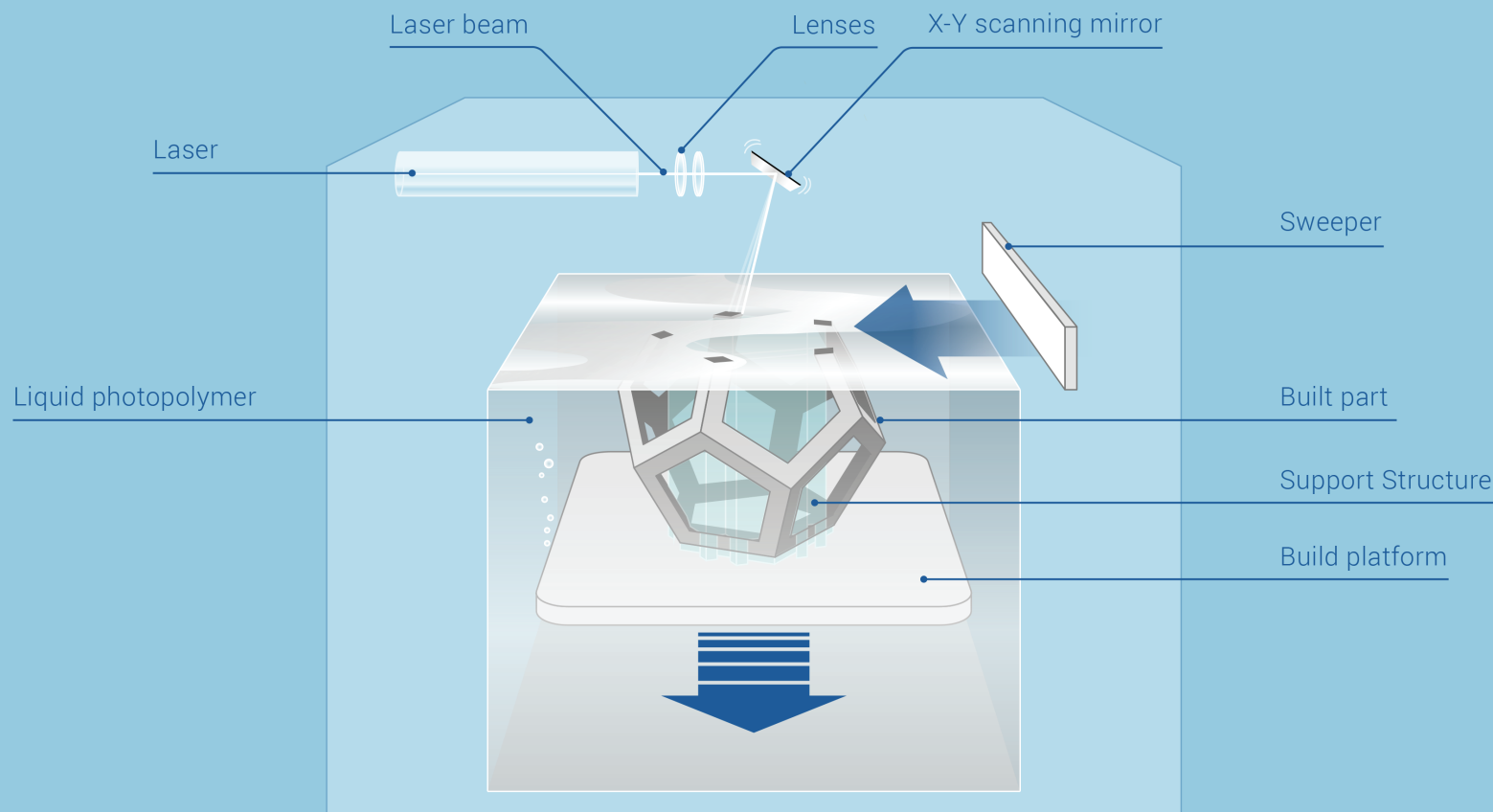


Stereolithography (SLA)



Stereolithography is one of the earliest (patented in 1986) and one of the best methods of 3D printing. Quality parts can be produced from growing range of specialised resins that found its use in rapid prototyping for testing or presentation, jewellery making (castable resin) and dentistry.

Post processing / finishes:

- Removing supporting structure that is often needed.
- Post-curing in UV light if durability and additional strength is required.
- SLA provides good surface finish that can be enhanced further by sandblasting, laquering or polishing.

Advantages:

- No restraint as to model geometry
- good surface finish and accuracy
- resolution up to 50 micron

Disadvantages:

- high cost of materials, machines, and parts
- limited to photosensitive polymers
- slow printing speed
- parts can be affected by moisture, heat or chemicals

Description of process:

Components are built up layer by layer from CAD file driven apparatus. Ultraviolet laser beam is directed onto the surface of photopolymer (in form of liquid resin) solidifying the liquid.

The part is gradually lowered into the vat after each successive layer is cured. The sweeper ensures the spread and level of resin is adequate for the next layer.

Materials used:

A wide range of liquid, UV-cured, thermosetting plastics (photopolymers) are available for SLA process. These can simulate injection-moulded plastics such as: *flexible PP, high clarity PC, grey, clear and black ABS, heat-resistant resin (ceramic filled and nano-particle filled).*

Additionally, pigment can be added to enable printing parts in a range of colours.

Speed (cycle time):

Small parts take hours and large parts can take days to complete.

Volume:

Limited to low volume prototyping or small batch production.

Part size: depending on machine type; desktop printers can produce parts up to 6"x 6"x 7" in size, and large, industrial ones up to - 60" x 30" x 22" or even larger.

Cost:

Machine cost: desktop printers start at £3,500 and industrial machines cost from £60,000.

Material cost: from £50 - 150 per litre for standard and engineering resins to over £500 for specialised dental resins.

Suppliers:



Drumlord Ltd.
tel: +44 (0)1495 249232
enquiries@drumlord.co.uk
www.drumlord.co.uk



LPE Laser Prototypes Europe Ltd
tel: +44 (0) 2890 706940
sales@laserproto.com
www.laserproto.com



3D System
tel: +44 (0) 8450 514900
www.3dsystems.com



Protolabs
tel: +44 (0) 1952 683047
customerservice@protolabs.co.uk
www.protolabs.co.uk



CBM
tel: +44 (0) 1792 341774
enquiries@cbmwales.co.uk
www.cbmwales.co.uk

Stereolithography (SLA) - Material Comparison Sheet

	Units	Test Method	si 50*	Watershed 11120**	Somos 9120**
Appearance			Opaque Grey	Transparent with slight green hue	Translucent White / Yellow
Hardness	Shore D		86		80 - 82
Tensile Strength	MPa	ASTM D638M	48-50	47.1 - 53.6	30 - 32
Tensile Modulus	MPa	ASTM D638M	2480 - 2690		
Elongation at Break	%	ASTM D638M	5.3 - 15.0	11 - 20	
Elongation at yield	%	ASTM D638M		3.3 - 3.5	15 - 25
Young's Modulus	MPa	ASTM D638M			1227 - 1462
Modulus of Elasticity	MPa	ASTM D638M		2650 - 2880	
Flexural Strength	MPa	ASTM D790M	72 - 77	63.1 - 74.16	41 - 46
Flexural Modulus	MPa	ASTM D790M	2210 - 2340	2040 - 2370	1310 - 1455
Izod Impact-Notched	J/m	ASTM D256A	16.5 - 28.1	20 - 30	48 - 53
Index of Refraction		ASTM D542A	N/A	1.512 - 1.515	N/A
HDT					
@ 0.46 MPa	°C	ASTM D468M	49 - 53	45.9 - 54.5	52 - 61
@ 1.81 MPa	°C	ASTM D468M	43 - 46	49.0 - 49.7	
@ 0.46 MPa with thermal Post Cure	°C	ASTM D468M	74 - 80		

* Data referenced from 3D Systems Product datasheets. Full Datasheets available on request.

