

# CASE STUDY: 3D PRINTED "TOTTLE" ADAPTER SAVES 30,000 EUROS ANNUALLY



## HENKEL IRELAND LEVERAGES ADDITIVE MANUFACTURING TO INCREASE PRODUCTIVITY AND REDUCE COST OF MACHINE DOWNTIME

*"Time is money on the production line," says David Brady, European Business Development Manager for Henkel AM Services.*

*"Henkel offers products in various sizes, and every time we switched from one size tottle to another, we spent two and a half hours changing our equipment over. Pardon the pun, but those changeovers were a serious bottleneck that we needed to reduce, or hopefully eliminate altogether."*

### Background

Henkel is a manufacturer of adhesives, sealants, coatings and surface treatment solutions for both the industrial and consumer markets. Many of their products are offered in a range of sizes, from intermediate bulk containers and drums, to small packages that allow for easier access in a manufacturing environment and make Henkel's products affordable for home use.

Bottle filling machines are used in many different industries including beverages, cleaning supplies, cosmetics and more. The techniques and processes used to fill the product are typically determined by the viscosity and material properties of the fluid being poured.

Automated filling machines leverage a series of routines and parts to grab, hold, fill, and cap each bottle. Like other manufacturing equipment, they are configured to run based on a set of specifications. Each time those change, a make ready or change over must be performed.

Additive manufacturing is proving to be a game changer for the global automation market. With a wide range of technologies and numerous material choices, it empowers engineers many new capabilities, allowing them to inexpensively produce precise, lightweight components and tooling. With access to this important technology, companies can solve many bottlenecks and other problems that hinder the efficiency of their production lines.



50 ml vs. 250 ml tottle holder

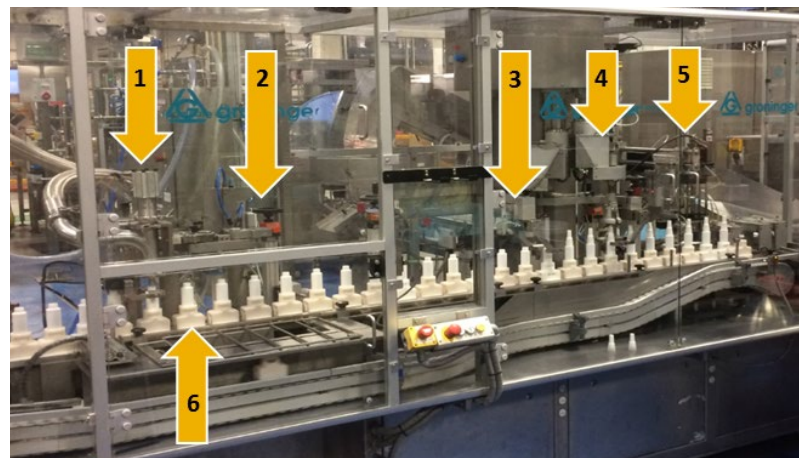
### The Challenge

Henkel Ireland Operations Ltd., manufactures performance adhesives for thread locking applications. Among other products, many types of liquid adhesives are produced at it's Dublin facilities. When a specific material is ready for packaging, it is fed into bottle filling machines.

Typically products are sold in 50 and 250 milliliter "tottles," a Henkel term for a container that is a combination of a tube and a bottle. The switch over from one size bottle to the other involved several different steps. The bottle carrier (holder), gripper, sensor, filler and capper all had to be replaced. Further, torque and other settings had to be adjusted based on the tottle size. In all, the process took about 2.5 hours.



Loctite Thread Sealant in 50 ml "Tottle"



Steps involved in bottle filling change over protocol

### APPLICATION:

Custom adaptor for automated bottle filling equipment

### MATERIAL:

LOCTITE 3D 3172 HDT50 High Impact

### TECHNOLOGY:

EnvisionTec Envision One Digital light processing (DLP) photopolymer 3D printer



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## The Solution

*"Normally, the bottle carriers are injection molded, and they are ordered in bulk, so we end up with inventory, which are used over time as change overs are requested at multiple different filling stations," says Mr. Brady. "The demand for Loctite adhesives was growing and we had to improve our throughput. We needed to go beyond our standard supply and manufacturing options. We found a better solution."*

Henkel Ireland's engineering team began by determining how they would solve the problem. To fill accurately, the machine needed each bottle to be the same height. If the team could enable the 50 ml bottles to work with the 250 ml bottle holders, they could eliminate the need for a change over.

