

## MATERIALS COMPARISON MATRIX

SLA	IMPERIAL		9120	Polypropylene	11122	Transparent ABS	18420	DMX	Nanotool	Tango	
ASTM Method	Description	Units								Black	Gray
D638M	Tensile Strength	PSI	4351 to 4641	4496 to 5395	6831 to 7774	6628	6120 to 6353	4307 to 4656	8949 to 11313	290	632
	Elongation at Break	%	—	—	11 to 20	41.6	8 to 16	12 to 28	0,7 to 1	47.7	47
	Elongation at Yield	%	15 to 25	7 to 13	3,3 to 3,5	—	—	3,3 to 3,7	—	X	X
	Modulus of Elasticity	10 <sup>3</sup> PSI	178 to 211	165 to 225	384 to 418	290	316 to 335	327 to 371	1595 to 1653	—	—
	Poisson's Ratio	—	—	—	—	—	0,43 to 0,45	0,40 to 0,42	0,34 to 0,38	—	—
D790M	Flexural Strength	PSI	5947 to 6672	5947 to 7977	9152 to 10761	10660	9674 to 10225	9863	11458 to 17550	—	—
	Flexural Modulus	10 <sup>3</sup> PSI	190 to 211	170 to 250	296 to 344	333	289 to 309	331 to 333	1479 to 1566	—	—
D256A	Izod Impact-Notched	ft-lb/in	0.9 to 1	0.4 to 1.4	0.37 to 0.56	3	0.37 to 0.41	1.14 to 1.33	0,0022 to 0,0028	—	—
D2240	Shore Hardness	—	80 to 82D	—	—	—	86 to 88D	80D	94D	61A	75A
D542	Index of Refraction	—	—	—	1,512 to 1,515	1.52	—	—	—	—	—
D624	Tear Strength	S.I	—	—	—	—	—	1.1	—	3.8	9.5
D1004	Graves Tear	Lbf/in	—	—	855	—	700	—	—	—	—
D570-98	Water Absorption	%	—	—	0.35	0,2 to 0,45	0.68	0,82 to 0,85	0.23	—	—
E831-00	Thermal expansion Coefficient -40 F to 32 F	µm/m-F	—	—	36.7 to 37.2	—	41.4 to 41.9	46.5 to 47.3	14 to 14.4	—	—
	Thermal Expansion Coefficient 32 F to 122	µm/m-F	—	—	50 to 53.3	—	56.22 to 61.3	68.8 to 74.5	16.88 to 18	—	—
	Thermal Expansion Coefficient 122 F to 212 F	µm/m-F	—	—	94.4 to 105	33.3 to 72.2	63.5 to 75.44	100.67 to 103	42.16 to 48.5	—	—
	Thermal Expansion Coefficient 212 F to 302 F	µm/m-F	—	—	102.7 to 105	—	71.9 to 76.7	99 to 99.9	50 to 53.16	—	—
D150-98	Dielectric Constant at 60Hz	—	—	—	3,9 to 4,1	3.7	3,5 to 3,6	4,2 to 4,5	4	—	—
	Dielectric Constant at 1KHz	—	—	—	3,7 to 3,9	—	3,4 to 3,5	3,8 to 4,1	3.9	—	—
	Dielectric Constant at 1MHz	—	—	—	3,4 to 3,5	3.7	3,1 to 3,3	3,6 to 3,8	3.6	—	—
D149-97a	Dielectric Strength	kV/inch	—	—	391 to 414	350 to 500	335 to 361	358 to 401	396 to 427	—	—
E1545-00	Glass Transition temp (Tg)	F	—	—	102 to 115	—	134.5 to 138	98.5	134.5 to 143.5	12.7	36.7
D648-98c	Heat Deflection temp @ 0,46 Mpa	F	125 to 143	224 to 250	114 to 130	201 to 404	127 to 133	109 to 113	437	—	—
	Heat Deflection temp @ 1,81 Mpa	F	—	—	120 to 121	187 to 381	114 to 116	106	185 to 194	—	—