** Data referenced from DSM Somos Product datasheets. Full Datasheets available on request.

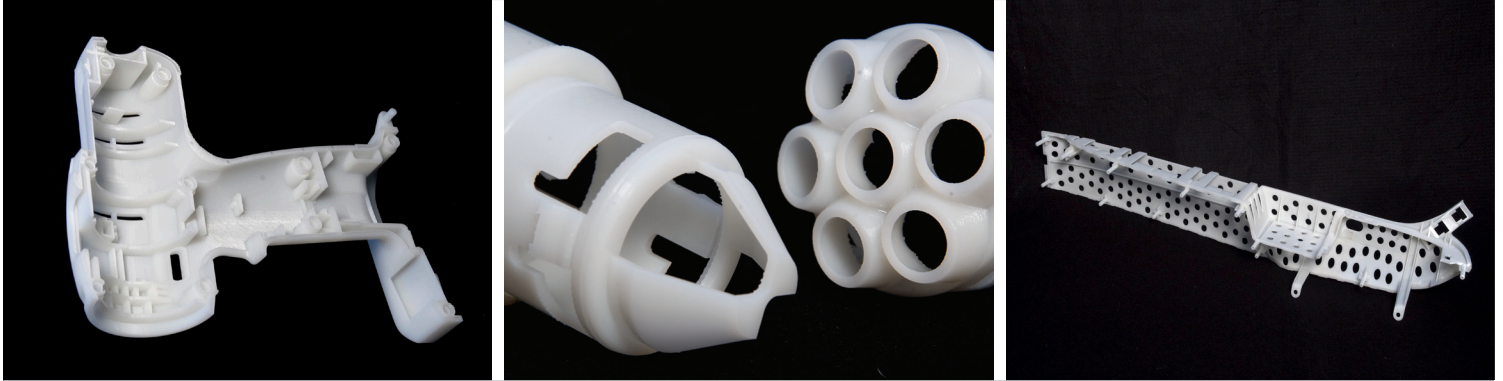
Stereolithography

Mechanical Properties	Tensile Strength	Tensile Modulus	Tensile Elongation at Break	Flexural Strength	Flexural Modulus	Hardness	Izod Impact - Notched	Heat Deflection Temp
Test Method	ASTM D638	ASTM D638	ASTM D638	ASTM D790	ASTM D790	DIN 53505/2240	ASTM D256	ASTM D648
Units	psi	psi	%	psi	psi	Shore D	(ft-lb)/in	°F
ABS-Like								
White (Std & High-Res) (ACCURA 55) 	9,200 - 9,850	360,000 - 390,000	5.3 - 15.0%	10,400 - 11,200	320,000 - 340,000	86	0.31 - 0.51	120 - 127°
White (Renshape 7810)	5,200-7,400	260,000-348,000	10 - 20%	8,500-10,000	343,000 - 359,000	80 - 87	0.26 - 0.49	137°
White (Std& High-Res) (ACCURA 25) 	5,450 - 5,570	230,000 - 240,000	13 - 20%	7,960 - 8,410	200,000 - 240,000	80	0.4	136 - 145°
Gray (ACCURA XTREME) 	5,510 - 6,380	260,000 - 287,000	14 - 22%	7,450 - 10,300	220,000 - 300,000	86	0.66 - 0.98	144°
Black (RenShape 7820)	5,200 - 7,400	274,000 - 348,000	8 - 18%	8,500 - 11,100	290,000 - 348,000	86	0.79 - 0.91	124°
High-Impact - White (Somos NeXt)	5,900 - 6,300	343,000 - 361,000	8 - 10%	9,800 - 10,300	350,000 - 366,000	82	0.88 - 0.97	131 - 134°
High-Impact - White (ACCURA XTREME WHITE 200) 	6,530 - 7,250	334,000 - 381,000	7 - 20%	10,880 - 11,460	341,000 - 370,000	78-80	1.03-1.24	108° - 117°
High-Temp (ACCURA BLUESTONE) 	9,600 - 9,800	1,100,000 - 1,700,000	1.4 - 2.4%	18,000 - 22,300	1,200,000 - 1,417,000	92	0.24 - 0.32	513 - 543°
White (VISIJET SL FLEX) 	5500	235,000	16%	8270	206,000	80	0.41	127°
Grey (VISIJET SL TOUGH) 	5950	274,000	18%	8990	268,000	86	0.82	129°
Black (VISIJET SL BLACK) 	6500	312,000	5%	1100	341,000	86	0.88	123°
Durable, PP-Like								
(Std& High-Res) (ACCURA 25) 	5,450 - 5,570	230,000 - 240,000	13 - 20%	7,960 - 8,410	200,000 - 240,000	80	0.4	136 - 145°
White ( VISIJET SL FLEX  )	5500	235,000	16%	8270	206,000	80	0.41	127°

Rigid, PC-Like								
(Std& High-Res) (ACCURA 60) 	8,410 - 9,860	390,000 - 450,000	5 - 13%	12,620-14,650	392,000 - 435,000	86	0.3 - 0.5	127 - 131°
(Std& High-Res) (ACCURA CLEARVUE) 	6,700 - 7,700	329,000 - 383,000	3 - 15%	10,400-12,200	287,000 - 335,000	80	0.7 - 1.1	124°
High-Temp (Std) (ACCURA PEAK) 	8,270 - 11,320	612,000 - 695,000	1.3- 2.5%	11,170 - 18,380	606,000 - 695,000	86	0.4 - 0.5	172°
High-Temp (VISIJET SL HI-TEMP) 	9570	491,500	6%	16250	446,500	86	0.48	134° - 230°
Clear (VISIJET SL CLEAR) 	7500	371,000	6%	12,000	338,000	85	0.86	122°
Semi-Flexible, PE-Like								
PE-Like (VISIJET SL FLEX) 	5500	235,000	16%	8270	206,000	80	0.41	127°
Technician's Choice	Varies Depending on Material Chosen							

Accura® 55

Rigid and strong plastic to stimulate and replace CNC machined White ABS articles



Technical Data

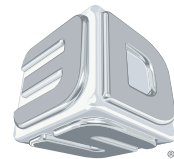
Post-Cured Material			
Measurement	Condition	Metric	U.S.
Tensile Strength (MPa/PSI)	ASTM D 638	63-68	9200-9850
Tensile Modulus (MPa/KSI)	ASTM D 638	3200-3380	460-490
Elongation at Break	ASTM D 638	5-8 %	5-8 %
Flexural Strength (MPa/PSI)	ASTM D 790	88-110	12830-15920
Flexural Modulus (MPa/KSI)	ASTM D 790	2690-3240	390-470
Impact Strength (J/m /Ft-lbs/in)	ASTM D 256 ASTM5420	12-22 1.1	0.2-0.4 0.81
Heat Deflection Temperature	ASTM D 648 @ 66 PSI @ 264 PSI	55-58 °C 51-53 °C	131-136 °F 123-127 °F
Coefficient of Thermal Expansion (CTE)	ASTM E 831-93 TMA (T<T _g , 0-40 °C) TMA (T<T _g , 75-140 °C)	61 163	141 326
Glass Transition (T _g)	DMA, E''	56 °C	132 °F
Shore D		85	85

Liquid Material

Measurement	Condition	Value
Viscosity	@ 30 °C (86 °F)	155-185 cps
Penetration Depth (Dp)		5.2 mils
Critical Exposure (Ec)		7.4 mJ/cm ²
Color		White
Solid Density	@ 25 °C (77 °F)	1.20 g/cm ³ at 25 °C
Liquid Density	@ 25 °C (77 °F)	1.13 g/cm ³ at 25 °C

Features

- Rigid and strong
- Functional assemblies
- Short-run production parts



3DSYSTEMS®

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NYSE: DDD
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Accura® 25

Flexible plastic to simulate and replace CNC machined white polypropylene articles



Technical Data

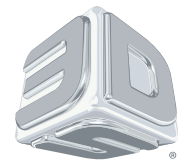
Post-Cured Material			
Measurement	Condition	Metric	U.S.
Tensile Strength (MPa/PSI)	ASTM D 638	55-58	5540-5570
Tensile Modulus (MPa/KSI)	ASTM D 638	1590-1660	230-240
Elongation at Break (%)	ASTM D 638	13-20	13-20
Flexural Strength (MPa/PSI)	ASTM D 790	55-58	7960-8410
Flexural Modulus (MPa/KSI)	ASTM D 790	1380-1660	200-240
Impact Strength (J/m /Ft-lbs/in)	ASTM D 256	19-24	0.4
Heat Deflection Temperature (°C/°F)	ASTM D 648 @ 66 PSI @ 264 PSI	58-63 51-55	136-145 124-131
Coefficient of Thermal Expansion (μ mm/m °C / μ in/in °F)	ASTM E 831-93 TMA (T<T _g , 0-20 °C) TMA (T<T _g , 75-140 °C)	107 x 10 ⁻⁶ 151 x 10 ⁻⁶	59.4 83.9
Glass Transition - T _g (°C/°F)	DMA, E''	72-74	162-165
Shore D		80	80

Liquid Material

Measurement	Condition	Value
Viscosity	@ 30 °C (86 °F)	250 cps
Penetration Depth (Dp)		4.2 mils
Critical Exposure (Ec)		10.5 mJ/cm ²
Color		White
Solid Density	@ 25 °C (77 °F)	1.19 g/cm ³ at 25 °C
Liquid Density	@ 25 °C (77 °F)	1.13 g/cm ³ at 25 °C

Features

- Flexible
- Snap fit assemblies
- Master patterns for vacuum casting
- Durable functional prototypes



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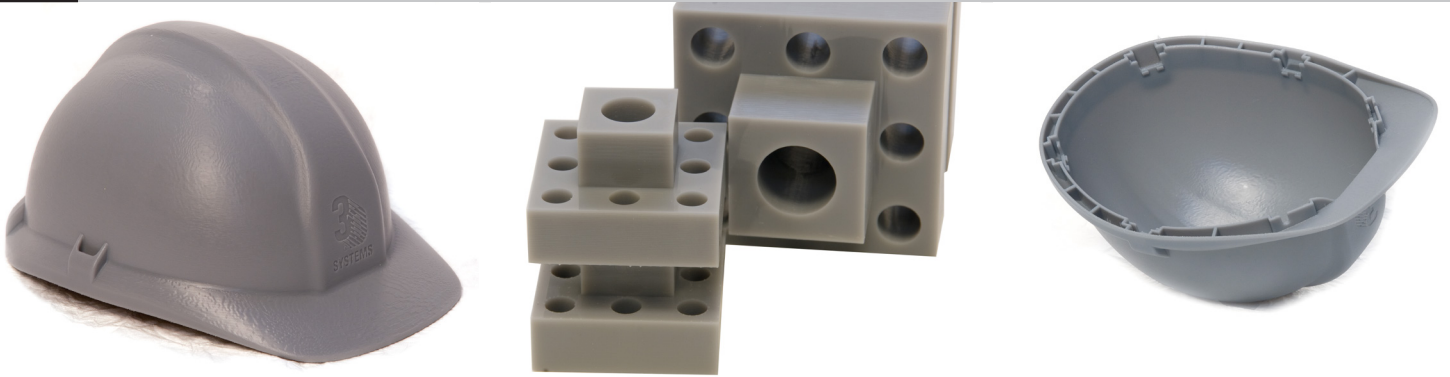
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Accura® Xtreme™

