DMC
DIGITAL
MANUFACTURING
CENTRE

Complex challenges – engineered solutions – additive production

THE FUTURE OF MANUFACTURING IS HERE...

Welcome to The Digital Manufacturing Centre. Combining a unique, engineering-led approach with state-of-the-art additive manufacturing (AM) technologies, we're a collaborative production partner dedicated to high-quality solutions. Based at Silverstone Park, in the heart of the UK, we are ideally placed to service customers nationally and internationally. From initial concept to design-for-application, production and inspection, our dedicated engineering and manufacturing teams will help you leverage the incredible advantages of AM, within your budget.

Performance

AM offers a step-change in part performance. With complete design freedom and innovative materials, the ability to optimise and tailor part properties is almost limitless. Whether minimising weight with an internal lattice structure, or consolidating fifty parts into five, the potential for ground-breaking advances is clear.

Sustainability

From production to end-use, few manufacturing processes can compete with AM on sustainability. Throughout production, material and energy efficiency help to lower emissions while AM parts also benefit from part consolidation and weight reductions, delivering further emissions benefits once in use.

Digital production

Embracing Industry 4.0 principles, the DMC is a fully-connected facility. We embrace the technology of tomorrow – from automated building control to complete digital traceability. With minimum production volumes of just one unit to serial production, AM plays a critical role in R&D, tooling production and one-off components, while also enabling mass customisation.

Advanced supply chain

While in-house AM requires significant capital expenditure, the DMC removes this barrier to entry, establishing a state-of-the-art AM supply chain in the heart of the UK. With substantially shorter lead times than traditional manufacturing techniques, AM gets programmes off the ground and products into the market faster. Once in service, AM parts require minimal part stock and warehousing thanks to spares-on-demand.

Enabling pioneers
The DMC works with visionaries and innovators, harnessing the advantages of AM to overcome industry-defining challenges.

AEROSPACE	AUTOMOTIVE	MEDTECH
SPACE	MOTORSPORT	MARINE
DEFENCE	MOBILITY	ENERGY

QUALITY, TRACEABILITY AND EXTENSIVE ENGINEERING SUPPORT

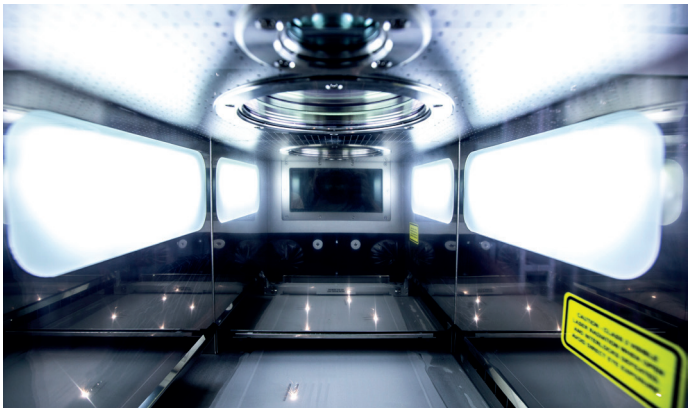
Far from a conventional supplier or print bureau, our highly experienced engineering team works in close partnership with each and every customer to help solve their design, material and production challenges, following through to final application support. We place great emphasis on producing high-quality parts that meet customer and industry standards, whether that be medical devices or aerospace components.