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SLS	IMPERIAL		DuraForm PA	Nylon 6 Unreinforced	ALM FR-106	Nylon 11	ALM RM250	Nylon 12	A6 Steel	Acier AISI 9260
Method	Description	Units								
ASTM D4164	Density	lb/in <sup>3</sup>	0.021	0.0361 to 0.057	—	0.0361 to 0.038	—	—	0.28	0.28
Diffraction Laser	Particle size d50	µm	58	—	95	—	40 to 50	4 to 63	—	—
Diffraction Laser	Particule size @ 90%	µm	25 to 92	—	—	—	—	—	—	—
ASTM D792	Specific gravity @ 20°C	lb/in <sup>3</sup>	0.035	0.015 to 0.029	0.039	—	0.035	0.0078 to 0,0.015	—	—
ASTM D570	Moisture absorption @ 20°C	%	—	—	—	—	—	—	—	—
ASTM D570	Moisture Absorption @ 23°C, 65% HR	%	0.41	3	—	—	—	—	—	—
ASTM D482	ash content	%	—	—	—	—	—	—	—	—
ASTM D3418	Glass temperature	°F	—	—	—	—	—	—	—	—
DSC	Melting point	°F	363	286 to 491	367	347 to 376	360	257 to 590	—	—
	Melting point, wax	°F	—	—	—	—	—	—	—	—
ASTM D648	Deflection temperature @ 0,45 Mpa	°F	351	107 to 415	—	—	—	—	—	—
ASTM D648	Deflection temperature @ 1,82 Mpa	°F	187	90 to 446	187	104 to 131	—	—	—	—
Vase ouvert Cleveland	Point of ignition Polystyrene	°F	—	—	—	—	—	—	—	—
	Point of ignition wax	°F	—	—	—	—	—	—	—	—
	Spontaneous combustion point	°F	—	—	—	—	—	—	—	—
ASTM D638	tensile strenght	PSi	6381	500 to 32053	5656 to 6672	2175 to 6382	5521 to 6672	1885 to 89053	68000	63816 to 221200
ASTM D638	Tensile modulus	PSi	232060	20305 to 1595415	195076	—	252366	1377 to 9282415	2.001521e+007	2.900755e+007
ASTM D790	Flexural modulus @ 23°C	PSi	186373	11023 to 4032045	—	—	—	—	—	—
ASTM D638	Elongation at break	%	9	1,5 to 500	21 to 38	30 to 400	4 to 16	0,35 to 500	2 to 4	11 to 22
ASTM D624	Tear Strength Matrix C at 23°C	Lbf/in	—	—	—	—	—	—	—	—
ASTM D 4069	R to abrasion Taber,Millstone CS-17, under 1kg (1000 cycles)	mg	—	—	—	—	—	—	—	—
	Resistance to the outbreak (straight) @ 23°C	PSI	—	—	—	—	—	—	—	—
ASTM D256	Izod Impact:	—	—	—	—	—	—	—	—	—
	notched	Ft-Lb/in	4	0.008 to 10000	—	—	—	—	—	—
	unnotched	Ft-Lb/in	8	10	—	—	—	—	—	—
	State surface without post-processing (Ra)	µm	8.5	—	—	—	9	—	—	—
	State surface after post-processing (Ra)	µm	0.13	—	—	—	—	—	—	—
ASTM D2240	Hardness Shore A @ 23°C	—	—	—	—	—	—	—	—	—
ASTM D257-93	Transverse resistivity @ 22°C, 500V	Ohms x in	1,21x10 <sup>14</sup>	—	—	—	—	—	—	—
ASTM D257-93	Surface Resistivity @ 22°C, 500V	Ohms x in	1.17x10 <sup>14</sup>	—	—	—	—	—	—	—
D150-95	Dielectric constant @ 22°C, 5V, 1000 Hz	—	2.9	3,3 to 7	—	—	—	—	—	—
D149-95a	Dielectric strength @ 22°C, 50% VR, In the air , 5V V/Sec	V/in	41000	34500 to 42000	—	—	—	—	—	—

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