Ultra tough grey plastic to replace CNC-machined polypropylene and ABS articles



Technical Data

Post-Cured Material

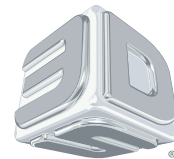
Measurement	Condition	Metric	U.S.
Tensile Strength (MPa/PSI)	ASTM D 638	38-44	5510-6380
Tensile Modulus (MPa/KSI)	ASTM D 638	1790-1980	260-287
Elongation at Break	ASTM D 638	14-22 %	14-22 %
Flexural Strength (MPa/PSI)	ASTM D 790	57-71	7540-10300
Flexural Modulus (MPa/KSI)	ASTM D 790	1520-2070	220-300
Impact Strength (J/m /Ft-lbs/in)	ASTM D 256	35-52	0.66-0.98
Heat Deflection Temperature	ASTM D 648 @ 66 PSI @ 264 PSI	62 °C 54 °C	144 °F 129 °F
Glass Transition (Tg)		70-74 °C	158-165 °F

Liquid Material

Measurement	Condition	Value
Viscosity	@ 30 °C (86 °F)	250-300 cps
Penetration Depth (Dp)		4.1 mils
Critical Exposure (Ec)		11.7 mJ/cm²
Color		Grey
Solid Density	@ 25 °C (77 °F)	1.19 g/cm³
Liquid Density	@ 28 °C (82 °F)	1.13 g/cm³
Tested Build Styles		EXACT™

Features

- Tough and durable
- Resists breakage and handles challenging functional assemblies
- Great for snap fits, assemblies and demanding applications
- Ideal for master patterns for vacuum casting



3DSYSTEMS®

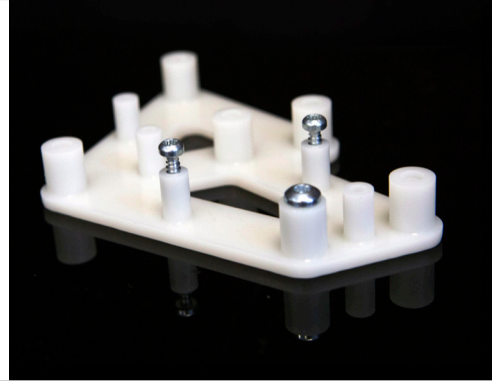
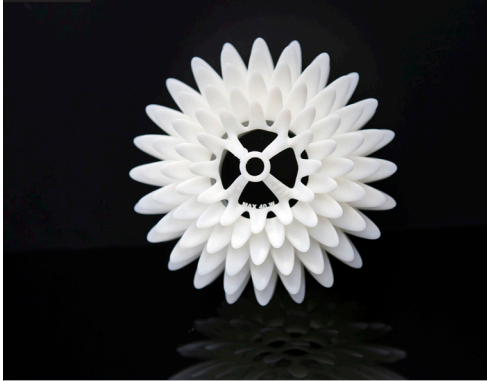
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Accura® Xtreme™ White 200

Ultra tough white plastic to replace CNC machined polypropylene and ABS articles



Technical Data

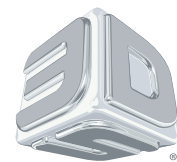
Post-Cured Material			
Measurement	Condition	Metric	U.S.
Tensile Strength (MPa/PSI)	ASTM D 638	45-50	6530-7250
Tensile Modulus (MPa/KSI)	ASTM D 638	2300-2630	334-381
Elongation at Break (%)	ASTM D 638	7-20	7-20
Flexural Strength (MPa/PSI)	ASTM D 790	75-79	10880-11460
Flexural Modulus (MPa/KSI)	ASTM D 790	2350-2550	341-370
Impact Strength (J/m /Ft-lbs/in)	ASTM D 256	55-66	1.03-1.24
Heat Deflection Temperature (°C/°F)	ASTM D 648 @ 66 PSI @ 264 PSI	47	117
		42	108
Coefficient of Thermal Expansion (μ mm/m °C / μ in/in °F)	ASTM E 831-93 30-50 °C 70-140 °C	95	53
		180	100
Water Absorption (%)	ASTM D 570-98	0.38	0.38
Glass Transition - Tg (°C/°F)	DMA, E"	52	126
Shore D		78-80	78-80

Liquid Material

Measurement	Condition	Value
Viscosity	@ 30 °C (86 °F)	650-750 cps
Penetration Depth (Dp)		4.6 mils
Critical Exposure (Ec)		8.3 mJ/cm ²
Color		White
Solid Density	@ 25 °C (77 °F)	1.18 g/cm ³
Liquid Density	@ 25 °C (77 °F)	1.12 g/cm ³

Features

- Exceptionally tough and durable
- Resists breakage and handles challenging functional assemblies
- Great for snap fits, assemblies and demanding applications
- Ideal for master patterns for vacuum casting



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Accura® Bluestone™

Composite material for manufacturing stable, high stiffness parts



Technical Data

Post-Cured Material

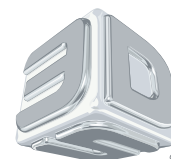
Measurement	Condition	Metric	U.S.
Tensile Strength (MPa/PSI)	ASTM D 638	66-68	6900-9800
Tensile Modulus (MPa/KSI)	ASTM D 638	7600-11700	1100-1700
Elongation at Break	ASTM D 638	1.4 - 2.4 %	1.4 - 2.4 %
Flexural Strength (MPa/PSI)	ASTM D 790	124-154	1800-2230
Flexural Modulus (MPa/KSI)	ASTM D 790	8300-9800	1200-1417
Impact Strength (J/m /Ft-lbs/in)	ASTM D 256	13-17	0.24-0.32
Heat Deflection Temperature	ASTM D 648		
UV Postcure only	@66 PSI	65-66 °C	149-151 °F
UV Postcure only	@ 264 PSI	65 °C	149 °F
UV + Thermal Postcure (120°C)	@ 66 PSI	267-284 °C	513-543 °F
Coefficient of Thermal Expansion (CTE)	ASTM E 831-93		
	TMA (T<T _g , 0-200 °C)	33-44 (x10 ⁻⁶ m/m °C)	18.3 - 24.4 (µin/in °F)
	TMA (T<T _g , 90-150 °C)	81-98 (x10 ⁻⁶ m/m °C)	45 - 54.4 (µin/in °F)
Glass Transition (T _g)	DMA, E''	78-81 °C	172-178 °F
Shore D		92	92

Liquid Material

Measurement	Condition	Value
Viscosity	@ 30 °C (86 °F)	1200-1800 cps
Penetration Depth (Dp)		4.1 mils
Critical Exposure (Ec)		6.9 mJ/cm ²
Color		Blue
Solid Density	@ 25 °C (77 °F)	1.78 g/cm ³ at 25 °C
Liquid Density	@ 25 °C (77 °F)	1.70 g/cm ³ at 25 °C
Tested Build Styles		EXACT™

Features

- Highest stiffness available
- Heat and abrasion resistant
- Excellent chemical resistance
- Great for windtunnel models, jigs and fixtures



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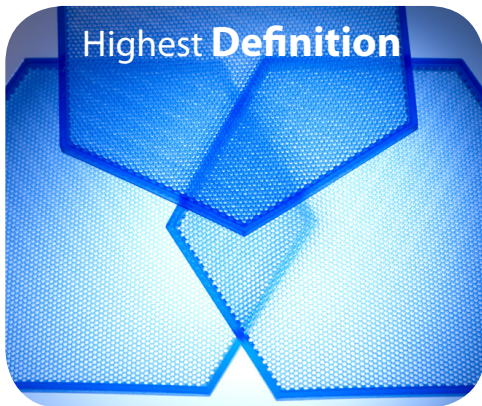
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ProJet® 3500 SD & HD

Professional 3D Printers

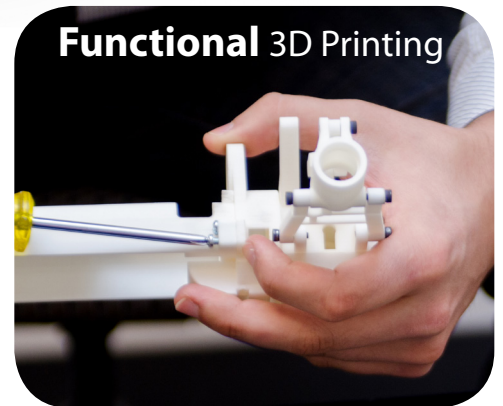
Precision
Productivity
Ease-of-Use



Highest **Definition**



Hard **Plastic** parts



Functional 3D Printing



3DSYSTEMS®

Most productive, highest capacity ProJet® 3500 Professional Printers

ProJet 3510 SD

The affordable ProJet 3510 SD prints high quality, durable plastic parts for engineering and mechanical design applications including functional testing, form and fit verification, rapid prototyping, design communication, rapid tooling and more. This office friendly 3D Printer delivers exceptional parts... on demand.

AFFORDABILITY • QUALITY • EASE-OF-USE

ProJet 3510 HD*Plus*

The ProJet 3510 HD*Plus* offers the flexibility to choose between 3 resolution modes to print concept models, verification prototypes and patterns for pre-production and digital manufacturing. Just connect to the printer to print extremely finely featured plastic parts with a greater output.