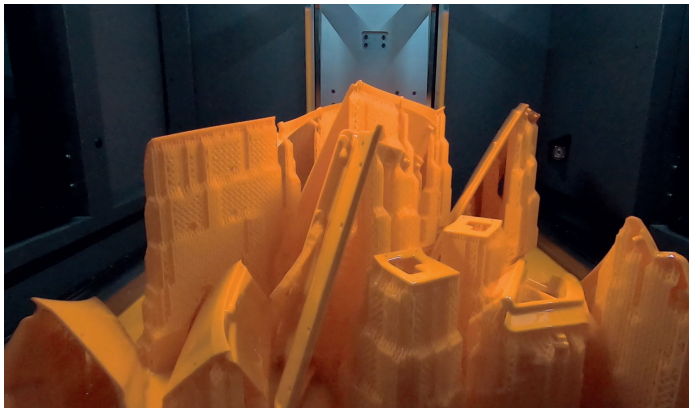
Quality: an industry leader

We pride ourselves on the quality of parts we manufacture, with full traceability through every stage of production for complete insight and transparency. With an on-site inspection laboratory, we control powder and materials in as well as parts out. We provide production part approval process (PPAP) quality control to demanding industries, including aerospace and automotive, and can align our processes with your supply chain requirements for quality, control and traceability.

End-to-end AM with DMC

1. Application development – understanding your challenges
2. Designing for AM – leveraging our in-house expertise
3. Material selection – the right solution for each part
4. Production – full traceability and exceptional quality
5. Finishing and inspection – ensuring your parts are 'end-use ready'
6. Delivery – expedited logistics from a geographically central location
7. Ongoing support – open access to the DMC's most experienced engineers





