



Alcoa Specialty Alloys: **A354 VersaCast™**

Bringing new strength to structural components

A354 VersaCast delivers the high strength and elongation required for the most demanding structural applications. This innovative specialty alloy offers excellent fatigue resistance, high strength properties, plus 3XX casting characteristics. The result is maximum reliability, fuel economy and performance.

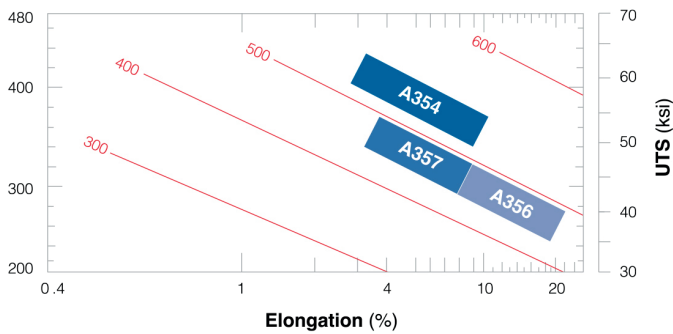
Most versatile specialty cast alloy

VersaCast's overall performance makes it the ideal choice for aluminum applications:

- Iron Casting Conversion: A cost-effective alternative capable of delivering tensile strengths similar to ductile irons.
- Structural Castings: Suitable for automotive, aerospace or military components where high strength is required; excellent castability allows for complicated shapes.

Improving Alloy Quality Index

The addition of copper in conventional 3xx casting alloys causes considerable loss of ductility (or elongation to fracture), because copper- and magnesium-containing compounds form during solidification. VersaCast's specialized properties defy the quality index previously possible for 3xx alloys, offering considerably higher strengths.



This figure compares the quality index achievable with VersaCast versus the common casting alloys A356 and A357. This plot shows the strength of rapidly solidified, permanent mold castings. Constant values of the quality index are shown by red lines.

A354 VersaCast™ Technical Data

CHEMICAL COMPOSITION (all in wt%. Single values indicate maximum content)

Si	Fe	Cu	Mg	Ti	Others Each	Others Total
8.0-10.0	0.20	1.3-2.1	0.25-0.45	0.12	0.05	0.15

MECHANICAL PROPERTIES*

Casting Process & Temper	Tension			Fatigue Endurance (R = -1, 10 ⁷) MPa
	Ultimate Strength (MPa)	Yield Strength (MPa)	Elongation (% in 2 in)	
P.M.-T62	450-470	350-380	4-6	70-90
Squeeze Cast.-T61	380-400	320-350	8-12	80-100

*The achievable mechanical properties are strongly dependent on the casting process used. The table refers typical properties obtained in permanent mold casting (low pressure die casting) and a squeeze casting.

PHYSICAL PROPERTIES (TYPICAL VALUES)

Density (g/cm ³)	Young's Modulus (GPa)	Coeff. Of Thermal Expansion (CTE) 20-300°C (mm/m/K)	Thermal Conductivity [W/(mK)]	Electrical Conductivity (%IACS)	Solidification Range (°C)
2.70	71-74	20.6-28.6	172-217	32-36	595-510

OTHER PROPERTIES

- Castability: Very good, suitable for sand casting and permanent mold casting
- Machinability: Very good
- Weldability: Good
- Corrosion Resistance (ASTM G110): Similar corrosion resistance as A359 alloy (the additions of Cu do not change the corrosion mode nor increase the depth of attack of the alloys).