RESOLUTION *Plus* • PARTS SIZE *Plus* • FLEXIBILITY *Plus*



ProJet 3510 HD

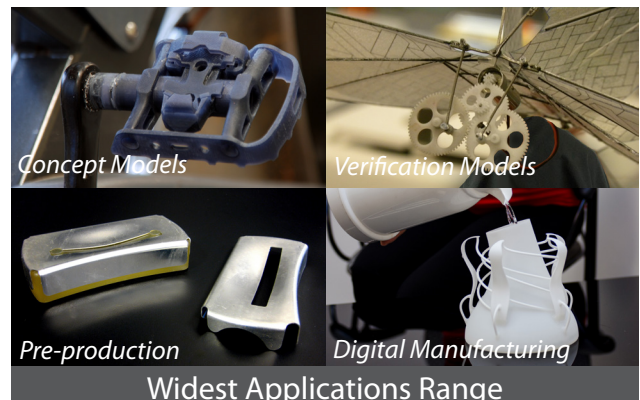
The ProJet 3510 HD prints precision, durable plastic parts ideal for functional testing, design communication, rapid manufacturing, rapid tooling and more. With a choice in materials and selectable print resolutions, this office friendly, easy to use 3D Printer is packed with features that help you maximize your return on investment (ROI).

HIGH DEFINITION • PRECISION • PRODUCTIVITY

ProJet 3500 HD*Max*

The high capacity ProJet 3500 HD*Max* offers greater productivity, including with the High Speed printing mode, and larger high definition prints, for the production of functional plastic parts for product design and manufacturing applications. Benefit of the increased throughput and part size with feature detail and quality only possible with ProJet printers.

Max THROUGHPUT • *Max* DEFINITION • *Max* VOLUME



VisiJet® M3 Materials for ProJet® SD & HD Printers

The VisiJet line of plastic materials offers numerous capabilities to meet a variety of commercial applications. Using the MultiJet Printing (MJP) Technology, 3D Systems' ProJet 3500 3D Printers use VisiJet M3 Materials to build accurate, high-definition models and prototypes for proof of concept, functional testing, master patterns for moldmaking, direct investment casting, for transportation, energy, consumer products, recreation, healthcare, education and other vertical markets. Toughness, high temperature resistance, durability, stability, watertightness, biocompatibility, castability are a few of the key attributes you will find within the VisiJet materials line. Parts can be drilled, glued, painted, plated, etc. Support material offers easy, non hazardous post processing and preserves delicate features.

Properties	Condition	VisiJet M3 X	VisiJet M3 Black	VisiJet M3 Crystal	VisiJet M3 Proplast	VisiJet M3 Navy	VisiJet M3 Techplast	VisiJet M3 Procast	VisiJet S300
Composition		----- UV Curable Plastic -----							Wax Support Material
Color		White	Black	Natural	Natural	Blue	Gray	Dark Blue	White
Bottle Quantity		2 kg	2 kg	2 kg	2 kg	2 kg	2 kg	2 kg	2 kg
Density @ 80 °C (liquid)	ASTM D4164	1.04 g/cm ³	1.02 g/cm ³	1.02 g/cm ³	1.02 g/cm ³	1.02 g/cm ³	1.02 g/cm ³	1.02 g/cm ³	N/A
Tensile Strength	ASTM D638	49 MPa	35.2 MPa	42.4 MPa	26.2 MPa	20.5 MPa	22.1 MPa	32 MPa	N/A
Tensile Modulus	ASTM D638	2168 MPa	1594 MPa	1463 MPa	1108 MPa	735 MPa	866 MPa	1724 MPa	N/A
Elongation at Break	ASTM D638	8.3 %	19.7 %	6.83 %	8.97 %	8 %	6.1 %	12.3 %	N/A
Flexural Strength	ASTM D638	65 MPa	44.5 MPa	49 MPa	26.6 MPa	28.1 MPa	28.1 MPa	45 MPa	N/A
Heat Distortion Temperature @ 0.45 MPa	ASTM D648	88 °C	57 °C	56 °C	46 °C	46 °C	46 °C	N/A	N/A
Ash Content		N/A	N/A	N/A	0.01 %	0.01 %	0.01 %	0.01 %	N/A
Melting Point		N/A	N/A	N/A	N/A	N/A	N/A	N/A	60 °C
Softening Point		N/A	N/A	N/A	N/A	N/A	N/A	N/A	40 °C
USP Class VI Certified*		No	No	Yes	No	No	No	No	N/A
ProJet Compatibility		SD, HD	SD, HD	SD, HD	SD, HD	SD, HD	SD, HD	HD	SD, HD
Description		ABS-like Plastic	High strength & flexibility plastic	Tough Plastic, Translucent	Plastic, Natural	Plastic, Blue	Plastic, Gray	Castable Plastic	Non-toxic wax material for hands-free melt-away supports

** DISCLAIMER: It is the responsibility of each customer to determine that its use of any Class VI certified VisiJet® material is safe, lawful and technically suitable to the customer's intended applications. Customers should conduct their own testing to ensure that this is the case.*



VisiJet M3 X



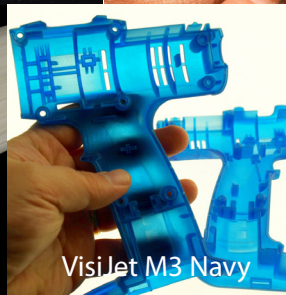
VisiJet M3 Black



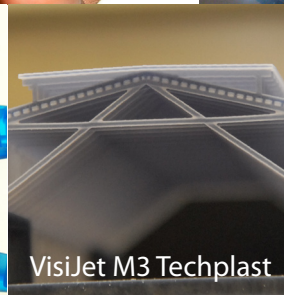
VisiJet M3 Crystal



VisiJet M3 Proplast



VisiJet M3 Navy



VisiJet M3 Techplast



VisiJet M3 Procast

VisiJet M3 Plastic Materials for ProJet SD & HD



ProJet 3510 SD

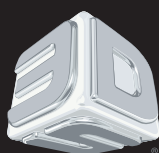
ProJet 3510 HD

ProJet 3510 HDPlus

ProJet 3500 HDMax

Printing Modes	HD - High Definition - - -	HD - High Definition - UHD - Ultra High Definition -	HD - High Definition - UHD - Ultra High Definition XHD - Xtreme High Definition	HD - High Definition HS - High Speed UHD - Ultra High Definition XHD - Xtreme High Definition
Net Build Volume (xyz)	11.75 x 7.3 x 8" (298 x 185 x 203 mm)	11.75 x 7.3 x 8" (298 x 185 x 203 mm)	11.75 x 7.3 x 8" (298 x 185 x 203 mm)	11.75 x 7.3 x 8" (298 x 185 x 203 mm)
HD Mode	-	-	-	11.75 x 7.3 x 8" (298 x 185 x 203 mm)
HS Mode	-	-	-	11.75 x 7.3 x 8" (298 x 185 x 203 mm)
UHD Mode	-	5 x 7 x 6" (127 x 178 x 152 mm)	8 x 7 x 6" (203 x 178 x 152 mm)	11.75 x 7.3 x 8" (298 x 185 x 203 mm)
XHD Mode	-	-	8 x 7 x 6" (203 x 178 x 152 mm)	11.75 x 7.3 x 8" (298 x 185 x 203 mm)
Resolution				
HD Mode	375 x 375 x 790 DPI (xyz); 32µ layers	375 x 375 x 790 DPI (xyz); 32µ layers	375 x 375 x 790 DPI (xyz); 32µ layers	375 x 375 x 790 DPI (xyz); 32µ layers
HS Mode	-	-	-	375 x 375 x 790 DPI (xyz); 32µ layers
UHD Mode	-	750 x 750 x 890 DPI (xyz); 29µ layers	750 x 750 x 890 DPI (xyz); 29µ layers	750 x 750 x 890 DPI (xyz); 29µ layers
XHD Mode	-	-	750 x 750 x 1600 DPI (xyz); 16µ layers	750 x 750 x 1600 DPI (xyz); 16µ layers
Accuracy (typical)	0.001-0.002 inch (0.025-0.05 mm) per inch of part dimension. Accuracy may vary depending on build parameters, part geometry and size, part orientation, and post-processing.			
E-mail Notice Capability	Yes	Yes	Yes	Yes
Tablet/Smartphone connectivity	Yes	Yes	Yes	Yes
5 Year Printhead Warranty	Optional	Standard	Standard	Standard
Build Materials	VisiJet M3 X VisiJet M3 Black VisiJet M3 Crystal VisiJet M3 Proplast VisiJet M3 Navy VisiJet M3 Techplast -	VisiJet M3 X VisiJet M3 Black VisiJet M3 Crystal VisiJet M3 Proplast VisiJet M3 Navy VisiJet M3 Techplast VisiJet M3 Procast	VisiJet M3 X VisiJet M3 Black VisiJet M3 Crystal VisiJet M3 Proplast VisiJet M3 Navy VisiJet M3 Techplast VisiJet M3 Procast	VisiJet M3 X VisiJet M3 Black VisiJet M3 Crystal VisiJet M3 Proplast VisiJet M3 Navy VisiJet M3 Techplast VisiJet M3 Procast
Support Material	VisiJet S300	VisiJet S300	VisiJet S300	VisiJet S300
Material Packaging Build and support materials	In clean 4.41 lbs (2 kg) bottles (machine holds up to 2 with auto-switching)			
Electrical	100-127 VAC, 50/60 Hz, single-phase, 15A; 200-240* VAC, 50 Hz, single-phase, 10A			
Dimensions (WxDxH)				
3D Printer Crated	32.5 x 56.25 x 68.5" (826 x 1429 x 1740 mm)	32.5 x 56.25 x 68.5" (826 x 1429 x 1740 mm)	32.5 x 56.25 x 68.5" (826 x 1429 x 1740 mm)	32.5 x 56.25 x 68.5" (826 x 1429 x 1740 mm)
3D Printer Uncrated	29.5 x 47 x 59.5" (749 x 1194 x 1511 mm)	29.5 x 47 x 59.5" (749 x 1194 x 1511 mm)	29.5 x 47 x 59.5" (749 x 1194 x 1511 mm)	29.5 x 47 x 59.5" (749 x 1194 x 1511 mm)
Weight				
3D Printer Crated	955 lbs, 434 kg	955 lbs, 434 kg	955 lbs, 434 kg	955 lbs, 434 kg
3D Printer Uncrated	711 lbs, 323 kg	711 lbs, 323 kg	711 lbs, 323 kg	711 lbs, 323 kg
ProJet® Accelerator Software	Easy build job set-up, submission and job queue management ; Automatic part placement and build optimization tools ; Part stacking and nesting capability (except ProJet SD) ; Extensive part editing tools ; Automatic support generation ; Job statistics reporting tools			
Print3D App	Remote monitoring and control from tablet, computers and smartphones			
Network Compatibility	Network ready with 10/100 Ethernet interface			
Client Hardware Recommendation	1.8 GHz with 1GB RAM (OpenGL support 64 mb video RAM) or higher			
Client Operating System	Windows XP Professional, Windows Vista, Windows 7			
Input Data File Formats Supported	STL and SLC	STL and SLC	STL and SLC	STL and SLC
Operating Temperature Range	64-82 °F (18-28 °C)	64-82 °F (18-28 °C)	64-82 °F (18-28 °C)	64-82 °F (18-28 °C)
Noise	< 65 dBA estimated (at medium fan setting)			
Certifications	CE	CE	CE	CE

* Requires small external transformer supplied by 3D Systems in the provided country kit.