Technology	Material	Key Benefits	Applications	Appearance	Tensile Modulas (Mpa) (XY)	Tensile Modulas (Mpa) (Z)		Tensile Strength (Mpa) (XY)	Tensile Strength (Mpa) (Z)	Elong -ation (XY)	Elong -ation (Z)	Material Properties / Characteristics					Key Application Areas						
												Accuracy	High Temp	Moisture Resistan'	Optical Clarity	Durability	Molding Tools	Snap Fit Assembl'	General Purpose Models	Auto motive	Wind Tunnel Testing	Medical	Aero -space
SLA	Somos PerFORM Reflect	Rigid high strength, excellent detail resolution and surface finish	Wind tunnel, electrical casings, moulding and general tooling	Orange	10,135	10,135		64	64	0.79% @ Break	0.79% @ Break	•••	•••	•••		•	•••		•	••	•••		
FDM	ABS M30	Versatile material with ABS for if charictised by its overall strength and toughness	Performance prototyping and production components for jigs and fixtures	Beige	2180	2190		28	25	8% @ Break	1.8% @ Break	•	•	•		••		•	••	•			•
	ABS M30i	High strength material which is biocompatible	Good for medical, food packaging and can be EtO sterilised	Ivory	2180	2180		80	30	4% @ Break	4% @ Break	•	•	•		••		•	••	•			•
	PC-ABS	Blend of Polycarbonate and Acrylonitride Butadiene with excellent flexible strength, high toughness and heat resistance	Good for production applications such as manifolds, ducting and fitment parts	Black, White	1980	1800		34	25	4.7% @ Break	1.8% @ Break	•	•	•		•		•	••	•			•
	PC	Polycarbonate charictised its high strength and impact resistance, coupled with dimensional stability and heat resistance breakaway and soluble support materials.	Production parts and tools that demand higher material properties than ABS or ASA.	White	2250	2100		57	35	5.2% @ Break	1.8% @ Break	•	•	•		•		•	••	•			•
	Ultem 9085	High strength to weight ratio, high thermal and chemical resistance	High temperature production parts, brackets, housings with material aerospace certification	Natural / Black	2510	2410		68	49	5.4% @ Break	1.9% @ Break	•	•••	••	•	•••		•••	••	•••		•	•••
	Ultem 1010	High performance Polyetherimide thermoplastic high temperature and broad chemical resistance and excellent thermal stability	HVAC systems, autoclave capable applications for sterilisations and composite lay up tools	Natural	3000	3000		80	30	4% @ Break	1.1% @Break	•	•••	••	•	•••		•••	•	•••			•
	Nylon 12 CF	Polyamide 12CF thermoplastic filament reinforced chopped fibre, highest flexural strength	Used for replacement of some metals with a light weight material for production applications	Black	7600	2300		76	34	1.9% @ Break	1.2% @ Break	•	•	••	•	••	•	••	•	•••			•
	ASA	Excellent UV resistance, mechanical properties and aesthetics	Jigs, fixtures and electrical boxes	Natural	2140	2000		30	28	5.9% @ Break	1.8% @ Break	•	•	•	•	•	•	•	•••	•			•
SLS	PA12	Very good resolution functional parts good for both production and prototype parts	Interior parts, brackets, model making, detailed parts	White	1700	1800		48	48	20% @ Break	15% @ Break	••			•••	•		••	•••	•••		••	•
	PA11	Better functional parts that require a good surface finish	Interior parts such as automotive, brackets	White	1800	1800		52	52	50% @ Break	30% @ Break	••			•••	•		••	••	•••	•	•	••
	PA12 Glass Bead	Tough material with reinforced polymer with glass bead	Production material for highly loaded parts	White	2500	2700		30	30	10% @ Break	10% @ Break	••			•••	•		•	•••	••			
	PA 2241 FR	Flame retardant materials with good mechanical properties and strength	Flame Retardant parts used for brackets for certified applications such as aircraft	White	1900	1900		49	46	9% @ Break	9% @ Break	••			•••	•		••		•••			•••
	PA 2210 FR	Flame retardant material with good overall compromised mechanical properties	Flame Retardant parts used for brackets for certified applications such as aircraft	White	2500	2300		46	41	4% @ Break	4% @ Break	••			•••	•		••		•••			•••
	PA12 Carbon	Tough material with best mechanical properties for various production applications	Flexibility of design but the strength for structural parts and brackets, housings with fine resolution	Dark / anthracite grey	8300 x 3400 y	2900		85 x / 55 y	45	3.2% @ Break	2.2% @ Break	••			••	••		••		•••			••
DMLS / Metal	AlSi10Mg	Good material giving better overall performance with a step up from basic polymer parts.	Brackets, waveguides, air ducting, switches	Silver	700	640		369	386	10.9% @ Break	7.3% @ Break	••	••	•••	•	••	••	•••	•	•••	•••	••	•••
	Ti6Al4V	High strength parts with excellent strength for various structural applications	Chassis inserts, brackets, structural components	Silver	1180	1210		1092	1099	12.7% @ Break	14.2% @ Break	••	•••	•••	•	•••	••	•••	•	•••	•	••	•••
	In625	High temperature material delivering very good overall material performance	Exhaust parts and high temperature applications	Silver	2250	2280		1005	985	31% @ Break	32% @ Break	••	•••	•••	•	•••	••	••	•	•••			••
	In718	High temperature material delivering excellent overall material performance	Exhaust parts and high temperature applications such housings, rocket chambers etc.	Silver	1900	1870		1504	1439	16% @ Break	16% @ Break	••	•••	•••	•	•••	•••	••	•	•••			••
	AlMgSc (Scalmalloy)	Material developed by Airbus for aerospace, defence and space applications however, is now adopted by various sectors including automotive and motorsport	Light weight brackets, inserts, structural applications that is required greater than standard aluminium	Silver	700	690		542	537	15.2% @ Break	14.4% @ Break	••	••	•••	•	•••	••	•••	•	•••	•		•••
DLP	3955	Very high temperature (>300 degrees C) high stiffness FST	Polymer that could replace aluminium applications in hot applications	Black	3556	3556		67	67	2.1% @ Break	2.1% @ Break	•••	••	•••		••		••	••	••			•
	403	Very high strength, Stiffness and good HDT	Brackets and applications that need good stiffness	Black	2572	2572		72	72	10% @ Break	10% @ Break	•••	•••	•••	••	•••		•••	••	•••	•••		••
	ST45	Versatile, good all around material engineering polymer	Lower cost polymer for application where an overall properties are needed with a higher elongation to break	Black, Clear	2000	2000		53	53	21% @ Break	21% @ Break	••••	••	•••		••		••	••	••			•
	402	TPU-like elastomer with good tear strength and elongation to break	Gaskets, seals, inface applications	Black	42	42		5.5	5.5	230% @ Break	230% @ Break	•••	•	•••	•	••			•	•••	•••		•••
SAF	PA11	Better functional parts that require a good surface finish	Interior parts such as automotive, brackets	Off White	1529	1609		51	47	30% @ Break	11% @ Break	••			•••	•	•	••	••	•••	•	•	••
									Tear Strength														
Silicone	TrueSil A20 - 20A	Medical approved silicone with low shore hardness good for low wear resistance applications	Medical applications and industrial applications such as seals, gaskets and O-rings	White / Transparent				5.9	5.8 N/mm	10 @ Break	10 @ Break	••		•••	••	•				•••		•••	
	TrueSil A35 - 35A	Medical approved silicone with low shore hardness good for low/medium wear resistance applications	Medical applications and industrial applications such as seals, gaskets and O-rings	White / Transparent				5.5	10 N/mm	6.5 @ Break	6.5 @ Break	••		•••	••	•				•••		•••	
	TrueSil A50 - 50A	Medical approved silicone with low shore hardness good for medium/high wear resistance applications	Medical applications and industrial applications such as seals, gaskets and O-rings	White / Transparent				7.3	11 N/mm	5.3 @ Break	5.3 @ Break	••		•••	••	•				•••		•••	
	TrueSil A60 - 60A	Medical approved silicone with low shore hardness good for high wear resistance applications	Medical applications and industrial applications such as seals, gaskets and O-rings	White / Transparent				8.5	17 N/mm	3.6 @ Break	3.6 @ Break	••		•••	••	•				•••		•••	

