

A hand is holding a white 3D printed finger. In the background, a 3D printer nozzle is visible, suggesting the manufacturing process. The scene is lit with a cool blue light.

**RICOH**  
imagine. change.

Unlock the  
potential of  
3D printing.

**Design  
Prototype  
Production**

[rapidfab.ricoh-europe.com](http://rapidfab.ricoh-europe.com)

# Adding more to Additive Manufacturing.

## Why choose Ricoh?

- 80 years' experience in ISO-certified manufacturing
- All-star team of design engineers, technical specialists and material scientists
- Customisable manufacturing solutions, from one to one million parts
- End-to-end service; from design to prototype to full production
- State-of-the-art facilities and equipment
- Global reach, with touchpoints across Europe and Asia



## Why choose 3D printing?

- Optimise the size, weight and functionality of your parts
- Produce complex geometries
- Product development cycle reduction, with rapid prototype iterations
- Streamlined production process, with on-demand printing
- Mass customisation
- Cost effective pricing structure
- Eliminate or reduce tooling costs
- Range of high performance materials
- Sustainable manufacturing method

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# Your partner in sustainability.

Our approach to sustainability touches every part of the company; from manufacturing to distribution, business sites to recycling and how we support our customers. As part of our global environmental goals, we have committed to using a minimum of 30% renewable energy by 2030 and 100% by 2050. We have also committed to reducing the use of new resources by 50% in 2030 and 93% in 2050. Our AM materials fall under the global Ricoh Green Procurement Standard which means you can be assured that when you work with Ricoh we're supporting you in reducing your environmental footprint.


Our supply chain documentation attests to non-use of substances contained in major laws and regulations including:

- EU REACH (Annex 17 restrictions)
- EU RoHS directive
- EU POP's (Persistent Organic Pollutants)
- Norwegian Act (PFOA - Perfluorooctanoic acid)
- Blue Angel Std (Halogenated polymers and halogenated organic compounds)

## Using our service couldn't be easier.

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“Ricoh have helped us discover what a 3D-printed design can really do. With the help of Ricoh’s engineering team we have succeeded in creating one of the world’s first production high performance 3D-printed products.”

Steve Rix, Future Engineering Developments Ltd.

# Building innovation.

## Core technologies

Selective Laser Sintering (SLS)

High Speed Sintering (HSS) / HP Multi Jet Fusion (MJF)

Fused Deposition Modelling (FDM)

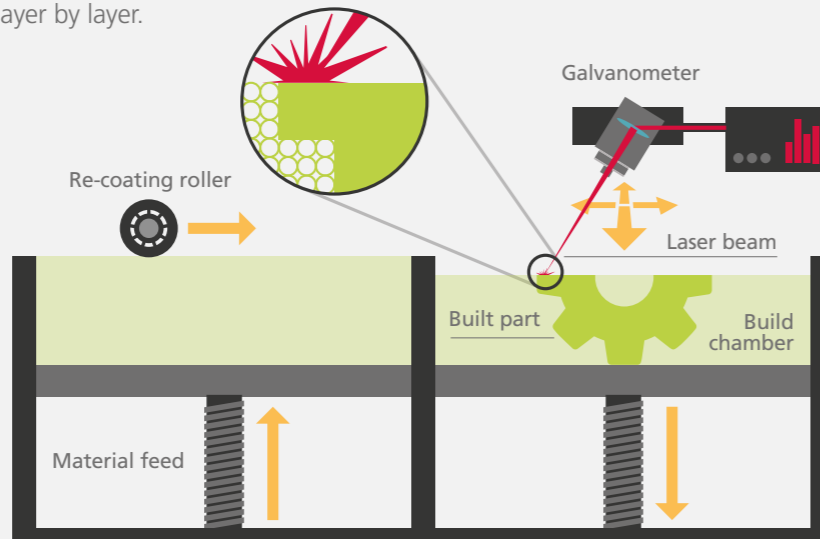
Injection Moulding

# Precision printing.

Looking to create complex geometrical designs? With exceptional speed? And without the need for costly moulds? Then look no further than Selective Laser Sintering (SLS). SLS enables you to produce highly accurate and functional end-use parts with minimal manufacturing waste.

## How does SLS work?

Polymer powder is sintered together using a laser. Each particle is fused together to create a solid structure. The 3D object is then built layer by layer.



