

SLA Resins & Rigid Plastics – Stereolithography (SLA), comparison with other common materials

Description	ASTM	Units	SLA Resins						Common Rigid Plastic Materials							
			Durable	Rigid		Clear	NeXt	PerFORM		Polyprop	Acetal CP	Trans-ABS	PolyCarb	Nylon6:6	ABS	HDPE
			UV Cure	+Heat Treated			UV Cure	+Heat Treated								
Tensile Strength	D638M	MPa	31	64-67		50	32	68	80	31	68	44	62	63	46	27
Tensile Modulus	D638M	MPa	1,340	2,800-3,980		2,800	2,430	10,500	9,800	1,500	3,000	2,200	2,300	2,100	2,400	1,380
Elongation at Break	D638M	%	20	4-7		11	9	1.1	1.2	20	-	-	110	80	42	400
Flexural Strength	D790M	MPa	45	105-118		70	69	120	146	50	-	72	94	88	70	31
Flexural Modulus	D790M	MPa	1,380	2,760-3,400		2,200	2,470	10,000	9,030	1,600	2,553	2,150	2,300	2,400	2,100	1,200
Impact Notched	D256A	J/m	50	22-29		25	50	17	20	60	53	149	71	15	16	69
Heat Defection 66psi	D648	°C	56	65	130	52	56	132	268	75	-	-	130	210	94	78
Heat Defection 264psi	D648	°C	45	57	110	49	50	82	119	64	111	-	120	110	82	-
Hardness Shore D	D2240		81	86		84	82	94	93	70	-	-	88	84	78	70
Water Absorption (24hr)	D570-98	%	-	0.25		0.35	0.4	0.2	0.1	-	0.2	0.3	0.17	2.2	1	0.1
Density (SG) at 25°C	D792	g/cm ³	1.13	1.17		1.12	1.17	1.61		0.94	-	1.07	1.2	1.14	1.06	0.95
Index of Refraction	D542		-	-		1.51	-	-		-	-	-	1.51	-	-	-
Dielectric Constant 60Hz	D150-98		-	-		4.0	4.65	4.0	4.0	-	-	-	-	-	-	-
Dielectric Constant 1KHz	D150-98		-	-		3.8	3.97	3.8	3.9	-	-	-	-	-	-	-
Dielectric Constant 1MHz	D150-98		-	-		3.45	3.62	3.6	3.7	-	-	-	-	-	-	-
Dielectric Strength	D149-97a	kV/m	-	-		15.9	15.2	26.3	25.4	-	-	-	-	-	-	-
Natural Colour			Milky	Amber		Clear	Off-White	Off-White								

SLS – Selective Laser Sintering (Nylon Polyamide 12)

Description	ISO	Units	Material	
			Unfilled	Glass filled (30%)
Tensile Modulus	527-1/-2	MPa	1,650	3,200
Tensile Strength	527-1/-2	MPa	48	51
Strain at break	527-1/-2	%	18	9
Charpy impact strength	179/1eU	kJ/m ²	53	35
Charpy notched impact strength (+23°C)	179/1eA	kJ/m ²	4.8	5.4
Flexural Modulus (23°C)	178	MPa	1,500	2,900
Flexural Strength	178	MPa	-	73
Izod Impact notched (23°C)	180/1A	kJ/m ²	4.4	4.2
Izod Impact unnotched (23°C)	180/1U	kJ/m ²	33	21
Ball indentation hardness	2039-1	MPa	77	98
Melting temperature (20°C)/min	11357-1/-3	°C	176	176
Temp. of deflection under load (1.80MPa)	75-1/-2	°C	-	96
Temp. of deflection under load (0.45MPa)	75-1/-2	°C	-	157
Vicat softening temperature (50°C/h 10N)	306	°C	181	179
Vicat softening temperature (50°C/h 50N)	306	°C	163	166
Density (SG) laser sintered	EOS Method	kg/m ³	930	1,220
Natural Colour			White*	Off-White*