MULTI-TECHNOLOGY PRODUCTION & ADVANCED MATERIALS

Metal additive manufacturing

The DMC offers a range of metal additive, net shape and subtractive Laser powder bed fusion, manufacturing and finishing services. With state-of-the-art equipment, The DMC uses industry-leading, multi-laser Direct Metal Laser our team produces end-use ready components using a wide variety of Sintering (DMLS) machines to ensure exceptional part quality high-performance metals and alloys. Our engineering-led approach, and performance. quality control and expertise in metal AM have proven invaluable to customers – both experienced and new to AM – time and again.

Heat treatment:
We offer on-site heat treatment to meet application requirements.

Multi-axis machining:
To ensure components meet required tolerances and surface finishes we provide comprehensive machining services to provide end use parts.

Inspection:
With inhouse capability and through external partners we can provide full inspection reports to cover dimensional, material properties and part validation such as X-ray and CT scanning.

Advanced casting:
We have partnered with Enable Manufacturing to provide our customers with access to their Additive Casting process.

Materials:
Aluminium, titanium, Scalmalloy, nickel alloys (Inconel 718, Inconel 625), stainless steel, copper and TiCP.

The top 1%:
The quality of our Scalmalloy parts has been evaluated by APWORKS and tested in the top 1% of approved suppliers worldwide.

Polymer additive manufacturing

With a diversity of polymer AM technologies and materials, we will find the right combination of part design, production system and material to meet your specifications and budget. Our polymer production is backed by finishing and inspection services that ensure consistent part quality and delivery of end-use ready parts within short timescales. Unsure about cost? Without the need for tooling or minimum order quantities, AM can actually be very price competitive.

Selective Laser Sintering (SLS):
With low part cost and a wide selection of proven materials (PA12, PA12 CF, PA12 GF, Polypropylene, PA11), SLS is a popular AM production technology and an ideal alternative to injection moulding for low production volumes. We use machines with a large bed to cater for larger part sizes and batches, up to 380mm x 700mm x 580mm.