## Why use SLS?

- Speed, precision and durability
- Shorter development cycle as parts can be produced and redesigned quickly
- No tooling cost
- Comparable properties to injection moulded components
- Large component manufacture
- Support material not required
- Thermoplastic materials for end-use applications
- Unsintered material can be recycled making the process more cost-effective and environmentally friendly
- Ability to manufacture multiple parts in one production cycle

## Key SLS applications

- Functional end-use parts
- Manufacturing production volumes
- Prototyping
- Jigs
- Tooling



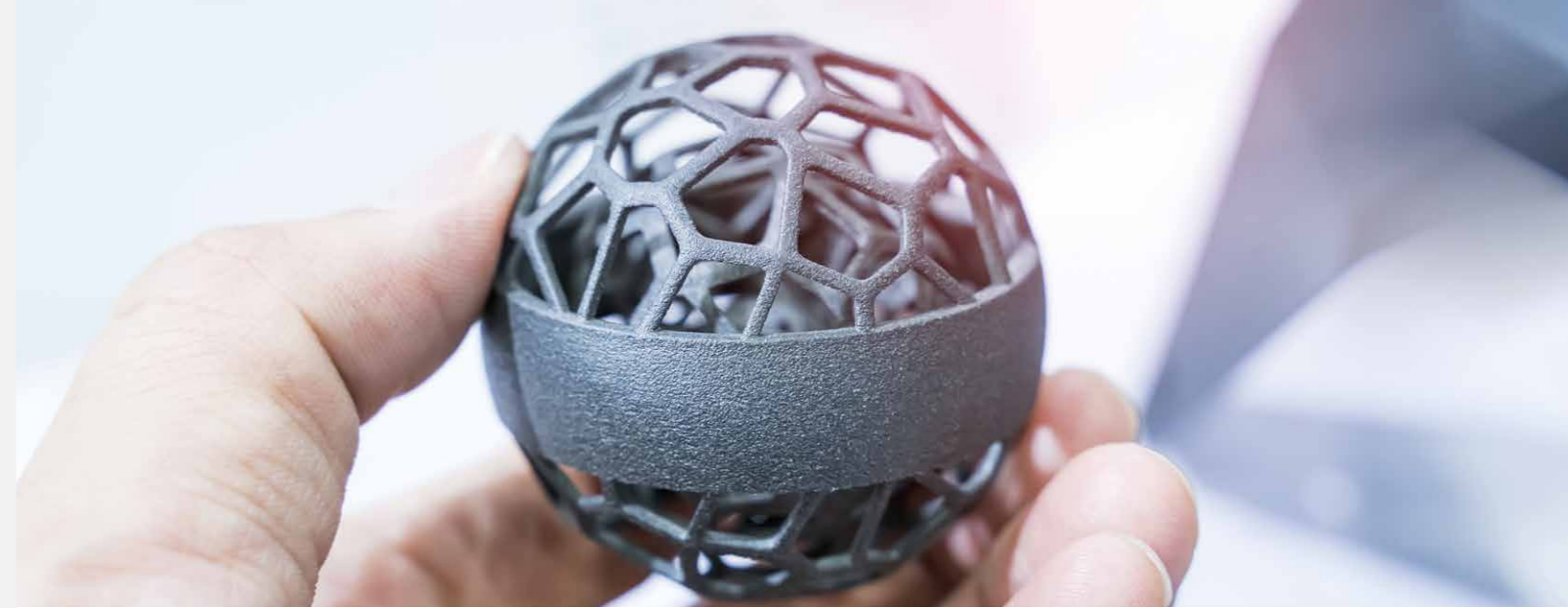
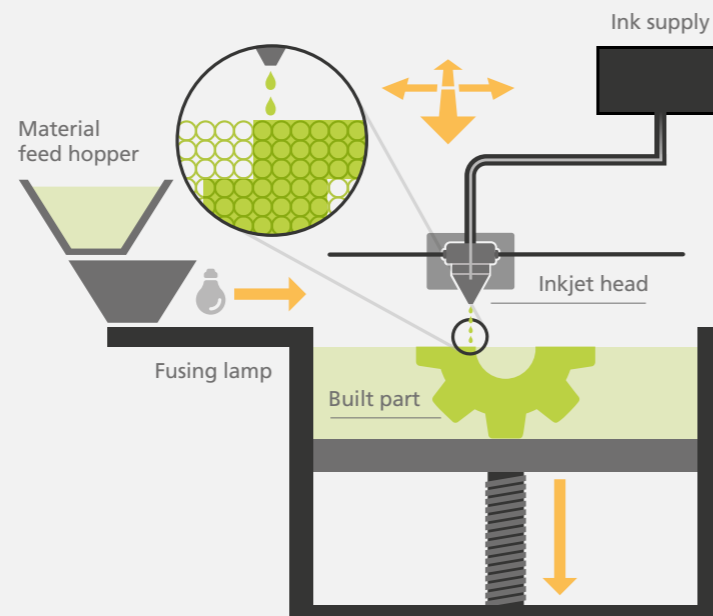
# Layers without lasers.

