



BHAGYANAGAR MAGNESIUM

Turn key light weighting solutions using magnesium alloys

Magnesium Alloys Data Sheet

Mechanical & Electrical Properties & Chemical Composition

Alloy Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	AZ91A	AZ91C	AZ91D	AZ91E	AZ92A	AZ31B	AZ80A	AZ81A	AZ63A	AM50A	AM60B	AM100A	QE22A	WE43A	ZK60A	ZK61A
Density (g/cm ³)	1.7	1.7	1.7	1.7	1.8	1.7	1.7	1.7	1.8	1.7	1.7	1.7	2	1.9	1.9	1.9
Melting Point (°C)	600	600	600	600	590	600	600	600	610	620	620	590	640	640	600	640
Ultimate Tensile Strength (MPa)	234 - 240	234 - 270	210 - 230	234 - 260	234 - 270	234 - 270	234 - 320	234 - 240	234 - 260	200 - 210	220 - 230	234 - 270	113 - 221	176 - 250	296 - 330	207 - 234
Yield Strength (0.2% Offset) (Mpa)	120 - 160	110 - 130	130 - 160	110 - 130	124 - 140	124 - 180	131 - 230	84 - 110	110 - 120	110 - 120	110 - 130	103 - 120	124 - 158	128 - 176	221 - 250	145 - 190
Shear Strength (MPa)	140	150	120	150	150	160	170	130	150	120	130	150	150	160	190	200
Fatigue Strength (MPa)	99	85	74	84	83	100	140	78	76	70	70	62	110	84	150	120
Brinell Hardness (HB)	63	62	80	75	81	73	72	55	73	58	62	-	80	-	-	-
Charpy Impact	-	4.1 J	2.7 J	-	-	-	-	-	-	2.8 J	2.8 J	-	-	-	-	-
Modulus of Elasticity (Gpa)	46	46	46	46	47	45	46	46	46	45	45	46	44	44	46	46
Shear Modulus (Gpa)	18	18	18	18	18	17	18	18	18	17	18	18	17	17	18	18
Poisson's Ratio %	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Elongation (% in 50 mm)	5%	4%	3%	4%	2%	8%	9%	9%	4%	11%	9%	3%	3%	6%	5%	7%
Thermal Conductivity (W/m K)	73	73	78	84	58	100	77	84	61	65	62	73	110	51	120	120
Coefficient of Thermal Expansion (um/m.k)	26	26	27	27	26	26	26	27	26	26	26	25	27	27	26	27
Electric Conductivity (% IACS)	10%	11%	11%	11%	12%	18%	11%	12%	12%	16%	13%	11%	25%	12%	30%	29%
Process	Die Casting	Sand Casting	Die Casting	Sand/Die Casting	Sand/Die Casting	Forging	Forging	Sand Casting	Sand Casting	Die Casting	Die Casting	Die Casting	Die Casting	Die Casting	Die Casting	Die Casting

Elements	Chemical Composition															
	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining
Mg	8.5 - 9.5	8.1 - 9.3	8.5 - 9.5	8.1 - 9.3	8.5 - 9.5	2.5 - 3.5	7.8 - 9.2	7.2 - 8.0	5.5 - 6.5	4.5 - 5.3	5.6 - 6.4	9.3 - 10.7	-	-	-	-
Al	0.08	0.1	0.025	0.015	0.2	0.05	0.05	0.081.8	0.20	0.008	0.25	0.1	0.1	0.03	-	0.10
Cu	0.2	0.02	0.08	0.2	0.2	0.1	0.1	0.2	0.2	0.008	0.2	0.3	-	0.01	-	-
Si	0.005	0.005	0.004	0.005	-	0.005	0.005	-	-	0.004	-	-	-	0.01	-	-
Mn	0.15 - 0.40	0.13 - 0.35	0.17 - 0.40	0.17 - 0.35	0.13 - 0.35	0.2 - 1	0.12 - 0.5	0.15 - 0.35	0.15 - 0.35	0.28 - 0.50	0.15 - 0.50	0.1 - 0.35	-	0.15	-	-
Ni	0.01	0.001	0.001	0.001	0.01	0.005	0.005	0.010	0.010	0.001	0.01	0.01	0.01	0.005	-	0.01
Zn	0.49 - 0.9	0.40 - 1.0	0.49 - 0.9	0.40 - 1	1.7 - 2.3	0.60 - 1.4	0.20 - 0.80	0.45 - 0.9	0.5 - 0.9	0.2	0.22	0.3	-	0.2	4.8 - 6.2	5.5 - 6.5
Ag	-	-	-	-	-	-	-	-	-	-	-	-	2.0 - 3.0	-	-	-
Ca	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-
Yt	-	-	-	-	-	-	-	-	-	-	-	-	-	3.7 - 4.3	-	-
Zr	-	-	-	-	-	-	-	-	-	-	-	-	0.4 - 1.0	0.4 - 1.0	0.45 - 1.0	0.6 - 1.0
Rare Earth Metals	-	-	-	-	-	-	-	-	-	-	-	-	1.8 - 2.5	2.4 - 4.4	-	-
Other Impurities	0.3	-	0.01	0.01	0.3	0.3	0.3	0.3	0.3	0.02	0.3	0.3	0.3	0.3	0.30	0.3

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