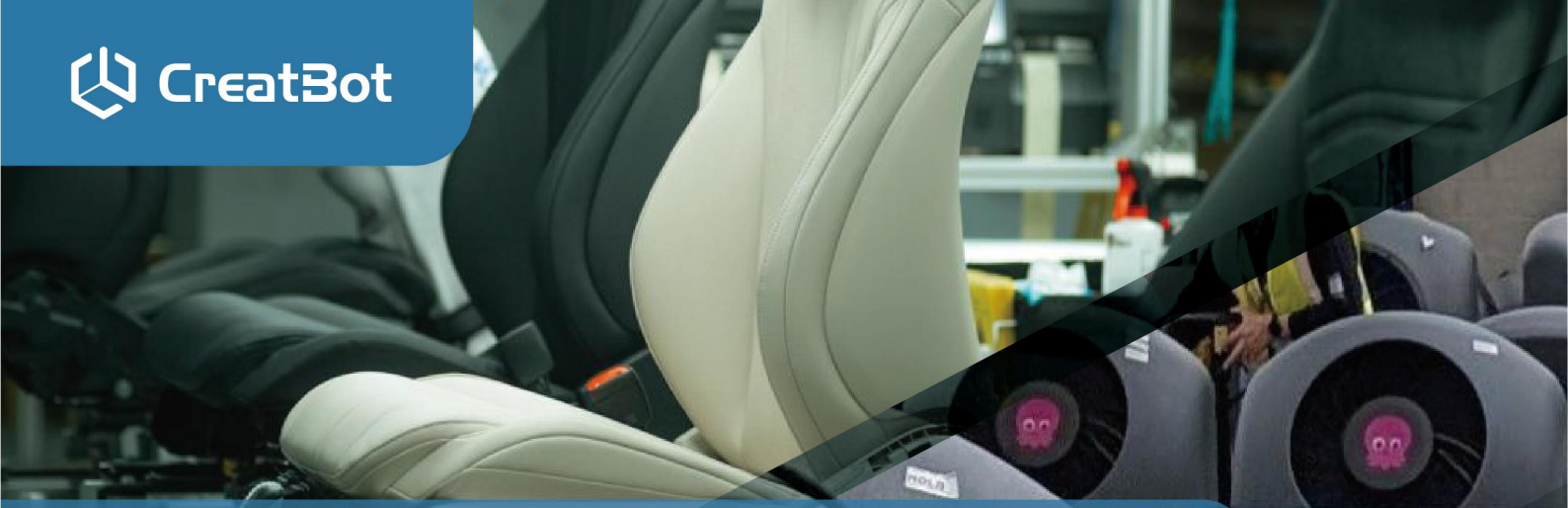
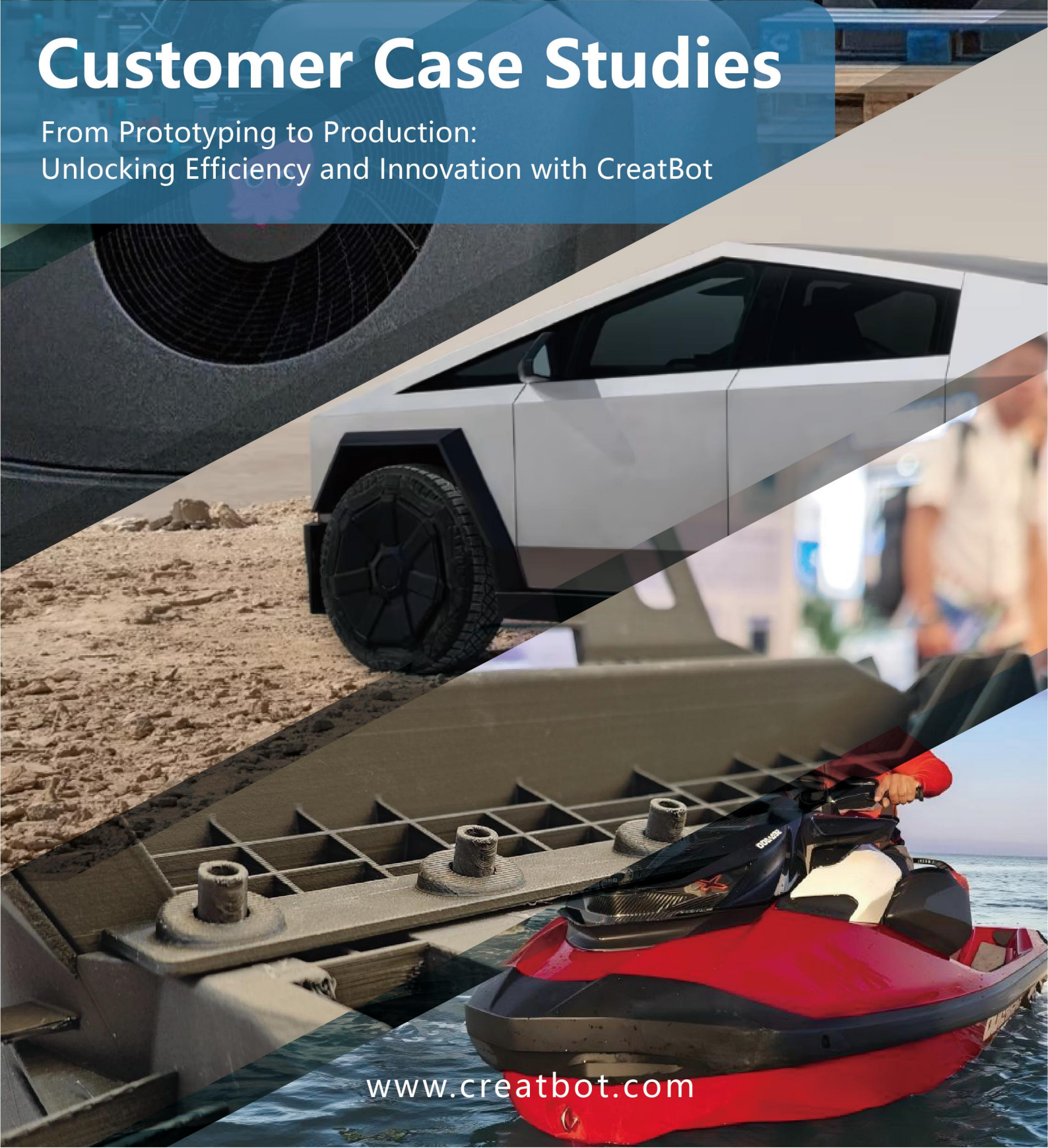
CreatBot



Customer Case Studies

From Prototyping to Production:
Unlocking Efficiency and Innovation with CreatBot



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Conclusion

CreatBot: Building Industrial Innovation with Additive Manufacturing.

Introduction and Overview

Cost Reduction • Innovation • Agility – Successful Applications of CreatBot 3D Printing Across Multiple Industries

Introduction

We are in an era of transformation, where global manufacturing and product development face unprecedented challenges and opportunities. Intensifying market competition, increasingly personalized user demands, and growing supply chain uncertainties are collectively driving enterprises to seek more efficient, flexible, and cost-effective production methods. Traditional subtractive manufacturing and mold-dependent production often struggle to meet the demands for small batches, high complexity, and rapid iteration. Their high time and economic costs have become bottlenecks constraining corporate innovation and market responsiveness.

Additive manufacturing (3D printing) technology, as a core pillar of Industry 4.0, is breaking these constraints with its unique "design for manufacturing" advantage. It is no longer just a tool for prototyping but has deeply integrated into various stages—from rapid tooling and jigs to direct end-use part production—injecting strong momentum into the digital transformation across industries. However, the universality of technology does not imply one-size-fits-all solutions. The market calls for 3D printing solutions that truly understand the stringent requirements of industrial scenarios, achieving an excellent balance between printing precision, material performance, equipment stability, and cost of ownership.

Against this backdrop, CreatBot stands out with its profound technical expertise and deep insight into industrial applications. This whitepaper aims to demonstrate, through detailed industry cases, how CreatBot's high-performance 3D printing equipment and solutions empower enterprise clients across different sectors. It showcases tangible outcomes: significant cost reduction, fundamental breakthroughs in innovation capability, and ultimate agility in market response—collectively painting a visionary picture of the future of digital manufacturing.

Introduction and Overview

Overview

The core objective of this whitepaper is to systematically elucidate how CreatBot's 3D printing technology has transitioned from theory to practice in multiple key industries, becoming an indispensable tool for enhancing core competitiveness. We will conduct an in-depth analysis centered around three core value dimensions: "Cost Reduction," "Innovation," and "Agility":

- Cost Reduction: Reshaping Manufacturing Economics

We will reveal how CreatBot significantly reduces the total lifecycle cost of products from R&D to manufacturing by replacing expensive molds, optimizing production processes, consolidating assembly components, and minimizing material waste. Whether avoiding hundreds of thousands in mold costs or slashing lead times for traditional tooling from weeks to mere hours, these efficiencies directly translate into improved net profit for businesses.

- Innovation: Unlocking Design Freedom

CreatBot's technology grants engineers and designers unprecedented creative liberty. It enables the production of complex geometries, hollow lightweight structures, and integrated functional components that are impossible to achieve with traditional methods. This not only fosters the development of superior products but also opens up entirely new avenues for product design, making the leap "from imitation to creation" a reality.

- Agility: Accelerating Market Response

In a rapidly changing market, speed is life. CreatBot enables ultra-fast iteration of the "design-verification-manufacturing" cycle. The journey from concept to physical prototype, and from customized tools to small-batch end-use parts, is completed within days or even hours. This agility drastically shortens time-to-market, allowing companies to experiment quickly, seize market opportunities, and flexibly respond to unexpected production demands.

In the following sections, we will delve into specific industries, using a series of authentic and vivid success stories to concretely demonstrate the transformative impact of CreatBot's 3D printing solutions. Each case serves as a solid testament to our commitment to "empowering industry through technology.

1. 100 Sets Delivered in 10 Days! CreatBot Small-Batch 3D Printing Accelerates Tesla Seat Validation

——Large-Format High-Temperature Printing and Nylon Carbon Fiber Material Small-Batch Delivery Prototype Manufacturing Solution

Introduction: When "Fast" Meets "Strong"

In the field of automotive R&D, time is market, and the efficiency of prototype validation directly determines the speed of product iteration. When Tesla and its partners sought a solution for validating a new generation of automotive seat parts, their core challenge was: How to conduct rapid small-batch delivery and validation of product prototypes without sacrificing functionality? The answer came from an efficient application of additive manufacturing technology------by deploying 15 CreatBot [D600 Pro2 HS]{.mark} large-format high-temperature 3D printers, the project team successfully delivered 100 sets of seat part models suitable for direct functional testing within 10 days, achieving a success rate of 92%, perfectly meeting Tesla's dual demands for speed and quality.

Automotive Manufacturer @Tesla

Industry Background: The Plight of Traditional Prototype Manufacturing

The validation of automotive interior components, especially seat systems, is far from just "making a sample". It requires prototype parts to withstand real working conditions such as **seat heating, long-term wear resistance, and structural strength testing.** Traditional CNC machining or mold-injection methods expose significant shortcomings at this stage:

- **Long Cycles:** A single round of mold creation or programming and machining takes weeks, severely slowing down the R&D process.
- **High Costs:** The per-part cost for small-batch trial production is extremely high, with poor cost-effectiveness.
- **Inflexible Iteration:** Long waiting times stifle the possibility of rapid trial-and-error and design optimization.
- **Insufficient Functional Validation:** Many traditional prototypes only possess appearance attributes and cannot withstand real functional validation such as **seat heating, durability testing, and strength testing.**

Tesla's project requirement was precisely to break this traditional dilemma and find an innovative path that enables both rapid **batch delivery**, and meets**stringent functional validation.**

Solution: CreatBot D600 Pro2 HS Large-Format High-Temperature 3D Printing System

To address the above challenges, the project team introduced the CreatBot D600 Pro2 HSlarge-format high-speed industrial-grade 3D printing solution.

1. Core Equipment: CreatBot D600 Pro2 HS

• **Large Format Build Volume:** The 600*600*600mm build volume can accommodate a complete automotive seat part, eliminating the need for segmentation and splicing, ensuring part integrity and structural strength.

• **Active Chamber Heating Function:** A constant temperature chamber reduces the impact of ambient humidity on hygroscopic materials, improves interlayer adhesion, and optimizes process consistency; this is a **key technical guarantee** for successfully printing high-performance engineering plastics (like Nylon Carbon Fiber), effectively preventing warping and cracking caused by temperature differences during printing.

• **High Precision and Reliability:** Industrial-grade design ensures equipment stability and printing accuracy during long-term continuous operation, laying the foundation for the 92% high success rate.

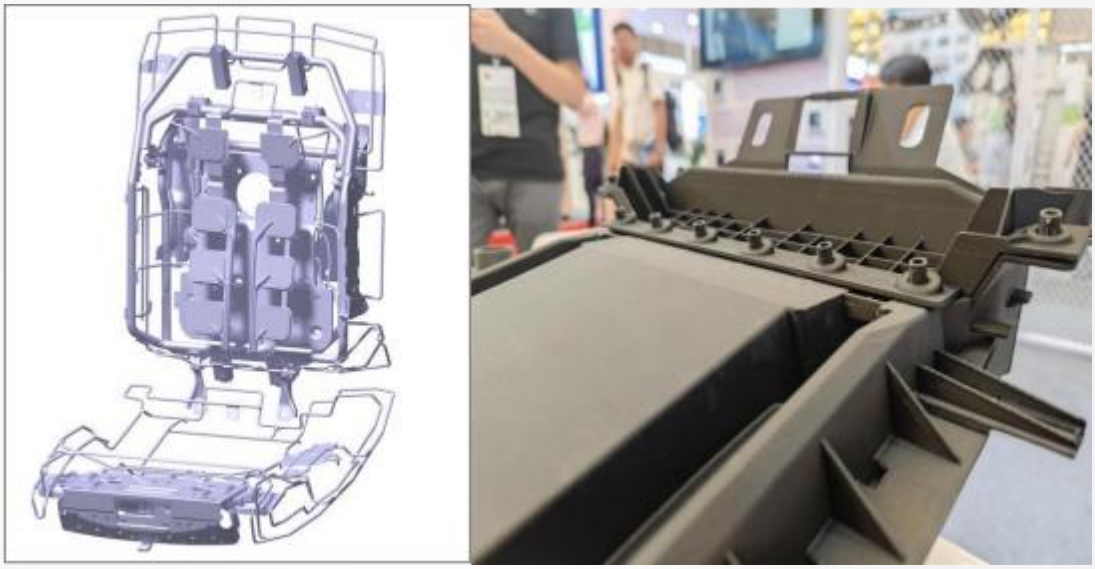
2. Core Material: UltraPA-CF (Nylon Carbon Fiber Composite)

The chosen material directly determines the functional attributes of the prototype part. UltraPA-CF material perfectly met the validation needs for automotive seats:

• **High-Temperature Resistance:** Can withstand temperatures above 150°C long-term, fully meeting the testing environment requirements of seat heating systems, without deforming or failing due to heat.

• **Excellent Mechanical Strength & Wear Resistance:** The carbon fiber reinforcement gives it strength and rigidity close to the final injection-molded parts, enabling use in assembly validation, durability testing, and ergonomic pressure testing.

• **Lightweight:** Achieves part lightweighting while ensuring strength, aligning with Tesla's overall vehicle design philosophy.



3D Printing Solution@CreatBot

Implementation Process and Results

Project Objective: Deliver 100 sets of automotive seat part models suitable for functional validation within 10 days, split into three batches

2. Implementation Process::

Digital Model Preparation: Receive 3D models provided by Tesla and perform pre-print model optimization adapted for 3D printing.

Parallel Print Productio: Mobilize **15 units** of CreatBot D600 Pro2 HS equipment, forming a small "print factory" operating 7x24 hours uninterruptedly, supported by all-around personnel support.

Batch 3D Printing Process@CreatBot

Efficient Print Operations: The print cycle for a single model was controlled within 2-3 days. Scientific scheduling and equipment management ensured a smooth

Post-Processing & Quality Inspection: After printing, necessary support removal and surface treatment were performed, with quality checks conducted on each part.

Outstanding Results:

- ✓ **Rapid Delivery:** Successfully delivered **100 sets** of high-quality models in just **10 days**, reducing time by over **70%** compared to traditional methods.

Batch Delivery

- ✓ **High Success Rate:** The overall print success rate remained stable at **92%**, greatly reducing material waste and rework time, ensuring delivery certainty

- ✓ **Direct Functional Validation:** The printed parts were not only dimensionally accurate but their high-temperature resistance and high-strength properties allowed them to be directly installed in test vehicles for comprehensive functional validation including **heating**, **ventilation**, **adjustment**, and **load-bearing**, providing Tesla with highly reliable first-hand data for design decisions.

Installation and Testing Process of Delivered Products@Tesla

Conclusion and Outlook

This case fully demonstrates that additive manufacturing has fully evolved from "making appearance samples" to a new stage of "manufacturing functional components." The CreatBot D600 Pro2 HS,large-format high-speed 3D printing system combined with high-performance composite materials brings transformation to the automotive manufacturing industry

- **Accelerated Innovation:** Shortening processes from months to days, greatly unleashing engineers' creativity and iteration efficiency
- **Reduced Costs:** Avoiding high mold costs, especially suitable for small-batch, multi-variety R&D trial production scenarios
- **Improved Quality:** Produced functional prototype parts can be directly used for stringent testing, identifying and solving problems early, enhancing the final product's reliability and user experience.

Automotive Seat Application Case@特斯拉

In the future, with the further development of materials science and continuous innovation in 3D printing technology, the application of additive manufacturing in the automotive field will extend from Rapid Prototyping (RP) to tooling/fixtures, small-batch end-use part production (small batches of customized interior parts), and even broader spaces. CreatBot will continue to be committed to providing high-performance, high-reliability industrial-grade additive manufacturing solutions, driving the digital transformation of automotive manufacturing together with industry partners.

2. Sea-Doo Watercraft Industrial 3D Printing Accelerates Watercraft Design

Customer Background: Sea-Doo Leads Global Water Transportation Innovation

Sea-Doo is a world-renowned brand under Canadian **BRP (Bombardier Recreational Products)** famous globally for its personal watercraft and high-performance water vehicles. Sea-Doo has always been committed to innovative design and the application of cutting-edge technology, maintaining a leading position in the industry。

Industry Pain Points: Traditional Manufacturing Limits Large Component R&D

When developing large, complex components like watercraft "bows," Sea-Doo long faced two major challenges:

1.**High Cost** —— Traditional mold manufacturing often costs tens of thousands of US dollars, and any design change almost meant starting over.

2.**Long Cycle** —— The process from design to prototype took at least several weeks or even months, severely impacting product iteration and market response speed.