Faster parts cooling. Cleaner unpacking. Easier job preparation.

The benefits of High Speed Sintering (HSS) quickly add up. Fitting really, as the process is up to 100 times faster than other 3D printing processes, which is why it's ideally suited to the manufacturing of high volume parts.

## How does HSS work?

HSS and MJF uses cutting-edge technology to combine the process of binder jetting with the material offerings of SLS printing. An ink jet head applies a heat-absorbent ink across the powder bed surface in the areas that are to be sintered to create parts. This ink then absorbs the heat from a series of heaters inside the printer to form 3D-printed parts.



## Why use HSS/MJF?

- Up to 100 times faster than other 3D printing processes
- Removal of support material is not required
- No tooling required
- Freedom to rebuild on demand
- Removal of support material is not required
- Better dimensional accuracy
- Enhanced isotropic mechanical properties

## Key HSS/MJF applications

- Functional end-use parts
- High-volume manufacturing
- Prototyping



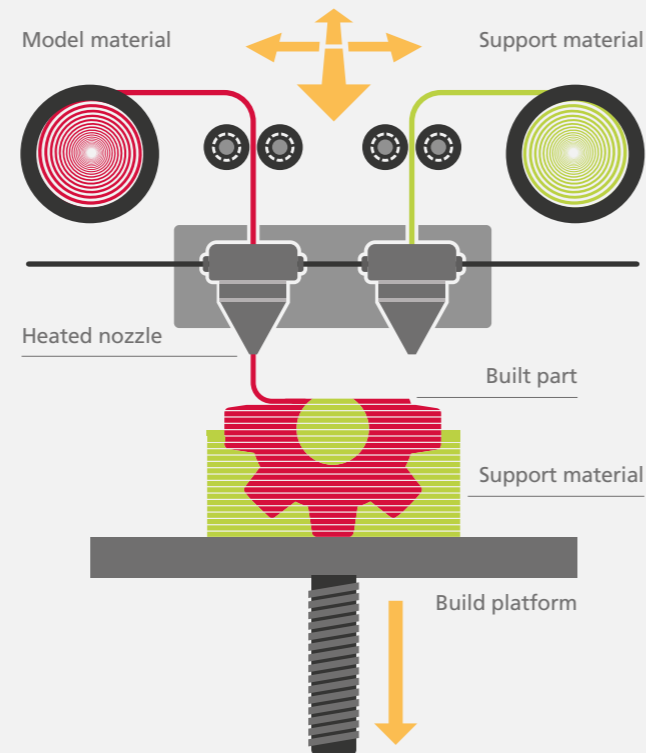


# Proven production.

Widely considered the simplest method of 3D printing, Fused Deposition Modelling (FDM), with its wide range of materials and colours is perfectly suited to end-use applications.

