



## *Aluminum and Copper Base Alloys*

### **Aluminum Alloys**

Aluminum Alloy castings represent the major portion of O'Fallon Casting's business. Most aluminum alloys are heat treatable and therefore can be furnished with the most optimal physical properties for the end product.

**356** and **A356** are the most common and economically produced aluminum alloys cast by O'Fallon Casting. These alloys are readily cast in complex, thin walled configurations with an excellent surface finish. They also combine good strength and corrosion resistance and are the first alloy preference for electronic housings within the investment casting industry.

Also routinely cast are aluminum alloys **A357** and **C355**. Alloy A357, and the Beryllium free variation **F357**, are stronger than A356 and should be specified when higher properties are required. Alloy C355 is also stronger than A356, especially at elevated temperatures, but is less ductile.

Other aluminum alloys cast at O'Fallon Casting are **D712** (also known as 40E) which is easily brazable, and **A201** (also known as KO-1), the highest strength cast aluminum alloy currently available. These alloys are significantly less castable than A356. By utilizing our countergravity casting techniques we are able to cast these difficult to cast alloys in complex configurations.

Silicon Carbide Metal Matrix Composites: Please refer to our separate technical sheet regarding the unique characteristics of this family of alloys.

### **Copper Base Alloys**

Some copper base alloys can be more difficult to cast than aluminum alloys since they often combine with oxygen in the atmosphere to form oxides. Oxide formation can be reduced by our countergravity (CLA) casting techniques. This CLA process offers a significant advantage to casting copper base alloys due to the low turbulence experienced during the casting operation.

Silicon Brass (**C87400**) represents the most common and castable of the copper base alloys. Other copper base alloys routinely cast by O'Fallon Casting include Yellow Brass (**C85400**), Red Brass or 85-5-5-5 (**C83600**), Aluminum Bronze - Grade C (**C95400**) and Navy G (**C90300**). These alloys are specified for their machinability, corrosion resistance and/or wear characteristics.

See reverse for alloy charts.



## ALUMINUM ALLOYS

Alloy (UNS Nbr)	Similar Designation	Castability	Condition	TYPICAL MECHANICAL PROPERTIES			Remarks
				Strength PSI		%	
				Tensile	Yield	Elong	
354 (A13540)		Very Good	T6	43,000	33,000	2	Premium quality alloy
C355 A33550)	AMS 4215 ASTM B 618	Very Good	T6	37,000 36,000	30,000 25,000	1 2.5	Premium quality alloy; good strength & corrosion resistance
356 (A03560)	AMS 4260	Excellent	T6	33,000	22,000	3	Most popular aluminum alloy
A356 (A13560)	AMS 4218 ASTM B 618	Excellent	T6P T6	33,000 34,000	27,000 24,000	3 3.5	Good strength, corrosion resistance, stability & weldability — poor brazability
A357 (A13570)	AMS 4219	Very Good	T6P	41,000	32,000	3	Higher strength than A356
F357	AMS 4289	Very Good	T6	41,000	32,000	3	Same as A357 except no Beryllium
D712 (40E) (A47120)	ASTM B 26	Poor	T5	34,000	25,000	4	Self aging alloy; good brazing characteristics
A201 (K01) (A02010)	AMS 4229 ASTM B 618	Poor	T7 T6	60,000 60,000	50,000 50,000	3 5	Highest strength alloy- excellent machinability

### PREMIUM QUALITY ALUMINUM AMS A 21180 From Separately Cast Test Bars

Class		1	2	3	10	11	12
A356-T6	Tensile Strength PSI	32,000	40,000	45,000	32,000	32,000	32,000
	Yield Strength, PSI (0.2% offset)	28,000	30,000	34,000	28,000	27,000	22,000
	Elongation, % in 2"	5	3	3	5	3	2
A357-T6	Tensile Strength PSI	45,000	5,000	-	45,000	41,000	45,000
	Yield Strength, PSI (0.2% offset)	35,000	40,000	-	35,000	31,000	35,000
	Elongation, % in 2"	3	5	-	5	3	3

## COPPER BASE ALLOYS

Alloy (UNS Nbr)	Similar Designation	Castability	Condition	TYPICAL MECHANICAL PROPERTIES			Remarks
				Strength PSI		%	
				Tensile	Yield	Elong	
Aluminum Bronze Grade C (C95400)	ASTM B 148	Poor	As Cast Heat Treated	75,000 90,000	30,000 45,000	12 6	Excellent corrosion resistance
Silicon Brass (C87400)	ASTM B 584	Very Good	As Cast	50,000	21,000	18	Good castability
Red Brass 85-5-5-5 (C83600)	AMS 4855 ASTM B 584	Very Good	As Cast	30,000	14,000	20	Good machinability; pipe fittings
Yellow Brass (C85400)	ASTM B 584	Poor	As Cast	30,000	11,000	20	Better machinability than naval brass; pipe fittings
Navy G (C90300)	ASTM B 584	Fair	As Cast	40,000	20,000	20	Bearings, bushings