Accura® 60

Clear plastic for quickly producing rigid and strong parts



Technical Data

Post-Cured Material

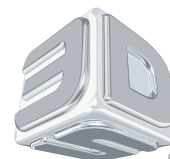
Measurement	Condition	Metric	U.S.
Tensile Strength (MPa/PSI)	ASTM D 638	58-68	8410-9860
Tensile Modulus (MPa/KSI)	ASTM D 638	2690-3100	390-450
Elongation at Break	ASTM D 638	5-13 %	5-13 %
Flexural Strength (MPa/PSI)	ASTM D 790	87-101	12620-14650
Flexural Modulus (MPa/KSI)	ASTM D 790	2700-3000	392-435
Impact Strength (J/m /Ft-lbs/in)	ASTM D 256	15-25	0.3-0.5
Heat Deflection Temperature	ASTM D 648 @ 66 PSI @ 264 PSI	53-55 °C 48-50 °C	127-131 °F 118-122 °F
Coefficient of Thermal Expansion (CTE)	ASTM E 831-93 TMA (T<T _g , 0-40 °C) TMA (T<T _g , 75-140 °C)	71-131 153	
Glass Transition (T _g)	DMA, E''	58 °C	136 °F
Shore D		86	86

Liquid Material

Measurement	Condition	Value
Viscosity	@ 30 °C (86 °F)	150-180 cps
Penetration Depth (Dp)		6.3 mils
Critical Exposure (Ec)		7.6 mJ/cm ²
Color		Clear
Solid Density	@ 25 °C (77 °F)	1.21 g/cm ³ at 25 °C
Liquid Density	@ 25 °C (77 °F)	1.13 g/cm ³ at 25 °C

Features

- Clear and transparent
- Rigid and strong
- Great for investment casting patterns
- Headlamps, bottles and transparent assemblies



3DSYSTEMS®

3D Systems Corporation
333 Three D Systems Circle
Rock Hill, SC 29730, USA

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NYSE: DDD
www.3dsystems.com

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Accura[®] PEAK[™]

Stiff plastic material for heat-resistant components



Technical Data

Post-Cured Material

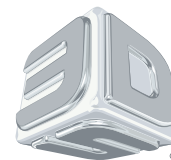
Measurement	Condition	Metric	U.S.
Tensile Strength (MPa/PSI)	ASTM D 638	57-78	8270-11320
Tensile Modulus (MPa/KSI)	ASTM D 638	4220-4790	612-695
Elongation at Break	ASTM D 638	1.3 - 2.5 %	1.3 - 2.5 %
Flexural Strength (MPa/PSI)	ASTM D 790	77-126	11170-18380
Flexural Modulus (MPa/KSI)	ASTM D 790	4180-4790	606-695
Impact Strength (J/m /Ft-lbs/in)	ASTM D 256	21.3-27.3	0.4-0.5
Heat Deflection Temperature	ASTM D 648		
UV Postcure Only	@ 66 PSI	78 °C	172 °F
UV Postcure Only	@ 264 PSI	59 °C	138 °F
120 °C thermal postcure	@ 66 PSI	153 °C	307 °F
120 °C thermal postcure	@ 264 PSI	124 °C	255 °F
Coefficient of Thermal Expansion (CTE)	ASTM E 831-93		
	0-50 °C	48	27
	50-120 °C	92	51
Glass Transition (Tg)	DMA, E"		
UV Postcure Only		80 °C	176 °F
120 °C thermal postcure		85-90 °C	185-194 °F
Shore D		86	86

Liquid Material

Measurement	Condition	Value
Viscosity	@ 30 °C (86 °F)	605 cps
Penetration Depth (Dp)		5.6 mils
Critical Exposure (Ec)		11.5 mJ/cm ²
Color		Translucent Amber
Solid Density	@ 25 °C (77 °F)	1.36 g/cm ³
Liquid Density	@ 25 °C (77 °F)	1.32 g/cm

Features

- High heat resistance
- Very high rigidity and stiffness
- Excellent humidity/moisture resistance



3DSYSTEMS[®]

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 Rock Hill, SC 29730, USA www.3dsystems.com

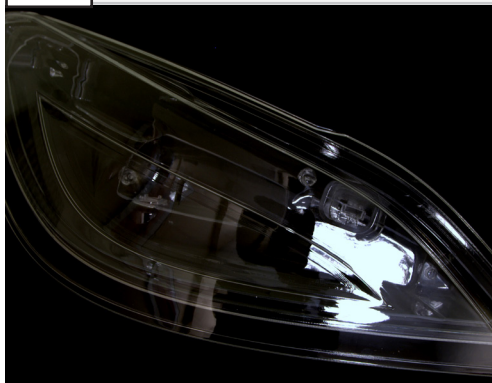
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Accura® ClearVue™

High clarity plastic for a multitude of applications



Technical Data

Post-Cured Material

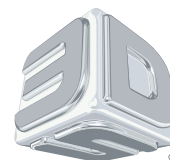
Measurement	Condition	Metric	U.S.
Tensile Strength (MPa/PSI)	ASTM D 638	41 - 46	5950-6670
Tensile Modulus (MPa/KSI)	ASTM D 638	2030-2220	294-322
Elongation at Break	ASTM D 638	4 - 7 %	4 - 6 %
Flexural Strength (MPa/PSI)	ASTM D 790	53-67	7690-9720
Flexural Modulus (MPa/KSI)	ASTM D 790	1560-2040	226-296
Impact Strength (J/m /Ft-lbs/in)	ASTM D 256	43-67	0.81-1.26
Heat Deflection Temperature	ASTM D 648 @ 66 PSI @ 264 PSI	46 °C 41 °C	115 °F 106 °F
Coefficient of Thermal Expansion (CTE)	ASTM E 831-93 < 35 °C > 60 °C	70 160	70 160
Glass Transition (Tg)	DMA, E"	56 °C	133 °F
Shore D		84	84

Liquid Material

Measurement	Condition	Value
Viscosity	@ 30 °C (86 °F)	235-260 cps
Penetration Depth (Dp)		6.1 mils
Critical Exposure (Ec)		9.5 mJ/cm²
Color		Clear
Solid Density	@ 25 °C (77 °F)	1.17 g/cm³
Liquid Density	@ 28 °C (82 °F)	1.10 g/cm³

Features

- Headlamps, bottles and transparent assemblies
- Rigid and tough
- Excellent humidity/moisture resistance
- Capable of meeting UPS Class VI



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Watershed

Colour: Water Clear

Simulates: ABS

Properties: Water resistant, Medical plastic

This water resistant SLA material can be finished to water clear. Watershed is suitable for Medical prototyping and is USP Grade VI approved.



Xtreme

Colour: Grey

Simulates: PC/ABS

Properties: Very tough, functional

Xtreme is a tough, functional PC/ABS simulant suitable for functional testing.



NeXt (New)

Colour: White

Simulates: Tough ABS

Properties: Very tough, functional, crack resistant

NeXt is a tough, functional resin suitable for snapfits, with excellent impact resistance



Si25

Colour: White

Simulates: PP

Properties: Flexible

Si25 is a tough flexible PP simulant, suitable for the production of snap fits, concept models and functional assembly components.



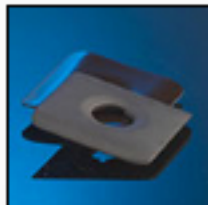
Si60

Colour: Clear

Simulates: PC

Properties: Durable, Stiff, High Clarity

Si25 is a durable stiff PC simulant suitable for the production of prototype models requiring some level of transparency.



SL7820

Colour: Black
Simulates: ABS
Properties: Exceptional surface detail

The first black SLA material, SL7820 boasts exceptional surface finish and can be finished to a high gloss black finish. SL7820 offers excellent dimensional stability even in humid conditions

View the [SL7820 datasheet](#).

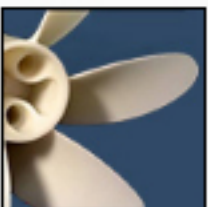


NanoTool

Colour: Off White
Simulates: Nano Particle Resin
Properties: Thermal resistance

A nano particle filled resin NanoTool offers exceptional stiffness and thermal resistance making it a popular material within the Automotive industry.

View the [Nanotool datasheet](#).



Ceramax

Colour: Opaque White
Simulates: High temperature plastic
Properties: Heat & Wear resistant

Ceramax is a heat and wear resistant ceramic based material, suitable for both aesthetic and functional components.

