CASE STUDY:
Extreme Boats - LOCTITE 3D IND406

LOCTITE®

Making Waves With 3D-Printed Boat Interiors

Background

IEE Ltd, based in Whakatane, New Zealand, is a trusted engineering services provider offering a wide range of solutions, including 3D scanning, reverse engineering, CAD modeling, and 3D printing. Among its valued clients is Extreme Boats, a respected family-owned business known for crafting high-quality aluminum boats for over 20 years. Extreme Boats collaborated with IEE Ltd to develop custom interior components for their vessels, benefiting from IEE's expertise and services to meet their specific design and manufacturing needs.

APPLICATION:
3D Printing end use interior parts for marine industry.

MATERIAL:
LOCTITE 3D IND406

Technology:
Printer make and model

The Challenge

Verifying the requirement for a 3D printed solution involved selecting a material that met specific criteria, like resistance to sunlight and UV radiation. It also meant ensuring compatibility with in-house production capabilities and maintaining cost-effectiveness, design flexibility, and uniqueness. This encompassed thorough material testing, assessment of production costs, and optimization of the design process to meet Extreme's specific needs effectively. Additionally, it required close collaboration with designers to create a custom design that reflected Extreme's brand identity and aesthetic preferences. Throughout the process, the team at Extreme aimed to bring manufacturing of the custom interior components local, with 3D printing identified as the most cost-effective solution allowing for minor part revisions and detail improvements throughout implementation into the production line while working off old stock.




Henkel

Henkel Adhesive Technologies

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The Solution

- Material selection: LOCTITE® 3D IND406
- Cleaner: Methylated spirits
- Curing: FlashForge

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*
IND406	*Black*	*107*	*55*	*25*	*1,600*	*1,900*	*35*	*79 A (3 sec)*





BENEFITS

Utilizing advanced 3D printing technology, the implementation of Loctite® 3D IND406 has yielded several notable benefits. Its exceptional resistance to direct sunlight ensures durability in outdoor environments, providing interior parts with a robust finish and tactile feel despite maintaining relatively thin wall thickness. While 3D printed parts may incur slightly higher costs compared to off-the-shelf products, they offer unique designs and finishes tailored to Extreme's requirements. Despite the higher costs associated with the new layout, its custom nature makes direct comparisons challenging. Notably, the combination of IND406 with advanced 3D printing technology has facilitated product performance improvements through rapid design iterations. This iterative process has led to numerous design optimizations, resulting in significant manufacturing cost savings. Leveraging Design for Additive Manufacturing (DFAM) principles and tools like the Carbon Design Engine for texture application has enabled reductions in material usage per part, primarily through wall thickness reductions and the removal of unnecessary design features. Overall, the adoption of IND406 alongside advanced 3D printing technology has enhanced product performance and optimized manufacturing costs, underscoring the value of this integrated approach for customized interior components.

Want to learn more about Henkel's unique material solutions for the additive manufacturing industry?
Visit Henkel's LOCTITE 3D Printing at **LoctiteAM.com** or reach out to us via **loctite3dp@henkel.com**

About LOCTITE

With its brands, innovations and technologies, Henkel holds leading market positions worldwide in the industrial and consumer businesses. The business unit Adhesive Technologies is the global leader in the market for adhesives, sealants and functional coatings. With Consumer Brands, the company holds leading positions especially in laundry & home care and hair in many markets and categories around the world. The company's three strongest brands are Loctite, Persil and Schwarzkopf. In fiscal 2023, Henkel reported sales of more than 21.5 billion euros and adjusted operating profit of around 2.6 billion euros. Henkel's preferred shares are listed in the German stock index DAX. Sustainability has a long tradition at Henkel, and the company has a clear sustainability strategy with specific targets. Henkel was founded in 1876 and today employs a diverse team of about 48,000 people worldwide – united by a strong corporate culture, shared values and a common purpose: "Pioneers at heart for the good of generations." More information at **www.henkel.com**

About Innovative Engines & Engineering

At IEE Limited, also known as Innovative Engines & Engineering, we're a leading engineering solutions company specializing in cutting-edge 3D services. Our comprehensive offerings include advanced 3D scanning, precise 3D modeling, and state-of-the-art 3D printing technologies. With a commitment to innovation and excellence, we continually push boundaries to deliver unparalleled solutions that transform ideas into reality. Whether it's prototyping, manufacturing, or product development, our dedicated team is driven to exceed expectations and bring innovation to life for our clients, no matter where they are.

About EXTREME Boats

Extreme Boats is a family owned and operated business that has been producing high quality aluminium boats for over 20 years. From a small shed on a rural property Glenn Shaw combined his engineering skills with a passion for fishing and boating to produce a few Aluminium Boats in what was a market heavily dominated by Fibreglass. From the early stages Glenn could see that Aluminium Boats had a lot to offer. Durability, lighter towing weights and the ability to customise the boats to better suit clients needs were just a few of the many advantages Aluminium Boats held over Fibreglass. This began a journey of innovation and refinement which still continues today. "Every boat is a compromise, and there is no such thing as the perfect boat - but we are always trying to close that gap in search of what we believe are the best Aluminium trailer boats available