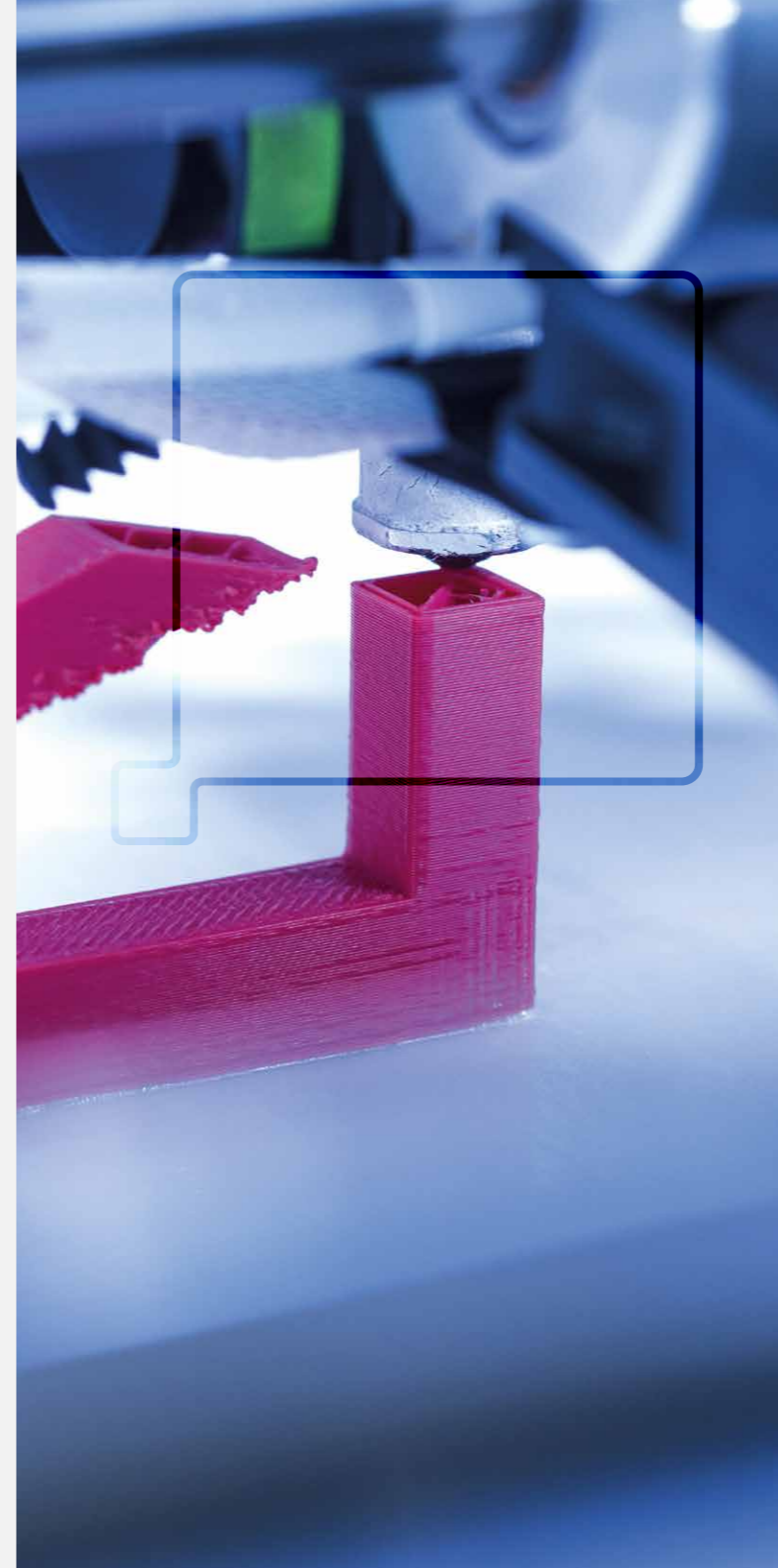
## How does FDM work?

FDM constructs parts by extruding polymer through a heated nozzle and depositing the melted material layer by layer.



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## Why use FDM?

- Highly cost-effective production process
- Ability to pause build to embed parts into the print e.g. metal inserts
- Internal 'honeycomb' structures can be created to reduce part weight
- Requires minimal post-processing
- Wide range of materials and colours
- Certified materials for aerospace, medical and food contact applications

## Key FDM applications

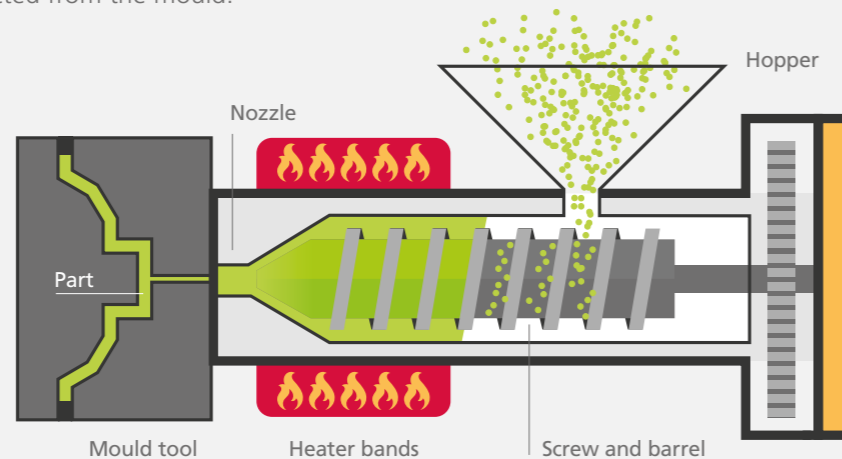
- Prototyping
- Tool inserts
- Jigs
- End-use parts

# Consistent excellence.

For almost 150 years injection moulding has been used to quickly create parts with effortless repeatability and high precision. By combining our print expertise, fast 3D-printed tooling methods and extensive knowledge of moulding services we're able to offer injection moulding solutions with the speed and accuracy demanded by your industry.

## How does injection moulding work?

This process involves injecting melted polymer into a mould cavity. The malleable polymer fills and solidifies to create large numbers of parts, which are then carefully ejected from the mould.



