

THIXOMOLDED MAGNESIUM

MATERIAL PROPERTIES & COMPARISON



MATERIAL		MAGNESIUM	MAGNESIUM	PC	PC	NYLON 6/6	PEI	STEEL	ALUMINUM	ZINC
Type		AZ91D	AZ31B	GE Lexan	LNP 30% CF	DuPont Zytel	GE Ultem	316	A380	ZAMAK 3
Process		Thixomolded	Machined Prototype	Injection Molded	Injection Molded	Injection Molded	Injection Molded	Cast	Cast	Cast
MECHANICAL UNITS										
Yield Strength	KSI(MPA)	23.5(160)	29(200)	9(62)	24(165)	11.5(79)	16(110)	34.8(240)	23.1(159)	32.0(221)
Modulus of Elasticity	MSI(GPA)	6.5(45)	6.5(45)	0.33(2.3)	1.9(13.1)	0.41(2.8)	0.48(3.3)	28(193)	10.3(71)	12.4(86)
Elongation	%	7.5 @ break	15 @ break	7 @ yield	2.5 @ break	5 @ yield	7 @ yield	60 @ break	3.5 @ break	10 @ break
Poisson's Ratio	-	0.35	0.35	0.3	0.3	0.3	0.3	0.29	0.33	0.27
Specific Modulus	in x106	99.4	101.6	7.5	21.6	9.5	10.5	96.9	105.0	51.7
PHYSICAL										
Specific Gravity	g/cc	1.81	1.77	1.21	1.33	1.18	1.27	8.0	2.73	6.6
Density	lb/in3	0.065	0.064	0.044	0.048	0.043	0.0459	0.289	0.098	0.24
Specific Volume	in3 per lb	15.29	15.63	22.73	20.83	23.26	21.79	3.46	10.2	4.167
Hardness	Rockwell	75 E	55 E	110 R	120 R	119 R	125 R	80 B	47 B	49 B
THERMAL										
Thermal Conductivity	Btu/ft-hr-F(W/m-K)	41.8(72)	55.5(96)	0.11(0.19)	0.41(0.71)	0.15(0.26)	0.13(0.22)	9.42(16.3)	63(109)	65.3(113)
Specific Heat	Btu/lb-F(kJ/kg-K)	0.25(1.05)	0.24(1.0)	0.28(1.17)	-	0.52(2.2)	-	0.12(0.5)	0.23(0.96)	0.10(0.42)
Coeff. Of Thermal Expansion @ 70F	µin/in-F(µm/m-K)	13.8(25)	14.4(26)	38(68)	9(16)	43.3(78)	31(55.8)	8.89(16)	11.7(21.1)	15.2(27.4)
Deflection Temperature @ 264 PSI	F(C)	>700(370)	-	270(132)	300(149)	176(80)	394(201)	1670(910)	670(354)	480(249)
Melting Temperature	F(C)	790(421)	1120(605)	550(288)	580(305)	486(252)	660(349)	2500(1400)	1000(538)	718(381)
ELECTRICAL										
Electrical Conductivity	% IACS	12	18.5	-	-	-	-	23	27	27
Electrical Resistivity	µOhm-in	43	23.4	-	-	-	-	29	16.3	16.3
Shielding Effectiveness 0.020" thk @ 100MHz	dB	>85	-	<20	<20	<20	<20	-	-	-
Shielding Effectiveness 0.050" thk @ 100MHz	dB	>88	-	<20	<25	<20	<20	-	-	-
CORROSION										
Mil 117B Salt Spray Corrosion	Mils per Year	2.8	-	-	-	-	-	30	15	-
FLAME CHARACTERISTICS										
Ignition Temperature at One Atmosphere	F(C)	900(490)+	-	-	-	-	-	-	-	-
UL94 Flame Exposure Results	-	DNB	-	V-0	V-1	V-0	V-0	-	-	-

TYPICAL TOLERANCES FOR THIXOMOLDED PARTS

Thickness	in (mm)	MIN	0.015(0.38)	MAX	2.0(50.8)	** Dependent on part geometry
Porosity	%	MIN	0.0%	MAX	1.1%	
		RANGE			TOLERANCE	
Linear Dimension: Formed by die features contained in the same die half	in (mm)	0.000	to	1.000	+/-	0.0005(0.013)
	in (mm)	Each additional inch beyond 1 in.			+/-	0.0010(0.025)
Across Parting Line Dimensions: Dimensions formed across the parting line of the two die halves. Based on component projected area.	in (mm)	0.000	to	10.0(64.5)	+	0.0015(0.038)
	in (mm)	11.0(71.0)	to	20.0(129.0)	+	0.0025(0.064)
	in (mm)	21.0(135.5)	to	50.0(322.6)	+	0.004(0.102)
	in (mm)	51.0(329.0)	to	100.0(645.2)	+	0.006(0.152)
Flatness: Across largest dimension of part.	in (mm)	0.000	to	3.00	+/-	0.002(0.051)
	in (mm)	Each additional inch beyond 3 in.			+/-	0.001(0.025)
Moving Die Component Tolerances: Consist of a) Linear Dimension and b) Moving Component Tolerance	in (mm)	0.000	to	10.0(64.5)	+	0.004(0.102)
	in (mm)	11.0(71.0)	to	20.0(129.0)	+	0.006(0.152)
	in (mm)	21.0(135.5)	to	50.0(322.6)	+	0.008(0.203)
	in (mm)	51.0(329.0)	to	100.0(645.2)	+	0.010(0.254)
Surface Finish	Replicates tool finish. Typical plastic tool polish levels employed. Expect 32 RMS or better.					

Values shown are typical values for comparison purposes and should not be used for design. Actual values should be taken from test results.

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