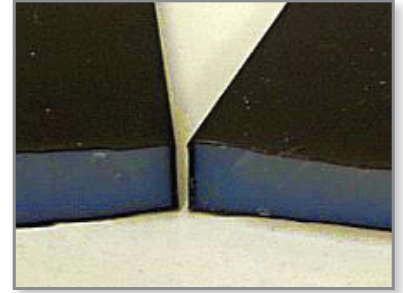


Figure 4: Two 8-mm-thick models printed with TangoGray and coated with TangoBlackPlus.

#### 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.

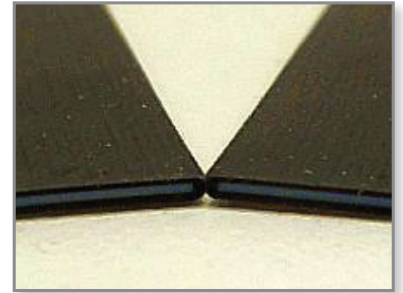


Figure 5: Thin parts showing core and coating materials.

## CONTACT:

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