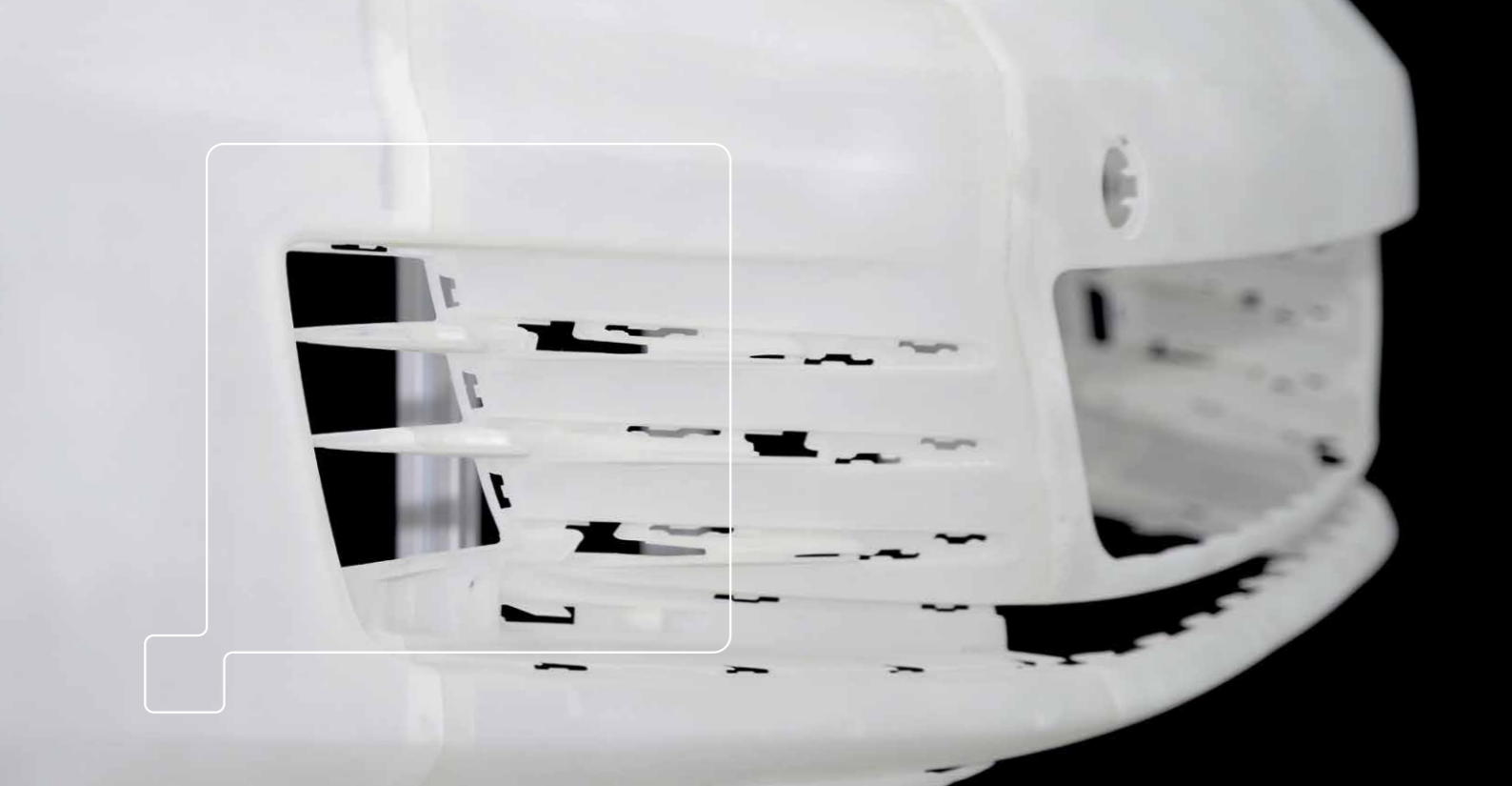
## Why use injection moulding?

- Fast production
- Excellent repeatability
- Extensive range of materials and colours
- Low part cost
- Reduced waste
- Scalable production options

## Key injection moulding applications

- Functional end-use parts
- Low to high volume manufacturing
- Packaging





# Strength in numbers.

## Core materials

Selective Laser Sintering (SLS)	Fused Deposition Modelling (FDM)
PA6	ASA
PA6GB	ABS-ESD7 / ABS-M30 / ABS-M30i
PA12	NYLON 12 / NYLON 12 CF
PP	PC / PC-ISO / PC-ABS
High Speed Sintering / Multi Jet Fusion	ULTEM 9085 / ULTEM 1010
PA12	
PP	

“Ricoh is the only additive manufacturer that offers advanced Polypropylene material and specific SLS technologies with a full service. They are the only provider to be offering a complete end-to-end solution for this material.”

Dr. Manfred Schmid, Inspire AG

We specialise in unique materials geared towards end-use manufacturing applications. Our vast range of materials offer flexibility, strength, durability and high heat resistance.

## Materials

### Selective Laser Sintering (SLS)

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## Unlocking layers of invention.

