CREAT3D
ADDITIVE MANUFACTURING SOLUTIONS PROVIDER

PAKT3D

CREAT3D CASE STUDY

FROM DESIGN TO MANUFACTURE OF END USE PART IN UNDER 10 HOURS

WITH 3D PRINTED MOULD TOOLS

PAKT3D, a new generation print and engineering bureau, are providing high-speed Additive Manufacturing services with Nexa3D technologies

> MEET PAKT3D

PAKT3D is a new generation service and engineering bureau, providing ultra-high-speed Additive Manufacturing to Automotive, Motorsport, Fitness, Medical, Aerospace and Marine sectors.

PAKT3D specialise in helping businesses improve quality, reduce lead-times and ultimately cut costs for development and production parts. Using advanced Nexa3D NXE400 ultrafast 3D printing technology, PAKT3D offers production volumes of parts, as well as prototypes, and the ability to print composite and injection mould tools.

Peter Kent

Director

With over 20 years experience of Additive Technologies and Engineering, the team at PAKT3D are passionate about using revolutionary high-speed technologies to solve traditional engineering problems, through rapid manufacturing.

"The quality of parts that we can produce in a matter of minutes is incredible. Now using the Nexa3D technology, you don't have to trade-off between quality, speed or margin. Now it's possible to benefit from rapid manufacturing, at low cost."

> CHALLENGE

Long lead times, low quality and costly. These are often the problems faced by engineering, design and manufacturing firms in producing components, mould tools, tooling and prototypes. In particular, recent experiences of issues in supply chains have triggered companies to look at new ways to manufacture.

> SOLUTION

High-speed Additive Manufacturing through the integration of the Nexa3D NXE400 Ultrafast Industrial 3D Printer.

Through ongoing support and consultation from CREAT3D (Additive Manufacturing Solutions Provider), PAKT3D have invested in the NXE400 Ultrafast 3D printer installed at their design and manufacturing site in Surrey.

PAKT3D print parts and tools within hours helping their clients to substantially reduce lead times and ultimately costs.

> RESULTS

"Look at the quality of parts we can produce in a matter of minutes or hours." highlights Peter Kent, Director.

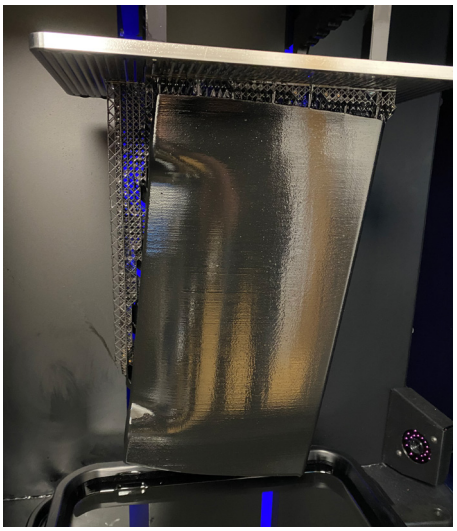
PAKT3D have been using Nexa3D's technology to produce

> Fast turnaround prototypes

> Mould tooling

> End components

The speed of PAKT3D's Additive Manufacturing capabilities means that parts can be produced in a matter of hours, essential for where immediate design feedback is required, or the product needs to get to market fast.



Automotive Interior Moulding.
Print time under 6 hours

> APPLICATION FOCUS
– 3D PRINTED MOULD TOOL

ARBR Bikes is a UK specialist manufacturer of handcrafted performance bicycles. Focused on pushing the boundaries of performance design, ARBR achieve critical design features with cutting-edge carbon fibre materials and manufacturing techniques.

To produce the bottom downtube component bracket, ARBR previously used an Ultem mould tool. The tool however, was costly to produce, on two-day lead time, but moreover, the Ultem meant that the surface finish was poor on the finished carbon fibre part, which required intensive hand-finishing, racking up manual labour hours and costs.

Lacking the quality required, ARBR engaged with PAKT3D to 3D print the mould tool. Fast turnaround times for composite parts have always been challenging for industry and are mainly due to mould tool machining and laminating times, so ARBR challenged PAKT3D to produce a same-day, robust tool.

> 3D Printed Tool – Fast, Minimal Post Processing

THE RESULT? Less than 10 hours to go from design to end part

PAKT3D took ARBR's original mould tool design and made some adjustments to the design, with a focus on achieving excellent surface finish for the finished part. The main adjustments included embedding channels to allow the flow of resin, but these had no impact on the final part.

