



3M
Buckley
Innovation
Centre

Materials Chart

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In-house Materials	Key Features	Applications	Ultimate strength	Impact strength -kJ/m ² Shore hardness Tear strength- kN/m	Density	Heat Deflection temp @0.45mpa Melting point Glass Transition temp	Compatible printer
PLA (Polylactic Acid)	<ul style="list-style-type: none"> •Renewable •Biodegradable 	<ul style="list-style-type: none"> •Prototyping •Tooling 	76 MPa	26.6 kJ/m ²	1.24g/cm ³	57 °C (@0.45MPa)	Bambu (Filaments)
ABS	<ul style="list-style-type: none"> •Tough •Durable •Good heat and freezing resistance •High impact resistance •Excellent water resistant performance 	<ul style="list-style-type: none"> •Prototyping •Functional parts •Standard engineering components 	62 MPa	39.3 kJ/m ²	1.05g/cm ³	87 °C (@0.45MPa)	
ABS-GF	<ul style="list-style-type: none"> •Enhanced mechanical and aesthetic properties •Good strength and stiffness •Good temperature resistance •Dimensional stability •Durable with good wear resistance •Good water resistance 	<ul style="list-style-type: none"> •Mechanical and decorative parts •Load bearing and bend resistance parts •Intricate mechanical assembly parts •Geometric components 	68 MPa	14.5 kJ/m ²	1.08g/cm ³	99 °C (@0.45MPa)	
PETG -HF	<ul style="list-style-type: none"> •Superior water resistance •Superior UV resistance •Higher temperature resistance to standard PETG 	<ul style="list-style-type: none"> •Ideal for out door items to withstand impact and collisions 	64 MPa	31.5 kJ/m ²	1.28g/cm ³	69 °C (@0.45MPa)	
PETG-CF	<ul style="list-style-type: none"> •Improved strength •Good toughness •High performance •Good impact strength •High flexibility 	<ul style="list-style-type: none"> •Drone parts •Racing models •Functional parts 	70 MPa	41.2 kJ/m ²	1.25g/cm ³	74 °C (@0.45MPa)	
PETG Translucent	<ul style="list-style-type: none"> •Easy to print •Good impact resistance •Excellent resistance to UV •Good light transparency •Good range of colours 	<ul style="list-style-type: none"> •Parts for use outdoors •Functional prototypes •End use parts 	33 MPa	37.4 kJ/m ²	1.25 g/cm ³	74 °C	
PA6-CF	<ul style="list-style-type: none"> •High performance engineering plastic •Exceptional strength •Exceptional durability •Exceptional dimensional stability •Good thermal properties •Good chemical resistance 	<ul style="list-style-type: none"> •Prototypes •Functional parts •Components, ideal for demanding industries •Automotive applications 	151 MPa	40.3 kJ/m ²	1.09g/cm ³	186 °C (@0.45MPa)	
TPU	<ul style="list-style-type: none"> •Tough •Good flexibility •Good durability 	<ul style="list-style-type: none"> •Impact resistant parts •Durable components •Protective casings •Flexible components •Sports equipment •Automotive parts 	0.8 MPa	124.3 kJ/m ²	1.24g/cm ³	183 °C (melt temp)	