Whether you're looking for flexibility or high heat resistance, our specialist range of engineering-grade materials, combined with the speed and precision of SLS, are suited to a wide range of applications. Our SLS materials include:

- PP (Polypropylene): lightweight, flexible, chemical resistant and WRAS-approved - unique to Ricoh
- PA6: high heat resistance
- PA6GB (Nylon 6 with glass beads): high heat and impact resistance
- PA12: a general use material with balanced mechanical properties

## Materials

### High Speed Sintering (HSS) / Multi Jet Fusion (MJF)

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## Form meets function.

High Speed Sintering and Multi Jet Fusion technologies are particularly suited to applications where speed and volume are critical. These processes combine with materials that offer good dimensional stability with balanced mechanical properties or flexibility. Our materials include:

- PP (lightweight, flexible and chemical resistant)
- PA12 (Nylon 12 – general purpose)



## Materials

### Fused Deposition Modelling (FDM)

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## Quick thinking, fast design.

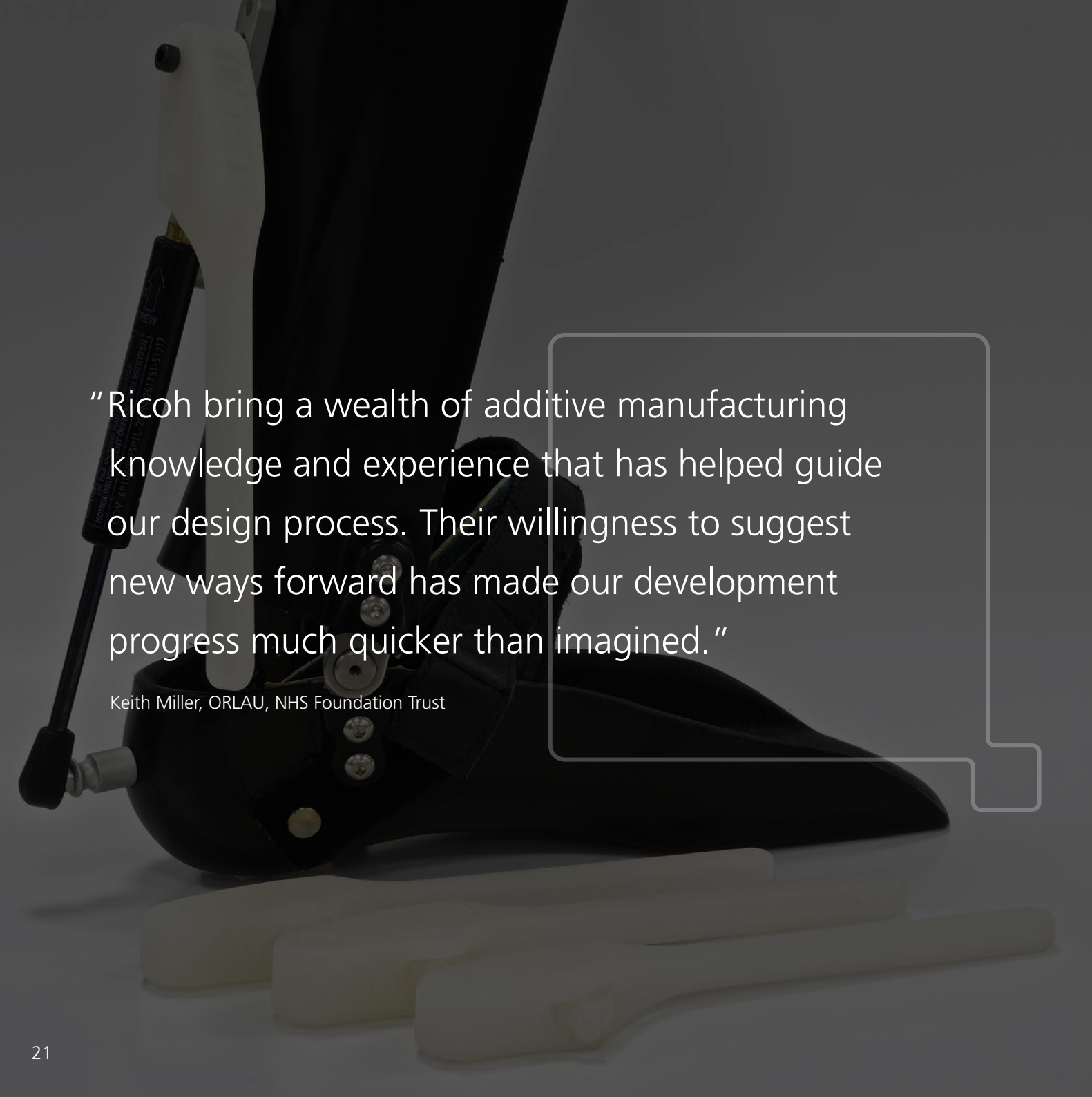
FDM's wide range of materials with certifications make it well suited to all applications, from prototype to production. Our range includes:

