

Alcoa Specialty Alloys: **EZCast-NHT™**

Non-Heat Treatable alloys for time- and cost-efficient production of HPDC thin-walled automotive structural parts

The majority of High Pressure Die Casting (HPDC) alloys available in the market cannot be used in 'as cast' state and require lengthy and costly heat treatment with further mechanical straightening to bring the casting to its original geometry. In addition, the alloys, able to yield sufficient mechanical properties without heat treatment (so called Non-Heat Treatable alloys), often suffer from poor castability.

To address this issue, Alcoa introduced two new, proprietary Non-Heat Treatable alloys with improved castability.

EzCast-NHT™ alloys offer good castability (good hot cracking resistance), mechanical properties in as-cast state comparable to T5/T6 temper of standard HPDC foundry alloys, as well as good rivetability.

The alloys are designed for HPDC production of structural parts like shock towers, cross members, battery trays, frame nodes, e-motor housings, etc.

Using parts in as cast state brings number of benefits

- Eliminate plant heat treat operation, saving cost, time and space
- Avoid distortion of the cast parts due to solution heat treatment and improve parts' dimensional tolerances for assembly
- Simplify overall production process and improve efficiency of operations

EZCast-NHT™ Technical Data

CHEMICAL COMPOSITION

Alcoa produces two variations of the EZCast-NHT™ aluminum alloy that do not require heat treatment. Internally designated as A152 (3.0 wt.% Mg) and A153 (4.0 wt.% Mg)

MECHANICAL PROPERTIES*

	Yield Strength (MPa)**	UTS (MPa)**	Elongation (%)
A365 / AlSi10MnMg - T6***	210-250	280-340	7-12
A352 / AlSi10MgMn - T7***	118-120	186-190	16-20
A152 EZCast-NHT™ - F***	142-150	267-283	14-17
AlMg5Si2Mn - F***	151-166	274-294	9.5-11.5

*The achievable mechanical properties are strongly dependent on the casting process used. The table refers to typical value ranges, measured at HPDC parts

** Strengths were measured at room temperature

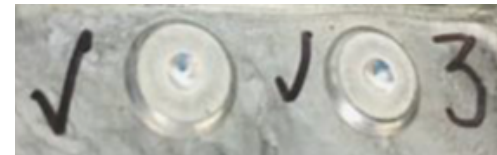
*** F – as cast state; T6, T7 – temper

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)
2.65	71-73	20.6-28.6	138-150	32-36	635-575

RIVETABILITY

High quality joints between EZCast-NHT™ rear shock tower casting and aluminum extrusion were obtained by self-piercing rivets.



OTHER PROPERTIES

- Castability: Very good, suitable for HPDC process, good hot cracking resistance
- Machinability: Very good
- Weldability: Very good
- Corrosion Resistance: Very good

EZCast™ Alloy Family

EZCast-NHT™ alloys complement Alcoa's 370 EZCast™ alloy family, designed for HPDC production of crash-resistant, yet thin-walled structural components for automotive applications. Alcoa's proprietary computer model designed to predict an alloy's die soldering properties (i.e., die sticking) allows to optimize the composition of particular alloy within EZCast™ family to deliver quality components with reduced die wear, while also achieving a higher, more consistent elongation in castings for desired strength levels.



To know more about the 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>