



## FUELING CHANGE: 3D PRINTING TRANSFORMS CARBURETOR PERFORMANCE

### Application Introduction

Ensuring that carburetors stay perfectly airtight is crucial for engine performance. This pressure gauge is specifically designed for that purpose, maintaining airtight conditions over an 8-hour period. It's a vital tool in the automotive industry, widely used in maintenance and repair by both professionals and DIY enthusiasts.

DLP (Digital Light Processing) technology was chosen for this application because it meets essential requirements: high dimensional accuracy, effective liquid and gas tightness, shape stability, and strong chemical resistance. These attributes ensure the pressure gauge performs reliably in demanding environments.

**APPLICATION:**  
3D Printed Carburetor

**MATERIAL:**  
LOCTITE 3D IND403

### The Challenge

The primary challenge was achieving quicker design iteration and improved performance for a go-kart carburetor used in competitive racing. The new carburetor version, designed for a new engine type, caused the engine to sputter and perform slower than the previous season. Conversely, the older carburetor worked optimally with the engine but couldn't be installed properly due to incompatibility with the new engine's geometry.

Tenco DDM addressed this by reproducing the internal design of the "improved" carburetor parts and adapting them to fit the new engine geometry. The initial parts were printed using LOCTITE® 3D IND403, chosen for its ability to handle slight heat development from the engine and the gasoline mixture flowing through the part. The prototype performed so well that a first series of 45 sets was printed and effectively implemented in the race, demonstrating significant improvements in both design iteration speed and performance.

# CASE STUDY: FUELING CHANGE: 3D PRINTING TRANSFORMS CARBURETOR PERFORMANCE



## The Solution

- Printer: Rapidshape I30
- Cleaners: LOCTITE Cleaner C, LOCTITE CL36

Henkel Materials Used								
	Color	HDT at .455 MPA (°C)	Tensile Stress at Break (MPa)	Elongation at Break (%)	Young's Modulus (MPa)	Flexular Modulus (MPa)	IZOD Impact Notched (J/m)	Shore Hardness
		ASTM D648	ASTM D638	ASTMD638 (D412)	ASTM D638	ASTM D790	ASTM D256	ASTM D2240
IND403	Black	80	70	10	2,600	2,700	27	78 D



## BENEFITS

Using the Rapidshapi30 3D printer, Tenco DDM implemented an efficient production strategy, printing 20 parts in a single 6-hour job, which equates to 10 sets of 2 parts. This approach adhered to Henkel's validated workflow, ensuring consistent quality throughout the manufacturing process. The choice of Loctite IND403 material proved instrumental, offering high durability, stability under load, the capability to tap screw threads, and exceptional performance in terms of fuel flow and sealing density.

This streamlined method facilitated the annual production of approximately 120 parts, each set of 2 parts costing € 93. By leveraging advanced 3D printing technology, Tenco DDM achieved a significant reduction in lead times, slashing it by 2-4 weeks compared to traditional manufacturing methods. Moreover, the material's ability to withstand high-frequency engine stresses and its chemical resistance to petrol and oil underscored its reliability and contributed to enhanced operational efficiency over the long term.

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.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](https://www.LoctiteAM.com)

### About **TENCO** Direct Digital Manufacturers

Tenco DDM is a Belgian based 3D Printing Service Bureau specialized in developing and producing technically and cosmetically advanced manufacturing solutions for small batches of products made from plastic or a combination of materials. Tenco DDM is one of the first companies that started over 15 years ago with DLP photopolymer printing and is one of the most experienced in this field. [www.tenco-proto.com](https://www.tenco-proto.com)