

Alloy Comparison

The following table illustrates properties of cast and wrought alloys.

Alloy	Heat Treatment ***	Tensile Strength (ksi) - Ultimate	Tensile Strength (ksi) - Yield	Elongation in 2 inches (%)	Brinell Hardness 500 kgf load (10-mm ball)
* Alloys Poured at General Foundry Service					
Aluminum - 356.0* - Sand Castings**	F	19	--	2.0	40-70
Aluminum - 356.0* - Sand Castings**	T51	23	16	--	45-75
Aluminum - 356.0* - Sand Castings**	T6	30	20	3.0	55-90
Aluminum - 356.0* - Sand Castings**	T7	31	29	--	60-90
Aluminum - A356.0* - Sand Castings**	T6	34	24	3.5	70-105
Aluminum - 356.0* - Permanent Mold Castings**	F	21	--	3.0	40-70
Aluminum - 356.0* - Permanent Mold Castings**	T51	25	--	--	55-85
Aluminum - 356.0* - Permanent Mold Castings**	T6	33	22	3.0	65-95
Aluminum - 356.0* - Permanent Mold Castings**	T7	25	--	3.0	60-90
Aluminum - A356.0* - Permanent Mold Castings**	T6	37	26	5.0	70-100
Zinc Aluminum - ZA8* - Sand Castings**	F	38	28	1.5	87
Zinc Aluminum - ZA12* - Sand Castings**	F	42	30	2	115
Zinc Aluminum - ZA27* - Sand Castings**	F	62	54	5	115
Zinc Aluminum - ZA27* - Sand Castings (Heat Treated)**	HT	46	37	9	95
535* (Almag) - Sand Castings**	F	35	18	8.0	75
A380 (Die Cast)	F	47	23	3.5	80
6061 Wrought (Machine Stock)	T6	45	40	12.0	95

(**Per Standards for Aluminum Sand and Permanent Mold Castings and ZA Alloy Foundry Practices Guide. Values represent properties obtained from separately cast test bars. Unless otherwise specified, the average values of specimens cut from castings shall not be less than 75% of the tensile and yield strength values and not less than 25% of the elongation values given above.)

***Heat Treatment of Aluminum Castings

- F** **As Cast** – Castings are cooled naturally from the mold in room temperature air with no further heat-treatment.
- T-51** **Aging Treatment** – Castings that are artificially aged by heating metal to 440°F for 7-9 hours.
- T-6** **Solution Heat-treated and Artificially Aged** – Castings are Solution Heat-treated by heating metal to 1000°F for 4-12 hours and quenched in water at 150-212°F, then artificially aged at 310°F for 3-5 hours.
- T-7** **Solution Heat-treated and Stabilized** -- Castings are stabilized to carry them beyond the point of maximum hardness, providing control of growth or residual stress, or both. Castings are Solution Heat-treated by heating metal to 1000°F for 4-12 hours and quenched in water at 150-212°F, then artificially aged at 400°F for 3-5 hours.