View the [Ceramax datasheet](#).



Perform (New)

Colour: Opaque White
Simulates: High temperature plastic
Properties: Heat resistant, durable, stiff

Perform is a durable and strong composite material, suitable for wind tunnel test and tooling applications.

View the [Perform datasheet](#).

Watershed

USP Grade VI & ISO 13485 Approved
water-clear, water-resistant resin.

Applications

- Medical Models
- Packaging
- Water flow analysis
- RTV Patterns
- Durable Concept Models
- Wind Tunnel Testing
- Quick Cast Patterns
- Lenses



Physical Properties

Colour	Water Clear
Type	ABS like resin

Mechanical Properties

		TEST/ISO
Flexural Strength (MPa)	63.1 – 74.2	ATSM D790
Flexural Modulus (MPa)	2,040 – 2,370	
Tensile Strength (MPa)	47.1 – 53.6	ATSM D638
Tensile Modulus (MPa)	2,650 – 2,880	
Elongation Break (%)	11 – 20	
Impact Strength (J/m)	0.2 – 0.3	ATSM D256
Water Absorption (%)	35	ATSM D570 -98

Thermal & Specific Properties

Glass Transition Temperature Tg (°C)	39 – 46	E1545 - 00
Heat Deflection Temperature (°C) @ 0.46 MPA @ 1.81 MPA	45.9 – 54.5 49 – 49.7	ATSM D648
Co-efficient of Thermal Expansion (µ/m°C) TMA (<Tg, -40 – 0°C) TMA (<Tg, 0 – 50°C) TMA (<Tg, 50 – 100°C) TMA (<Tg, 100 – 100°C)	66 – 67 90 – 96 170 – 189 185 – 189	ATSM E831-93

[Click here](#) to request a quote
or phone us on 028 9070 6940

Thermal & Specific Properties		
Dielectric Constant		
60Hz	3.9 – 4.1	ATSM D150 -98
1KHz	3.7 – 3.9	
1MHz	3.4 – 3.5	
Dielectric Strength (kV/mm)	16.3	ASTM D149 -97A
Index of Radiation	1.512 – 1.515	ASRM D542

Xtreme

Tough, functional material
ideal for snap fits and tough enclosures.

Applications

- Fit form and function prototypes
- Durable assemblies
 - Snap fit assemblies
 - Tough enclosures
 - Consumer electronic components
- Master patterns for RTV/Silicone Mouldings
- Replace CNC machining of ABS/PC



Physical Properties

Colour	Grey
Type	Simulate PC/ABS

Mechanical Properties

Hardness	Shore A/D	86D	TEST/ISO
			868
Flexural Strength (MPa)		52 - 71	ATSM D790
Flexural Modulus (MPa)		1,520 - 2,070	
Tensile Strength (MPa)		38 - 44	ATSM D638
Tensile Modulus (MPa)		1,790 - 1,980	
Elongation Break (%)		14 - 22	ATSM D256
Impact Strength (J/m)		35 - 52	

Thermal & Specific Properties

Glass Transition Temperature Tg (°C)	52	DMA,E''
Heat Deflection Temperature (°C)		ATSM D648
@ 66 PSI	62	
@ 264 PSI	54	

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NeXt

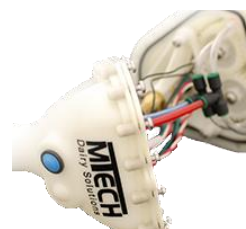
Extremely Durable Resin

Ideal For Production Of Tough Complex Parts

Applications

Low volume manufacturing applications ideal for functional end-use.
Performance prototypes such as:

- Snap-fit designs
- Impellers
- Duct work
- Connectors and Electronic Covers
- Automotive Housings and Dashboard Assemblies
- Packaging and Sporting goods



Physical Properties

Colour	White
Type	Simulates Tough Functional Thermoplastic

Mechanical Properties

Hardness (Shore D)	82	TEST/ISO
		ATSM D2240
Flexural Strength (MPa)	67.8 - 70.8	ATSM D790
Flexural Modulus (MPa)	2,415 - 2,525	
Tensile Strength at Yield (MPa)	41.1-43.3	ATSM D638
Tensile Modulus (MPa)	2,370 - 2,490	
Elongation Break (%)	8 - 10	ATSM D256
Impact Strength (J/cm)	0.47 - 0.52	

Thermal & Specific Properties

Glass Transition Temperature Tg (°C)	43 - 47	DMA,E"
Heat Deflection Temperature (°C)		ATSM D648
@ 66 PSI	55 - 57	
@ 264 PSI	48 - 51	
Co-efficient of Thermal Expansion (µ/m°C)		ATSM E831-05
TMA (T<Tg, -40 - 0°C)	71.5 - 74.3	
TMA (T<Tg, 0 - 50°C)	106.5 - 114.5	
TMA (T<Tg, 50 - 100°C)	168.6 - 176.4	
TMA (T<Tg, 100 - 150°C)	168.8 - 176.4	

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Si25

Flexible resin
good for snap fits.

Applications

- Functional components for assemblies and mock ups
- Master patterns for RTV/Silicone Mouldings
- Automotive styling parts/Consumer Electronic components/Toys
- Snap fit assemblies
- Replace CNC Machining of polypropylene for short run plastic parts
- Simulate injection moulded parts
- Concept & Marketing Models



Physical Properties

Colour	White
Type	Simulates PP

Mechanical Properties

Hardness	Shore A/D	80D	TEST/ISO
			868
Flexural Strength (MPa)		55 - 58	ATSM D790
Flexural Modulus (MPa)		1,380 - 1,660	
Tensile Strength (MPa)		38	ATSM D638
Tensile Modulus (MPa)		1,590 - 1,660	
Elongation Break (%)		13-20	ATSM D256
Impact Strength (J/m)		19 - 24	

Thermal & Specific Properties

Glass Transition Temperature Tg (°C)	60	DMA,E"
Heat Deflection Temperature (°C)		ATSM D648
@ 0.46MPa	58 - 63	
@ 1.81MPa	51 - 55	ATSM E831-93
Co-efficient of Thermal Expansion (μ/m°C)		
TMA (T<Tg, 0 - 20°C)	107	
TMA (T<Tg, 90 - 150°C)	151	

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Si60

High clarity models
in durable, stiff resin.

Applications

- Tough functional prototypes
- Automotive design components
- Lighting components & consumer electronics
- Medical instruments, devices & lab-ware
- Transparent assemblies & clear display/fluid flow models
- Patterns for Investment/urethane castings
- Concept & Marketing models



Physical Properties

Colour	Clear
Type	Simulates PC

Mechanical Properties

Hardness	Shore A/D	86D	TEST/ISO
			868
Flexural Strength (MPa)		87 - 101	ATSM D790
Flexural Modulus (MPa)		2,700 - 3,000	
Tensile Strength (MPa)		58 - 68	ATSM D638
Tensile Modulus (MPa)		2,690 - 3,100	
Elongation Break (%)		5 - 13	ATSM D256
Impact Strength (J/m)		15 - 25	

Thermal & Specific Properties

Glass Transition Temperature Tg (°C)	58	DMA,E"
Heat Deflection Temperature (°C)		ATSM D648
@ 0.46MPa	53 - 55	
@ 1.81MPa	48 - 50	
Co-efficient of Thermal Expansion (μ/m°C)		ATSM E831-93
TMA (T<Tg, 0 - 40°C)	71	
TMA (T>Tg, 75 - 140°C)	153	

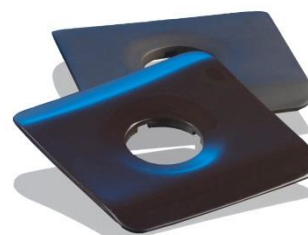
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SL7820

Excellent Dimensional Stability
with good surface finish detail

Applications

- Black parts with high strength & good dimensional stability (even in humid conditions)
- ABS like, fine detailed surfaces
- Ideal for building
 - Automotive Parts
 - Packaging
 - Housings
 - Consumer Goods
 - Electronics
 - Toys



Physical Properties

Colour	Black
Type	ABS like resin

Mechanical Properties

Hardness	Shore A/D	86D	TEST/ISO
			868
Flexural Strength (MPa)		59 - 80	ATSM D790
Flexural Modulus (MPa)		2,000 - 2,400	
Tensile Strength (MPa)		36 - 51	ATSM D638
Tensile Modulus (MPa)		1,900 - 2,400	
Elongation Break (%)		6 - 16	ATSM D256
Impact Strength (J/m)		42 - 48	

Thermal & Specific Properties

Glass Transition Temperature Tg (°C)	62	DMA,E"
Heat Deflection Temperature (°C) @ 66 PSI	51	ATSM D648
Co-efficient of Thermal Expansion (µ/m°C)	93	ATSM E831-93

[Click here](#) to request a quote
or phone us on 028 9070 6940

Ceramax

High Temperature Stiff/Rigid Resin

Excellent abrasion, moisture & thermal resistance

Applications

- Heat and wear resistant components.
- Stiff/Rigid assemblies and prototypes
- Composite ceramic-like components
- Aesthetic components
- Moisture stable components
- Where metal plating of prototype parts is required



Physical Properties

Colour	Opaque White
Type	Ceramic Filled

Mechanical Properties

Hardness	Shore A/D	89D	TEST/ISO
			868
Flexural Strength (MPa)		137 - 145	ATSM D790
Flexural Modulus (MPa)		8,270 - 8,370	
Tensile Strength (MPa)		78 - 87	ATSM D638
Tensile Modulus (MPa)		9,460 - 9,680	
Elongation Break (%)		0.7 - 1.0	ATSM D256
Impact Strength (J/m)		14.5 - 17.9	

