Alcoa Specialty Alloys:
EverCast™

Redefining flexibility in suspension components

High tensile strength, excellent elongation, and fatigue resistance enable optimized design and light weighting. EverCast offers an ideal solution for suspension components, such as steering knuckles and control arms.

The formula for fighting fatigue

A decade of research and testing has produced the EverCast alloy (Al-Zn-Mg, 7xx). Compared with conventional 3xx casting alloys, 7xx alloys eliminate brittle silicon particles, allowing for the highest fatigue strength. The result is significantly higher tensile and fatigue strengths compared to the traditional A356 alloy with properties equal to or better than most 6xxx alloy forgings.

EverCast achieves excellent fluidity and resistance to hot cracking and shrinkage formation.

- Extensive research and casting simulations have developed the parameters to minimize hot cracking and shrinkage.
- Castability is further improved by the use of micro-alloying additions and grain refining practices.

Conquering the stress of corrosion

Castings produced from EverCast have shown outstanding corrosion resistance. Field tests included pre-stressing samples at 240 MPa, and placing them underneath trucks that routinely traveled along the heavily salted winter highways between Alcoa's Massena, New York and Cleveland, Ohio plants. In addition, samples were placed at a seaside location in Port Judith, Rhode Island. After over seven years of exposure, none of the pre-stressed samples failed.

EverCast™ Technical Data

CHEMICAL COMPOSITION (C862F) (all in wt%. Single values indicate maximum content)

Si	Fe	Cu	Mn	Mg	V	Zr	Zn	Ti	Others Each	Others Total
0.15	0.15	0.35-1.0	0.10	1.0-2.0	0.05-0.30	0.05-0.30	4.0-5.5	0.20	0.05	0.15

MECHANICAL PROPERTIES*

Alloy	Yield Strength (MPa)	UTS (MPa)	Elongation (%)	Fatigue Strength (MPa, R=-1, 107 Cycles)
A356-T6	240	300	7	70
C862F-T6	320-350	375-400	8-12	100

*The achievable mechanical properties are strongly dependent on the casting process used. The table refers typical properties obtained in semi-permanent mold castings.
** Strengths were measured after 500 hours exposure at temperature.

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)
2.76	70-72	21.9-29.0	152-200	36-43	642-475

CASTABILITY

Fluidity	Hot Cracking	Shrinkage
Better fluidity than A356 based on spiral mold (C862F = 188mm, A356 = 173mm)	Slightly increased hot-cracking index than A356 (C862F = 6mm, A356 = 2-4mm)	Solidification shrinkage is higher than A356 (C862F = 4.3%, A356 = 3.2%)

OTHER PROPERTIES

- Machinability: Very good
- Weldability: Very good
- Corrosion Resistance: Good SCC and general corrosion resistance

MELT TREATMENT AND CASTING

- Grain refinement with Ti-B is required. Addition of Ti-B improves castability.
- Casting temperature: 680°C to 720°C

To know more about full range of Alcoa special alloys for automotive applications, scan the QR Code or send your question to SpecialAlloys@alcoa.com.

You can also use the link in your Internet browser:
https://www.alcoa.com/global/en/what-we-do/aluminum/cast-products/foundry-aluminum-alloys.asp