This created an urgent need within Sea-Doo's R&D department for an industrial-grade 3D manufacturing solution capable of **large-format printing for giant components, supporting high-performance materials like carbon fiber and PEEK, and offering high output and high precision**

Solution: CreatBot D600 Pro2 HS Industrial-Grade 3D Printer

After extensive evaluation, Sea-Doo ultimately introduced the **CreatBot D600 Pro2 HS**。This high-end 3D manufacturing printer, aimed at the industrial and commercial markets, offered:

CreatBot Printing the Watercraft Bow Process

Extra-Large Build Volume —— Capable of forming large watercraft components in a single print;

High-Temperature Printing Capability —— 支 Supports top-tier engineering plastics like carbon fiber reinforced materials and PEEK;

High-Speed and High-Precision Performance—— Enables rapid prototyping while ensuring detail accuracy;

Industrial-Grade Stability and High Output —— Can run continuously for long periods, meeting commercial R&D demands

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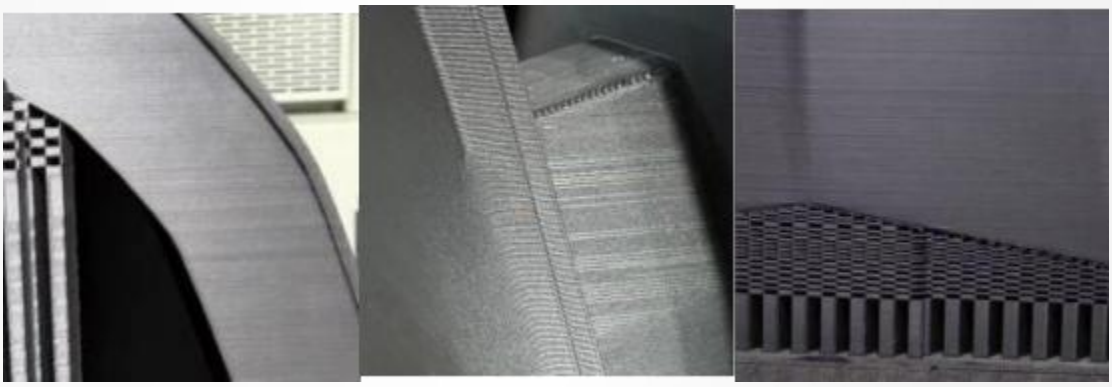
Implementation Process: From Design Drawing to Giant Prototyp



Model Details of the CreatBot-Printed Watercraft Bow

Sea-Doo engineers imported the CAD drawing of the bow into the CreatBot D600 Pro2 HS and selected carbon fiber reinforced material for printing. The entire process was stable and efficient, completing in just a few days a **large prototype that would have taken weeks using traditional processes**。The design team then conducted rapid verification and optimization based on this, significantly shortening the R&D cycle.

Problem Solved: From Pain Point to Breakthrough

Since introducing the CreatBot industrial-grade 3D printer, Sea-Doo has achieved breakthroughs in multiple areas:

R&D Cycle Shortened by Over 70% —— The process from design to testing for new model bow components now takes only days;

Manufacturing Costs Reduced by 60% —— Reduced reliance on expensive molds, saving hundreds of thousands of dollars;

More Flexible Material Application —— Ability to switch between printing high-performance materials like carbon fiber, PEEK, and nylon on the same equipment;

Higher Production Capacity —— The engineering team can develop multiple prototypes simultaneously, greatly enhancing R&D efficiency

Unleashed Innovation —— Designers can more boldly experiment with entirely new shapes and structures without worrying about manufacturing costs and risks.

Customer Watercraft Application Results Showcase

Results: Efficiency Leap, Innovation Accelerated

Leveraging the CreatBot D600 Pro2 HS, Sea-Doo not only rapidly introduced a new bow prototype but also accelerated the overall R&D progress of the new generation of personal watercraft. Product development shifted from "passive waiting" to "rapid iteration," greatly

enhancing Sea-Doo's competitiveness in the global market.

Customer Feedback: A Groundbreaking Innovation Tool

Sea-Doo's R&D Director stated:

"CreatBot D600 Pro2 HS is the**best industrial-grade 3D manufacturing printer**。we have encountered. Its large format and high performance have completely unleashed our team's creativity, allowing us to drive personal watercraft innovation at an unprecedented speed.

3. NIU Electric Scooter Large-Format Engineering-Grade Integrated Lightweight Cockpit

—— ***Integrated PET-CF Lightweight Cockpit Rapid Prototype Validation and Industrial Application Case***

Abstract

In the field of electric mobility innovation, speed is key to success. This case study demonstrates how the CreatBot D1000 HS industrial 3D printer collaborated with NIU electric scooters to break through traditional manufacturing bottlenecks: **just 65 hours a **750mm long integrated PET-CF carbon fiber cockpit shell**, was printed in one piece inweighing only **2.4kg**, This successfully achieved **mold-free, high-strength, rapid iteration** prototype validation, setting a new benchmark of "combining speed and performance" for the R&D of large functional components

Electric Scooter Personalized Manufacturing @ NIU

Industry Background and Challenges

In the electric vehicle innovation sector, product iteration speed and customization capability have become key metrics for measuring a company's core competitiveness. NIU electric scooters, as an industry technology leader, needed to create 1:1 functional prototypes for real vehicle testing and user research to validate the structural integrity, ergonomic adaptability, and aerodynamic performance of a new generation intelligent cockpit system. However, they faced the following common industry challenges:

- **R&D Cycle Pressure:** Traditional mold manufacturing cycles take months, unable to meet the market demand for rapid iteration
- **Customization Needs:** Personalized demands for model configurations are increasing across global markets
- **Cost Control:**Mold opening costs are high, posing significant risks, especially during the prototype validation phase
- **Global Collaboration:** Required synchronized development and data sharing across transcontinental R&D centers

Solution: CreatBot Industrial-Grade 3D Printing System

NIU electric scooters adopted the CreatBot D1000 HS industrial-grade 3D printing system to implement a digital prototype manufacturing solution:

- ✓ **Extra-Large Build Volume:** 1000×1000×1000mm build volume, easily handling the 750mm large component printing requirement.
- ✓ **High-Temperature Printing Capability:** Supports high-temperature, high-performance composite materials, ensuring mechanical properties of components.
- ✓ **Stable and Reliable Industrial-Grade Design:** Guarantees stability and precision during 65-hour continuous prints.

- ✓ **Global Service Support:** Provides consistent technical support for R&D centers in Beijing and Munich

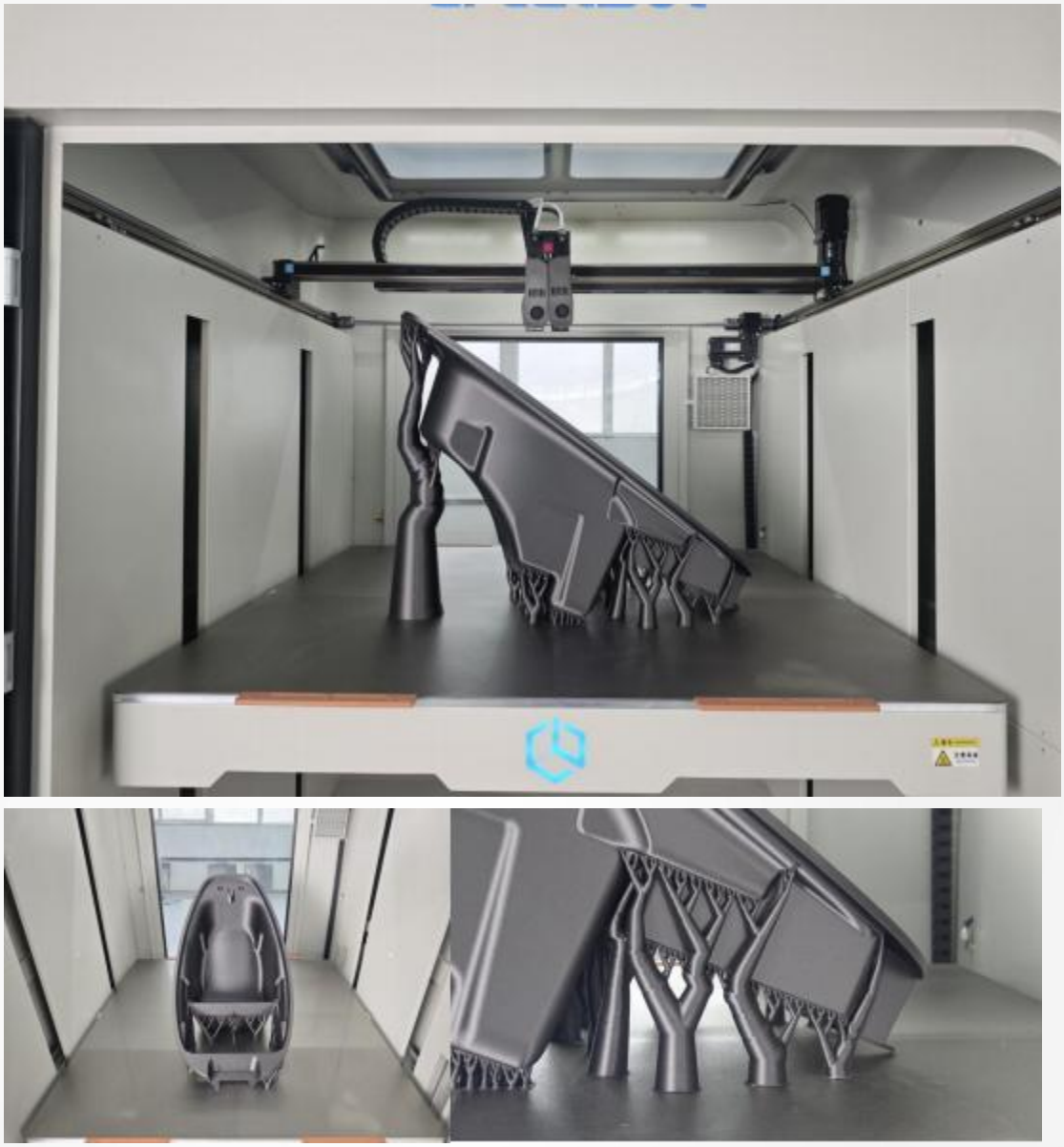
Electric Scooter Base Printing Process @CreatBot

Regarding material selection , **PET-CF polymer material,**specifically chosen based on the cockpit prototype's need to simultaneously meet structural strength testing, assembly accuracy verification, and display vehicle quality requirements. This selection was based on the following engineering considerations:

- ✓ Carbon fiber reinforcement system provides flexural strength up to 58MPa, ensuring the prototype part meets load-bearing performance targets.
- ✓ Low shrinkage rate of 0.8% ensures dimensional stability of large components, controlling assembly tolerances within ±0.15mm
- ✓ Density of 1.24g/cm³ achieves lightweight design goals, reducing weight by 35% compared to traditional ABS.
- ✓ Resistance to environmental stress cracking meets outdoor testing requirements.

Implementation Results and Value

Single Print Time	Model Size	materials	Model weight
65h	750 × 390× 375mm	PET-CF	2.4kg



Electric Scooter Base Printing Details@CreatBot

1. Enhanced R&D Efficiency

Prototype production time reduced from several weeks to 65 hours

Design iteration cycle shortened by over 85%

Enabled synchronous development and validation between China and Europe

2. Significant Economic Benefits

Provided an economical solution for small-batch customized production

Mold Cost: ¥30,000 → 3D Printing Cost: ¥800/part

Total development cost decreased by 68%, iteration frequency increased 6 times.

3. Technology Upgrade

Beijing R&D Center: First D1000 HS deployment and validation
↓
Munich R&D Center: Technology replication and expansion
↓
Dual-Center Collaborative Development: Established a global rapid manufacturing network
↓
2026 Target: Scalable mass production of end-use custom parts

Electric Scooter Base Application Scenario@NIU

Future Outlook and Industry Significance

The collaboration between NIU electric scooters and CreatBot demonstrates the complete industrialization path of industrial-grade 3D printing in the transportation manufacturing sector::

Technology Globalization: Successfully achieved the cross-continental transfer and application of 3D printing technology from Beijing to Munich.

Industrialization Upgrade: Established a technology evolution path from prototype verification to small-batch production and further to scalable mass production.

Customization Revolution: Provides technical assurance for the mass production of end-use custom parts by 2026

Industry Benchmark: Provides a successful example of digital manufacturing transformation and upgrade for the entire electric vehicle industry.

Electric Scooter Personalized Manufacturing @ NIU

Conclusion

This project not only verified the technical feasibility of CreatBot industrial-grade 3D printers in manufacturing large functional components but also demonstrated the industrialization application prospects of additive manufacturing technology in high-end manufacturing. By introducing the CreatBot D1000 HS industrial 3D printing system, NIU electric scooters successfully built a complete digital manufacturing system covering prototype validation, small-batch production, and future scalable customization, providing a replicable innovation model for the industry.

With the advancement of the 2026 mass production plan for end-use custom parts, CreatBot will continue to assist NIU electric scooters in maintaining their leading position in industry innovation, jointly promoting the digital manufacturing transformation in the field of electric mobility.

4. Bell Helmets × Creatbot: 3D Printing Technology Accelerates the Innovation Storm in Helmet Design

—— 3DPrinting Technology Drives Agile Innovation and Cost Eficiency in Safety Equipment

In the helmet industry, where extreme safety and comfort are pursued, the speed and accuracy of prototype development directly determine the pace of product innovation. When the world-renowned helmet brand **Bell Helmets** faced bottlenecks with traditional manufacturing methods in complex design validation, personalized fitting, and small-batch trial production, the, **Creatbot 3D D600 Pro2 HS** became the key tool to break through these constraints.

Helmet Manufacturer @Bell Helmets

Challenge: The Innovation Shackles of Traditional Manufacturing

Slow Iteration: Reliance on traditional mold manufacturing meant new design validation cycles took weeks, severely slowing down the R&D pace.

High Costs: The high cost of mold creation for small-batch prototypes or customized designs stifled attempts at bold innovation.

Limited Geometric Freedom: Difficulty in efficiently and economically achieving precise validation of complex internal structures (e.g., ventilation ducts, liner structures) highly conforming to ergonomics.

Customization Difficulties: Providing rapid personalized adaptation solutions for professional athletes or users with special needs was costly and time-consuming.

Solution: Creatbot Industrial-Grade 3D Printing Enables Agile Manufacturing

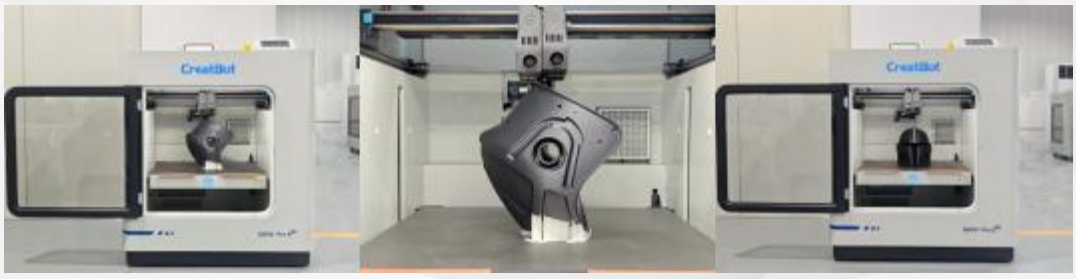
Bell Helmets introduced the **Creatbot high-performance industrial 3D printer D600 Pro2 HS**, deeply integrating it into the core processes of helmet design and R&D.

1. **Rapid Prototyping of Complex Designs:**

   • **Iterate in Hours:** Digital models from designers are quickly transformed into physical prototypes via Creatbot equipment (D600 Pro2 HS), reducing validation cycles from weeks to hours or days.

   • **Realistic Functional Validation:** Using high-strength, heat-resistant engineering plastics (PET-CF), printed prototypes can realistically simulate the mechanical properties and assembly relationships of the final product, perfectly suited for structural strength testing, wind tunnel experiments, and wearing comfort assessment.

   • **Intricate Structure Reproduction:** High-precision printing perfectly recreates the helmet's complex internal ventilation systems, energy-absorbing structures (e.g., MIPS simulation components), and liner anchor points, enabling precise validation of design intent.



Helmet Printing Process@D600 Pro2 HS

2. **Customized Tooling and Manufacturing Aids:**

• **Perfectly Fitted Fixtures:** 3D print customized assembly jigs and inspection gauges to enhance production line efficiency and accuracy.

• **Personalized Adaptation Tools:** Rapidly produce customized scanning brackets or adaptation modules for measuring athletes' head shapes.

Helmet Model Prototype Details@D600 Pro2 HS

3. **Small-Batch Trial Production & Special Demand Response:**

• **Market Testing Tool:** No need for high mold investment; directly 3D print small batches of specific designs or limited-edition helmet components for quick market release to test user feedback

• **Agile Customization Response:** Provide cost-effective, rapid solutions for personalized components (e.g., custom vent covers, liner interface parts) for professional teams or users with special needs.

Personalized Helmet Prototype Manufacturing@D600 Pro2 HS

Results: A Leap in Innovation Speed and Quality

By integrating Creatbot 3D printing technology, Bell Helmets has revolutionized its R&D and production processes:

Soaring R&D Efficiency:

- ✓ Design iteration cycle compressed from 28 days to 72 hours
- ✓ Annual prototype output increased to 1200+ units (a 400% increase).

Optimized Development Costs:

- ✓ Small-batch trial production costs reduced by 67% (\$4,950 → \$1,650/variant
- ✓ Customized solution development costs decreased by 82%

Significantly reduced prototype and small-batch trial production costs, freeing more resources for core design innovation。

Liberated Design Freedom:

- ✓ Engineers and designers break through traditional manufacturing constraints, boldly exploring more complex, higher-performance, and more ergonomic structural designs
- ✓ Offer more flexible and faster personalized service options for the high-end market and professional users

Accelerated Time-to-Market: Respond faster to market trends, bringing safer, more comfortable, and cooler helmets to global consumers.

Personalized Customization@Bell Helmets

Future: Deepening Collaboration to Lead a New Era in Safety Equipment

The successful collaboration between Bell Helmets and Creatbot is a paradigm of the deep integration of cutting-edge additive manufacturing technology with traditional industries. Creatbot's stable, efficient, and high-precision industrial-grade 3D printing solutions have become one of the core engines for Bell Helmets to maintain its innovative competitiveness. In the future, both parties will continue to explore the potential of 3D printing in areas such as **high-performance material applications, smarter structure manufacturing (e.g., lattice structure shock-absorbing layers), and Direct Digital Manufacturing (DDM)** jointly pushing the boundaries of helmet safety, comfort, and personalized experience

Creatbot: Creatbot: Empowering Manufacturing Innovation, Making Complex Designs 'Printable'.

Multi-Scenario Application Cases@Bell Helmets

Ready to Revolutionize Your Product Development?