Stereolithography (SLA):
Also known as resin printing, SLA produces high-accuracy parts with fine features and a smooth surface finish. A number of advanced materials are available, including Somos® PerFORM Reflect specifically designed for wind tunnel testing. Our SLA build envelope is 800mm x 800mm x 600mm.

Fused Deposition Modelling (FDM):
Using a continuous spool of thermoplastic filament, FDM allows us to produce components in a variety of high-performance polymers to aerospace standard. Our build envelope is 614mm x 914mm x 914mm. Materials such as ULTEM 9085, ULTEM 1010, ASA. See full material list.

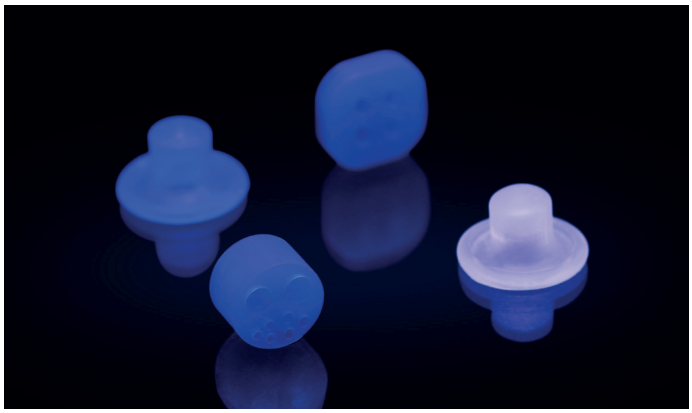
Composite filament carbon-filled PEEK:
One of the highest performance polymers in the world, it has outstanding mechanical properties with thermal and chemical resistance.

Selective Absorption Fusion (SAF):
Using a counter-rotating roller to coat powder layers onto a print bed where high energy-absorption HAF fluid is selectively jetted to image the part layers. Industrial piezo-electric print heads jet single or multiple droplets of fluid according to the part requirement for fine detail or large areas. Using infrared energy radiated from an IR lamp, the imaged layers and underlying particles are fused across the span of the print-bed. PA11 material.

Digital Light Projection (DLP):
The UV projector displays a pattern of light onto the build head area equal to a layer of the part where the exposed liquid polymer hardens, then the process is then repeated layer by layer until the parts are complete. With in-situ analytics combined with automatic pressure, separation force and temperature regulation to ensure the first part is the same as the last part. See material list including rubber and ceramic loaded materials.

Silicone AM:
We offer silicone AM with world-leading quality that meets relevant medical standards. Silicone parts are available from the DMC in Shore Hardness 20A/40A/50A/60A. Part sizes up to 130mm x 75mm x 120mm.

Finishing & Colouring:
The DMC is equipped with variety of surface finishing (vapour fuse) and colouring solutions for high-specification, bespoke components. We also have capability to finish parts with metal coating and high quality paint finish.



Work with the DMC

Dedicated to quality, performance and efficiency, we provide an end-to-end solution, from design-for-manufacture to prototyping and serial production.

Combining the very best in additive, subtractive, finishing and inspection technologies, with complete digital connectivity and traceability, we are a global leader in AM.

To find out how the DMC can support your next product, project or programme, speak to one of our dedicated applications engineers. Alternatively, come and visit us at our 2,000-square metre state-of-the-art manufacturing facility in Silverstone Park.

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For more information on the DMC, visit:
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The DMC is a sister company of KW Special Projects (KWSP), a high-performance engineering consultancy specialising in motorsport and motorsport applications. To learn more about KWSP, visit:
www.kwspecialprojects.com

In collaboration with:

RENISHAW
laserlines
BECKHOFF
CATAPULT Satellite Applications
DYE MANSION
SILVERSTONE TECHNOLOGY CLUSTER
SEMLEP South East Midlands Local Enterprise Partnership
Buckinghamshire LOCAL ENTERPRISE PARTNERSHIP THE ENTREPRENEURIAL HEART OF BRITAIN