

## 3D PRINTING REDUCES COST AND IMPROVES EFFICIENCY IN THE AUTOMOTIVE SECTOR

### Background

Fehrenbacher Kabeltechnik GmbH, which is based in St. Georgen in the Black Forest, goes back to Alfred Fehrenbacher GmbH, founded in 1963, which provided turned parts, components, cable assemblies and assemblies for the turntable industry. In 2015, the cable assemblies and components divisions were taken over by today's Managing Director Thomas Botta and transferred to an independent company. "I was already employed in the original company, first as a sales manager and later as a managing director. Through the spin-off, I was able to consistently develop the areas that are most close to my heart," explains the managing director.

### APPLICATION:

3D Printed Electronics Connector

### MATERIAL:

LOCTITE 3D IND406 HDT100 High Elongation

### TECHNOLOGY:

GENERA G2 / F2 System

### The Challenge

When using traditional production methods, problems can often arise that can have a massive impact on the cost effectiveness of the application. These traditional production methods can be too time consuming and far too expensive.

A manufacturer of diagnostic equipment required pre-assembled plug-cable combinations for diagnostic devices in the automotive sector, which were supplied by [Feba Kabel](#) in a batch size of about 5,000 pieces per year. These pieces were then encapsulated by other suppliers and the plug was then overmolded with plastic. This process required as many as five working steps with intermediate transport logistics. Potting and overmolding is a hot process however, which usually results in a significant scrap rate. This diagnostic equipment manufacturer then turned to its supplier 'Feba-Kabel' to explore new ways to optimize electronic connectors for a cable assembly. Together with [3D-Werk](#), [GENERA](#) and the use of additive manufacturing, the perfect solution could be provided.



*The double-cranked connector geometry is where the challenge arises with the connection cable for the diagnostic device.*



# 3D PRINTED CONNECTOR FOR DIAGNOSTIC DEVICES



## The Solution

After evaluating a variety of different materials for this application, the photopolymer [Loctite 3D\\_IND406 HDT100](#) material from Henkel's Loctite 3D Printing portfolio proved to be the optimal material. By using IND406 together with a combination of [GENERA's G2 / F2 System](#) and the DLP process the cable set for a car diagnostic device was redesigned. IND406 was chosen as the material for the series parts. This is black in color and has great weather and aging resistance as well as high heat deflection, which is hugely important for the cable assemblies. "Together with material manufacturers, we are working to provide parameter sets for a wide variety of use cases so that users have the security of having a reproducible process available. Because series production thrives on process reliability and that's what our machines are designed for." reveals Dr. Klaus Stadlmann, Managing Director of GENERA.



## IND406

<b>24 %</b>	<b>1658 MPa</b>	<b>52 MPa</b>	<b>35 J/m</b>	<b>103°C</b>
Elongation at Break	Tensile Modulus	Ultimate Tensile Strength	Impact Strength (Notched)	Heat Deflection Temperature

## BENEFITS

Printing with Loctite IND406 ensures that we can offer a high-strength, high elongation engineering plastic with good impact and high temperature resistance. Stiffness, toughness and thermal durability make this material ideal for a wide variety of tools in the production floor and for final parts production in manufacturing.

Ultimately, the appropriate combination of material selection, functional design and perfect finish has led to the end customer now having the entire cable manufactured by Feba Kabel. Using Loctite IND406 on GENERA's G2 / F2 System, the lead time was reduced by several weeks and even months and the time to market was much faster during COVID-19 thanks to not having the need of injection molding tooling. The manufacturing cost was also reduced significantly due to removing the number of production steps.



During the final assembly, the pre-assembled plug-cable combination is inserted into the lower part of the housing, encapsulated with a 2K mass and then sealed.

Due to the simple shape of the part, we can also print many of them on a platform, which results in a very low price per part. In the end, the 3D printed production part was a lot cheaper than the traditional manufacturing method due to the reduction of scrapped parts.

Want to learn more about Henkel's unique material solutions for the additive manufacturing industry? Visit Henkel's LOCTITE 3D Printing at [LoctiteAM.com](http://LoctiteAM.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, customized resins and 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](http://www.LoctiteAM.com))

### About **GENERA**

Creation made reliable.

GENERA is a young Austrian SME with the vision of revolutionizing industrial 3D Printing.

3D Printing has been promising fast, reliable and clean production for many years but failed to deliver on these claims. GENERA was founded with the mission of creating a fully automated DLP 3D Printing System for Serial Production. In the past, users were left with the delicate coordination between process steps and selection of process parameters. To overcome these issues, we strongly believe that additive manufacturing needs to be a comprehensive process from setup to the final result. Only if all steps are harmonized, the end product can be exceptional. The GENERA Workflow and the GENERA Printing Systems guarantee repeatable results according to the required specifications. With our open material library and strong industry partners our customers can choose the material best suitable for each application. The freedom and reliability of the GENERA Printing Systems will take your production to a new level. Learn more about GENERA and our 3D Printing Systems on our homepage and register for an online live demo: <https://genera3d.com/online-live-demo/>

### About **Feba-Kabel**

Partner for the Technology of Cable Technology and Accessories  
Elektrotechnik Kabeltechnik GmbH

The team of Fehrenbacher Kabeltechnik GmbH, manufacture at the St. Georgen site with about 55 employees They are a small, flexible company with standardized processes and short decision-making paths. Whether strands, sheathed cables, ribbon cables or complex assemblies, they always have a solution that will take you further, because they harmonize quality and cost-effectiveness in order to meet your wishes and ideas. With well over 100 of their own tools, tailored to contacts from various manufacturers such as Tyco, JST, Stocko, Lear, Molex, Hirose and various others, we convince with quality. With their modern machinery, they can respond flexibly to your customer requirements. Whether automotive, mechanical engineering, medical technology, railway technology, sensor technology, lighting technology, industry, agriculture or household appliance technology, they are already at your side in the project phase to find a solution together with you. They are ideally equipped for small batch sizes as well as for large series for any customer requirement. Thanks to their own toolmaking and a neighbouring turned parts company, they can also react flexibly as a system supplier to the high demands you place on them. (<http://www.feba-kabel.de/>)

### About **3D WERK**

3D-Werk have been dealing with the topic of additive manufacturing for more than 15 years. Today, they offer the complete process chain from development/design to the production of small series. In their family-run company, short distances and quick decisions are a matter of course. They believe in the future. They use state-of-the-art, industrial 3D technologies. With experience and competence, they find suitable solutions for their customers. (<https://3d-werk.eu/>)