In-house Materials	Key Features	Applications	Ultimate strength	Impact strength -kJ/m ² Shore hardness Tear strength- kN/m	Density	Heat Deflection temp @0.45mpa Melting point Glass Transition temp	Compatible printer
PVDF	<ul style="list-style-type: none"> • High performance polymer • Exceptional thermal resistance • Exceptional chemical/solvent resistance • Non-Hygroscopic (does not absorb moisture) • Very good abrasion resistance 	<ul style="list-style-type: none"> • Prototypes • Functional parts • Components, ideal for demanding industries • Automotive applications • Gas & Oil applications • Chemical/solvent resistant parts 	50 MPa	Contact for further information	1.71g/cm ³	158°C (@0.45MPa) 170 °C (melt temp)	Bambu (Filaments)
Bio Med Clear	<ul style="list-style-type: none"> • Biocompatible • Sterilizable • Long term bodily contact • Mucosal membrane contact 	<ul style="list-style-type: none"> • End tools • Instruments and devices • Medical devices • Device components • Ventilator and PPE components • Drug delivery devices 	52 MPa	78 shore D hardness	1.09g/cm ³	67 °C (@0.45MPa)	Form Labs
Bio Med White	<ul style="list-style-type: none"> • Biocompatible applications • Long term skin contact • Short term mucosal contact • Disinfection and sterilisation compatible • Opaque material 	<ul style="list-style-type: none"> • Pharmaceutical and drug delivery applications • End use devices • Device components • Cutting and drilling guides • Anatomical models • Jigs and fixtures • Moulds 	45.75 MPa	80 shore D hardness	1.15g/cm ³	67 °C (@0.45MPa)	
Bio Med Durable	<ul style="list-style-type: none"> • Biocompatible • Strong impact resistant • Clear 	<ul style="list-style-type: none"> • End use devices • Components • Single use instruments 	29.1 MPa	75 shore D hardness	1.05g/cm ³	46 °C (@0.45MPa)	
Bio Med Elastic 50A	<ul style="list-style-type: none"> • Soft elastic medical grade material • Long term skin contact • Short term mucosal membrane contact 	<ul style="list-style-type: none"> • Biocompatible elastic devices • Soft tissue models • Wearables, such as straps • Compressible buttons • Stretchable enclosures and casings 	2.3 MPa	50 shore A hardness 11kN/m	1.01g/cm ³	36 °C (Tg)	
Bio Med Flex 80A	<ul style="list-style-type: none"> • Biocompatible • Good durability • Flexible • Long term skin contact • Short term mucosal membrane contact • Transparent 	<ul style="list-style-type: none"> • Flexible devices • Flexible parts/components • Models 	7.2 MPa	77-80 shore A hardness 22 kN/m	1.05g/cm ³	37 °C (Tg)	
Silicone 40A	<ul style="list-style-type: none"> • 100% silicone • Excellent chemical resistance • Excellent thermal resistance • Withstand repeated cycles of stretching, flexing, and compression 	<ul style="list-style-type: none"> • Fabricate soft, pliable and durable parts • Highly functional parts and components • Fine detailed features and parts 	5.0 MPa	12.0 kJ/m 40 shore A hardness	1.02g/cm ³	-107 °C (Tg)	

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Flame Retardant	<ul style="list-style-type: none"> • Flame retardant • Heat-resistant • Stiff • Creep-resistant • Can handle post-fabrication operations such as tapping, trimming, and drilling • Excellent surface finish 	<ul style="list-style-type: none"> • UL 94 Blue Card certified material for creating self-extinguishing and halogen-free parts • Heat resistance parts and components for long-term in indoor and industrial environments with high temperatures or ignition sources • Engineering, parts and components • Protective and internal consumer or medical electronics components • Interior parts in airplanes, automobiles, and railways 	41 MPa	1.05-1.11 kN/m	1.25g/cm ³	55-111 °C (@0.45MPa) 101-144 °C(Tg)	Form Labs
High Temp	<ul style="list-style-type: none"> • High thermal stability 	<ul style="list-style-type: none"> • Precise prototypes • End use parts • Moulds and inserts • Parts exposed to hot air, gas and fluid flow • Heat-resistant mounts, housings and fixtures • Engineering, parts and components 	49.0 MPa	33-17 J/m	1.14g/cm ³	238 °C (@0.45MPa)	
Grey V5	<ul style="list-style-type: none"> • High accuracy • Strong mechanical properties • Fine feature performance • Appearance of injection-moulded parts 	<ul style="list-style-type: none"> • Form and fit prototyping • Presentation-ready models with fine features and intricate details • General dental models • Jigs and fixtures 	62.0 MPa	36-32 J/m	1.11g/cm ³	62 °C (@0.45MPa)	
Grey Pro	<ul style="list-style-type: none"> • Tough • Some heat resistance • Low creep • Fine detail • High precision 	<ul style="list-style-type: none"> • Concept models • Look alike prototypes • Functional prototypes • Form and fit testing • Jigs and fixtures for manufacturing 	61.0 MPa	18.7 J/m	1.08g/cm ³	78 °C (@0.45MPa)	
Black V4	<ul style="list-style-type: none"> • Intricate and precise detailing • Matte surface finish • Opaque appearance 	<ul style="list-style-type: none"> • General-purpose prototyping • Design models with intricate details 	48.0 MPa	16-25 J/m	1.09g/cm ³	73 °C (@0.45MPa)	
Clear V4	<ul style="list-style-type: none"> • Rigid material • Polishes to near optical transparency 	<ul style="list-style-type: none"> • Clear prototype parts • LED housing windows • Fluidics • Moulds • Optics • Lighting and any parts requiring translucency • Showcasing internal features, see-through models and devices 	53.0 MPa	29-27 J/m	1.08g/cm ³	65 °C (@0.45MPa)	