- ABS-ESD7: general purpose electrostatic dissipative
- ABS-M30: general purpose
- ABS-M30i: general purpose biocompatible and compliant with ISO 10993
- ASA: general purpose weather resistant
- Nylon 12: weather resistant and tough
- Nylon 12 CF: carbon-filled and structurally strong
- PC: heat resistant
- PC-ABS: impact-resistant
- PC-ISO: heat and chemical resistance, compliant with ISO 10993 USP Class VI
- ULTEM 1010: biocompatible and chemical-resistant. General and certified grade available
- ULTEM 9085: FST rated, heat and chemical resistant



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“Ricoh bring a wealth of additive manufacturing knowledge and experience that has helped guide our design process. Their willingness to suggest new ways forward has made our development progress much quicker than imagined.”

Keith Miller, ORLAU, NHS Foundation Trust

# A true end-to-end service.



3D Printing Consultancy

Post-Processing Solutions

Metrology Services

Materials Testing Services





## 3D Printing Consultancy

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# Collaboration is key.

We can offer consultancy to aid with your design and manufacturing processes, enabling you to unlock the potential of additive manufacturing. Every customer is different, so we offer a truly tailored consultancy service either at our state-of-the-art AM centre or your facilities. Our team based across Europe can be at your side to guide you through every aspect of the design and manufacturing process.

## Post-processing Solutions

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# Smother surfaces and striking finishes.

Our post-processing services include:

### **Adhesion**

By dividing a model, building and then bonding together we're able to create large products.

### **Smoothing**

Using an automated process we're able to smooth parts to greatly enhance the surface finish.

### **Dyeing**

Thanks to our automated process we're able to dye our SLS, HSS and MJF parts black, including Polypropylene.

### **Painting**

Take your parts to the next level with our painting service to achieve a striking visual finish.

# Quality that measures up.

We offer a range of contact and non-contact metrology services upon request, enabling us to provide measurement reports for all 3D printed parts. Catering from 1 to 1 million parts, we can adapt to your requirements. These services include:

- Coordinate Measuring Machine (CMM)
- 3D Laser Scanning
- Vision Systems



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# Tried, tested, trusted.

Our materials testing services include:

## **Differential Scanning Calorimetry (DSC)**

Our DSC technology measures the temperatures and heat flows associated with a material's thermal transitions. This enables you to accurately characterise the melting and crystallisation transitions of your materials, in turn improving reliability and reproducibility.

## **Powder Flowability**

Being able to accurately identify powder properties is key to achieving a uniform, repeatable performance. Our Freeman Technologies FT4 Powder Rheometer® can measure dynamic flow properties, as well as bulk properties including compressibility, permeability and density.