Creatbot Industrial-Grade 3D Printing Solutions Help You Break Through Manufacturing Bottlenecks Like Bell Helmets and Unleash Unlimited Innovation Potential

5. 3D Printing in Smart Inspection Vehicles

— Creatbot tehnology imited&Henan College of Transportation industry-university cooperation project

This article elaborates on the in-depth industry-university cooperation project between CreatBot and Henan College of Transportation (hereinafter referred to as "Henan Jiaoyuan"). Seizing the opportunity presented by serving SMP Robotics, a globally leading robotics technology company, and its intelligent inspection robot, both parties fully leveraged their respective advantages in technological R&D and talent cultivation. They successfully utilized CreatBot's large-format industrial-grade 3D printing technology to complete the complex, lightweight, and highly customized shell design and rapid manufacturing for this robot. This case not only validates the application value of industrial-grade 3D printing in the high-end equipment manufacturing sector but also explores a successful path of "industry-education integration and collaborative innovation," providing a replicable model for the smart manufacturing industry.

Intelligent Inspection Vehicle@ SMP Robotics

Background and Challenges

With the deepening advancement of the "Made in China 2025" strategy, the application of intelligent robots in fields such as industrial inspection, security, and logistics has experienced explosive growth. Intelligent inspection robots, with their ability to operate autonomously, accurately perceive and work 24/7, have become core equipment for ensuring the safety of modern facilities and enhancing operational maintenance efficiency. Their application scenarios widely cover:

• Industrial Sector: In complex environments like factories, power stations, and petrochemical plants, they replace manual tasks for equipment status monitoring, thermal defect identification, gas leak detection, and gauge reading, effectively avoiding operational risks in hazardous environments.

• Infrastructure: In large public facilities like data centers, airports, and subway stations, they perform all-weather security patrols, personnel intrusion detection, and fire warning, building a comprehensive security system.

• Energy Industry: In outdoor energy bases like photovoltaic power stations, wind farms, and substations, they automatically complete tasks such as photovoltaic panel inspection, equipment inspection, and line patrols, significantly reducing operational maintenance costs.

SMP Robotics, as an internationally renowned developer of ground robots, has deep expertise in this field. Its products need to operate stably in various harsh and diverse environments, thus placing extremely high demands on core components like the shell regarding lightweight design, environmental tolerance, and rapid customization capabilities.

During the R&D process for the intelligent inspection project at Henan College of Transportation, the shells of its teaching robot equipment primarily faced the following issues:

1. **Structural Design and Aesthetic Flaws**: The original shell had a rough shape, lacking standardized industrial design. It did not convey the sense of technology and professionalism expected of specialized inspection equipment, affecting the intuitiveness of teaching demonstrations and professional appearance, and hindering effective student understanding of modern intelligent inspection equipment structures。

2. **Insufficient Sealing Leading to Protection Hazards:** The shell failed to achieve effective sealing. Internal critical components like circuits and sensors were long-term exposed to the experimental environment, susceptible to dust accumulation and moisture intrusion, causing electrical connection failures and signal drift, severely impacting equipment stability and experimental data accuracy。

3. **Lack of Physical Protection Mechanisms:** The shell lacked integrated impact resistance and buffer structures. During equipment handling, mobile demonstrations, or simulated operation, bumps or falls could easily damage internal precision components (e.g., LiDAR, optical sensor modules), not only increasing maintenance costs but also substantially impacting teaching progress and course continuity。

These structural defects had become a significant bottleneck constraining the upgrading of teaching equipment and industry-university-research collaborative innovation, urgently requiring an advanced manufacturing solution for rapid,

customized, and functionally integrated shell production

One-Stop Solution

Addressing the above challenges, the project team abandoned traditional manufacturing schemes and adopted CreatBot's industrial-grade Additive Manufacturing (AM) technology, combined with an end-to-end digital workflow, to achieve the rapid, precise, and functionally integrated manufacturing of the shell

Innovative Manufacturing Process:

1. Precise Scanning: Accurate Data Capture

Used high-precision 3D scanning equipment to perform 0.1mm precision scans of the intelligent inspection vehicle chassis, completely capturing 3D point cloud data of the chassis surface, component mounting points, and existing structural dimensions. Compared to traditional manual measurement, this avoided measurement errors (e.g., cumulative errors from manual caliper measurement, inaccuracies in curved surface measurement), providing a 1:1 true-to-life base model for subsequent design, ensuring perfect adaptation of the new shell to the chassis 。

Reverse High-Precision Scanning@Creatbot technology

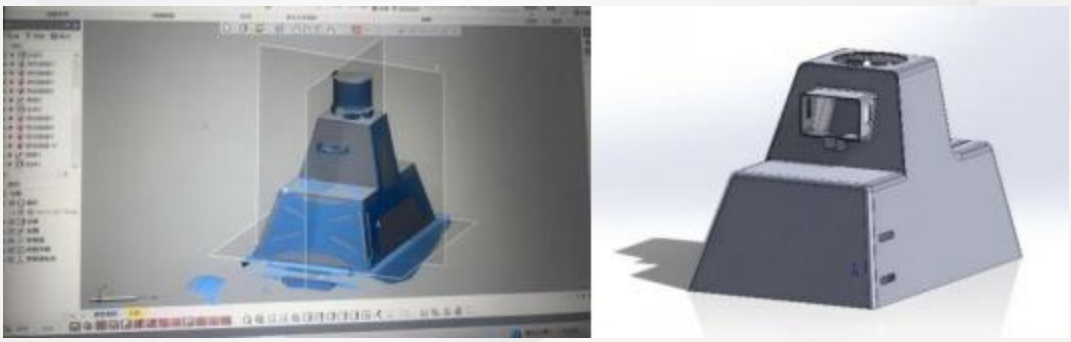
Reverse Design: Perfect Prototype Replacement

2. Based on 3D scan data, the reverse design team used professional software to convert point cloud data into a 3D model, specifically addressing the original problem.

• **Appearance and Teaching Adaptability:** Incorporated a "simple industrial style" design, with neat shell lines and appropriate edges/corners, conforming both to the professional image of logistics equipment and facilitating clear display of the equipment structure to students during teaching; reserved interfaces for sensors and expansion mechanisms, supporting functional expansion experiments in teaching scenarios.。

• **Protection and Space Optimization:** Redesigned the internal space, created enclosed cavity protection for components, and designed reasonable heat dissipation holes and dust/water-proof structures to address heat dissipation and maintenance challenges

• **Structural Reinforcement Design:** Added reinforcement ribs and buffer structures at corners and impact-prone areas; selected PLA-CF composite material (high strength, good toughness) to enhance physical protection capability and reduce the risk of equipment damage during teaching use.



Prototype Design@Creatbot technology

3D Printing: Efficient Prototyping Equipment

Utilized the industrial-grade CreatBot D600 Pro2 HS industrial printer: Its large 600*600*600mm build volume perfectly accommodated the teaching equipment shell size, enabling monolithic printing, avoiding structural weakening and assembly errors from split-part assembly.

• Cost and Cycle Advantages: Eliminated the need for high mold costs (traditional mold opening costs over ten thousand RMB per set), completing printing and post-processing for delivery within 3 days; supported small-batch customization, allowing flexible replication if multiple equipment modifications were needed for teaching.

• Detail Reproduction Capability: Precisely printed designed details like heat dissipation holes, mounting interfaces, and reinforcement structures, ensuring 100% realization of design functions, making the new shell fully match teaching and practical requirements in protection, layout, and expandability 。

D1000 Pro2 HS 3DPrinting Process @Creatbot technology

Project Results and Value

1. For SMP Robotics:

Results Comparison		
Technical Indicator	Traditional Process	This Solution
Development Cycle	28days	7days
Production Cost	Printing cost dozens of Tens of thousands RMB	per set for mold opening| times lower than raditional

3D Printed Robot Shell Installation@Creatbot technology

2. For Henan College of Transportation:

• **Practical Teaching Reform:** Introduced real enterprise projects into the classroom, achieving the "integration of teaching, learning, and practice," significantly enhancing students' engineering practical ability and innovation capability。

• **" Dual-Qualified" Faculty Team Building:** Teachers accumulated valuable engineering experience by participating in cutting-edge technology projects, strengthening the faculty team

• **Enhanced Brand Influence:** The successful case became powerful proof of the college's teaching strength in the smart manufacturing field, attracting more high-quality students and enterprise cooperation.

3. For CreatBot:

Top-Tier Application Case Validation: Through cooperation with a world-class robotics company, fully validated the reliability, advancement, and practicality of CreatBot equipment in high-end application scenarios.

Market Direction Expansion: Successfully entered the blue ocean market of intelligent robot component manufacturing, providing a perfect solution for similar clients.

Deepened Industry-University-Research Ecosystem: Explored a new model of cooperation with universities, laying a solid foundation for future continuous technological innovation and talent reserve.

Application Scenario@SMP Robotics

Outlook

The cooperation between CreatBot and Henan College of Transportation goes far beyond successfully printing a single robot shell. It represents a perfect collision and

integration of **"advanced technology **""advanced technology"**、**"application scenarios"**与**"talent cultivation"**

In the future, CreatBot will continue to deepen cooperation with universities and research institutes, jointly building a more open innovation ecosystem, focusing on more frontier fields (such as aerospace, new energy vehicles, medical devices, etc.), and persistently promote the empowerment of various industries by 3D printing technology, contributing to smart manufacturing in China and globally

6. Samsung Electronics × CreatBot: A Powerhouse Collaboration Redefining the Paradigm of Display Prototype Development

—— 3D Printing Strategy Driving Agile Innovation and Cost Eficiency in Consumer Electronics

Consumer Electronics Manufacturer @SAMSUNG

Customer Profile | Samsung: A Global Leader in Consumer Electronics Manufacturing

Samsung is a globally renowned consumer electronics manufacturer with deep accumulation in display technology and industrial design. Its computer and television display products are distributed in over 100 countries, consistently

ranking among the top in annual shipment volumes.

In the high-end gaming monitor segment, Samsung not only focuses on performance metrics such as refresh rate and response time but also emphasizes how exterior design lines and material textures enhance the user experience.

In this project, Samsung aims to launch a new large curved gaming monitor featuring a futuristic design optimized for mass production. During the R&D phase, Samsung intends to validate design proportions, assembly feasibility, and ergonomic performance through full-scale (1:1) appearance prototypes.

Gaming Display @SAMSUNG

Challenge | The practical bottlenecks in the implementation of design

Although traditional CNC machining or injection molding can produce large enclosures, the Samsung team identified several unavoidable challenges during evaluation:

•**Curvature and Overall Dimensional Accuracy**:The casing of this monitor is 1.1 meters long and features a large curvature. If it is processed in sections, it is likely

to cause discontinuous curvature transitions, which will affect the visual effect.

• **The pressure of the R&D schedule**: There is less than 10 days left for prototype production from design freeze to the first appearance verification.

• **Multiple rounds of fine-tuning**: The appearance design may need to be adjusted multiple times during the review process. The traditional mold method is difficult to meet the flexibility requirements.

Objective | Achieving efficient and high-precision large-scale prototype manufacturing

In this project, Samsung has outlined the following key requirements:

• One-time integral molding: Ensure that the appearance prototype has no seams, enhancing the visual effect during presentation and review.

• High precision manufacturing: The dimensional accuracy must meet the requirements for assembly and functional testing.

• Excellent surface quality: Achieve the quality of mass production on the surface.

• Rapid delivery: Delivery cycle ≤ 7 days.

• Cost control: While meeting the quality requirements, reduce the cost by more than 50%.

Solution | CreatBot D1000 Customized Large-Scale 3D Printing Solution

After fully understanding the client's requirements and the challenges of the project, the CreatBot team proposed a comprehensive large-scale prototype manufacturing solution specifically tailored for this project:

✓ **Core equipment selection**

It is recommended to use the CreatBot D1000 industrial-grade 3D printer as the core manufacturing device. With its 1000 × 1000 × 1000 mm ultra-large forming space, it features high-precision linear tracks and servo motors. These advanced hardware components ensure extremely high precision and repeatability during the printing process, enabling the one-time overall printing of the display screen shell and avoiding assembly errors.

✓ **Balancing material and performance**

Using engineering-grade high-strength PLA-CF, combined with a layer thickness of 0.2 mm and optimized curved surface paths, to reduce surface step patterns.

Display screen prototype manufacturing process @CreatBot D1000

✓ **Flexibly handle design changes**

During the research and development stage, models can be quickly modified and re-printed to ensure that any design adjustments can be implemented within a short period of time.

✓ **Pre-assembling simulation**

Before printing, the team will conduct a digital assembly verification of the shell with the existing Samsung base model to ensure that the hole positions and bending angles are perfectly matched.

Display screen prototype@CreatBot D1000

Impact | Outcome: Rewriting industry standards

Dimension	Outcome Data	Efficiency
Accuracy	Deviation ≤ 0.3mm	Meets strict assembly tolerances
Cost	$10,500 saved	Research and development investment decreased by 70%
Cycle	5-day delivery	Iteration speed increased by four times
Surface quality	Meets A-level spray coating standards	Can be directly used for market preview

Display screen application scenarios@SAMSUNG

Value | Industry value and future application prospects

This case not only demonstrates the practical application value of 3D printing in the manufacturing of the appearance prototypes of large-scale game computer

monitors, but also provides new manufacturing ideas for the entire industry. With the increasing diversity and iteration of the appearance designs of consumer electronic products, industrial-level 3D printing will be increasingly widely applied in prototype manufacturing, functional verification, and small-batch production. The CreatBot D1000, with its large size, stability, and flexibility, will unleash its great potential in more industry scenarios.

7. Speed Legend: 3D Printing Helps Data Driven Performance Break World Records

——The direct application of CreatBot 3D printing in manufacturing high-performance racing car intake pipes

Abstract

In the world of racing games, every millisecond of breakthrough relies on the pursuit of the ultimate in technology and craftsmanship. This article presents how Justin Taylor, the chief engineer of Data Driven Performance (DDP), used the CreatBot D600 series industrial-grade 3D printers and UltraPA-CF (carbon fiber reinforced polyamide) materials to successfully manufacture intake pipes and other key components directly applicable to record-breaking racing cars for his racing team. With these 3D-printed components, his Cadillac CTS-V broke the world record for top speed over half a mile and is currently challenging more records. This case powerfully demonstrates that the CreatBot additive manufacturing solution is no longer just a prototype verification tool, but has become a reliable choice for the end manufacturing of high-performance, small-batch terminal functional components (Direct Digital Manufacturing), providing unprecedented agility, economy and outstanding performance for the automotive high-performance modification field.

Live footage of modified racing cars in action@Data Driven Performance

Challenge: Constraints in Manufacturing under Extreme Performance Conditions

Data Driven Performance (DDP), a company specializing in high-performance car modifications, has always been dedicated to creating top-of-the-line performance cars. Its engineer, Justin Taylor, has a simple and direct goal: to break various speed records. However, on the path to achieving this goal, traditional manufacturing processes have become the biggest obstacle:

- **The paradox of performance and cost:** The complex intake pipes designed for optimal airflow are astronomically expensive to mold, which is an unaffordable cost for a car that only needs to be produced a few pieces.

- **No time to waste:** Seasons and races do not wait. The traditional months-long

manufacturing cycle cannot meet the urgent need for rapid testing, iteration, and racing on the track.

• **The ultimate test of material performance:** The engine compartment of a racing car is extremely harsh, and components must be able to withstand high temperatures, fuel corrosion, and intense vibrations for a long time. Any failure means the failure of the record or even danger.

•**Iteration equals competitiveness:** Aerodynamic design needs continuous optimization. Under traditional methods, every design modification means huge time and money costs, seriously slowing down the research and development process.

Justin needs a technology that can break free from these constraints and turn his innovative designs into reality quickly.

Solution: The "Agile Manufacturing Factory" located beside the racetrack

The choice for Data Driven Performance was: to directly connect multiple CreatBot D600 series printers to their workflow, establishing their own "factory beside the racetrack", achieving a complete closed loop from design to manufacturing.

1. Key Tool: CreatBot D600 Series Industrial 3D Printer

Reliability and Precision in Industry: The D600 series features a stable mechanical structure and precise motion control, ensuring that every printed component has the size accuracy and consistency of a production-grade product, meeting the strict assembly requirements.

High Temperature Printing Capability: Its enclosed constant-temperature chamber and all-metal high-temperature nozzle provide the necessary environment for printing high-performance materials like UltraPA-CF, fundamentally ensuring the inter-layer bonding force and overall strength of the components.

Large-Scale Integrated Manufacturing: Capable of producing large and complex intake pipes in one go, avoiding potential leakage points and strength weaknesses caused by separate assembly, and perfectly replicating the aerodynamic design.

2. **Core material: UltraPA-CF (Carbon Fiber Reinforced Polyamide)**

Outstanding heat resistance: With a thermal deformation temperature exceeding 160°C, it can perform flawlessly in the high-temperature environment of turbochargers, maintaining stable shape and performance.

Excellent strength and stiffness: The reinforcement of carbon fiber makes it much stronger than ordinary nylon, capable of withstanding intense vibrations and pressure from the intake system under high engine speeds.

Outstanding chemical resistance: It has excellent resistance to gasoline, engine oil, and coolant, ensuring long-term durability in corrosive environments.

Batch manufacturing of 3D-printed intake pipes

The Road to Victory: From Digital Models to Championship Awards Cups

1. **Implementation process:**

- ✓ **Design freedom:** The DDP team used 3D software to design the most efficient airflow-optimized complex pipeline structure without any restrictions.
- ✓ **Instant manufacturing:** After the design was completed, the model was directly sent to the printer. Within just a few hours, a complete, ready-to-use intake pipeline was printed out.
- ✓ **Easy post-processing:** After simple support removal, the component can be subjected to vehicle testing.

3D printed intake pipes and their accessories

2. **Outstanding Achievements - Testimonials from Partners:**

"My 3D-printed air intake just broke the world record for the fastest CTS-V in a mile... All the 3D-printed parts are manufactured on your machine!! ... All these vehicles have your printed parts and are always in good condition! I really like the quality of your 3D printers!"

—— Justin Taylor, DDP Engineer

- ✓ **Achieving the championship:** The 3D-printed intake pipe directly contributed to the racing car **breaking the world record for top speed of half a mile**, and is about to challenge the records for quarter mile and mileage.
- ✓ **Revolutionary cost and cycle:** No molds are needed, and the single-piece cost is extremely low. From design to physical production, it only takes **a few days**, achieving the ultimate agile development of "thinking and doing immediately".
- ✓ **Unquestionable reliability:** It has withstood the most rigorous practical tests

on multiple record-breaking racing cars, proving its outstanding reliability as an end-functional component.

- ✓ Dominant future layout: Based on the manufacturing capabilities provided by CreatBot, Justin is quickly replicating his successful experience to models such as Camaro ZL1, as Justin said - **"Taking over this industry"**.

3D-printed intake pipes for batch installation of modified vehicles

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Insight: Racing technology drives industry transformation

The case of Justin Taylor is a prime example of additive manufacturing being applied to the end products. It clearly indicates that industrial-grade 3D printing technology has matured to the point where it can handle the most demanding end-use applications. It is not merely a "quick prototype", but rather a "quick final form". This capability is completely transforming the rules of the game in the high-performance modification field:

Lowered the entry threshold for top-level performance.