In-house Materials	Key Features	Applications	Ultimate strength	Impact strength -kJ/m ² Shore hardness Tear strength- kN/m	Density	Heat Deflection temp @0.45mpa Melting point Glass Transition temp	Compatible printer
PVDF	<ul style="list-style-type: none"> • White Photopolymer Resin • High Resolution • High Performance • Moderate Tensile Strength • Scratch Resistant Prints 	<ul style="list-style-type: none"> • Standard & Engineering Grade components • Rapid prototyping • Industrial functional parts • Anatomical displays/specimen 	40 MPa	Contact for further information	Contact for further information	Contact for further information	Form Labs
ESD	<ul style="list-style-type: none"> • Tough • High modulus • High impact strength • Static- dissipative 	<ul style="list-style-type: none"> • Anti-static prototypes • End use parts • Housing for sensitive electronics • Tooling, jigs and fixtures • Production tooling • Engineering, parts and components • Prototyping 	44.2 MPa	90 shore D hardness	1.116g/cm ³	62.2 °C (@0.45MPa)	
visijet M2R-WT	<ul style="list-style-type: none"> • High strength and modulus • High accuracy • Moisture resistance • Opaque white 	<ul style="list-style-type: none"> • General purpose models • Functional prototypes • Jigs, fixtures and tools • Patterns, dies and moulds 	35-40 MPa	77 shore D hardness	1.6g/cm ³	50 °C (@0.45MPa)	ProJet 2500 (Resin)
visijet M2R-BK	<ul style="list-style-type: none"> • High strength and modulus • High accuracy • Moisture resistance • Opaque black 	<ul style="list-style-type: none"> • General purpose models • Functional prototypes • Jigs, fixtures and tools • Patterns, dies and moulds 	45-55 MPa	81 shore D hardness	1.6g/cm ³	59 °C (@0.45MPa)	
visijet M2R-CL	<ul style="list-style-type: none"> • High strength and modulus • High accuracy • Moisture resistance • Transparent clear 	<ul style="list-style-type: none"> • General purpose models • Functional prototypes • Jigs, fixtures and tools • Patterns, dies and moulds 	35-40 MPa	77 shore D hardness	1.6g/cm ³	44-50 °C (@0.45MPa)	
PA6-CF (Black)	<ul style="list-style-type: none"> • High stiffness • Good strength • Excellent thermal properties • Excellent mechanical properties • Excellent impact resistance • Good lightweight characteristics 	<ul style="list-style-type: none"> • Automotive components • Mechanical and structural parts • Industrial and consumer products • Sports equipment • Machinery components • Suitable for items that are subjected to regular mechanical stress • Hand tools 	81 MPa	10.0 kJ/m ²	1.17g/cm ³	219 °C (melt temp)	Landr (Filament)
Polyterra PLA	<ul style="list-style-type: none"> • Bio plastic • Good rigidity • Good mechanical properties • Easy processing 	<ul style="list-style-type: none"> • Models • Fixtures 	23.2 MPa	6.7 kJ/m ²	1.31g/cm ³	163 °C (melt temp)	

