

# materials information

## Zinc Alloy Composition

%	ZAMAK 3	ZAMAK 5	ZA8	ZA27	ACuZinc5
Aluminum	3.5-4.3	3.5-4.3	8.0-8.8	25.0-28.0	2.8-3.3
Copper	0.25 max	0.75-1.25	0.8-1.3	2.0-2.5	5.0-6.0
Magnesium	0.02-0.05	0.03-0.08	0.015-0.03	0.01-0.02	0.025-0.05
Iron (max)	0.1	0.1	0.075	0.075	0.075
Lead (max)	0.005	0.005	0.006	0.006	0.005
Cadmium (max)	0.004	0.004	0.006	0.006	0.004
Tin (max)	0.003	0.003	0.003	0.003	0.003
Nickel	-	-	-	-	-
Others	-	-	-	-	-
Zinc	Remainder	Remainder	Remainder	Remainder	Remainder

## Magnesium Alloy Composition

%	AZ91D	AM60A
Aluminum	8.3-9.7	5.5-6.5
Manganese	0.15-0.5	0.13-0.6
Zinc	0.35-1.0	0.22 max
Silicon (max)	0.1	0.5
Copper (max)	0.03	0.35
Nickel (max)	0.002	0.03
Iron (max)	0.005	-
Other Metallic (max each)	0.02	-
Magnesium	Remainder	Remainder

## Designations & Standards Cross Reference

Zinc	ZAMAK 3	ASTM B86	SAE 903
	ZAMAK 5	ASTM B86	SAE 925
	ZA8	ASTM B791-45	-
	ZA27	ASTM B791-96	-
Aluminum	A380	ASTM B85	SAE 306
	383	ASTM B85	SAE383
	B390	ASTM B85	-
Magnesium	AZ91D	ASTM B94	SAE 501A
	AM60A	ASTM B94	-

## Aluminum Alloy Composition

%	A380	383	B390
Beryllium	-	-	-
Copper	3.0-4.0	2.0-3.0	4.0-5.0
Iron (max)	1.3	1.3	1.3
Magnesium	0.1 max	0.1 max	0.45-0.65
Manganese	0.5 max	0.5 max	0.5 max
Phosphorus	-	-	0.01 min
Silicon	7.5-9.5	9.5-11.5	16.0-18.0
Zinc (max)	3.0	3.0	1.5
Nickel (max)	0.5	0.3	0.1
Tin	0.35 max	0.15 max	-
Titanium	-	-	0.1 max
Others	0.5 total	0.5 total	0.2 total
Aluminum	Remainder	Remainder	Remainder



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## Mechanical Properties

		Tensile Strength psi	Tensile Strength MPa	Yield Strength (0.2% offset) psi	Yield Strength (0.2% offset) MPa	Impact Strength ft. lb.	Impact Strength J	Shear Strength psi	Shear Strength MPa	Hardness Brinell	Elongation % in 50 mm
Zinc	ZAMAK 3	36-41000	248-283	32000	221	43	58	31000	214	82	10
Zinc	ZAMAK 5	42-48000	289-331	39000	269	48	65	38000	262	91	7
Zinc	ZA8	53-56000	365-386	42000	290	24-35	32-48	40000	275	103	8
Zinc	ZA27	61000	425	53000	371	9	5	47000	325	118	1-3
Zinc	ACuZinc5	59000	407	49000	338	-	-	40600	280	118	5
Magnesium	AZ91D	34000	230	23000	159	2	3	20000	138	63	0.5-3
Magnesium	AM60A	32000	220	19000	131	5	6	-	-	62	8
Aluminum	A380	47000	325	23000	159	2	3	28000	195	83	4
Aluminum	383	43000	300	19000	131	2	3	29000	200	65-90	1-3
Aluminum	B390	41000	283	35000	242	5	6	29000	200	120	1
Brass	C38500	62-77000	430-530	33000	228	12	17	-	-	143	15-25
Brass	C38000	61-67000	420-460	33000	228	12	16	-	-	133	20-25
Steel	SAE1020	65000	448	48000	331	64	87	-	-	143	36

## Physical Properties

		Density lb/cu in	Density g/cm <sup>3</sup>	Melting Range °F	Melting Range °C	Thermal Conductivity Btu-ft/h-ft <sup>2</sup> °F	Thermal Conductivity W/m°C	Thermal Expansion x10 <sup>-6</sup> °F <sup>-1</sup>	Thermal Expansion 10 <sup>-6</sup> °C <sup>-1</sup>	Electrical Conductivity % IACS
Zinc	ALLOY 3	0.24	6.7	719-728	381-387	65.3	113	15.2	27.4	27
Zinc	ALLOY 5	0.24	6.7	717-727	380-386	62.9	109	15.2	27.4	26
Zinc	ZA8	0.23	6.3	707-759	375-404	66.3	115	12.9	23.3	27.7
Zinc	ZA27	0.181	5	708-903	376-484	72.5	125	14.4	26	29.7
Zinc	ACuZinc5	0.25	6.85	755-860	402-460	61.2	106	13.3	24	26.9
Magnesium	AZ91D	0.066	1.81	875-1105	468-596	41.8	72	15	27	11
Magnesium	AM60A	0.065	1.8	1005-1140	540-615	36	62	14.4	26	12.4
Aluminum	A380	0.097	2.7	1000-1100	537-593	55.6	96	11.7	21	27
Aluminum	383	0.097	2.7	977-1058	525-570	57.9	100	11.1	20	26
Aluminum	B390	0.099	2.75	945-1200	507-649	77.5	134	10	17.9	27
Brass	C38500	0.3	8.4	1616-1652	880-900	65.3	113	14.4	26	26
Brass	C38000	0.3	8.4	1652-1688	900-920	62.9	109	11.7	21	25
Steel	SAE1020	0.28	7.8	2600	1426	28.9	50	6.7	12.1	12