After just a few hours of redesign, the mould tool was then 3D printed in xCE Black resin on the Nexa3D NXE400. xCE is a high performance single cure polymer material. The resin formulation delivers higher flexural strength that is typically achieved only in dual cyanate ester resins. With excellent isotropic properties and long-term environmental stability, the material is well suited to mould tools.

The 340mm long tool took just 6 hours to print

INSIDER KNOWLEDGE

The same part, printed on an FFF 3D printer would take more than 5 days to print.

"The surface finish of the printed tool is so impressive from the outset, that it required less than 10 minutes preparation before the tool heading off to the laminating clean room" highlights Peter Kent.

Once printed, carbon fibre was laminated in the tool and cured at 120ºC through an autoclave manufacturing process to produce the final component.

Robert Barr, Founder of ARBR Bikes adds "We were amazed at the speed and quality of the parts produced, and will now be working closely with PAKT3D to produce more components for our state-of-the-art bike"

BOTTOM DOWNTUBE GUARD COMPONENT & 3D PRINTED MOULD TOOL

COMPONENT USE

Mould tool to produce downtube guide for use on ARBR bike

TRADITIONAL MANUFACTURE

Tool is traditionally manufactured in Ultem, at high cost, with a 2 day lead time

PROBLEM

Ultem mould tool lacks quality, with poor surface finish and a long lead time. Furthermore, high levels of post processing are required to finish the part to a sufficient quality before use

OUTCOME OF USING ADDITIVE

> Huge step change in part quality resulting in only 10 minutes of trimming required
> Overall time from design to manufacture < 10 hours
> Mould tool 3D printed on the Nexa3D NXE400 in xCE Black in under 6 hours
> Cost saving 30% against traditional Ultem tool

PAKT3D component and original component from the Ultem mould tool

> ADDING FURTHER APPLICATIONS

ARBR Bikes have been impressed with both the speed and quality of 3D printed parts produced on the Nexa3D NXE400, so much so that further applications and components are now 3D printed.

Components such as chain guides and rear swing arm chain stay protectors are now 3D printed in an ABS-like material, instead of being injection moulded.

> SAVING COSTS, PRODUCING FASTER

Irrespective of industry, the key benefits of ultrafast Additive are demonstrated in the excellent cost savings and the huge jumps in speed of production, typically a matter of hours!

Applications have expanded from mould tools to 3D printed patterns, as well as end use parts and components, including casings, electrical enclosures, wind tunnel models and tools. More extensive geometry can be achieved through 3D printing than traditional manufacturing, plus there are no chunky costs for tooling.

For businesses in Motorsport and Automotive, development and testing schedules are usually under severe time pressures, but with ultrafast 3D printing, the speed of getting prototypes and parts in time for testing has revolutionised how fast companies can design, develop and manufacture.

We asked PAKT3D, what would life be like without Nexa3D 3D printers?

"Slow!" explains Peter, Director, "With high-speed Additive Manufacturing, we can help companies save costs, and get to production quicker".

"Our one tip is to talk to us before you turn to old habits!" explains Alun Tribe, Director. "We can help you redesign and manufacture faster and better, but we need to be involved earlier in your design and production processes to truly benefit from this highly effective technology."

"Fast Additive has become an alternative manufacturing method for one to a few thousand parts and companies are able to exploit the advantages that this technology brings", concludes Alun.

> FIND OUT MORE

CREAT3D Ltd
Additive Manufacturing Solutions Provider

CREAT3D offer Additive Manufacturing end-to-end solutions including: business consultation, independent buying advice, provision of 3D printers and related equipment, tailored training packages, ongoing technical support, servicing and maintenance, repair & business continuity programmes.

520 Eskdale Road, Winnersh Triangle,
Wokingham, Berkshire, RG41 5TU

T: 0800 689 1011 | E: info@creat3d.co.uk

W: creat3d.solutions

LinkedIn: /company/creat3d-ltd
Twitter: @CREAT3Dprinters

PAKT3D

PAKT3D, Ultra High Speed 3D Printing Services

PAKT3D specialise in next generation high speed Additive Manufacturing (AM) enabling you to go from CAD to high quality parts in just hours or even minutes. Whether you are looking for prototype parts to validate a design, or 100s to 1000s of parts for a production run, PAKT3D can help.

Haselmere, Surrey

E: info@pakt3d.com

T: 07973 967446

W: www.pakt3d.com

Linkedin: linkedin.com/company/pakt3d-ltd/

nexa3D