## **Particle Size Distribution**

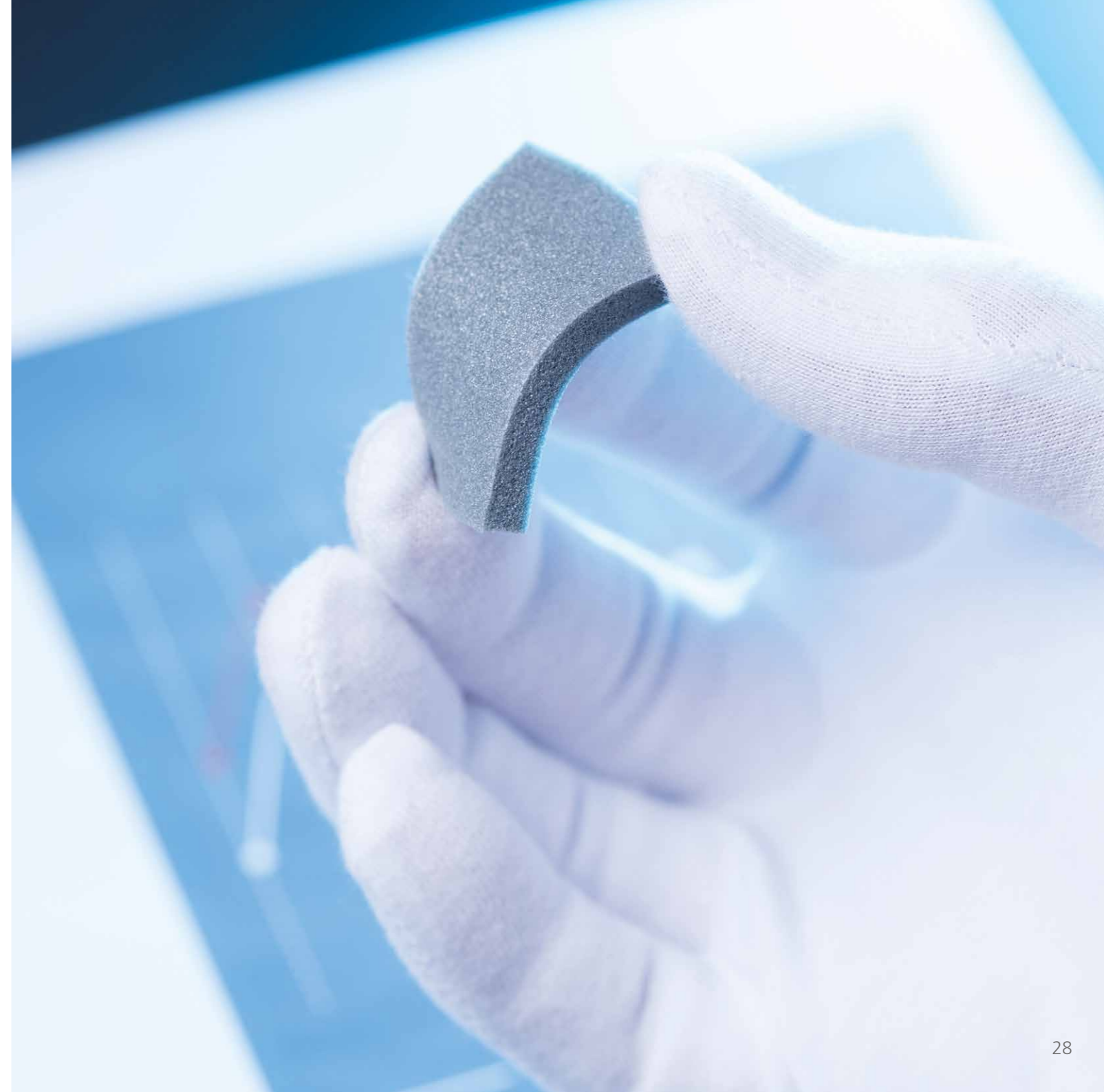
We can quickly measure the particle size distribution of any powder with our Mastersizer 2000 Analyser. This highly intelligent machine uses laser diffraction technology to provide a continuous measurement for analysing process streams.

## **Melt Flow Rate**

Our Tinius Olsen MP1200 Melt Flow Index Analyser measures the rate of thermoplastic extrusion through an orifice at a prescribed temperature and load, enabling you to accurately record the flow of a melted material.

## **Print Test**

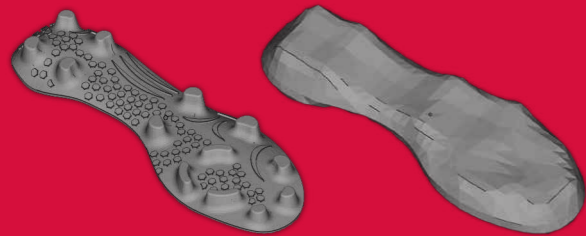
Using our desktop Selective Laser Sintering printer our team can assist you in evaluating the suitability and performance of new polymer powders.



# The value of efficiency.

## Looking at volume manufacturing?

We understand every project requirement is different; that sometimes a single part will suffice, while other times ten thousand may be needed. You'll find we're perfectly set up for all scenarios, with competitive discounts for series production or repeat components. Simply contact us to discuss your requirements.



## How our quoting works.

To calculate part prices we take into consideration both the XYZ bounding box size and actual volume of material used. This quoting method means parts are priced based on the amount of material and waste powder used, along with the volume of space occupied within the machine build volume. Simply put, this means we do not penalise you for parts that have a large XYZ volume but a low physical volume.

To calculate the material price we apply a theoretical shrinkwrap to the parts. By comparing this shrinkwrap volume to the XYZ volume we're able to see if the unused material can be used for other parts, giving you the best price based on the material you use. If the unused volume within a design cannot be utilised by another part (i.e we cannot remove it) then the XYZ volume will be considered within the pricing.

Ask a member of our team for more information.

# Working the right way, right away.

Our key accreditations include:

- ISO 9001
- ISO 14001
- ISO 27001
- ISO 10993: USP Class VI (ULTEM 1010 and PC 150 FDM materials)
- BS OHSAS 18001
- WRAS (Polypropylene material)
- FST Certified (Flame-Smoke-Toxicity resistant: ULTEM 9085 materials)
- NSF-51 (Certified for food contact: ULTEM 1010 and PC ISO FDM materials)



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