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Stainless Steel 316L	<ul style="list-style-type: none"> • High hardness • Excellent toughness • High corrosion resistance • Good machinability • Can be highly polished and post processed 	<ul style="list-style-type: none"> • Plastic injection, pressure die-casting moulds and extrusion die • Surgical tools • Maritime components • General engineering, parts and components • Prototyping • Research and development projects 	706-667 MPa	Contact for further information	8g/cm ³	1371°C - 1399°C (melt temp)	Renishaw (PBF*)
Titanium Ti6Al4V	<ul style="list-style-type: none"> • High specific strength • High corrosion resistance • Excellent biocompatibility • Good osseointegration • Low thermal expansion • Low thermal conductivity 	<ul style="list-style-type: none"> • Medical and Dental • Aerospace and Defence • Motorsport • Jewellery and art • Maritime applications • High-end sports equipment • Engineering, parts and components • Prototyping • Research and development projects 	1054-1031 MPa	Contact for further information	4.4g/cm ³	1635°C - 1665°C (melt temp)	
Inconel 625 (svbp)	<ul style="list-style-type: none"> • High creep resistance • Very high corrosion and oxidation resistance at high temperature • High fatigue strength in seawater • Excellent welding characteristics • Non-magnetic 	<ul style="list-style-type: none"> • Automotive • Aerospace and Defence • Chemical process industry • Marine engineering • Oil and gas industry • Nuclear • Seawater heat exchanger • Engineering, parts and components • Prototyping • Research and development projects 	864 MPa	Contact for further information	8.4g/cm ³	1290°C - 1350°C (melt temp)	
Tungsten (svbp)	<ul style="list-style-type: none"> • High heat resistance • High tensile strength • High density • Exceptional electrical conductivity 	<ul style="list-style-type: none"> • Aerospace and Defence • Medical • Nuclear • Energy industries • Industrial applications 	Contact for further information	Contact for further information	10.0-10.60 g/cm ³	Contact for further information	
Copper Alloy CuCrZr (svbp)	<ul style="list-style-type: none"> • Moderate to high conductivity in heat treated conditions • Good mechanical properties • Electrical conductivity • Thermal conductivity 	<ul style="list-style-type: none"> • Rocket engine parts • Heat exchangers • Induction coils 	345-510 MPa	Contact for further information	8.84g/cm ³	Contact for further information	

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PA2200 - polyamide 12	<ul style="list-style-type: none"> • Good mechanical properties • Biocompatible with ISO 1099-1 certified for use with food • High detail resolution • High long term constant behaviour 	<ul style="list-style-type: none"> • Functional parts/end products • Ideal for fully functional parts under high mechanical and thermal load • Vacuum casting pattern • Illustrative models • Spare parts 	48-40 MPa	32.8 kJ/m ² 75 shore D hardness	0.45g/cm ³	172-180 °C (melt temp)	EOS (PBF*)
PLA (ECO) 2.85mm	<ul style="list-style-type: none"> • Non-toxic • Biodegradable • All round PLA 	<ul style="list-style-type: none"> • Prototyping • Models • Decorative parts 	45 MPa	Contact for further information	contact for more info	155 °C (melt temp)	Ultimaker (Filament)
rPLA -2.85mm	<ul style="list-style-type: none"> • Bio plastic • Low warping • Quality print 	<ul style="list-style-type: none"> • Prototyping • Models • Decorative parts 	69.8 MPa	3.4 kJ/m ²	Contact for further information	74-146 °C (melt temp)	
PETG	<ul style="list-style-type: none"> • Easy to print • Good impact resistance • Excellent resistance to UV 	<ul style="list-style-type: none"> • Parts for use outdoors • Functional prototypes • End use parts 	33 MPa	37.4 kJ/m ²	1.25 g/cm ³		
TPU A95	<ul style="list-style-type: none"> • Easy to print • Tough • Flexible • Good chemical • UV and water resistance • Can be used for functional prototypes and end use parts 	Contact for further information	55 MPa	80 to 95 shore A hardness	Contact for further information	190 °C	
PP (polypropylene) -2.85mm	<ul style="list-style-type: none"> • Lightweight • High chemical resistance properties wear • Abrasion resistance • Fatigue resistance • Semi flexible • Durable • Excellent interlayer adhesion 	<ul style="list-style-type: none"> • Multi-functional material • Dishwasher safe • Microwave safe • Food containers • Liquid containers • Functional engineering parts • Prosthetics • Orthopaedics • Medical 	12 MPa	50 shore D hardness 30 kJ/m ²	0.9g/cm ³	170 °C (melt temp)	

A close-up, low-angle shot of a 3D printing nozzle. The nozzle is positioned at the top center, with a bright, glowing yellow-orange light emanating from its tip. Below the nozzle, a complex, lattice-like structure is being printed. The structure consists of multiple interconnected, curved, and ribbed components that resemble a series of interconnected arches or a honeycomb-like pattern. The background is a dark, slightly blurred blue-grey, suggesting a factory or laboratory setting. The overall lighting is dramatic, highlighting the intricate details of the printed part and the intense heat of the nozzle.

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We are continually assessing and reviewing the materials available for all our machines, as new 3D printing materials are constantly being developed by manufacturers.

If you'd like more details about any of the materials shown, want to explore something not listed, or discuss materials for your project - get in touch at **technology@3mbic.com**

We'd be happy to talk through your options.