Significantly accelerated the R&D iteration cycle.

Granted engineers unprecedented design freedom.

The customer demonstrates the 3D-printed intake pipe.

Create the Future Together

The racetrack is the ultimate test of technology. The success of Data Driven Performance is not only the highest recognition of the quality of CreatBot equipment, but also points out the future direction for us. CreatBot will continue to strive to provide the most reliable and powerful industrial-grade additive manufacturing solutions for global innovators, engineers and manufacturers, helping them turn the most radical ideas into reality and break through every seemingly impossible limit.

8. Nexen Tire Hub -The prototype development cycle for high-performance hubs has been shortened by 70%.

Customer Profile: The innovative DNA of an industry giant

Nexen Tire USA (Nexen Tire of the United States) is one of the top ten tire manufacturers globally - the core North American branch of Korean Nexen Tire. Renowned for its high-performance tires, SUV tires and leading tire pressure retention technology, it is the original equipment supplier for many well-known car brands. Nexen has always been committed to technological innovation, and its research and development center is dedicated to exploring the most cutting-edge design and engineering solutions to maintain its leading position in the fiercely competitive market.

Customer tire application demonstration

Industry pain point: The "speed constraint" of traditional prototyping manufacturing

In the development of tire wheel hubs, prototype manufacturing is a crucial step for verifying the design, conducting wind resistance, weight and structural tests. However, traditional methods have significant limitations:

High time cost: Outsourcing CNC metal forging or mold making is complex and takes up to **4-6 weeks**.

Limited design iteration: The high cost and time prevent engineers from easily trying multiple, bold innovative designs, thus stifling creativity.

High communication cost: Frequent communication with external suppliers poses risks to data security and confidentiality.

Solution: A technological leap in one-stop rapid prototyping

CreatBot D600Pro2 HS prints hub models

In the face of challenges, the American R&D Center of Nexans decided to introduce internal rapid prototyping capabilities. They ultimately chose the **industrial-grade large-sized 3D printer D600 Pro2 HS from CreatBot**, as it perfectly met their requirements:

Large-scale integrated molding: A molding volume of 600*600*600mm is sufficient to print the prototypes of most car and SUV wheel hubs at one time. There is no need for segmented assembly, ensuring structural integrity.

High speed and high precision coexist: The high-speed version (HS) is equipped with a high-temperature nozzle, which can print high-strength engineering materials (such as PA-CF nylon carbon fiber) at a speed of **250mm/s** and with stability. The detail expression is astonishing.

Industrial-grade reliability: The all-metal body and the closed-temperature chamber ensure the success rate of continuous printing tasks for several days, far exceeding that of ordinary desktop-level equipment.

Implementation process: Seamless transition from digital model to physical prototype

1. **Design verification:** The engineers directly imported the three-dimensional model of the brand-new lightweight hollow hub into the slicing software developed by CreatBot.

2. **Material selection**: **PA-CF (nylon carbon fiber) material** was chosen, which has high strength, light weight, and good heat resistance, sufficient to meet the functional testing requirements of the final metal product.

3. **One-click printing:** Printing began on the D600 Pro2 HS equipment. In just **58 hours**, a 22-inch-diameter, complex-structured integrated hub prototype was completed.

4. **Post-processing:** After simple support removal and surface polishing, the

prototype was immediately sent to the design team for assembly and evaluation.

Details of the hub model presentation

Outstanding achievement: A exponential increase in research and development efficiency

After introducing the CreatBot solution, Nexsen achieved revolutionary results:

Time compression: The time for a single prototype manufacturing was reduced from an average of **35 days to less than 3 days**, with an efficiency increase of over **70%**.

Cost control: The cost of a single prototype was reduced by approximately **65%**, making it possible to conduct 5-6 design iterations within a project cycle, greatly stimulating the potential for innovation.

Outstanding quality: The printed prototypes were lightweight and highly strong, successfully passing preliminary vehicle fitting, aerodynamic analysis, and static load tests, providing a highly reliable physical basis for the final decision.

The finished product of the hub prototype printed by CreatBot is on display.

Customer Testimonial: Praise from the Chief Engineer

David Chen, the chief engineer of the Nikex US R&D Center, commented:David Chen, the chief engineer of the Nikex US R&D Center, commented:

“This is truly a revolution. Previously, when we saw a brilliant design, the first thing we would consider was 'How difficult is it to manufacture it?'. Now that thought has completely vanished. The CreatBot D600 Pro2 HS is like our R&D department's 'time machine', allowing us to outpace our ideas. Its printing quality and reliability far exceed our expectations for a 3D printer. It is a truly

industrial-grade production equipment. The most crucial aspect is that it liberates us from long waiting periods, granting the team unprecedented agility and creativity. This is one of the most wise investments we have made in recent years."

9. Jolly Music Adopts CreatBot 3D Printers

Jolly Music - A New Musical Instrument Manufacturing Brand from the Philippines

Company Introduction: A Rising Guitar and Bass Manufacturing Brand from the Philippines

Jolly Music is a guitar and bass manufacturer that has emerged in the Philippines. It is favored by music enthusiasts for its youthful, personalized and cost-effective products. The company invests a significant amount of resources in innovative design, aiming to provide customers with more unique appearances and a more comfortable playing experience. However, in terms of prototype development and shell customization, Jolly Music also faces common challenges in the

industry.

Industry pain point: High costs and low efficiency constrain personalized innovation

During the process of developing musical instruments, especially in the design and manufacturing of the shells of guitars and basses, there are three major drawbacks of traditional techniques:

1. **The development cycle is too long** - prototype prototyping usually takes 3-4 weeks;

2. The mold cost is high - a new mold often costs several thousand dollars;

3. Personalization is difficult to implement - small batch customization and complex appearance are extremely hard to achieve.

These have repeatedly limited Jolly Music's attempts at personalized design.

Innovative Solution: CreatBot Industrial-grade Large-sized 3D Printer

Jolly Music has introduced the **CreatBot industrial-grade large-sized 3D printer D1000 HS**:

- A forming space of 1000mm in size

- ±0.05mm high precision and 24/7 uninterrupted operation stability

- Supports high-performance materials such as carbon fiber reinforced materials, ABS, and nylon. It can directly print large-sized guitar and bass cases.

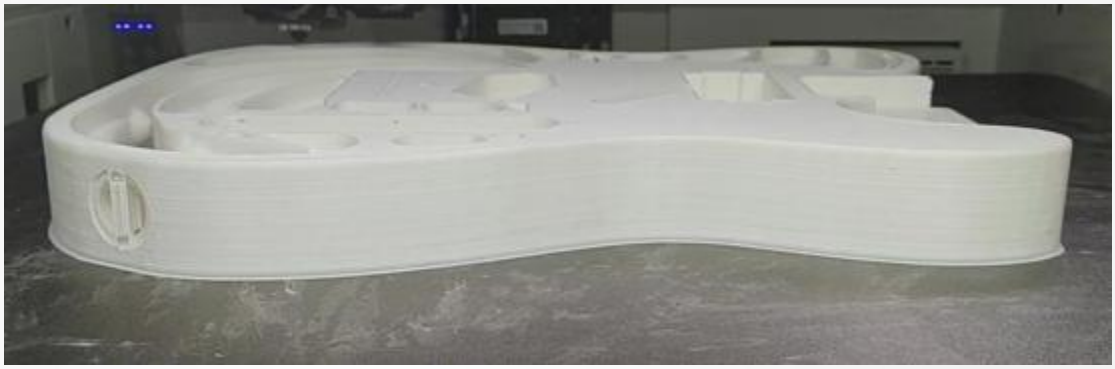
Implementation process: From design to the final prototype for direct use

Design model: The Jolly Music team completed the exterior design of the shell in CAD.

Guitar model design drawing

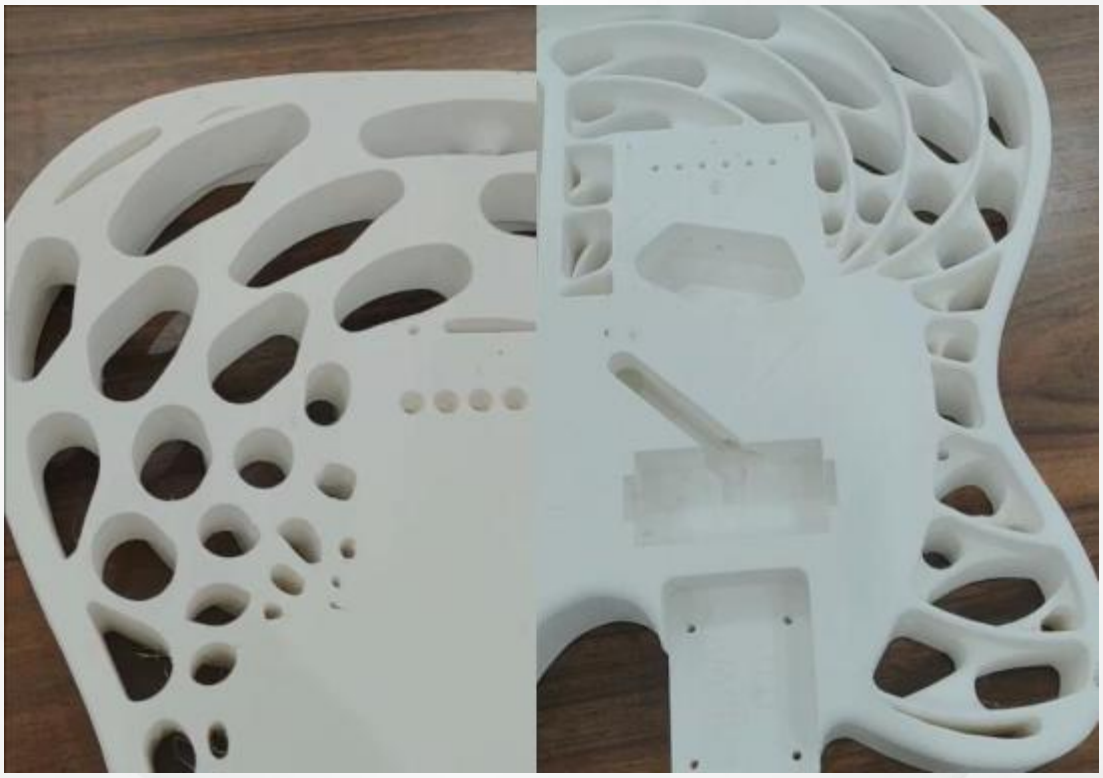
Integrate the printer: Input the model file into the CreatBot 3D printer;

Form the print: Use materials such as PLA and carbon fiber reinforced materials for printing, achieving a complete shell in one go;



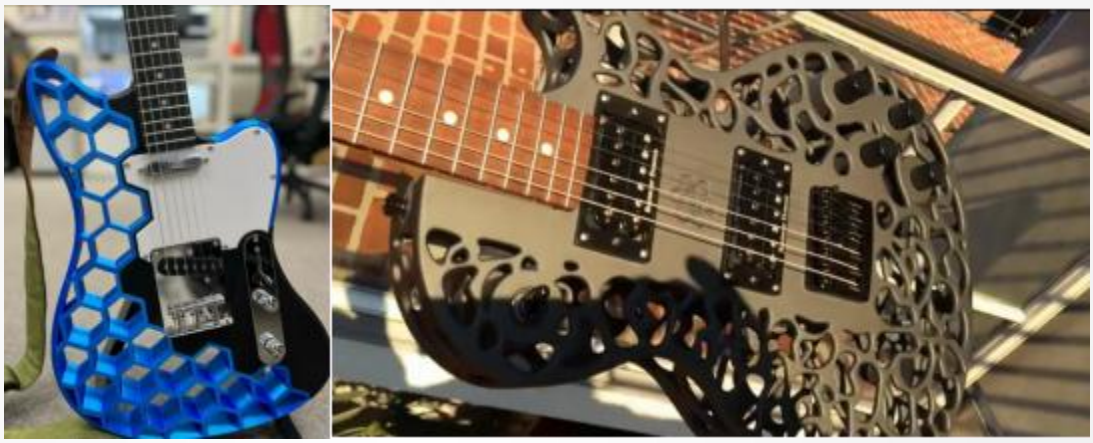
The process of creating a guitar model using CreatBot

Post-processing: A simple cutting and polishing process will suffice, and it can then be directly assembled and used.



Guitar model detail display

The entire process was completed in just 72 hours, which was three weeks faster than the traditional method.



Guitar model finished product display

Outcome: Efficiency has soared, creativity has been unleashed.

The customer uses a printed guitar performance scene

The CreatBot printer helped Jolly Music achieve:

- **The research and development cycle has been shortened by 75%** - from design to completion, it only takes 3 days.

- **Cost savings of 60% -** Prototype production can be carried out without the need for expensive molds;

- **Personalization capabilities enhanced -** Can easily achieve complex shapes such as hollowing, curved surfaces, and unique textures;Personalization capabilities

  enhanced - Can easily achieve complex shapes such as hollowing, curved surfaces, and unique textures;

- **The prototype is the final product -** the shell's strength and surface finish can be directly tested during the performance.

"As a guitar enthusiast, I have been constantly seeking ways to create a unique guitar. The experience of using the 3D printer of CreatBot to print the guitar shell was simply amazing! The printed guitar shell is not only extremely precise, with a smooth surface and perfect detail reproduction, but it is also custom-made exactly according to my personalized design. After assembly, the sound performance is also very excellent, far exceeding my expectations. 3D printing has turned my creativity into reality. In the future, I will also try to print more different styles of instrument components. I highly recommend this to every music enthusiast who pursues individuality."

-------Jolly Music customer

"The industrial-grade 3D printer of CreatBot has truly ushered us into a new era

of "personalized instrument manufacturing".The industrial-grade 3D printer of CreatBot has truly ushered us into a new era of "personalized instrument manufacturing". The guitar shells printed out are not only sturdy and durable, but also have a novel and unique appearance. We can now respond more quickly to musicians' demands for personalization and create one-of-a-kind instruments for them. The guitar shells printed out are not only sturdy and durable, but also have a novel and unique appearance. This is a complete industry revolution! We can now respond more quickly to musicians' demands for personalization and create one-of-a-kind instruments for them. This is a complete industry revolution!"

-------Jolly Music Design Director

10. 3D Printing Accelerates Faurecia Seat Production

——The CreatBot large-scale industrial 3D printer helps Faurecia achieve rapid prototype verification of automotive seat bases

Prototype manufacturing of the Faurecia car chassis

The Pain of Prototype Manufacturing in the Automotive Industry

Faurecia, as a world-leading supplier of automotive seats, interior systems and cleaning technologies, its innovative R&D process is of vital importance. In the development of new car seats, the seat base, as the core load-bearing and safety component, the accuracy, strength and verification speed of its prototype

directly affect the progress of the entire project.

Before this project, the R&D team of Faurecia encountered the following typical challenges:

• **Time pressure:** The outsourcing of the stamping process for manufacturing the car seat model usually takes 2 to 4 weeks. During the production process, due to the need for heating and pressure retention for quenching, the production cycle is prolonged, resulting in low production efficiency and severely delaying the verification period.

• **Economic cost:** The processing cost for a single large prototype is high, especially when there are multiple design iterations, and the cost increases exponentially.

• **Lack of flexibility**: Once the design needs to be adjusted, the entire prototype of the car seat almost has to be completely rebuilt, which is unaffordable in terms of time and cost.

Therefore, Faurecia urgently needs a prototyping solution that can be internalized, quick, and economical to support its agile R&D requirements.

Stamping die @ Faurecia

CreatBot Large-scale Industrial 3D Printing Solution

After a rigorous technical assessment, Faurecia selected the large-format industrial 3D printer D1000 series from CreatBot as part of its solution.

Equipment selection: CreatBot D1000 series

• **Extremely large molding volume:** Satisfies the requirement of a one-time, complete printing of the automotive seat base mold, without the need for segmented assembly, ensuring structural integrity.

• **Industrial-grade reliability and precision:** Uses a full-metal frame, high-temperature nozzles and a closed-loop control system, ensuring the stability of long-term printing and the dimensional accuracy of the final prototype, fully meeting the requirements for assembly verification.

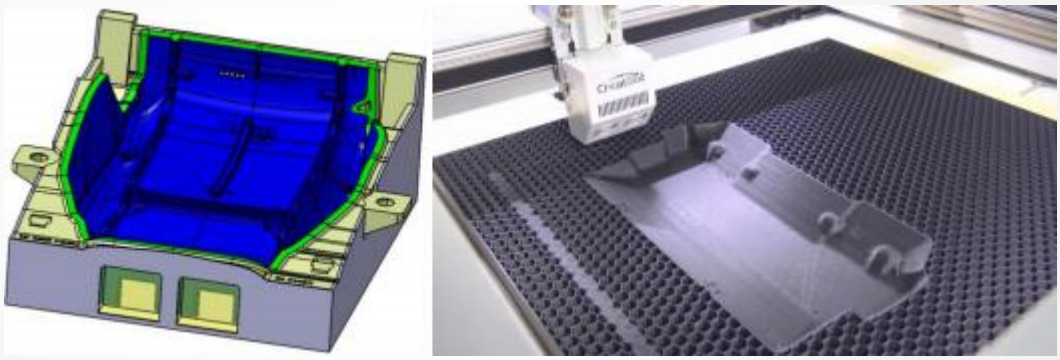
• **High-performance material compatibility:** Supports the printing of high-strength **ABS, UltraPA-CF, ASA, PET-CF** and other engineering plastics. Among them, the UltraPA-CF material provides a strength-to-weight ratio close to that of some metals, making it highly suitable for structural verification.

Implementation process:

• **Data Preparation:** Import the three-dimensional model of the seat base provided by Faurecia directly into the slicing software.