*Colour dyeing options available

FDM – Fused Deposition Modelling

			Material	
			ABS-M30	
Description	ASTM	Units	XZ Axis	ZX Axis
Tensile Strength	D638M	MPa	32	28
Tensile Modulus	D638M	MPa	2,230	2,180
Elongation at Break	D638M	%	7	2
Flexural Strength	D790M	MPa	60	48
Flexural Modulus	D790M	MPa	2,060	1,760
Impact Notched	D256A	J/m	128	-
Heat Defection 66psi	D648	°C	96	
Heat Defection 264psi	D648	°C	82	
Hardness Rockwell R	D785		110	
Density (SG)	D792	g/cm ³	1.04	
Dielectric Constant	D150-98		2.6-2.86	
Dielectric Strength	D149-09	kV/mm	3.94	14.2
Natural Colour			Ivory or Black	



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RIGID URETHANES

Description	ASTM	Units	Material	
			TC-857	TC-808
Tensile Strength	D638M	MPa	63	41
Tensile Modulus	D638M	MPa	2,000	1,310
Elongation at Break	D638M	%	11	7
Flexural Strength	D790M	MPa	84	43
Flexural Modulus	D790M	MPa	2,068	1,172
Impact Notched	D256A	J/m	50	28
Heat Deflection 66psi	D648	°C	102	77
Heat Deflection 264psi	D648	°C	99	-
Hardness Shore D	D2240		84	78
Density (SG) at 25°C	D792		1.12	1.08
Index of Refraction	D542		1.5	-
Natural Colour			Clear	White

Silicon Rubber

Description	ASTM	Units	Material			
			TC5030	TC5040	TC5050	TC5060
Tensile Strength	D412-98A	MPa	4.8	6	ASTM D638 4.4	5.2
Elongation at Break	D412-98a (2002)e1	%	400	540	325	225
Tear Strength	D624-00e1	Pli	65	95	87	85
Shrinkage in/in linear	D2566 @ 1"depth		Nil	Nil	Nil	Nil
Coefficient of thermal expansion		In/in/F	TBD	8.5x10 ⁻⁵	8.5x10 ⁻⁵	TBD
Hardness Shore A	D2240		30	40	50	60
Density (SG) at 25°C	D792	g/cm ³	1.08	1.09	TBD	1.34
Natural Colour			Clear	Clear	Blue	Pale Green

FLEXIBLE URETHANES

Description	ASTM	Units	Material								
			25A	30A	40A	50A	60A	70A	80A	90A	95A
Hardness Shore A	D2240-04e1	±5	25	30	40	50	60	70	80	90	95
Specific Gravity	D792-00	g/cc	1.026	1.029	1.04	1.06	1.07	1.09	1.11	1.091	1.114
Tensile Strength	D412-98a(2002)e1	psi	690	810	759	931	1,260	1,429	2,337	1,819	3,273
Tensile Modulus	D412-98a(2002)e1	psi	135	165	144	243	340	695	1,552	3,314	5,516
Elongation at Break	D638-03	%	1,200	970	793	748	715	1,183	819	843	776
Tear Strength	D624-00e1	pli	60	80	80	114	150	225	328	345	435
Shrinkage in/in linear	D2566 @ 1"depth	in/in	0.0025	0.0030	0.0015	0.0020	0.0016	0.0025	0.0022	0.0025	0.0024
Dielectric Constant, 1MHz	D150-87		5.353	5.769	5.332	5.982	5.376	4.987	5.281	5.003	4.81
Dissipation Factor, 1MHz	D150-87		0.0465	0.058	0.064	0.069	0.064	0.043	0.072	0.053	0.045
Natural Colour			amber	amber	amber	amber	amber	amber	amber	amber	amber

Shore A temperature before deformation is typically 60°C

Data given is for a 7 day ambient cure



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