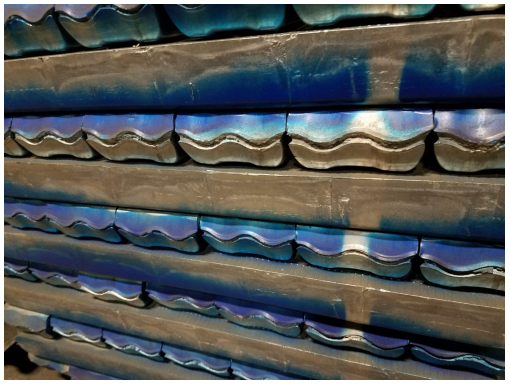

A356.0 (7Si-0.3Mg) Aluminum Alloy

- AMS. 356.0: 4217, 4260, 4261, 4284, 4285, 4286. A356.0: 4218
- Former ASTM. 356.0, SG70A; A356.0, SG70B
- SAE. 356.0: J452, 323
- UNS number. 356.0: A03560. A356.0: A13560
- Government. 356.0: QQ-A-601, QQ-A-596. A356.0: MIL-C-21180
- Foreign. ISO: AlSi7Mg, AC 4C, 3599, G-AlSi7Mg, A-S7G, EN AC-42000, LM 25
- Description: A356 is commonly heat treated. We typically always use A356.2 aluminum alloy. A356.2 (original material direct from smelter) contains improved mechanical properties. A356.2 offers more strength, ductility and elongation. Typically this alloy is used in castings for aircraft parts, pump housings, impellers, high velocity blowers and structural castings where high strength is required. It can also be used as a substitute for aluminum alloy 6061. The trade off is typically A356.2 is more expensive than 356.1. Consequence of exceeding impurity limits. High copper or nickel decreases ductility and resistance to corrosion. High iron decreases strength and ductility.

Typical A356 Properties & Characteristics of Aluminum Sand Castings

Typical Aluminum Alloys (a)					...	Resistance to Corrosion (b)		...	...	...	Typical Mechanical Properties					
AA	Former AA Designation	ASTM Spec. No.	Federal Spec. No.	SAE Alloy No.	Approx. Weight, lb./in.3	General	Stress Corrosion Cracking	Relative Machinability (c)	Castability (k)	Weldability (Arc) (d)	Ultimate Tensile Strength, ksi (i)	Yield Strength Tension, ksi (e) (i)	Elongation, Percentage in 2 in. (Round Specimen, 1/2" Dia.) (f) (i)	Shear Strength, ksi (g)	Fatigue Endurance Limit, ksi (h)	Brinell Hardness (500-kg Load, 10-mm Ball) (j)
356.0-T6	356	B26	QQ-A-601	323	0.098	2	A	4	1	2	33	24	3.5	26	8.5	70
356.0-T7	356	B26	QQ-A-601	...	0.098	2	A	4	1	2	34	30	2	24	9	75
A356.0-T6	A356	...	...	...	0.098	2	A	4	1	2	37	27	5	20	8.5	80

Footnotes:

(a) For all Alcoa casting alloys, the following data apply: (a) Young’s modulus of elasticity may be taken as 10,300,000 pounds per square inch (710 gram-pascals); (b) Modulus of

rigidity may be taken as 3,800,000 pounds per square inch (262 gram-pascals); (c) Poisson's ratio is 33; (d) Bearing strength is equal to 1.8 times tensile strength, provided edge distance, in direction of stressing, is not less than twice the diameter of the hole.

(b) Relative ratings of general corrosion resistance 1 through 5 are in decreasing order of merit, based on exposures to sodium chloride solution intermittent spray or immersion. Relative ratings of resistance to stress corrosion cracking are based on service experience and on laboratory tests of specimens exposed to the 3.5 percent sodium chloride alternate immersion test.

A – No known instance of stress corrosion cracking in service when properly manufactured; B – Stress corrosion cracking not anticipated in service from residual stresses or from design and assembly stresses kept below about 45 percent of the minimum guaranteed yield strength given in applicable specifications; C – Stress corrosion failures have occurred in service with either the specific alloy and temper or with alloys and tempers of this type. Designers should be aware of the potential stress corrosion cracking problem that exists when using these alloys and tempers under adverse conditions.

(c) Composite rating based on ease of cutting, chip characteristics, quality of finish and tool life. 1 – indicates best; 5 – indicates not recommended

(d) Based on ability of alloy to be fusion welded prior to heat treatment with filler rod of same alloy. 1 – indicates best; 5 – indicates welding not recommended

(e) Yield strength is the stress at which the material exhibits a permanent set of 0.2 percent.

(f) For die casting alloys, 1/4 inch (6.35 mm) diameter.

(g) Shearing strengths are single-shear values obtained from double-shear tests.

(h) Fatigue endurance values are based on withstanding 500 million cycles of completely reversed stress using the R.R. Moore type of machine and specimen.

(i) Mechanical properties are obtained on separately cast ASTM specimens. Since minimum guaranteed values vary with the applicable specifications, they are not given on this table.

(j) From tests made approximately 30 days after casting.

(k) Castability is rated on a scale of 1 through 5, in which higher numbers indicate lower merit. For sand and permanent-mold alloys, the ratings take into account resistance to hot cracking, fluidity and feeding ability. For die castings, the resistance to hot cracking, fluidity, die soldering and cast surface finish are considered. Even the alloys with the lowest rating of 5 may be successfully used with the proper techniques to produce commercial castings.

Designations & nominal compositions of common aluminum alloys used for sand casting							
AA Number	Former AA designations	Former ASTM number	Cu	Mg	Mn	Si	Others
A356.0	A356	SG70B	0.20 (Max)	0.35	0.10 (Max)	7.00	0.20 Fe (Max), 0.10 Zn (Max)

Characteristics of common aluminum alloys used in sand casting										
Alloy	Fluidity	Resistance to hot cracking	Pressure tightness	Heat Treatment	Strength at elevated temperatures	General corrosion resistance	Machining	Polishing	Anodizing Appearance	Weldability
A356.0	1	1	1	Yes	3	2	3	4	4	1

Alloy	Uses
A356.0	Automobile transmission cases, oil pans and rear-axle housings

Typical Tensile Properties for separately cast test bars of common aluminum casting alloys										
Alloy	Temper	Tensile strength		Yield strength		Shear strength		Compressive yield strength		Elongation %
		Mpa	Ksi	Mpa	Ksi	Mpa	Ksi	Mpa	Ksi	

Typical Tensile Properties for separately cast test bars of common aluminum casting alloys											
356.0	T6	230	33	165	24	180	26	170	25	3.5
356.0	T7	235	34	210	30	165	24	215	31	2

Other Aluminum Specs:

- 319
- C355
- 535
- 713

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