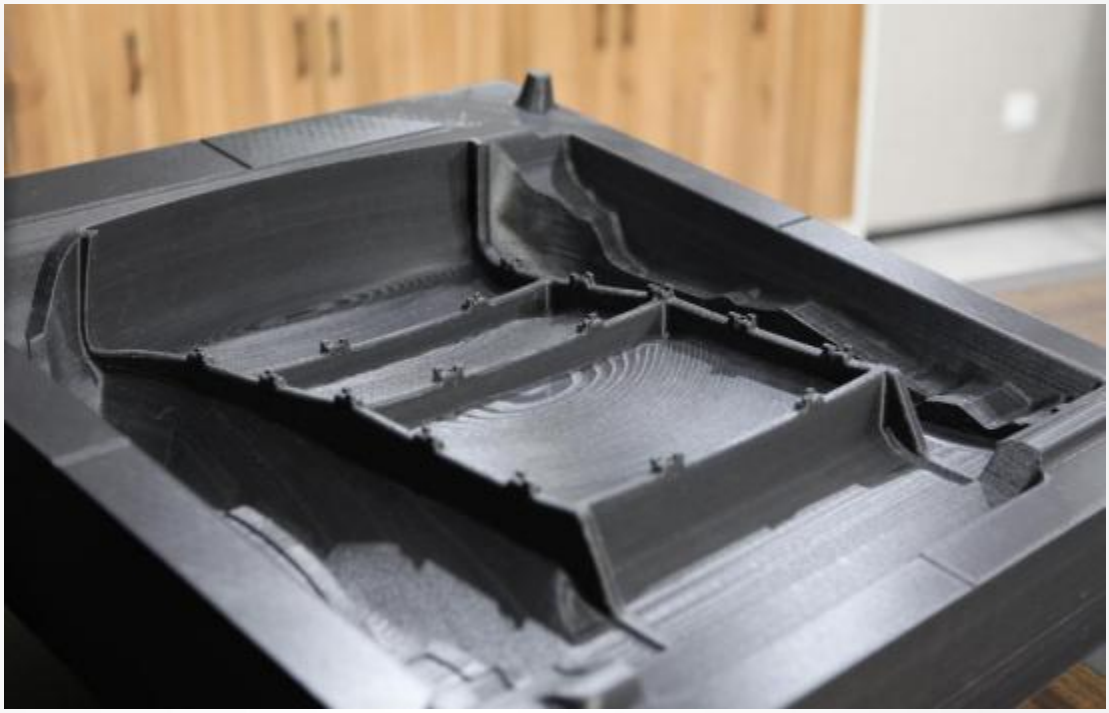
• **Parameter Optimization:** Based on the force conditions of the model, customize the filling density of different areas through the software (such as high filling in the core load-bearing area and low filling in non-critical areas), ensuring strength while maximizing material savings and time.

• **Integrated Printing:** Place the model on the molding platform of the CreatBot D1000 series and start the equipment for integrated printing.



Printing process@CreatBot

• **Post-processing and assembly:** After the printing is completed, the components are removed. With simple support removal and surface treatment, they can be directly delivered to the Faurecia engineers for assembly and functional verification.



Printing results@CreatBot

Outcome and Value: Disrupting Traditional Efficiency Improvements

By adopting the CreatBot 3D printing solution, Faurecia achieved significant benefits in this prototype verification of the automotive seat base:

Evaluation dimensions	Traditional method	CreatBot 3D printing solution	Improvement effect
Delivery cycle	8-15 weeks	10 days	Reduce by over 85%
Unit cost	High (materials + processing fees)	Very low (only consumable costs)	Reduce by over 70%
Design iteration	Difficult, with extremely high costs	Extremely convenient, with almost no additional costs	Realize true agile development
Design flexibility	Limited by processing difficulty	Can easily achieve complex topological structures	Provide the possibility for lightweight design

Evaluation dimensions	Traditional method	CreatBot 3D printing solution	Improvement effect
Internal capabilities	Depend on external supply chain	Realize rapid internal manufacturing, enhanced confidentiality	Reduce supply chain risks

Batch production seat accessories developed through 3D printing of molds@Faurecia

Customer Testimonial:

"The 3D printer of CreatBot has completely transformed our prototype development model. Previously, we had to wait for several weeks to obtain an expensive product prototype. Now, our engineers can receive the physical product for verification within one week after the design is completed. This not only saves costs and time, but more importantly, it encourages our team to make more innovative attempts because the cost of trial and error is almost negligible. This is crucial for maintaining Faurecia's technological leadership position."

—— Faurecia Head of the R & D Center

Future Outlook

This successful collaboration has laid a solid foundation for Faurecia and CreatBot. In the future, the cooperation between the two parties will further deepen:

Expansion to production tools: Apply 3D printing technology to customized assembly fixtures, inspection jigs (CMM gauges), etc., further enhancing production line efficiency.

Expansion of application fields: Expand the application of 3D printing technology in the entire automotive sector, extend cooperation to other product lines of Faurecia, covering key components of interior, electronics and other systems for development.

Continuous technological iteration: CreatBot will continuously optimize equipment performance based on feedback from leading clients such as Faurecia, providing more efficient and reliable additive manufacturing solutions.

Conclusion

The case of Faurecia clearly demonstrates that industrial-level additive manufacturing technology is no longer merely a "concept model" creation tool, but has evolved into a key production technology that supports the core R&D processes of the automotive

industry. With its **large-format, high-precision, and industrial-grade reliability features, CreatBot** successfully helped industry giants like Faurecia solve the fundamental pain points of prototype manufacturing, achieving **remarkable time and cost savings**, and providing a strong impetus for its innovation engine.

For any automotive manufacturing enterprise committed to maintaining a leading position in the fierce competition, investing in internal rapid manufacturing capabilities like CreatBot has become a strategic necessity.

11. Ostberg Partners with CreatBot for Fan Development

— *Transforming HVAC R&D with Large-Format 3D Printing*

Abstract

Swedish HVAC leader Ostberg used the CreatBot D600Pro2 HS to rapidly produce full-scale fan prototypes, cutting development time by 70% and costs by 65%. This demonstrates the impact of high-temperature, large-format 3D printing on industrial R&D.

Customer Challenge: Overcoming HVAC R&D Pain Points

Company Background

Ostberg Group – Founded in 1947, Ostberg is a leading European manufacturer of ventilation systems for commercial and residential applications, renowned for energy efficiency and cutting-edge technology.

Core Requirements

• **Produce full-scale** 1:1 fan models for aerodynamic testing

• **Key material performance requirements:**

a. Withstand high-temperature airflow of 80°C

b. Maintain structural integrity at impeller speeds over 2,500 rpm

c. Survive over 100 hours of high-frequency vibration testing

• **Complex structure realization:** Integrated impeller and airflow duct, difficult and time-consuming with traditional CNC machining

• **Cost and time pressures:** Metal tooling for single prototypes exceeds $8,000, with delivery cycles ≥3 weeks

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Solution: CreatBot D600Pro2 HS in Action

Equipment Configuration:

CreatBot D600Pro2HS Industrial 3D Printer

Core Features:

• Large Build Volume: 600 × 600 × 600 mm (Top 5% in the industry)

• Dual High-Temperature Nozzles: Up to 420°C, compatible with engineering materials such as ABS, ASA, Ultra PA, PET-CF

• High-Precision Industrial Linear Rails

• Active Temperature-Controlled Chamber: 70°C

Material Selection: Ultra PA-CF (Carbon Fiber Reinforced Nylon)

The fan had four core requirements: 80°C high-temperature airflow resistance, 2500 rpm centrifugal tear resistance, >100 hours vibration stability, and Ra < 10 μm for air channel precision. To meet these requirements, we adopted the Ultra PA-CF material solution:

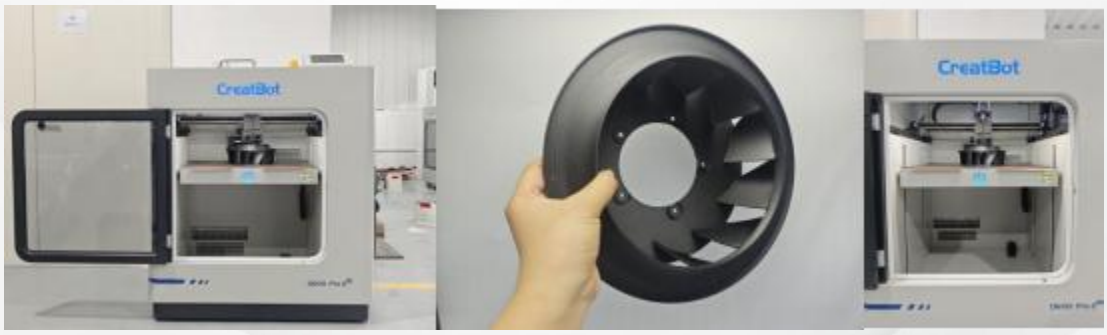
• Heat Resistance: 197°C ensures structural integrity under high-temperature airflow

• Strength: 61 MPa with carbon fiber resists centrifugal stress

• Durability: +40% impact toughness via interlayer reinforcement, vibration-tested

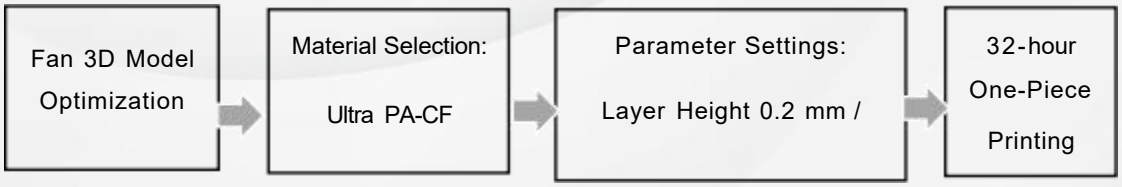
• Precision: Polished air channels achieve Ra = 6.8 μm for optimal airflow

• Performance: 420°C nozzles + 70°C chamber maximize UltraPA-CF potential



Wall-Mounted Fan Printing Process @ D600 Pro2 HS

Implementation Process



Fan Prototype Details @ D600 Pro2 HS

Fan Prototype Details @ D600 Pro2 HS

Performance Comparison: Breaking Traditional Manufacturing Limits

Metric	Traditional CNC Post-Processing	D600Pro2HS 3D Printing	Improvement
Delivery Time	22 days	6 days	↓73%
Design Iterations	≤2 per cycle	5 per week	↑150%
Material Utilization	45%-60%	98%	↑63%

Industry Impact & Insights

Product Development Revolution

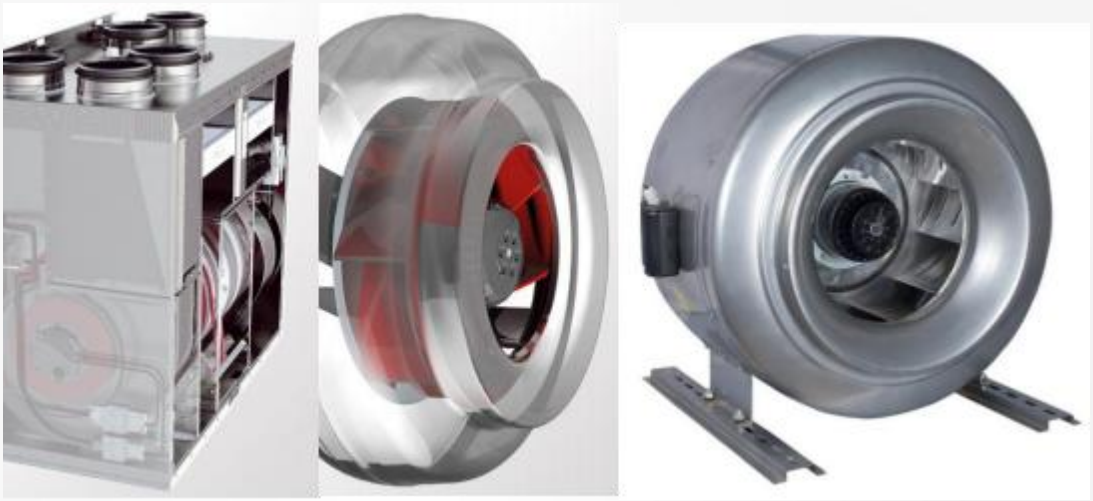
- ✓ 1:1 functional prototyping with zero scaling errors
- ✓ Integrated impeller–volute manufacturing for real operating conditions

Upgraded Manufacturing Mode

- ✓ From "Design → Outsource → Wait" to "Design → Print → Test"
- ✓ Engineers operate independently, ensuring IP protection

Sustainable Development

- ✓ 85% less metal waste during R&D
- ✓ 12 tons lower annual carbon emissions per device vs. outsourcing



Wall-Mounted Fan Case Study @ Ostberg

Technology Expansion Directions

Based on the successful experience of fan prototype validation, Ostberg will continue to leverage 3D printing to drive three major technology upgrade initiatives:

☑**Functional Integrated Printing:** Smart housing with embedded sensor channels

☑**High-Performance Material Application:** Carbon fiber reinforced nylon (PA-CF) impellers

☑**Small-Batch Customized Production:** Achieving 50 units/month using equipment clusters

Ventilation Systems @ Ostberg

Conclusion

The Ostberg case vividly demonstrates that industrial large-format 3D printing has evolved beyond a mere "concept validation tool" into a powerful engine driving end-to-end product development. With its unmatched compatibility with engineering-grade materials, precision industrial architecture, and an open production ecosystem, the CreatBot D600Pro2HS is rapidly becoming indispensable R&D infrastructure across HVAC, energy, and heavy machinery industries.

In the relentless pursuit of peak industrial fan performance and groundbreaking design, Ostberg continues to set the benchmark. We are proud to have partnered with their exceptional R&D team, delivering high-precision industrial fan prototypes through our advanced, one-stop industrial 3D printing solutions.

This collaboration is far more than prototype production—it embodies Ostberg's unwavering commitment to efficient, agile, and innovative product development. Our

end-to-end services—from meticulous model data optimization and expert material guidance to high-precision printing and professional post-processing—ensured flawless delivery of industrial fan prototypes, empowering Ostberg to push the boundaries of performance, design, and innovation.

12. From Sketch to Screen: CreatBot 3D Printing Powers Props Factory's Fantastical Creations

Props Factory – Film Prop Workshop

At Singapore's leading film prop workshop, Props Factory, the CreatBot D1000 industrial 3D printer has become the engine of creative magic. From a director's initial concept to fully operational props in an actor's hands, Props Factory leverages the CreatBot D1000 to turn complex, fantastical, and seemingly impossible designs into reality within just a few days. With digital production, intricate forms that were previously difficult or impossible with traditional techniques are easily achieved, giving filmmakers unprecedented freedom to bring their visions to life.

Client Background

Props Factory PTE LTD, a premier film prop company in Asia, having created hundreds of high-precision props for international streaming series and top local productions. Their props span a wide variety of designs with extremely high standards.

However, the fast-paced, high demand nature of film production has long posed four core challenges that constrained creativity:

- **Tight deadlines:** Props must be completed within just a few days.
- **High costs:** Hand-carving or mold-making for a single prop can cost thousands of dollars.
- **Complex designs:** Fantasy and sci-fi themes often require unique forms and intricate internal structures that are difficult to achieve with traditional methods.
- **Frequent revisions:** On-set changes requested by directors or art directors are common, and manual rework is costly.

Where Creativity Meets Technology

With digital production, Props Factory discovered new possibilities. Complex geometries and hollow structures can now be realized, and design revisions can be quickly accommodated by adjusting digital models, eliminating the need to create new molds. Creativity and practicality now coexist, allowing actors to handle props with ease.

Creative and colorful model props

Digital Prop Production Workflow

By introducing the CreatBot D1000 industrial 3D printer, Props Factory has established an efficient and flexible digital prop production line:

Digital modeling and optimization: The art team creates high-precision concept models, fully unleashing their creativity. Models are directly imported into the CreatWare slicing software for intelligent parting and print preparation.

CreatWare Slicer Software

CreatWare Slicer Software & ASA Material Benefits:

- **Strong and Lightweight:** Durable yet easy to handle for actors.
- **Outdoor-Friendly:** Excellent weather resistance, withstanding UV exposure and extreme temperature changes.
- **Easy Post-Processing:** Smooth, like-new surfaces can be achieved, ideal for customized finishing.

Case Study: Recreating the Venomous Snake

When tasked with producing a striking venomous snake model, the **CreatBot D1000** delivered flawlessly:

- Captured every detail, from the texture of the snake’ s head to the sharpness of its fangs.
- Handled intricate internal structures, including the mouth.
- Achieved rapid production without compromising quality.

Even the most complex, imaginative designs can now be realized quickly and precisely.

One-Piece Snake Model Produced Using the CreatBot D1000

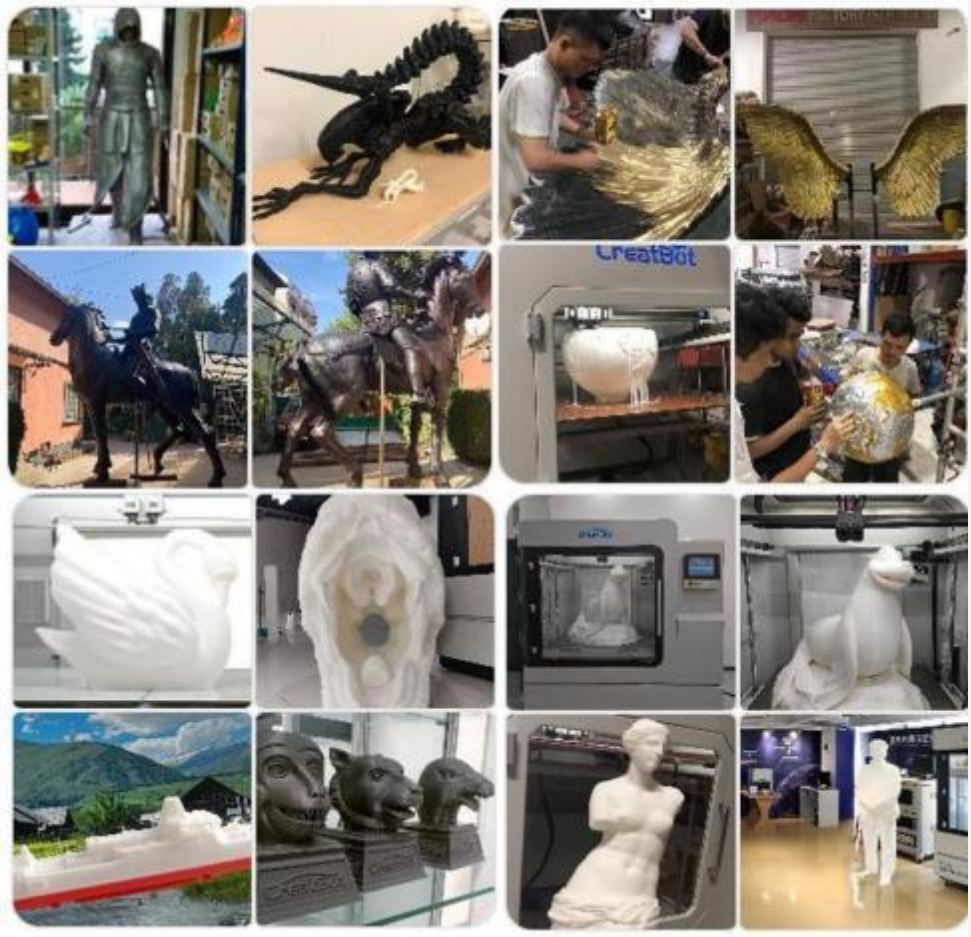
CreatBot 3D printers open the door to endless possibilities in model making, artistic creation, and more, bringing every imaginative idea to life perfectly.

Customer Feedback

"The CreatBot D1000 has completely transformed our creative process. Projects that once seemed impossible (short-cycle, highly complex designs) are now our competitive edge. In our latest project, we delivered multiple entirely distinct design solutions to the

client within just 48 hours, something we could never have achieved before."

