PROPERTIES OF ZINC AND ALUMINIUM ALLOYS

TYPICAL MECHANICAL PROPERTIES

	ALUMINUM DIE CASTING ALLOYS						ZINC DIE CASTING ALLOYS						
	A360	A380	383	B390	A413	518	#2	#3	#5	#7	ZA-8	ZA-12	ZA-27
Ultimate Tensile Strength (ksi)	46	47	45	46	42	45	52	41	48	41	54	59	62
Tensile Yield Strength (ksi)	24	23	22	36	19	28	41	32	39	32	41-43	45-48	52-55
Compressive Yield Strength (ksi)	-	-	-	-	-	-	93	60	87	60	37	39	52
Elongation (% in 2")	3.5	3.5	3.5	<1	3.5	5.0	7	10	7	13	6-10	4-7	2.0-3.5
Hardness(BHN) 500kg load 10mm ball	75	80	75	120	80	80	100	82	91	80	100-103	95-105	116-122
Shear Strength, (ksi)	26	27	-	-	25	29	46	31	38	31	40	43	47
Impact Strength ft-lb ASTM .25" diecast bar	-	3	3	-	-	7	35	43	48	43	24-35	15-27	7-12
Fatigue Strength (ksi)(Rotary Bent 10^8)	18	20	21	20	19	20	8.5	6.9	8.2	6.9	15	-	21
Young's Modulus (psi x 10^6)	10.3	10.3	10.3	11.8	-	-	[81]	[81]	[81]	[81]	12.4	12	11.3

[81] Varies with stress level, applicable only for short duration loads, Use 10^7 as a first approximation

PHYSICAL PROPERTIES

	ALUMINUM DIE CASTING ALLOYS						ZINC DIE CASTING ALLOYS						
	A360	A380	383	B390	A413	518	#2	#3	#5	#7	ZA-8	ZA-12	ZA-27
Density (lbs./in^3)	0.095	.098	.099	.098	.096	.093	.24	.24	.24	.24	.227	.218	.181
Melting Range (° F)	1035-1105	1000-1100	960-1080	950-1200	1065-1080	995-1150	715-734	718-728	717-727	718-728	707-759	710-810	708-903
Specific Heat BTU/ lb ° F	0.230	0.230	0.230	-	0.230	-	.10	.10	.10	.10	.104	.107	.125
Coefficient of Thermal Expansion (µ in./in. $^0F \times 10^{-6}$)	11.6	12.1	11.7	10.0	11.9	13.4	15.4	15.2	15.2	15.2	12.9	13.4	14.4
Thermal Conductivity (BTU / ft hr °F)	65.3	55.6	55.6	77.4	70.21	55.6	60.5	65.3	62.9	65.3	66.3	67.1	72.5
Electrical Conductivity (% IACS)	29	23	23	27	31	24	25.0	27.0	26.0	27.0	27.7	28.3	29.7
Poisson's Ratio	.33	.33	.33	-	-	-	.30	.30	.30	.30	.30	.30	.30

	ALUMINUM ALLOY CHEMICAL SPECIFICATIONS (% by weight)						ZINC ALLOY CHEMICAL SPECIFICATIONS (% by weight)							
	A360	A380	383	B390	A413	518		#2	#3	#5	#7	ZA-8	ZA-12	ZA-27
Silicon (Si)	9.0-10.0	7.5-9.5	9.5-11.5	16.0-18.0	11.0-13.0	.35	Aluminum (Al)	3.9-4.3	3.9-4.3	3.9-4.3	3.9-4.3	8.2-8.8	10.8-11.5	25.5-28.0
Iron (Fe)	1.3	2.0	1.3	1.3	1.3	1.8	Magnesium (Mg)	.025-.05	.03-.06	.03-.06	.01-.02	.02-.03	.02-.03	.012-.02
Copper (Cu)	.6	3.0-4.0	2.0-3.0	4.0-5.0	1.0	.25	Copper (Cu)	2.7-3.3	.10	.7-1.1	.10	.9-1.3	.5-1.2	2.0-2.5
Manganese (Mn)	.35	.50	.50	.50	.35	.35	Iron (Fe)	.035	.035	.035	.075	.035	.05	.07
Magnesium (Mg)	.4-.6	.10	.10	.45-.65	.1	7.5-8.5	Lead (Pb)	.004	.004	.004	.002	.005	.005	.005
Nickel (Ni)	.5	.5	.3	.10	.5	.15	Cadmium (Cd)	.003	.003	.003	.002	.005	.005	.005
Zinc (Zn)	.5	3.0	3.0	1.5	.5	.15	Tin (Sn)	.0015	.0015	.0015	.0010	.002	.002	.002
Tin (Sn)	.15	.35	.15	-	.15	.15	Nickel (Ni)	-	-	-	.005-.020	-	-	-
Titanium (Ti)	-	-	-	.10	-	-	Zinc (Zn)	Bal.	Bal.	Bal.	Bal.	Bal.	Bal.	Bal.
Others (each)	-	-	-	.10	-	-								
Others (Total)	.25	.50	.50	.20	.25	.25								
Aluminum (Al)	Bal.	Bal.	Bal.	Bal.	Bal.	Bal.								