

Intent-Based Material Extrusion 3D Printing: Moving from process-driven to intent-driven 3D printing

The proposed design is a software plugin for the Cura engine based on product configuration systems used in retail. The software architecture consists of six modules that work together to analyse the model geometry, retrieve requirements and wishes based on the communicated intent, recommend profile selections and user actions, validate the print preparation process and guide the user towards ideal printer configurations and process parameters.

Within the plugin users can better voice their intentions through selecting component profiles. These profiles present meaningful feedback to users that both guides and educates them.

Curved Surface
This profile guides you through the print preparation of curved surfaces for presentation modes.

TIP: By orienting the component properly, you can avoid visible 'steps' on curved surfaces.

Recommended Custom

Aesthetics
Printing aesthetically pleasing curved surfaces increases print time.

Fine

Clickfinger
This profile guides you through the print preparation of clickfinger components to enable the correct mechanical properties.

CAUTION: Orient the clickfingers so deflections are parallel to the XY plane, otherwise they will not function properly.

Recommended Custom

Flexibility
Making the snap fit more flexible decreases its strength.

Flexible

Accurate Holes
This profile guides you through the print preparation of accurate holes in order to achieve better dimensional accuracy.

TIP: The accuracy of a hole can be improved by orienting the hole perpendicular to the build platform (see image).

Recommended Custom

Accuracy
The accuracy of a hole can be influenced by layer height and print speed.

Accurate

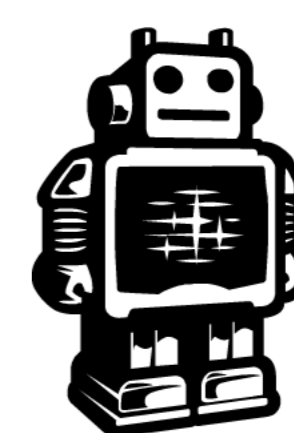
Part Strength
This profile contains presets for print preparation of strong parts.

TIP: Parts are strongest against forces parallel to its layers and weakest against forces perpendicular to its layers (see image).

Recommended Custom

Strength
Making a part stronger increases print time.

Normal



Ultimaker

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Integrated Product Design

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