— Chief Prop Designer, Props Factory



Case Study:

One-Piece Film Prop Models with the CreatBot D1000

Future Prospects: Our Journey Continues

Embarking on the journey of design and art was just the beginning. Today, CreatBot continues to advance steadily along the path of creativity. From helping designers turn bold ideas into reality, to enabling artists to bring abstract visions to life, and providing niche creators with more efficient tools, CreatBot' s mature 3D printing solutions accompany every step. Together with design and art enthusiasts, each step forward witnesses new possibilities in creative expression.

13.CreatBot Powering Volkswagen's Lightweight Innovation

Volkswagen Manufacturing

Volkswagen, a global automotive benchmark, is more than an icon, and is a pioneer in sustainable mobility. From classic internal-combustion models to advanced electric vehicles, Volkswagen pursues its "driving the future" mission, delivering value while advancing carbon neutrality through the Way to ZERO strategy. Traditional manufacturing, however, struggles with development speed, cost, and material efficiency, and calls for a bold new approach.

Enter CreatBot industrial 3D printing—unlocking lightweight designs, sustainable manufacturing, and rapid iterative development. Volkswagen now has the tools to push automotive innovation beyond traditional limits.

Customer Challenge: Modern Automotive Needs

Founded in 1937 and headquartered in Wolfsburg, Germany, Volkswagen Group is home to iconic brands such as Audi, Porsche, Lamborghini, Bentley, and Bugatti, spanning passenger, commercial, and electric vehicles.

Under the Way to ZERO strategy, Volkswagen continuously improves vehicle energy efficiency and environmental performance. For critical components like the steering wheel—the primary interface connecting driver, safety, and innovation—Volkswagen needed a solution that could ensure structural strength and safety, reduce weight to enhance vehicle range, and support both green manufacturing and rapid iterative design. Traditional methods alone could not meet all these requirements.

Why 3D Printing Matters: The Four Pillars of CreatBot Technology

√ **Industry Trends Driving Innovation:**

- Customization demand rising: Electric and high-performance models require bespoke components.

- Accelerated iteration: Faster market cycles demand quicker R&D and innovation.

- Sustainability push: Light-weighting and carbon neutrality goals require more efficient, waste-reducing processes.

Traditional manufacturing struggles to keep up. CreatBot industrial 3D printing solves these challenges by: shortening R&D cycles, cutting prototyping costs, enabling complex designs, and maximizing material efficiency.

√ **CreatBot Advantages at a Glance:**

- Rapid iteration: From concept to physical prototype in just days.
- Cost efficiency: Tool-free manufacturing slashes development time and costs.
- Design freedom: Supports geometries impossible with traditional methods.
- Eco-friendly production: Minimizes waste, maximizes material usage, and promotes carbon neutrality.

Project Implementation: From Concept to Verification

Defining the requirements: In 2019, Volkswagen Germany set lightweighting goals under Way to ZERO, focusing on **weight reduction, green manufacturing, and functional integration.** By 2022, Volkswagen ' s U.S. R&D team refined these requirements for steering wheel design—cutting material weight while ensuring safety, structural integrity, and functional performance.

Lightweight Steering Wheel Design Diagram

② **Technology Selection:** Partnering with Volkswagen R&D, the CreatBot team selected the D600 Pro2 HS industrial 3D printer for experimental production and iterative testing:

- Large build volume (600 × 600 × 600 mm): Prints the steering wheel frame in a single piece, avoiding weak assembly points.
- High-temperature printing: Enclosed chamber up to 70 °C and nozzle at 420 °C ensures flawless carbon fiber-reinforced material performance.
- Material: Ultra PA-CF balances high strength, wear and heat resistance, and lightweight design.

③ **Printing and Iteration:** Printing the steering wheel frame as a single unit reduced assembly steps, eliminated potential failure points, and accelerated validation cycles.

Steering Wheel Printing Process

④ **Testing and Verification**: Prototypes underwent rigorous strength, stiffness, and heat-resistance testing. Adjustments optimized material usage and structural design.

⑤ **Results and Impact:**

- Validated performance: Functional prototypes meet core requirements.
- Efficiency gains: R&D cycle cut by 70%, development cost reduced by 50% (materials + equipment + labor).
- Proven workflow: Demonstrated a reliable "rapid prototyping → lightweight design → sustainable manufacturing" process for automotive components.

Volkswagen Steering Wheel Printing Outcomes and Applications

Looking Ahead: Redefining Automotive Manufacturing

CreatBot 3D printing is set to expand across core automotive components:

- **Functional components:** Seat frames, wheel hubs, oil pump housings, brake parts —ideal for rapid prototyping and small-batch production.

- **Lightweight parts:** Carbon fiber-reinforced and high-performance plastics reduce weight, improving efficiency and range.

- **Customized solutions:** Steering wheel grips, mirror brackets, and other parts can be tailored for specific models or user preferences, enabling flexible design and rapid iteration.

- **Sustainable production:** On-demand manufacturing reduces material waste by up to 90%, supporting green supply chains and accelerating the automotive industry’ s sustainability goals.

By breaking free from the constraints of traditional manufacturing, CreatBot is more than a technology; it is a catalyst for innovation. Lightweight, intelligent, and sustainable development is no longer a vision — it’ s already happening, and Volkswagen is leading the way.

14. How Bosch Achieves Manufacturing Efficiency with CreatBot

A Global Leader in Automotive Technology and Services – Bosch

Bosch, a global leader in automotive technology and services, has always placed innovation at its core, continuously exploring cutting-edge manufacturing technologies. When traditional production methods could no longer keep up with the growing demand for rapid iteration, customization, and small-batch production, CreatBot' s industrial 3D printing technology stepped in, empowering Bosch to accelerate the development of prototypes and end-use manufacturing of key components such as oil pumps and hydraulic valves, ushering a new chapter in automotive production.

Client Background: A Century of Engineering Excellence

Founded in 1886 and headquartered in Gerlingen, Germany, Bosch is a world-renowned engineering and industrial technology company. Known for its exceptional engineering capabilities and rigorous quality standards, Bosch has long set

the benchmark in global automotive component manufacturing.

In today's fast-evolving automotive landscape, the performance and production efficiency of core components directly determine competitiveness. Take the oil pump—the "heart" of the engine's lubrication system—as an example: its efficiency directly affects vehicle performance and fuel economy. As the industry moves toward lightweight designs and greater customization, Bosch faced the challenge of overcoming the efficiency and cost limitations of traditional manufacturing. To maintain its pursuit of precision, speed, and design excellence, the company sought a more flexible, cost-effective, and responsive production solution.

Opportunities & Challenges: Redefining Automotive Manufacturing with Additive Technology

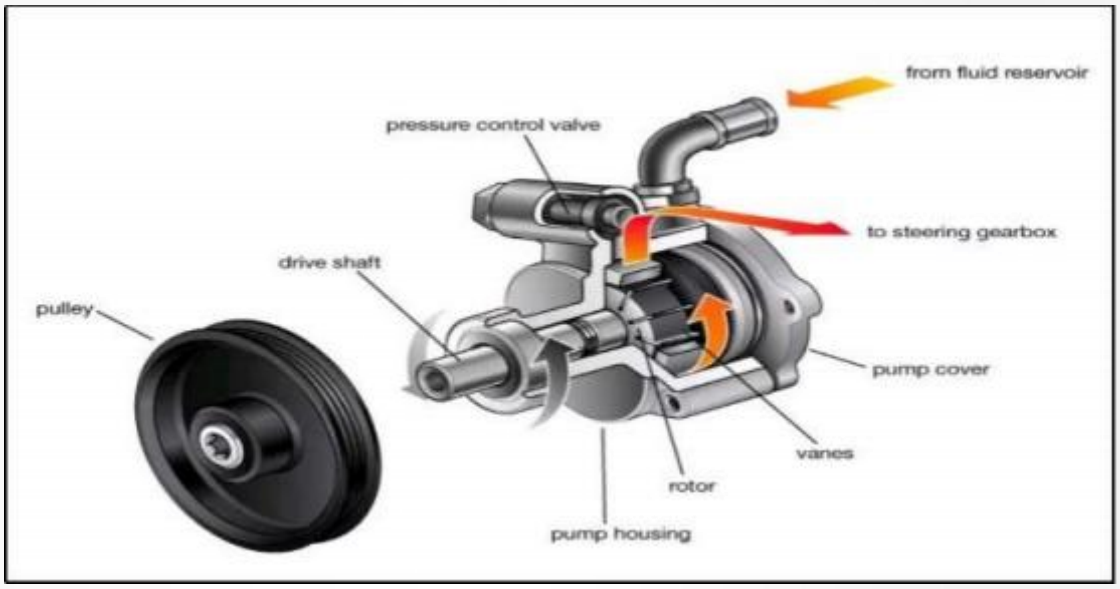
√ Market Opportunities:

- Global vehicle production continues to grow, driving steady demand for oil pumps—the market is projected to reach USD 3.8 billion by 2033.
- Increasing customization requirements demand rapid iterations of multiple designs.

× Traditional Manufacturing Pain Points:

- Efficiency bottleneck: Developing a new oil pump mold takes 6–8 weeks, which severely limits R&D speed.
- Cost pressure: Small-batch molds for customized or experimental parts can exceed 50% of total project cost.

- Design limitations: Conventional split-casting struggles to optimize complex internal channels or incorporate lightweight, geometrically advanced structures.



Schematic Diagram of Bosch Automotive Power Pump

Solution: From Concept to Production with CreatBot 3D Printing

Since 2015, Bosch has deployed CreatBot industrial 3D printers across its global R&D and production centers in the U.S., Mexico, Germany, Vietnam, Hungary, and the U.K., seamlessly from prototype validation to mass production:

√ **Phase 1 – Technology Exploration (2015–2021):**

- 2015: Bosch Rexroth U.S. introduced the first CreatBot DX PLUS, reducing oil pump design cycles from six weeks to just ten days.
- 2021: Breakthroughs in both Mexico and Germany:

Mexico: CreatBot PEEK-300 high-temperature printer successfully produced oil valve components capable of withstanding 230°C.

Germany: CreatBot F1000 was tested for mass production of high-temperature materials.

Oil Pump Housing Made by Traditional Processes

√ **Phase 2 – Scale Expansion (2022–2024):**

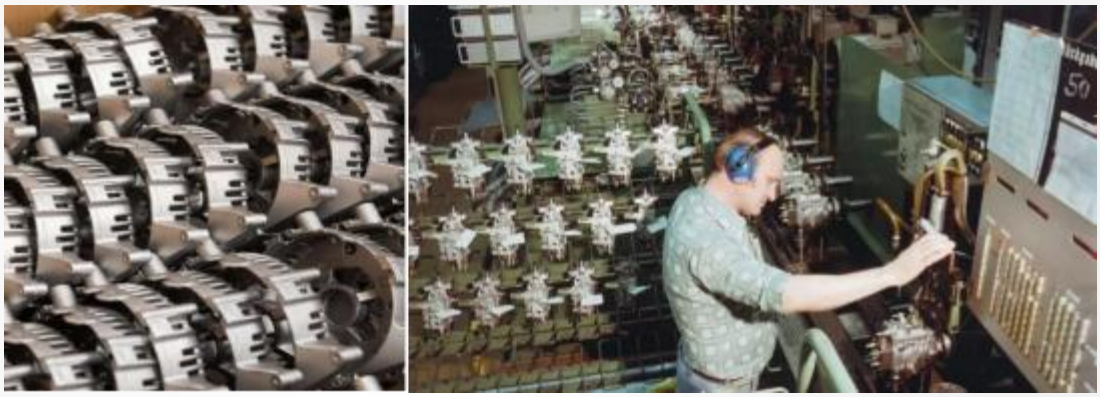
- 2022: The Vietnam facility adopted CreatBot D600, printing 80% of tooling fixtures—boosting efficiency by 60% and reducing per-piece mold costs by 87%.

- 2023: Germany HQ expanded with its use of the CreatBot PEEK-300, where end-use PEEK parts now account for 30% of total output.

- 2024: Hungary achieved rapid 48-hour iterations of customized pump housings using D600, while Germany prepared integrated D1000 printing lines, enhancing structural strength by 32%.

As the automotive industry increasingly prioritizes efficiency, energy saving, and lightweight design, the market places higher demands on oil pump performance. This include improving pumping efficiency to reduce energy consumption and achieving structural lightweighting to decrease overall vehicle weight, while also responding to the customized needs of diverse vehicle models. Facing these challenges, Bosch

urgently needs to overcome the bottlenecks inherent in traditional manufacturing processes.

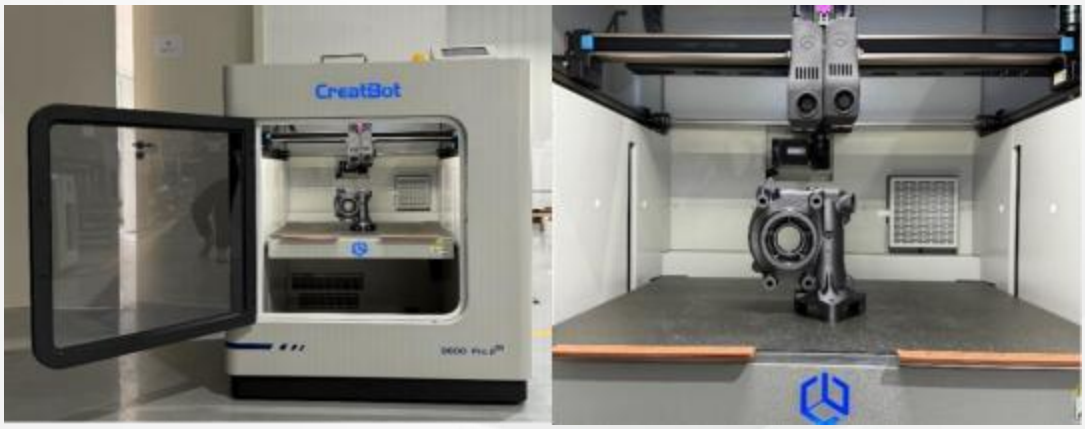


Bosch Mass-Produced Housing Model

√ **Phase 3 – Production Deepening (2025):**

- Germany HQ began procuring D600 Pro2 HS and D1000 HS printers to further enhance production capabilities.

- The U.K. subsidiary adopted the D1000 HS for localized production, cutting validation cycles by 58% through real-time design-to-manufacture integration.



Oil Pump Housing Model 3D Printed by Bosch Using CreatBot D600 Pro2 HS

Results & Client Testimonials

By leveraging the high-performance 3D printing systems of CreatBot, Bosch has achieved significant improvements in manufacturing efficiency, material performance, and design flexibility. This represents not merely a process upgrade, but a decisive step toward the future of intelligent, on-demand automotive production.

Oil Pump Housing Model Made of Aluminum Die-Casting

"Now, in just a single day, our developers can print five variants of an injection valve, refer directly to the models in discussions with colleagues, and evaluate the merits of the different variants."

——Head of the Bosch CoC for 3D printing

"It enables us to supply our customers with new products in an extremely short time and in completely new fields. 3D printing lets us customize products and adapt them even better to our customers' requirements."

—— Production Director of the Bosch European Factory

15. Busted Knuckle Revolutionizes Intake Development with CreatBot

— *From weeks to 48 hours, boosting performance and cuting costs*

Executive Summary:

Faced with intense off-road racing competition and tight modification windows, professional aftermarket brand Busted Knuckle Off-road turned to the CreatBot D600 Pro2 HS industrial 3D printer. By using PA-CF material to 3D-print high-performance intake manifolds in a single piece, they slashed the development cycle from 3–4 weeks to just 48 hours, cut single-unit costs by over 80%, and validated outstanding performance and reliability in world-class competitions, giving drivers a real edge on the track.

Busted Knuckle Offroad Racing Customization

Industry Challenge: Traditional Manufacturing Can't Keep Up with Racing Agility

For a top-tier off-road motorcycle brand like Busted Knuckle Offroad, upgrading the engine intake manifold is key to unlocking performance. Yet, relying on traditional aluminum CNC machining and welding presents major hurdles:

- **Time-consuming:** From finalizing the design to a testable part, CNC programming, machining, and post-processing take 3–4 weeks—too slow for fast-paced race preparation.

- **Costly:** Small-batch, custom parts require expensive tooling, often exceeding $5,000 per intake, limiting the frequency of design iterations.

- **Design limitations:** Welded assemblies can accumulate up to ±1.2 mm in tolerance errors, and complex internal structures like optimized airflow channels or integrated dust separators are nearly impossible, restricting performance gains.

Technical Breakthrough: CreatBot D600 Pro2 HS One-Piece 3D Printing Solution

By adopting the CreatBot D600 Pro2 HS, Busted Knuckle Offroad gained clear advantages over traditional methods:

- ✓ Fast turnaround: Full "design-print-test" loop completed in just 48 hours.
- ✓ Dramatic cost reduction: No expensive tooling, single-unit production costs a fraction of traditional methods.
- ✓ Unlimited design freedom: One-piece printing eliminates weld errors, allowing complex aerodynamic shapes and integrated functional structures.

Engine Intake Manifold 3D Printing Process

Performance Challenges and Engineering Solutions:

Why PA-CF 3D Printing Works

The engine intake is the engine’ s "lungs," directly affecting power, efficiency, and reliability. In harsh off-road conditions, it must meet these demands:

1. Extreme heat resistance:

Withstands 80–120°C continuously, with short peaks above 140°C, without softening or warping.

2. High strength and rigidity:

Survives off-road vibration and shocks; prevents resonance or interference with other components.

3. Material stability and sealing:

Resistant to oils and chemicals, ensuring long-term durability; airtightness is critical for precise ECM control.

4. Optimized internal airflow:

Smooth internal walls reduce flow resistance; aerodynamic shapes ensure fast, stable airflow into cylinders.

5. Lightweight:

Reducing both sprung and un-sprung mass is key to improving vehicle handling and responsiveness.

Our Solution:

Traditional methods were slow and costly. Using CreatBot D600 Pro2 HS and advanced materials, Busted Knuckle Offroad delivered a perfect solution.

How We Made It Happen:

1. Material Choice: High-Performance PA-CF (Carbon Fiber Reinforced Nylon)

- ✓ Heat resistance: HDT up to 140°C, exceeding engine bay requirements.
- ✓ Strength and rigidity: Carbon fibers in nylon matrix enhance stiffness and impact resistance. Achieves 38% weight reduction while maintaining durability.
- ✓ Chemical resistance: Naturally resists oils and chemicals for long-term performance.

2. One-Piece 3D Printing

- ✓ Sealing and integrity: With a 600×600×600 mm build volume, the intake is printed in one piece, eliminating weld-induced leaks and tolerance errors.
- ✓ Design freedom and airflow: 3D printing enables complex internal channels and aerodynamic shapes, allowing rapid iteration for peak performance.

3. Precision Post-Processing

- ✓ Critical flanges are machined for perfect engine and throttle body fit, with high-quality seals ensuring airtight connections.