Thermal & Specific Properties

Glass Transition Temperature Tg (°C)	108 - 110	DMA,E"
Heat Deflection Temperature (°C)		ATSM D648
@ 66 PSI	148	
@ 264 PSI	95	
@ 66 PSI w/ Thermal Postcure	220	
Co-efficient of Thermal Expansion (µ/m°C)		ATSM E831-93
TMA (T<Tg, 25 - 57°C)	31.1	
TMA (T<Tg, 70 - 200°C)	87.4	

[Click here](#) to request a quote
or phone us on 028 9070 6940

NanoTool

High Temperature Resin

Exceptional Stiffness & Thermal Resistance

Applications

- Wind Tunnel Testing for Motorsport & Aerospace Industries
- Production of rapid tools for injection moulding
- Where heat generated by Electrical components may be a factor i.e. Lighting Design
- Covers & Enclosures of Electrical & Mechanical components
- Where metal plating of prototype parts is required



Physical Properties

Colour	Off White
Type	Nano-particle Filled

Mechanical Properties

Hardness	Shore A/D	94D	TEST/ISO
			868
Flexural Strength (MPa)		79 - 121	ATSM D790
Flexural Modulus (MPa)		10,200 - 10,800	
Tensile Strength (MPa)		61.7 - 78	ATSM D638
Tensile Modulus (MPa)		11,00 - 11,400	
Elongation Break (%)		0.7 - 1.0	ATSM D256
Impact Strength (J/m)		0.12 - 0.15	

Thermal & Specific Properties

Glass Transition Temperature Tg (°C)	57 - 62	DMA,E"
Heat Deflection Temperature (°C)		ATSM D648
@ 66 PSI	225	
@ 264 PSI	85 - 90	
@ 66 PSI w/ Thermal Postcure	258 - 263	
Co-efficient of Thermal Expansion (µ/m°C)		ATSM E831-93
TMA (T<Tg, -40 - 0°C)	25.3 - 26	
TMA (T<Tg, 0 - 50°C)	30.4 - 32.4	
TMA (T<Tg, 50 - 100°C)	75.9 - 87.4	
TMA (T<Tg, 100 - 150°C)	90 - 95.7	

[Click here](#) to request a quote
or phone us on 028 9070 6940

PerFORM

Durable, stiff Resin

Ideal for the production of high heat resistant parts

Applications

PerFORM produces strong, stiff parts with excellent high heat resistance. It is an ideal material for

- Tooling
- Wind Tunnel Testing
- High Temperature Testing
- Electrical Casings
- Automotive Housings



Physical Properties

Colour	Off-White
Type	Ceramic Filled

Mechanical Properties

	UV Postcure	Thermal Postcure	TEST/ISO
Hardness Shore A/D	94	93	ATSM D2240
Flexural Strength (MPa)	120	146	ATSM D790
Flexural Modulus (MPa)	10,000	9,030	
Tensile Strength (MPa)	68	80	ATSM D638
Tensile Modulus (MPa)	10,500	9,800	
Elongation Break (%)	1.1	1.2	
Impact Strength (J/m)	17	20	ATSM D256A

Thermal & Specific Properties

	UV Postcure	Thermal Postcure	
Glass Transition Temperature Tg (°C)	72	81	DMA,E"
Heat Deflection Temperature (°C)			ATSM D648
@ 66 PSI	132	268	
@ 264 PSI	82	119	
Co-efficient of Thermal Expansion (µ/m°C)			ATSM E831-05
TMA (T<Tg, -40 - 0°C)	29.9	26.4	
TMA (T<Tg, 0 - 50°C)	49.4	34.3	
TMA (T<Tg, 50 - 100°C)	79.1	59.9	
TMA (T<Tg, 100 - 150°C)	80.9	94.7.	

[Click here](#) to request a quote
or phone us on **028 9070 6940**



FAQS: DSM SOMOS MEDICAL-GRADE MATERIALS

DSM Somos WaterShed® XC 11122 and ProtoGen™ 18420 have passed ISO 10993 biocompatibility testing. This is a major accomplishment, given this ISO test is considered to be more stringent and more widely accepted within the medical device community worldwide than even USP Class VI.

Below, we have provided you with some FAQs which will help you communicate about these materials to your customers. Please familiarize yourselves with the information and, if you have any questions, as always, please contact us directly.

Q: Are Somos® medical-grade materials FDA approved?

A: No. Somos ProtoGen™ 18420 and WaterShed® XC stereolithography materials are not FDA approved. They meet ISO 10993-5: Cytotoxicity, ISO10993-10: Sensitization, ISO 10993-10: Irritation, and USP Class VI standards.

Q: Are there special handling/post -processing procedures that need to be followed in order to supply parts that meet medical approvals?

A: Yes. For more information please contact your DSM Somos sales representative http://www.dsmsomos.info/pages/contact_us/en/map.htm

Q: What is USP Class VI?

A: The USP Class tests are designed to determine the biological response of animals to direct and/or indirect contact with the test material. For more information please visit US Pharmacopoeias' website.

Q: What is ISO 10993?

A: Cytotoxicity Tests - ISO 10993-5 is a Cytotoxicity in-vitro screening test used to assess, in a fast and sensitive way, the biocompatibility of the test material when in contact with a specific cell culture.

Sensitization Tests - ISO 10993-10 is a sensitization test used to determine the allergic or sensitizing capacity to the repeated or prolonged exposure of a test material. Sensitization is characterized by the fact that reactions are delayed, not localized, and independent of dose.

Irritation Tests - ISO 10993-10 is an in-vivo irritation test to evaluate the potential for test materials, or their extracts, to cause irritation on an exposed part of the body. Standard studies are single exposure evaluations.

For more information please visit ISOs' website.

Q: Other SL resin suppliers claim to offer medical -grade resins, so how can DSM Somos be the first to meet ISO medical standards?



A: DSM Somos is the first SL resin supplier to actually have ISO 10993 testing conducted on its materials and to subsequently pass those tests and receive full certifications. To view or receive copies of the ISO certificates for Somos medical-grade materials, please contact your DSM Somos sales representative.

Q: Does this mean that prototypes made with the above -specified DSM Somos resins are:

- Suitable for extended skin contact (i.e. hearing aids)? Yes. Please contact your DSM Somos sales representative for more information.
- Able to be used for applications that will include contact with body fluids? Please contact your DSM Somos sales representative for more information.
- Implantable? No. It is important to note that DSM Somos medical grade materials with ISO 10993-5 and ISO 10993-10 certification cannot be used to create implantable devices.

Q: Can DSM Somos medical-grade materials be used to create end -use medical devices?

A: DSM Somos medical-grade materials can be used to create SOME medical devices (please contact your DSM Somos sales representative for details), however additional medical testing is required by regional and international regulatory departments.

Most medical device manufacturers, after the final device is created, are required to apply for additional regulatory certifications for the device based on what it is designed to do.

Q: What sterilization techniques can be used for prototypes made from DSM Somos medical -grade materials?

A: Products made from Somos medical-grade materials can be sterilized using common sterilization techniques. For more details on recommended sterilization methods, please contact your DSM Somos sales representative

http://www.dsmsomos.info/pages/contact_us/en/map.htm

Have questions regarding ISO 10993 certification for DSM Somos stereolithography materials?

Please contact: Christine Woollard
DSM Somos
1122 St. Charles Street
Elgin, IL 60120 USA
847-608-2596
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www.dsmsomos.com

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SOMOS® PERFORM

Description

Somos® PerFORM produces strong, stiff, high-temperature resistant composite parts on standard 355 nm stereolithography machines. This material's lower viscosity makes processing parts faster. It exhibits superior sidewall quality, along with excellent detail resolution compared to other composite stereo lithography materials.

Applications

Somos® PerFORM is an easy to process material with excellent detail resolution. It is the ideal material for creating strong, stiff parts with excellent high heat resistance, including wind tunnel models for aerospace and automotive applications, as well as rapid tooling for injection moulding.

Technical Data – Liquid Properties	
Appearance	Off-White
Viscosity	~1,000 cps @ 30°C
Density	~1.61 g/cm ³ @ 25°C

Technical Data – Optical Properties		
EC	7.8 mJ/cm ²	[Critical Exposure]
DP	4.3 mils	[slope of cure-depth vs. ln (E) curve]
E10	80 mJ/cm ²	[exposure that gives 0.254 mm (.010 inch) thickness]



Somos® PerForm Technical Data*

Mechanical and Thermal/Electrical Properties		Somos® PerForm UV Post cure		UV & Thermal Post cure	
ASTM Method	Property Description	Metric	Imperial	Metric	Imperial
D638-10	Tensile Strength	~68 MPa	~9.9 ksi	~80 MPa	~11.8 ksi
D638-10	Tensile Modulus	~10,500 MPa	~1,520 ksi	~9,800 MPa	~1,420 ksi
D638-10	Elongation at Break	~1.1%	~1.1%	~1.2%	~1.2%
D638-10	Poisson's Ratio	~0.32	~0.32	~0.33	~0.33
D790-10	Flexural Strength	~120 MPa	~16.5 ksi	~146 MPa	~21.2 ksi
D790-10	Flexural Modulus	~10,000 MPa	~1,340 ksi	~9,030 MPa	~1,310 ksi
D256-10	Izod Impact (Notched)	~17 J/m	~0.32 ft-lb/in	~20 J/m	~0.31 ft-lb/im
D2240-05	Hardness (Shore D)	94	94	93	93
D570-98	Water Absorption	0.2%	0.2%	0.1%	0.1%
E831-12	C.T.E. -40 - 0°C (-40 - 32°F)	~29.9 µm/m°C	~16.6 µin/in°F	~26.4 µm/m°C	~14.7 µin/in°F
E831-12	C.T.E. 0 - 50°C (32 - 122°F)	~49.4 µm/m°C	~27.4 µin/in°F	~34.3 µm/m°C	~19.1 µin/in°F
E831-12	C.T.E. 50 - 100°C (122 - 212°F)	~79.1 µm/m°C	~43.9 µin/in°F	~59.9 µm/m°C	~33.3 µin/in°F
E831-12	C.T.E. 100 - 150°C (212 - 302°F)	~80.9 µm/m°C	~44.9 µin/in°F	~94.7 µm/m°C	~52.6 µin/in°F
D15-11	Dielectric Constant 60 Hz	~4.0	~4.0	~4.0	~4.0
D150-11	Dielectric Constant 1 KHz	~3.8	~3.8	~3.9	~3.9
D150-11	Dielectric Constant 1 MHz	~3.6	~3.6	~3.7	~3.7
D149-09	Dielectric Strength	~26.3kV/mm	~668 V/mil	~25.4 kV/mm	~644 V/mil
E1545-11	Tg	~72°C	~162°F	~81°C	~178°F
D648-07	HDT @ 1.81 MPa (264psi)	~82°C	~180°F	~119°C	~246°F