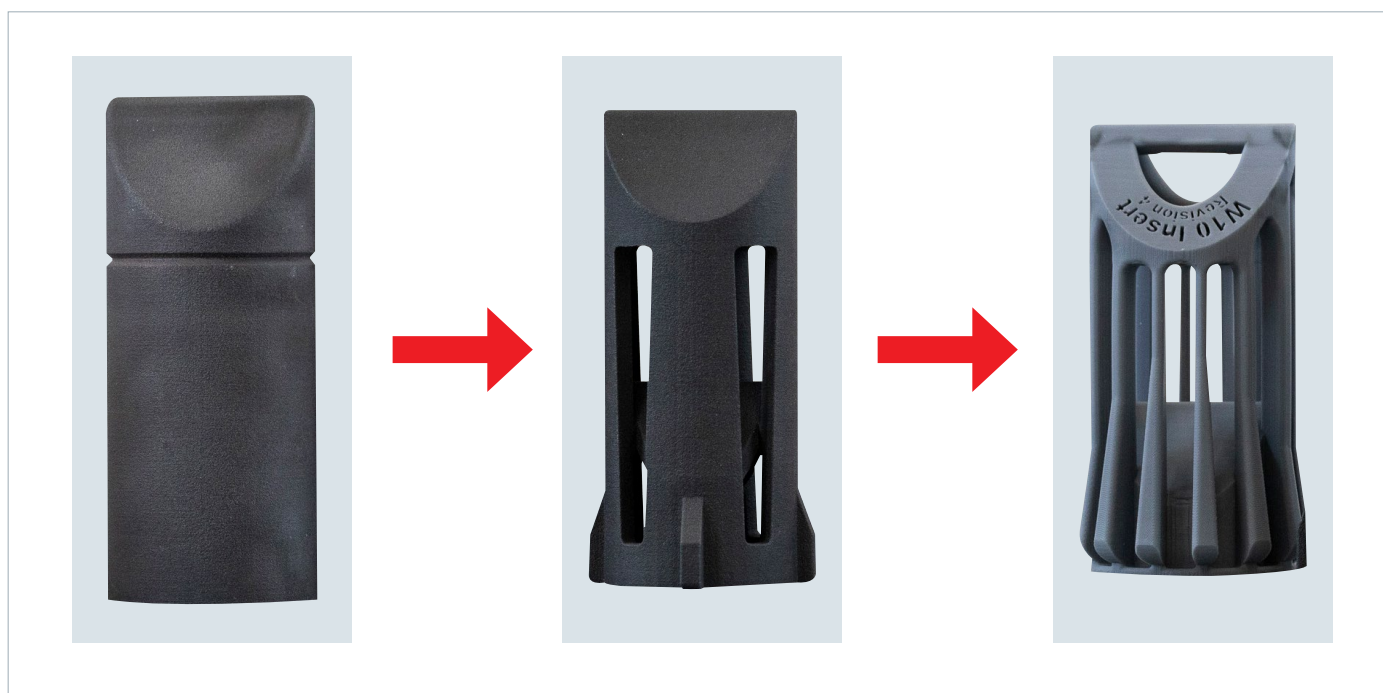
Using Design for Additive Manufacturing (DfAM) principles, they began working on an adapter that could raise the 50 ml bottle height and secure them snugly in the 250ml bottle holders.

Henkel's engineers planned to produce the adaptor using digital light processing (DLP) photopolymer 3D printing. With that in mind they chose Loctite 3D 3172 as their material. It's characteristics include toughness and high impact strength, making it ideal for a tooling application.

After developing several prototypes, the team finalized its design. The final parts exhibited an outstanding surface finish, durability and toughness to withstand mechanical assembly and continuous use on the filling line. More importantly, the new adapter worked as anticipated, eliminating an important bottleneck from the company's production line.



50 ml and 250 ml bottles being filled in the same production run



Tottle holder design iterations from initial concept to final part



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## BENEFITS

*“By leveraging design for Additive Manufacturing and our Open Materials platform, we were able to identify the best solution to reduce the need for change overs and simplify management of the filling line,” says Mr. Brady. “In a manufacturing environment, any downtime is costly. We saved over 2 hours per change over with the new adapter. With it, we’re squeezing more efficiency from our existing equipment. It’s a result we couldn’t have envisioned, much less achieved without additive manufacturing.”*

With the new adapter, Henkel’s Ireland operations group was able to reduce the amount of time it took to conduct a change over from two and half hours down to 15 minutes. Over the course of a year, the time savings equates to over 30,000 Euro.

Beyond the increased productivity and decreased cost, Henkel’s team realized several other important benefits. First, by using a high performance, engineering grade polymer, the adapter exhibited exceptional strength even though it was optimized to be very lightweight. This eliminated as much strain as possible on the automated bottling machine’s other components.

Additive manufacturing allows engineers to create designs that can’t be traditionally produced. This offered the team new freedom when it came to the part’s design. Also because it’s digital, 3D printing allows for quick iteration and customization. As Henkel’s needs evolve, new parts can be developed and existing parts can continuously improve, without the inventory and waste involved with mass production.

Industrial automation is helping companies increase their throughput and reduce the cost of production. Additive manufacturing has the potential to drive productivity even higher by eliminating common bottlenecks. For the vendors and customers of automated packaging equipment, this bottle adapter demonstrates the ROI opportunity. Working with Henkel and its Open Materials Platform, industrial automation companies can conceive and quickly produce the parts they need to take their equipment to the next level of efficiency.



Want to learn more about Henkel’s unique material solutions for the additive manufacturing industry? Visit Henkel’s LOCTITE 3D Printing at [LoctiteAM.com](https://www.loctite3dp.com) or reach out to us via [loctite3dp@henkel.com](mailto:loctite3dp@henkel.com)

## About **LOCTITE**

LOCTITE Additive Manufacturing delivers unique photopolymers with production capability, customize resins and deliver engineering services to identify the best application to address your needs. With a constantly growing portfolio of high-performance materials, specialized equipment and post-processing solutions, LOCTITE overcomes the limitations of conventional 3D printing to enable additive manufacturing for the production of durable, functional parts. Through its strategic partnership with technology leaders for specialized equipment, LOCTITE is driving the adoption of 3D printing beyond prototyping and toward the production of final parts. ([www.loctiteam.com](https://www.loctiteam.com))

## About **envisionTEC**

EnvisionTEC is a leading global provider of professional-grade 3D printing solutions. Our company invents, develops, manufactures and sells 3D printers and proprietary materials worldwide. Founded in 2002 with its pioneering commercial DLP printing technology, EnvisionTEC now sells more than 40 printers based on six distinct technologies that build objects from digital design files. The company’s premium 3D printers serve a wide variety of medical, professional and industrial markets, and are valued for precision, surface quality, functionality and speed. EnvisionTEC’s intellectual property includes more than 100 pending and granted patents and 70 proprietary materials.