

A Properties Guide to Modern Zinc Alloys and other selected Materials

PROPERTY	UNITS	ZP3	ZP5	ZP2	ZP8	LM24	A380	AZ91D	ABS	NYLON PA66	NYLON PA66 30% GR	POLY-CARBO-NATE	ACETAL
Yield Strength	MPa	268	295	361	319	150	159	111-170	n/a	n/a	n/a	n/a	-
Ultimate Tensile Strength	MPa	308	331	397	387	320	317-324	200-260	25-65	71-85	155-210	54-72	37-70
Youngs Modulus	GPa	96	96	96	96	71	71	44	1.4-5.1	0.7- 4.1	3.2-12.7	1.6-5.5	1.4-3.6
Torsional Modulus	MPa x 10 ³	33+	33+	33+	33+	26.9	26.9	16.5	n/a	n/a	n/a	n/a	-
Elongation at Fracture	%	5.8	3.4	6	3.4	2	3.5	3	2-110	15-300	2.0 -150	8-135	3-250
Shear Strength	MPa	214	262	317	275	-	186	138	-	-	-	-	-
Compressive Yield Stress	MPa	414	600	641	600 appr.	-	-	108-159	-	-	-	-	-
Impact Resistance	Joules	46	52	38	42	3.4	4	3.7-6	1-2	0.6-1.4	5	20-30	8
Fatigue Resistance (5.10 ⁸ cycles)	MPa	48	57	59	51.5	-	70-138	97	7	-	15	7	-
Hardness	Brinell	97	114	130	110	85	80	63-85	too soft	too soft	too soft	too soft	-
Fracture Toughness K _{1c}	x 10 ⁷ N.m ^{-3/2}	2.25	2.1	-	1.95	3.6	3.6	-	-	0.07	-	0.22	0.09
Density	g/cm ³	6.6	6.7	6.8	6.3	2.79	2.76	1.82	1.02-1.21	1.03-1.16	1.11-1.68	1.17-1.45	1.29-1.43
Spec Damping Capacity @ 35 MPa	%	18	-	-	20	-	1	25	-	-	-	-	-
Spec Damping Capacity @ 100 MPa	%	40	-	-	44	-	4	53	-	-	-	-	-
Coeff of Thermal Expansion	µm/m/°C	27.4	27.4	27.8	23.3	21	21.1	25.2-26.0	50-150	65-150	17-104	32-20	12-162
Thermal Conductivity	Wm ⁻¹ °K ⁻¹	113	109	105	115	96	109	51-72.7	0.2	0.24	<1	<1	0.13-0.3
Electrical Conductivity	% IACS	27	26	25	27.7	24	27	11.5-12.1	n/a	n/a	n/a	n/a	n/a
Electrical Resistivity	µ ohm - cm	6.37	6.54	6.85	6.2	-	-	-	-	-	-	-	-
Melting Temperature Range	°C	381-387	380-386	379-390	375-404	520-580	538-593	468-598	-	-	-	-	-
Specific Heat Capacity	J/kg/°C	419	419	419	435	960	960	1020	1960-2130	1600-2750	1200-2350	1000-1200	-
Coeff of Friction	-	0.07	0.08	0.08	0.11	-	-	-	0.45	0.28-0.46	0.28	0.38	0.21
Typical Precision over 100 mm	plus/minus µ	100	100	100	100	250-350	250-350	175	High shrinkage and humidity make close tolerances difficult for plastics				
Min Wall Thickness	mm	0.4	0.4	0.4	0.4	1.3	1.3	1.2	-				
Typical Production Speeds	shots per hour	Large 200-500. Small 400-1000. Tiny 2000-3000.				50-250		Typical 200-275. About 2 thirds Zn, size for size.	Production speeds governed largely by product size, material used and rate of cooling, which, size for size, tends to be far slower than metals				
Broad Production Speed Range	shots per hour	200-3600				30-350		40-2400	Injection moulding speeds 100 to 400 shots per hour				
Typical Tool Life	shots	750,000-2,000,000				100,000-225,000		300,000-500,000	Highly dependent on composition and reinforcement				

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