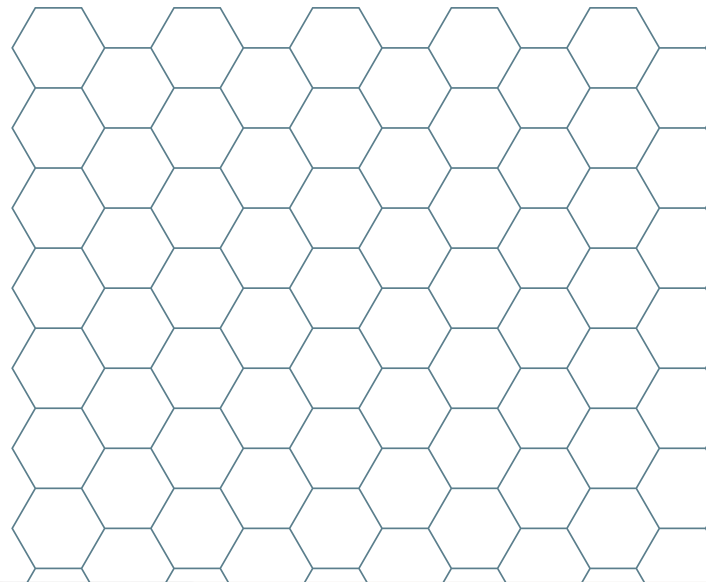


Ultimaker cheat sheet

3D printing applications for automated packaging lines





Introduction

On the following pages, you will find 9 parts and tools used by industry-leading companies and optimized by Ultimaker application engineers. Each showcases the benefits of in-house 3D printing for commercial product design and automated production.

And while the application descriptions include details on materials and cost savings – that’s not the full story.

Because these 3D printed parts and tools can do so much more to speed up iteration cycles and time to market. Or to reduce unplanned downtime or the need for storage.

In this way, you will find that by 3D printing just one or two of these applications, you can quickly offset the cost of a printer through increased flexibility, productivity, and efficiency.

Let’s get started.



Drinks can designs

Visual prototype

Summary

- ✓ Look and feel
- ✓ Reusable modular elements
- ✓ Fast iterations

Description

3D printing is used by many designers to create visual prototypes.

Design concepts like these are usually communicated in 3D renders or outsourced ink-on-aluminum prints. But 3D printing makes it easy to show off different colored designs using dual extrusion.

This design features a screw top and bottom that can be interchanged with different designs.

Conventional

Material: Aluminum and ink

Lead time: 2 weeks

Cost: €150

3D printing

Material: Ultimaker PLA

Print time: 24 hours

Cost: €10 (93% saving)



Perfume bottle designs

Visual prototype

Summary

- ✓ Look and feel
- ✓ No mold needed
- ✓ Fast iterations

Description

These luxury bottles are inspired by the design innovation of one of Ultimaker's customers - L'Oréal.

Instead of relying on renders, it's quick to 3D print a model that can be held in the hand and be part of user testing. The gold ABS knurled cap clicks onto two bottle bodies. And because there is no need to make a mold or fabricate using glass, concepts such as these can achieve quick validation and progress to the next stage in production.

Conventional

Material: Foam / CNC

Lead time: 2 weeks

Cost: €180

3D printing

Material: Ultimaker PLA / ABS

Print time: 14 hours

Cost: €2 (99% saving)



Squeeze tubes

Functional prototype

Summary

- ✓ Water tight
- ✓ Useful for line testing
- ✓ Fast iterations

Description

This fast, single-wall print is made from PP, with a working hinged cap from Tough PLA.

The tube's strong interlayer adhesion makes it water and air-tight. This means you can quickly test iterations with the liquid product to validate hand-fit and the right squeeze-ability.

The design has been refined to optimize translucency so that production lines can be tested to ensure correct fill levels.

Conventional

Material: Foam / CNC
Lead time: 2 weeks
Cost: €130

3D printing

Material: Ult. PP / Tough PLA
Print time: 4 hours
Cost: €3 (98% saving)



Drinks bottle designs

Functional prototype

Summary

- ✓ Useful for line testing
- ✓ Fast iterations
- ✓ Non-breakable

Description

We ran a competition among Ultimaker engineers to create a new beer bottle design. These are the winners.