Full-Scale 3D-Printed Engine Intake Manifold Showcase

Proven Performance: Lab to World-Class Races

Phase 1: Extreme Lab Testing (Q3 2023)

Ran 50 hours at 85°C/95% humidity with zero deformation.

Lightweight advantage: 38% lighter than aluminum (620g → 385g).

Phase 2: Global Race Validation (2024 Season)

King of the Motos: 15% less high-altitude power loss, achieved 2nd place.

Sea to Sky: Air filter replacement intervals extended 300%, completed the race smoothly.

Real-World Applications of the Engine Intake Manifold

Economic Impact: Redefining Cost Structures

Traditional CNC Program: around **$5,200** (including $5,000 tooling amortized over small batch)

3D Printing Solution: Total: **$470**

- ✓ Material + energy: **$320**
- ✓ Post-processing: $150: **$150**

Over 90% savings, enabling more design testing. It also allows development of the specialized parts for additional models.

Conclusion and Outlook

Busted Knuckle Offroad's success demonstrates that additive manufacturing is a game-changer for high-performance, low-volume, custom industrial applications. The CreatBot D600 Pro2 HS not only tackled complex engineering challenges but also streamlined development workflows, unlocking a decisive competitive advantage.

Looking forward, the team is set to expand 3D printing to engine mounts, lightweight structural components, and other mission-critical parts—continuing to push the boundaries of off-road motorcycle performance and innovation.

16. FAL Boosts Efficiency with CreatBot 3D Printing

Abstract

This case study details how FAL (Fábrica de Armas de Leiria), a leading Portuguese industrial manufacturer, successfully addressed three long-standing core challenges in traditional mold manufacturing – long lead times, high costs, and design limitations – by introducing the CreatBot D1000 HS industrial-grade 3D printer. The results show that FAL reduced the lead time for complex molds from the traditional 4 weeks to just 5 days, achieved an 82% reduction in unit cost, and implemented previously unmanufacturable conformal cooling channels, ultimately increasing injection molding yield to 99%. This study provides a replicable digital upgrade pathway for the manufacturing industry, particularly in the mold and precision casting sectors.

FAL Company Mold Manufacturing Factory

The Challenges of Traditional Mold Manufacturing

Molds are the "profit levers" of industrial production, as their efficiency directly determines the development speed, cost, and quality of the final product. However, traditional mold manufacturing processes, represented by CNC subtractive manufacturing, are increasingly becoming a bottleneck that constrains innovation.

As a precision manufacturing enterprise with a long history, FAL's mold department acutely faced the following challenges:

Prolonged Lead Times: CNC machining of complex molds required over 200 hours, with total delivery cycles spanning 3-4 weeks, failing to meet market demands for rapid response.

High Production Costs: The unit cost for small-batch trial molds exceeded €5,000, with a material waste rate as high as 45%, significantly compressing project profitability.

Technical Limitations on Design Freedom: Traditional machining methods were virtually incapable of producing optimally efficient conformal cooling channels, resulting in extended injection cycles, uneven part cooling, and low yield rates.

FAL's traditional wood pattern manufacturing and furan sand molding process involved cumbersome and time-consuming procedures.

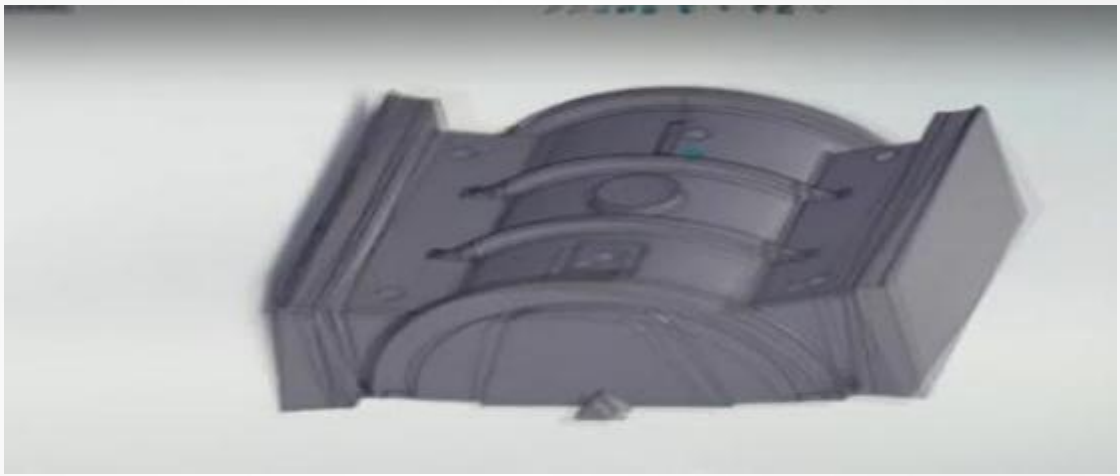
The CreatBot D1000 HS enables rapid tooling production

In 2025, FAL made the strategic decision to embrace additive manufacturing (AM) technology by integrating the CreatBot D1000 HS large-format industrial 3D printer into its rapid tooling workflow.

Digital-First Design: Engineers now directly utilize 3D modeling software for mold design, freely integrating conformal cooling channels and lightweight topological structures.

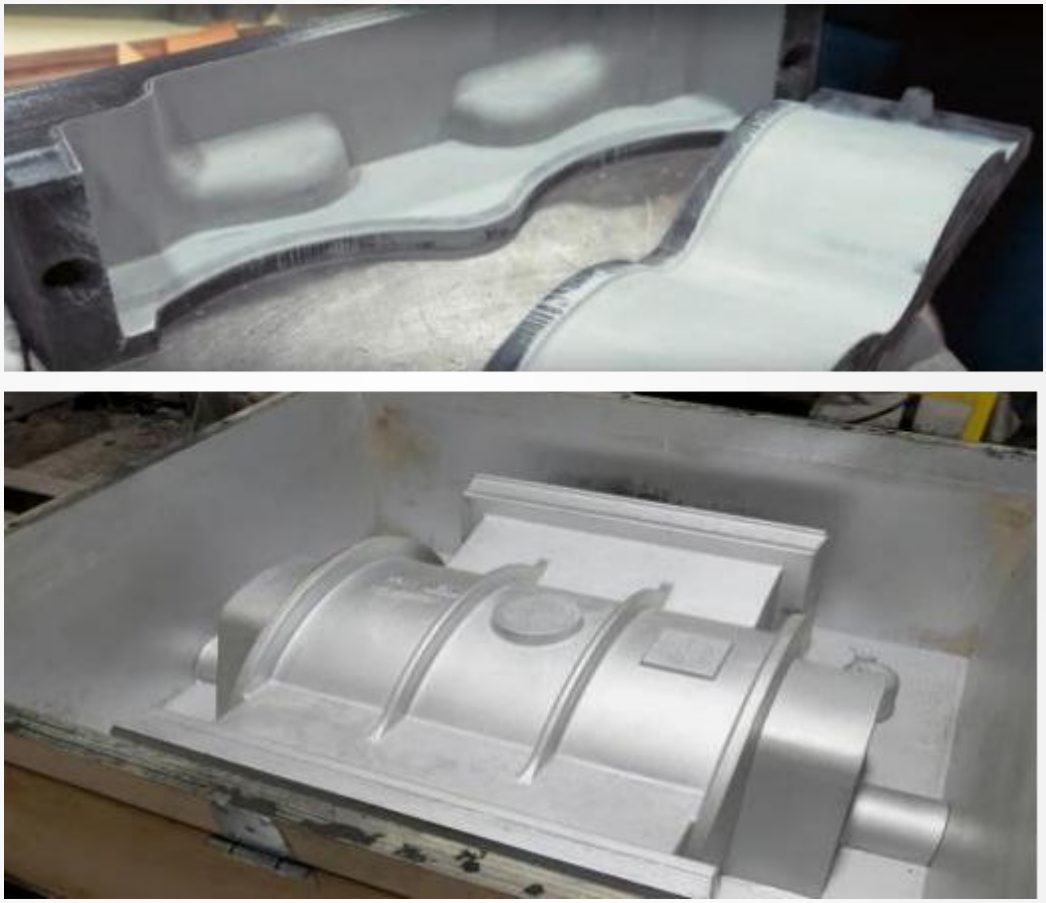
Integrated 3D Printing: The D1000 HS, using high-temperature materials like HTPA-CF, directly produces high-precision, heat-resistant mold patterns.

Accelerated Casting: The 3D-printed patterns enable rapid sand or investment casting processes, followed by molten metal pouring to obtain final steel molds.



Digital Model Design

CreatBot D1000 HS Large Mold Printing Process



Mold Fabrication Process Using Printed Models

Choose the CreatBot D1000 HS?

Large Build Volume (1000 × 1000 × 1000mm³): Enables one-piece printing of medium-sized injection molds, eliminating segmented assembly and ensuring structural integrity and precision.

High-Performance Material Compatibility: Supports high-temperature engineering materials like HTPA-CF. Printed molds can be directly used in injection molding environments below 200°C, meeting prototyping and production needs for most plastics.

Industrial-Grade Accuracy (±0.2mm): Delivers high surface quality in printed parts, significantly reducing the need for post-processing and achieving true near-net shaping.

Effect analysis: Quantitative revolution

FALs practical data fully demonstrates the advantages of additive manufacturing solutions.

1.**Efficiency improvement: Time is competitiveness**

The mold delivery time has been slashed from 4 weeks to 5 days. The D 1000 HSs continuous printing capability and large-format molding capability enable even the most complex molds to complete prototype manufacturing in a short time, achieving a speed revolution.

2.**Cost control: significantly improve profit margins**

The following table clearly compares the direct costs of the two options:

project	Traditional steel mold	D 1000 HS 3D Printing Mold	Save
Unit cost	€ 5,200	€950	**82%↓**
Trial attempts	3-5 times	1-2 times	**60%↓**
Material waste	45%	<5%	**90%↓**

3.**Breakthrough in performance: Design leads manufacturing**

Form-follower cooling channels: 3D printing enables the creation of internal flow channels with arbitrary complex shapes, maximizing mold cooling efficiency and shortening injection molding cycles.30%, and the product yield increased to 99%.

Lightweight structure: Through topology optimization, the weight of the mold itself is reduced by 50%, which not only saves materials, but also improves the loading and unloading efficiency.It reduces the labor intensity of operators.

The injection mold printed by D1000 HS features integrated conformal cooling channels, a capability unachievable through conventional manufacturing processes.

Polishing and subsequent processing

Conclusions and perspectives

FAL success story exemplifies how additive manufacturing is revolutionizing the traditional mold industry. The CreatBot D 1000 HS is not instead of simply replacing CNC, it has opened up a new digital path for mold manufacturing, and its core value lies in:

Shorten the value chain time: greatly shorten the cycle from design to product, enabling manufacturers to respond to the market faster.

Lowering the innovation threshold: making small-batch, multi-variety customization economically feasible.

Unlocking design potential: Breaking the shackles of traditional craftsmanship, allowing engineers to focus on functional implementation rather than manufacturing feasibility.

In the future, with the further development of material science and the deepening of industry cognition, the penetration rate of additive manufacturing in the mold industry will continue to increase.

CreatBot will continue to provide more efficient, stable, and user-friendly industrial-grade 3D printing solutions for global manufacturing.
Businesses are working together to promote a new round of intelligent manufacturing revolution.

17.Octopus New Energy: Accelerating Heat Pump Production with CreatBot 3D Printing

——CreatBot empowers green energy innovation

Abstract：

This white paper provides a detailed analysis of how Octopus, a global leader in new energy, has successfully introduced the CreatBot D600 Pro 2 series. Industrial-grade large-format 3D printers have revolutionized the R&D and production processes of heat pump products. To meet growing market demands, Octopus leverages the D600 Pro 2 series printers outstanding advantages in cost control, material diversity, print strength, and post-processing compatibility. This enables rapid and cost-effective manufacturing of large functional test components, tooling fixtures, and end-use parts, significantly shortening product time-to-market. The solution also provides agile and reliable manufacturing capabilities for large-scale deployment of heat pumps in charging infrastructure.

Heat Pump Launch Event @Octopus Energy

R&D challenges in industry change

With the explosive growth of the global electric vehicle industry, the supporting charging infrastructure network is rapidly expanding. Heat pump systems, crucial components for maintaining normal operation of charging station internal parts under extreme temperatures, have seen surging demand. As an innovator in this field, Octopus New Energy faces the following critical challenges:

- Rapid Iteration Needs: Product designs require continuous optimization for different environments. Traditional mold manufacturing involves long cycles and high costs, unable to meet the need for fast prototyping and iteration.
- Large Part Manufacturing: Heat pump housings and internal large functional components exceed the build volume of standard desktop 3D printers, making one-piece printing impossible
- Functionality and Durability: Components must possess good mechanical strength, weather resistance, and even heat resistance to withstand harsh outdoor conditions.
- Cost Control: There is a pressing need to reduce the costs of prototyping and small-batch trial production without compromising quality, thereby improving the project's overall return on investment.

Octopus New Energy's Solution: Adoption of the CreatBot D600 Pro series industrial-grade FDM 3D printers.

To overcome these challenges, Octopus New Energy introduced the CreatBot D600 Pro series industrial-grade FDM 3D printers into its R&D center, aiming to establish autonomous, rapid, and flexible in-house rapid prototyping capabilities.
Key Reasons for Selecting the D600 Pro Series:

Large-format build volume – Capable of producing large EV components or batch-printing smaller parts.

Exceptional printing stability and precision – Ensures prototypes exhibit excellent assembly compatibility and reliability for functional testing.

Broad compatibility with engineering materials – This is a core advantage of the solution. The D600 Pro series can process a variety of high-performance engineering plastics to meet stringent requirements across different scenarios.

Significant cost efficiency – In-house printing reduces the cost per part to a fraction of traditional methods, enabling "print-on-demand" flexibility.

Post-processing capabilities – Printed models can undergo post-treatment processes such as sanding, painting, electroplating, and vapor smoothing to achieve surface quality and visual effects close to those of final products, meeting the needs of design reviews.

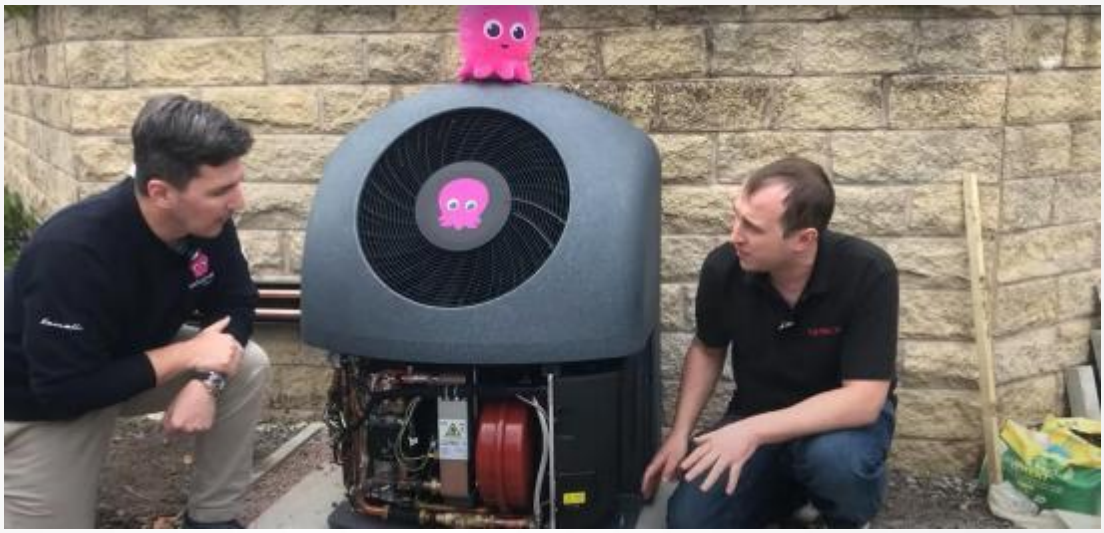
Heat pump mold printing process

Application implementation: from design to quasi-production

Octopus New Energy has deeply integrated the D600 Pro2 series printers into its heat pump product development and manufacturing processes:

- **Rapid Prototyping & Functional Testing:** Engineers use PC material to directly print structural components such as internal brackets and air ducts for heat pumps, conducting rigorous functional and durability tests. Design issues can be identified and modified within days, eliminating the need to wait weeks for traditionally machined parts.

- **Customized Tooling & Fixtures:** Leveraging the wear resistance of PA material, the company prints specialized assembly fixtures and inspection jigs for production lines. This not only shortens tooling preparation time but also enhances production efficiency through lightweight and customized advantages.



Heat pump function test and internal structure display

●End-Use Part Manufacturing and Post-Processing

For small-batch production of specific models or during transition periods, Octopus directly utilizes the D600 Pro2 to print heat pump housings and non-critical structural components. After printing, the parts undergo post-processing techniques such as sanding, sandblasting, and spraying/plating. The resulting surface quality and performance meet end-use requirements, achieving a "quasi-mass-production" application breakthrough.electroplating, ensuring both surface quality and performance meet final application requirements, achieving a leap in near-production application capabilities.

Heat pump near mass production

Results Summary: From cost center to innovation engine

By deploying the CreatBot D 600 Pro2, Octopus New Energy has achieved remarkable commercial and technological returns:

- 70% Reduction in R&D Cycle Time: The timeline from design to obtainable testable physical parts has been shortened from several weeks to just days, significantly accelerating the pace of product innovation.

- Substantial Manufacturing Cost Reduction: Prototyping and small-batch production costs have been reduced by up to 60% compared to traditional mold opening or outsourced CNC machining, saving substantial resources in the early stages of projects.

- Leap in Manufacturing Flexibility: Without relying on external supply chains, internal teams can quickly respond to design changes and achieve small-batch, customized part production, enhancing market competitiveness.

- Promotion of Sustainable Manufacturing: Additive manufacturing generates far less material waste than subtractive methods, aligning closely with Octopus's vision as a new energy enterprise.

Actual application scenarios of heat pump installation

Conclusions and perspectives

The Octopus New Energy case compellingly demonstrates that industrial-grade 3D printing technology has evolved beyond being merely a prototyping tool into a core production asset that spans the entire workflow from product development and trial production to end-use part manufacturing. The CreatBot D600 Pro2 series printers, with their robust hardware capabilities, extensive material compatibility, and exceptional cost-effectiveness, have successfully empowered industry leaders like Octopus to maintain both agility and innovative strength amid intense market competition.

Looking ahead, CreatBot will continue to deepen its collaboration with Octopus New Energy, exploring further applications such as carbon fiber-reinforced composites for higher-strength components, jointly advancing the digital transformation of manufacturing paradigms within the new energy sector.