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SOMOS® WATERSHED XC 11122

Description

DSM's Somos® WaterShed XC 11122 is a low viscosity liquid photopolymer that produces strong, tough, water-resistant, ABS-like parts. Most importantly, parts created with Somos® WaterShed XC 11122 are nearly colorless, and look more like true, clear engineered plastic. In addition, Somos® WaterShed XC 11122 has been formulated with the Somos® Oxetane Advantage™— an advanced chemistry platform that produces parts with outstanding water resistance and high dimensional stability.

Applications

This ABS-like photopolymer is used in solid imaging processes, like stereo lithography, to build three-dimensional parts. Somos® WaterShed XC 11122 offers many properties that mimic traditional engineering plastics, including ABS and PBT. This makes the material ideal for many applications in the automotive, medical and consumer electronic markets and include lenses, packaging, water flow analysis, RTV patterns, durable concept models, wind tunnel testing and investment casting patterns

Technical Data – Liquid Properties	
Appearance	Optically clear, near colourless
Viscosity	~260 cps @ 30°C
Density	~1.12 g/cm ³ @ 25°C

Technical Data – Optical Properties		
EC	11.5 mJ/cm ²	[Critical Exposure]
DP	6.50 mils	[slope of cure-depth vs. ln (E) curve]
E10	54 mJ/cm ²	[exposure that gives 0.254 mm (.010 inch) thickness]



Technical Data							
Mechanical Properties		Somos® Watershed XC 11122 – UV Postcure		ABS* (Transparent)		Polybutylene* Terephthalate	
ASTM Method	Property Description	Metric	Imperial	Metric	Imperial	Metric	Imperial
D638M	Tensile Strength at Break	47.1 – 53.6 MPa	6.8 – 7.8 ksi	45.7 MPa	6.8 ksi	55 MPa	8.0 ksi
D638M	Elongation at Break	11 – 20%	11 – 20%	41.6%	41.6%	20%	20%
D638M	Elongation at Yield	3%	3%	N/A	N/A	3.5 – 9%	3.5 – 9%
D638M	Modulus of Elasticity	2,650 – 2,880 MPa	384 – 420 ksi	2,000 MPa	290 ksi	2,700 MPa	391 ksi
D970M	Flexural Strength	63.1 – 74.2 MPa	9.2 – 10.8 ksi	73.5 MPa	11 ksi	80 MPa	11.6 ksi
D790M	Flexural Modulus	2,040 – 2,370 MPa	296 – 344 ksi	2,300 MPa	334 ksi	2,500 MPa	363 ksi
D256A	Izod Impact (Notched)	0.2 – 0.3 J/m	0.4 – 0.6 ft-lb/in	1.61 J/m	1.5 – 2.0 ft-lb/in	1.3 J/m	0.56 ft-lb/in
D542	Index of Refraction	1.512 – 1.515	1.512 – 1.515	1.52	1.52	N/A	N/A
D1004-09	Graves Tear	150,288 N/m	833 – 858 ft-lb/in	N/A	N/A	N/A	N/A
D570-98	Water Absorption	0.35%	0.35%	0.20 – 0.45%	0.20 -0.45%	0.16%	0.16%

Technical Data							
Thermal/Electrical Properties		Somos® Watershed XC 11122 – UV Postcure		ABS* (Transparent)		Polybutylene* Terephthalate	
ASTM Method	Property Description	Metric	Imperial	Metric	Imperial	Metric	Imperial
E831-05	C.T.E. -40 - 0°C (-40 - 32°F)	66 – 67 µm/m°C	37 µin/in°F	60 – 130 µm/m°C	33 – 72 µin/in°F	50 – 145 µm/m°C	28 – 81 µin/in°F
E831-05	C.T.E. 0 - 50°C (32 - 122°F)	90 - 96 µm/m°C	50 -53 µin/in°F				
E831-05	C.T.E. 50 - 100°C (122 - 212°F)	170 - 189 µm/m°C	94 – 105 µin/in°F				
E831-05	C.T.E. 100 - 150°C (212 - 302°F)	185 - 189 µm/m°C	103 – 105 µin/in°F				
D150-98	Dielectric Constant 60 Hz	3.9 – 4.1	3.9 – 4.1	3.7	3.7	2.9 – 4.0	2.9 – 4.0
D150-98	Dielectric Constant 1 KHz	3.7 – 3.9	3.7 – 3.9	N/A	N/A	2.9 – 4.0	2.9 – 4.0
D150-98	Dielectric Constant 1 MHz	3.4 – 3.5	3.4 – 3.5	3.7	3.7	2.9 – 4.0	2.9 – 4.0
D149-97A	Dielectric Strength	15.4 – 16.3 kV/mm	390 – 413 V/mil	13.8 – 19.7 kV/mm	350 – 500 V/mil	14.7 – 30 kV/mm	373 – 762 V/mil
E1545-00	Tg	39 - 46°C	102 - 109°F	N/A	N/A	41°C	106 °F
D648	HDT @ 0.46 MPa (66 psi)	45.9 – 54.5°C	115 – 130 °F	94 – 207 °C	201 – 405 °F	150°C	302°F
D648	HDT @ 1.81 MPa (264 psi)	49.0 – 49.7°C	120°F	86 – 194 °C	187 – 381 °F	61°C	142°F

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Product Data

Somos[®] NeXt LV Grey

Description

Somos[®] NeXt LV Grey creates tough, ABS-like parts with a high modulus while maintaining a low viscosity for effortless cleaning. Somos[®] NeXt LV Grey has good water resistance and thermal properties. This third generation Somos[®] high impact material focuses on creating quality resins that can produce tough, complex parts.

Applications

Somos[®] NeXt LV Grey produces parts that are more resistant to fracture and cracking than standard SL resins. It is ideal for use in functional testing and low-volume manufacturing applications.

This resin is excellent for functional end-use performance parts, especially snap-fit designs, impellers, connectors, and sporting goods.

TECHNICAL DATA - LIQUID PROPERTIES

Appearance	Opaque Grey
Viscosity	~480 mPas @ 30°C
Density	~1.12 g/cm ³ @ 25°C

TECHNICAL DATA - OPTICAL PROPERTIES

E _c	10.23 mJ/cm ²	[critical exposure]
D _p	5.04 mils	[slope of cure-depth vs. ln (E) curve]
E ₁₀	101.2 mJ/cm ²	[exposure that gives 0.254 mm (.010 inch) thickness]

TECHNICAL DATA			
Mechanical Properties		Somos® NeXt LV Grey UV Postcure	
ASTM Method	Property Description	Metric	Imperial
D638M	Tensile Modulus	2,970 - 3,285 MPa	431 - 476 ksi
D638M	Tensile Strength at Yield	60 - 66 MPa	8.7 - 9.6 ksi
D638M	Elongation at Break	4.6 - 7.2%	4.6 - 7.2%
D638M	Elongation at Yield	3.0%	3.0%
D790M	Flexural Stress at 5% Strain	4.6 - 7.2%	4.6 - 7.2%
D790M	Flexural Modulus	1,843 - 2,017 MPa	267 - 292 ksi
D256A	Izod Impact (Notched)	0.30 - 0.35 J/cm	0.56 - 0.66 ft-lb/in
D2240	Hardness (Shore D)	84	84
D570-98	Water Absorption	0.36 - 0.40%	0.36 - 0.40%

TECHNICAL DATA			
Thermal/Electrical Properties		Somos® NeXt LV Grey UV Postcure	
ASTM Method	Property Description	Metric	Imperial
E831-06	C.T.E. before Tg (~44°C)	74.3 - 80.5 $\mu\text{m}/\text{m}^\circ\text{C}$	41.2 - 44.7 $\mu\text{in}/\text{in}^\circ\text{F}$
E831-06	C.T.E. after Tg (~44°C)	218 - 236 $\mu\text{m}/\text{m}^\circ\text{C}$	121.1 - 131.1 $\mu\text{in}/\text{in}^\circ\text{F}$
D150-98	Dielectric Constant and Dissipation Factor 1 kHz	k' = 3.75, D = 0.02	k' = 3.75, D = 0.02
D149-97a	Dielectric Strength	21.6 - 23.4 kV/mm	549 - 594 V/mil
E1545-05A	Tg	40 - 48°C	104 - 118°F
D648-07B	Deflection Temperature (0.46 MPa)	53 - 57°C	127 - 135°F
D648-07B	Deflection Temperature (1.82 MPa)	49 - 57°C	120 - 135°F

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