3D printed bottles like these replace bottles created with foam or CNC on a lathe, which is a labor intensive process that creates a lot of waste. They can then be used to test changeover line adjustments when different bottle dimensions require different machine configurations.

Conventional

Material: Foam / CNC lathe
Lead time: 2 weeks
Cost: €200

3D printing

Material: Ultimaker PETG
Print time: 1 day
Cost: €7 (97% cost saving)



Safety switch LOTO

Support tool

Summary

- ✓ Enhance safety
- ✓ Mark points of attention
- ✓ Fully customizable

Description

This dual extrusion print features industry-standard safety labelling that's instantly recognizable for operators.

When the switch is turned off for maintenance, the cover can be lowered over the switch and locked with a padlock so that no one can reengage the machinery while maintenance is being performed.

Off-the-shelf LOTO equipment is relatively cheap but tends to be universal. By contrast, this application offers an affordable alternative that's customizable. That means it can be permanently mounted for different shapes of critical switches.

Conventional

Material: Nylon
Lead time: 1-2 weeks
Cost: Up to €60

3D printing

Material: Ultimaker Tough PLA
Print time: 38 hours
Cost: €17 (72% cost saving)



Ergonomic wrench

Assembly tool

Summary

- ✓ Color-coded handles
- ✓ Metal replacement
- ✓ Lightweight

Description

Wrenches like this are often used to tighten or loosen large nuts on packaging line machinery for maintenance. This design has ergonomic enhancements that are highly beneficial for the user and the sort of customization that can be easily created using 3D printing.

Stiff material makes the tool robust enough to withstand heavy use. And TPU 95A used on the color-coded handles has rubber-like properties to increase operator comfort and grip.

Conventional

Material: Stainless steel
Lead time: 2 weeks
Cost: Around €600

3D printing

Material: Ult. TPU 95A, CPE
Print time: 1 week
Cost: €20 (97% cost saving)



Label gauge

Quality tool

Summary

- ✓ Color-coded
- ✓ Clear labelling
- ✓ Fast print

Description

This low-cost solution ensures that labels are positioned correctly on product packaging. 3D printing gives you the freedom to create this kind of tooling easily.

Color coding and clear labeling means operators don't have to memorize all the different tooling. It has the benefit of being lighter weight than metal. And less brittle than POM.

Conventional

Material: Metal or POM

Lead time: 1 week

Cost: €130

3D printing

Material: Ultimaker PLA

Print time: 7 hours

Cost: €1.50 (99% cost saving)



Sprocket wheel

Replacement part

Summary

- ✓ Optimized geometry
- ✓ High wear resistance
- ✓ Dual material print

Description

This is one of the most common 3D printing applications used by Ultimaker's commercial customers. A replacement part that can be embedded in the production line.

The outer material is a self-lubricating polymer, which can withstand the wear and tear of the production environment. And because it's a different color, operators can easily see if the outer ring wears down over time and needs replacing.

Combining two materials in this way and having an optimized lightweight design are features that can only be achieved with 3D printing.

Conventional

Material: PA6/66

Lead time: 3 weeks

Cost: €30 (MOQ 20)

3D printing

Material: Nylon CF, Igus®

iglidur® i190-PF

Print time: 1 day

Cost: €10 (67% cost saving)



Conveyor comb

Replacement part

Summary

- ✓ JIT production
- ✓ Easily adapted design
- ✓ No MOQ restraints

Description

Another of the top replacement parts 3D printed by Ultimaker customers. This transition piece guides rolling products at a conveyor system junction.

Just In Time production means there's no need to keep an inventory and this fast 3D print can "bridge" the time it takes for an OEM replacement to be shipped – avoiding unplanned downtime.

An engineering-grade material was chosen for its specific properties to withstand the impacts and chemicals of a fast-moving production line.

Conventional

Material: PP / POM

Lead time: 2 weeks

Cost: €20 (MOQ 20)

3D printing

Material: Ultimaker CPE+

Print time: 6 hours

Cost: €3 (85% cost saving)