18.From China to Europe: Sulzer's Digital Casting Leap

Sulshou: Manufacturing and supply of high precision mechanical equipment

Customer Background: Precision manufacturing challenges for industrial giants

Sulzer, founded in Switzerland in 1834, is a global leader in pumps, turbomachinery, and industrial fluid technology. Its Dalian facility specializes in precision casting of high-end pump bodies and hydraulic components, with products widely used in energy, chemical, and water treatment sectors. Facing intensifying global competition, Sulzer urgently needed to overcome the efficiency bottlenecks and design limitations of traditional casting methods.

In 2023, Sulzer's Dalian plant pioneered the adoption of the CreatBot D1000 large-format industrial 3D printer for PLA investment casting. After a year of rigorous production validation, the equipment demonstrated proven reliability, prompting Sulzer Pumps Finland Oy to procure two additional D1000 HS systems in 2024 to accelerate rapid iterative development at its European R&D center.

High-end pump body and hydraulic parts finished product pictures

Industry pain points: Traditional casting is slow, expensive, and rigid.

In precision pump body manufacturing, Sulzer faces three core challenges:

Production delays: The metal mold for the complex pump housing takes 4-6 weeks to make, delaying customer delivery;

High cost: the cost of small batch mold accounts for more than 40% of the total cost of parts;

Design constraints: Split molds cannot achieve innovative structures such as flow channel optimization, hollow weight reduction, and irregular cooling channels.

A 400 mm diameter impeller mold requires multiple steel molds to be assembled using traditional methods, resulting in a casting scrap rate as high as 30% 。 ”

——Su Ershou, Production Director, Dalian Plant

Solution: D1000 HS industrial-grade breakthrough

1. Ultra-large molding space: scarce resources in the industry

1000 × 1000 × 1000 mm³, the worlds leading dimensions, enables integrated printing of impellers, volutes and other oversized investment castings.

±0.2 mm dimensional accuracy, ensuring the casting assembly surface requires no

secondary machining;

High-precision linear guide + closed-loop synchronous drive, continuous printing for 500 hours without failure

2. Ultimate Reliability: The Founding Stone of the Foundry Workshop

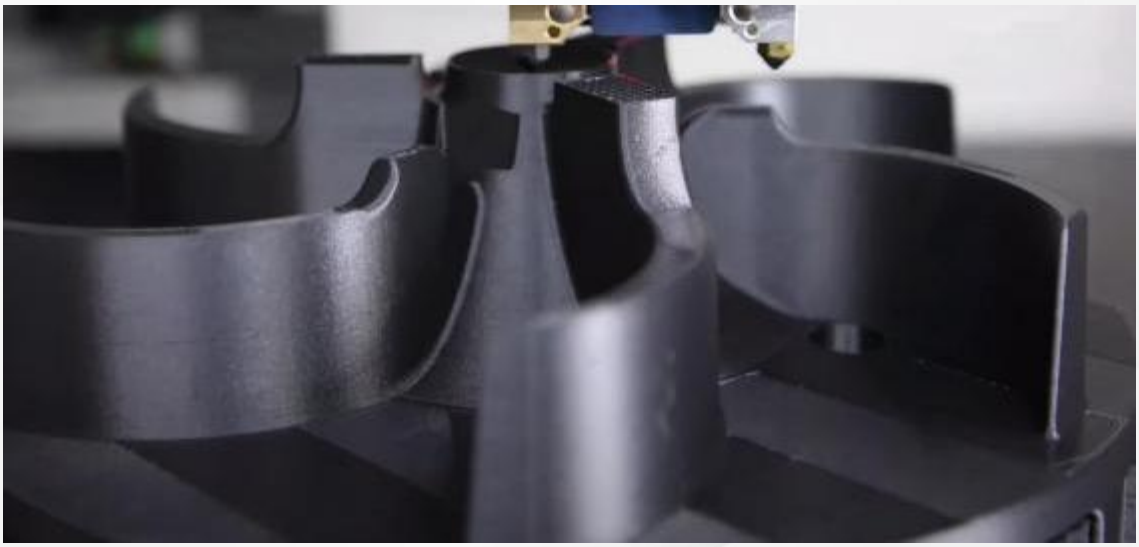
Certified with 1,000 hours Mean Time Between Failures (MTBF);

Practical records from Surshou Dalian factory:

✓ 27 consecutive days (648 hours) of uninterrupted production (except for consumable replacement);

✓ Over 5,000 hours of cumulative printing, with no replacement of key components.

3. Digital Casting Full Chain



CreatBot 3D Printing Pump Body Parts Process

Post-machining processing: 98% casting qualification rate.6%

Implementation process: Digital leap from Dalian to Finland

Phase 1: The Stability Test of Dalian Factory (2023-2024)

The first D 1000 undertook the task of nuclear-grade pump body fusion casting:

✓ Maximum single-piece size of 900 × 850 × 600 mm, setting an industry record;

✓ Compared with traditional steel mold: the cycle is compressed from 42 days to 10 days, and the cost is reduced by 76%.

Pour high-temperature alloy

Phase 2: Disruptive applications at the European R&D center

The Finnish team used the D 1000 HS to achieve:

✓ Closed-loop iteration of Ye Luns fluid simulation, printing, and testing accelerates by 5 times;

✓ The worlds first integrated hollow cooling channel impeller, pump efficiency increased by 32%.

Quantitative results: rewrite industry benchmarks

Metrics	Traditional handicraft	CreatBot Solution	Increase amount
Mold production cycle	35-48 days	5-8 days	80%↓
Single mold cost	$12,000	$1,800	87%↓
Maximum formable size	≤ 500 mm（fission）	1000 mm (one-piece)	100%↑
Cast surface accuracy	Ra 12.5	Ra6.3	50%↑

Customer Testimony: Trust Behind the Data

"What impressed us most about the D1000 HS is its stability—it successfully completed 9 marathon printing sessions each exceeding 200 hours, with dimensional deviations consistently controlled within ±0.5 mm, while significantly accelerating the production efficiency of customized parts."
— Manager, Advanced Manufacturing Department, Sulzer Dalian Plant

"The European team initially had reservations about the reliability of 'Made in China,' but the 5,000-hour operational record from the Dalian plant completely changed our perspective. These two systems have now become our 'strategic assets'."
— Technical Director, Sulzer Pumps Finland Oy R&D Center

19.Midual: Integrated Engine Manufacturing

Midual Motorcycle Precision Manufacturing

In the field of high-end metal craftsmanship, traditional mold manufacturing methods face constraints such as prolonged cycles, high costs, and design limitations. This case study provides an in-depth analysis of how metal art manufacturer Midual innovatively employed the CreatBot F430NX dual-independent nozzle 3D printer with PET-CF (carbon fiber-reinforced polyester) material, utilizing dual-color printing technology to integrally produce both the mold model and support structures for motorcycle engine sand casting in a single process. This approach successfully replaced traditional metal mold processing, which previously took months, achieving a seamless workflow from "digital file → printed mold → precision casting → metal finished product." Not only did this reduce the development cycle from several months to just a few days, but it also significantly enhanced design freedom, offering the metal casting industry an agile, cost-effective, and efficient new paradigm for digital production.

The dilemma: the pain of manufacturing behind the beauty of precision

Midual is dedicated to crafting top-tier metal motorcycle engine components with sculptural aesthetics. However, transforming intricate designs from blueprint to metal reality faced its first major bottleneck at the initial stage—manufacturing the casting mold:

- **Prohibitive Time Costs:** CNC machining of metal molds required several months per set, severely delaying product development and customization.
- **Cost-Effectiveness Stifling Innovation:** The high cost of molds made design iterations and small-batch trial production economically unviable, where any minor modification meant significant waste of prior investment.
- **Limited Geometric Complexity:** Traditional subtractive manufacturing struggled to achieve certain complex internal cavities and organic curved surfaces, restricting designers' creativity.
- **Challenges in Integral Forming:** Complex molds often needed segmented manufacturing and subsequent assembly, introducing errors and compromising the integrity of the final cast component.

Midual required a solution capable of rapidly and accurately generating high-strength molds, suitable for direct casting, straight from their digital models.

Breakthrough: Synergistic innovation of two-color printing and high-performance materials

Midual adopted the CreatBot F430NX, establishing an innovative digital mold manufacturing workflow that breaks from tradition.

Core Technology: CreatBot F430NX Industrial Dual-IDEX 3D Printer

- **Independent Dual Extruder (IDEX):** This system is the cornerstone of the innovation. With two print heads operating completely independently, it enables Midual to simultaneously print with two different materials—one for the casting pattern itself and another specifically dedicated to support structures.
- **Exceptional Printing Accuracy and Stability:** The F430NX ensures high dimensional precision and superior surface quality of the mold patterns, which is critical for obtaining dimensionally accurate final metal castings.

- **Industrial-Grade Robust Frame:** The printer maintains stability during prolonged printing of large, dense objects, guaranteeing the reliability of the final molds.

Core Material: PET-CF (Carbon Fiber Reinforced Polyester)

- **High Stiffness and Strength:** The infusion of carbon fiber provides the printed molds with sufficient mechanical strength to withstand the compaction and clamping pressures during the sand casting process, preventing deformation.

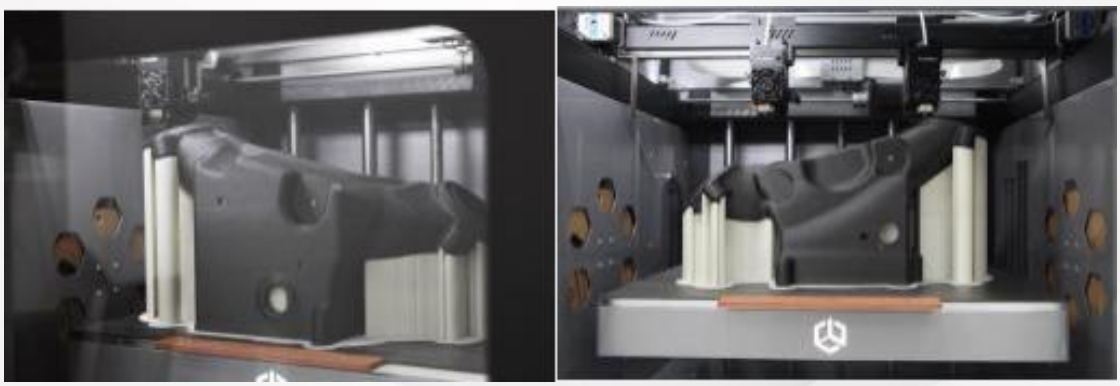
- **Excellent Dimensional Stability and Heat Resistance:** The material resists warping and shrinkage during printing, ensuring mold accuracy, and its heat resistance is adequate for the sand casting environment.

- **Smooth Surface Finish:** Printed patterns exhibit a smooth surface, contributing to higher-quality casting surfaces.

Revolutionary Process: Dual-Material Printing, Integrated Pattern and Support
Leveraging the IDEX system, Midual uses PET-CF for the main pattern and a second, easily removable or dissolvable material (such as water-soluble support or another easily separable polymer) for all support structures. This enables:

- **Non-destructive Support Removal:** After printing, support structures can be easily and completely removed without damaging the complex surface of the mold pattern.

- **Maximum Efficiency:** The pattern and its supports are printed in a single, automated process, eliminating the need for manual support application.



Motorcycle engine mold printing process

Journey: From digital bits to metal souls

Implementation process:

1. Digital Modeling: The designer completes the 3D model of the engine component in modeling software.

2. Automated Slicing: In slicing software, two materials are assigned for the F430NX: PET-CF for the pattern itself, and a dedicated support material for all overhanging structures.

3. Integrated Printing: The F430NX initiates printing, synchronously and precisely manufacturing the high-strength PET-CF mold pattern along with its perfectly matched support structures in a single print job.

4. Streamlined Post-Processing & Casting: The support material is removed, revealing the complete mold pattern. This pattern is then used for traditional sand mold preparation, followed by investment casting to produce the final metal engine component.

Engine model finished product display

Value realization:

- Lead Time Reduced by Over 90%: Mold manufacturing time was slashed from "months" to "days," enabling "light-speed" iteration in product development.
- Maximized Cost-Effectiveness: By avoiding expensive CNC machining and material waste, the cost per trial was dramatically reduced, making small-batch customization and rapid market validation feasible.
- Unprecedented Design Freedom: Any digitally designed complex shape can be accurately printed as a mold, allowing designers to focus on the perfect integration of aesthetics and functionality without being constrained by "manufacturability."
- Uncompromised Precision & Quality: The high accuracy and smooth surface finish of the printed molds directly translate into final metal castings with superior dimensional compliance and excellent initial surface quality.

Engine component practical application cases

Insight: Digital chain drives manufacturing revolution

Midual's practice signifies that 3D printing has evolved beyond auxiliary prototyping to deeply penetrate the core manufacturing环节 of tooling (molds). It has successfully transformed the traditional, linear "design → mold making → casting" process into a highly flexible, digital closed-loop. This hybrid manufacturing model of "printing molds, casting metal" charts a clear path toward agility, digitalization, and customization for the traditional casting and metalworking industries currently facing transformation pressures.

Look forward to the future

The successful collaboration between CreatBot F430 NX and Midual is but one microcosm of the smart manufacturing wave. As materials science continues to advance and printing technologies become increasingly refined, additive manufacturing is poised to transition from "replacing" to "leading" across more traditional industrial sectors. CreatBot remains committed to empowering innovators like Midual, providing reliable industrial-grade solutions to break constraints and transform cutting-edge ideas into tangible reality.

20. IVM Vending Machines Customized Small-Batch Production

IVM leverages CreatBot 3D printing to revolutionize customized vending machine solutions

Abstract

Amidst the diversification of retail formats and the fragmentation of consumer scenarios, the vending machine industry faces unprecedented challenges in meeting customized demands. IVM Vending Machines has successfully overcome the constraints of traditional manufacturing in terms of cost, lead time, and design freedom by introducing the CreatBot D600 Pro2 HS industrial-grade 3D printers and establishing a flexible manufacturing system. This case study delves into how IVM leverages additive manufacturing technology to achieve small-batch customized production of large vending machines, offering an innovative model for the digital transformation of retail equipment manufacturing.

Smart vending solutions

Industry pain point: the fierce collision between standardized production and customized demand

As vending machines expand their applications from public spaces to specialized environments such as corporate campuses, medical facilities, and transportation hubs, traditional manufacturing models have revealed three core challenges:

- **Economic Constraints:** Mold development costs account for 40%-60% of the total expense for small-batch orders.
- **Delivery Timeline Pressure:** The process from design finalization to product delivery takes 12-16 weeks, often causing missed market opportunities.
- **Innovation Bottlenecks:** Complex functional structures are limited by traditional processing techniques, making design iterations prohibitively expensive.

The primary challenge for IVM lies in meeting customers' personalized requirements for equipment specifications, functional modules, and aesthetic designs without compromising economic viability.

The Breakthrough Strategy: Building a Flexible Manufacturing Core with the CreatBot D600 P ro2 HS

IVM choice of the CreatBot industrial-grade 3D printing solution has revolutionized production systems through three dimensions:

2.1 Core Advantages of the Equipment

- Large-Format Integrated Printing: With build volumes of 1000×1000×1000mm and 600×600×600mm, it enables monolithic production of large panels and structural components.
- High-temperature material compatibility: Supports engineering materials such as PET-CF and UltraPA-CF, ensuring mechanical properties and environmental durability of components.
- Dual-nozzle precision system: Perfectly presents complex internal structures

IVMs 3D printing factory

2.2 Innovative production model

IVM has established an agile process of "digital design, rapid printing, and precise verification":

- Customer customization requests are converted into printable 3D models within 48 hours
- The structural components printed with PET-CF material demonstrate strength comparable to traditional injection-molded parts.
- Special functional components (such as integrated cooling ducts and cable management systems) enable integrated manufacturing

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Effectiveness shows: the transition from "scale economy" to "scope economy"

1.**Breakthrough in economic benefits**

✓ The unit cost of small batch orders is reduced by 45%

✓ The product development cycle was reduced from 16 weeks to 4 weeks

✓ Inventory costs decreased by 30% and achieved true on-demand production

2.**Product innovation achievements**

- ✓ Successfully developed a medical drug vending machine with integrated temperature control module and secure medication dispensing system
- ✓ Develop AI-powered interactive vending machines for tech companies, enabling integrated design of complex sensor layouts
- ✓ The lightweight structure reduces the weight of the equipment by 25% and significantly reduces the cost of transportation and installation

3.**Quality improvement performance**

- ✓ 3D-printed structural components demonstrated excellent performance in durability tests, with a 30% reduction in failure rates.
- ✓ Material consistency ensures that each batch of products maintains the same quality standards
- ✓ The rapid iteration mechanism allows design defects to be found and resolved early in product development

3D printer vending case

Strategic implications: Digital manufacturing reshapes industry competitiveness

IVM case studies demonstrate that 3D printing technology is not merely a manufacturing process, but a core driver of corporate strategic transformation.

1. Supply chain restructuring

Establish a distributed manufacturing network, and allocate some production tasks to regional service centers to realize local rapid response.

2. Innovation in business models

Upgrade from device manufacturer to solution provider and gain premium space through rapid customization capabilities.

3. Build a technical ecosystem

Integrate 3D printing with IoT and big data analytics to build an intelligent sales ecosystem.

Future expectations

With the continuous progress of materials science and printing technology, the application of additive manufacturing in the field of retail equipment will be expanded to a deeper level:

- ✓ Multi-functional integrated printing enables more complex mechatronic structures
- ✓ Sustainable materials drive the green transformation of the industry
- ✓ AI-driven generative design further optimizes component performance

IVM plans to achieve 85% 3D-printed components in its next-generation products, ultimately building a fully digital manufacturing system.
Flexible production system.

Conclusion

CreatBot: Building the Foundation of Industrial Innovation with Additive Manufacturing

In summary, the case studies across various industries presented in this whitepaper collectively illustrate a clear trend: additive manufacturing has evolved into a mature digital production technology, with its value quantitatively demonstrated in real-world industrial applications through three core dimensions — cost reduction, innovation, and agility.

From high-performance components in aerospace to customized solutions in healthcare, and from rapid iteration to tooling optimization in automotive manufacturing, CreatBot equipment serves as a highly flexible and reliable tool for on-demand production. It simplifies assembly and supply chain complexity by transforming intricate designs into integrated, ready-to-use parts. It accelerates time-to-market by enabling rapid prototyping and small-batch production. And by eliminating geometric constraints, it opens new pathways for structural optimization and functional integration.

CreatBot is committed to delivering high-precision, high-stability 3D printing equipment and solutions that meet industrial-grade requirements. Our focus is on seamlessly integrating this technological tool into users' R&D and production workflows, ensuring consistent and predictable manufacturing outcomes.

Looking ahead, as material science continues to advance and process control becomes increasingly refined, the depth and breadth of additive manufacturing applications will expand further. SpeedTech will continue to refine equipment performance and explore new technological applications, aiming to establish CreatBot as the preferred solution for industries facing challenges in customization, lightweight design, and efficient production — providing a practical and innovative technological pathway for sustained industrial advancement and value creation.

CreatBot

Case Study Inside

Scan to read the full story