

AEROSPACE ALUMINUM AA5028 AlMgSc
THE STRONG LIGHTWEIGHT

Aleris





IMPROVED STRENGTH ALUMINUM MAGNESIUM SCANDIUM SHEET

Our AlMgSc technology offers aerospace manufacturers significant weight savings opportunities. In a 1:1 exchange, or drop-in, our alloy AA5028 H116 offers a 4 to 5 percent weight advantage compared to conventional AA2024. The exceptional weldability of AA5028, offers further weight savings. With AlMgSc sheet, stringer reinforced aircraft fuselage

components can be Laser Beam Welded (LBW) or Friction Stir Welded (FSW) when the individual parts are still flat, without any prior treatment. Creep forming the material at elevated temperatures can achieve the single or double curvature of the fuselage part required for the aircraft body. Using this method, there is no distortion or spring back

of the material, thus enabling a high precision and cost-effective production process. As compared to stretch forming, no clamping allowance is required, which improves the buy-to-fly ratio. Even for traditionally riveted designs AlMgSc sheets can be roll-formed with subsequent attachment of any kind of stringer material.

Chemical Composition Limits (all data in wt.-%) according to AA registration

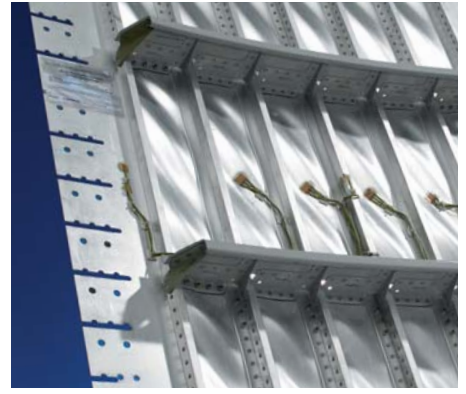
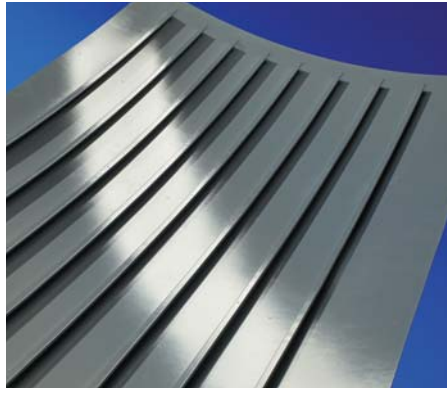
Alloy	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Zr	Sc	Others each	Others total
AA5028	0.0-0.30	0.0-0.40	0.0-0.20	0.30-1.0	3.2-4.8	0.05-0.15	0.05-0.50	0.05-0.15	0.05-0.15	0.02-0.40	0.05	0.15

Mechanical Properties (typical values, as delivered and after creep forming, if applicable)

Alloy	Temper	Thickness	Tensile strength		Yield strength		Elongation		Tension modulus	Compression modulus	Density
			[MPa]	[MPa]	[MPa]	[MPa]	[%]	[%]			
AA5028	H116	2.3	402	405	330	345	12	13	74	72	2.67
			400	400	325	330	12	13			
		5									
AA5028	H116	0.09	58	59	48	50	12	13	10	10	0.097
			58	58	47	48	12	13			
		0.20									

Corrosion Resistance (as delivered)

Test	Specification	Requirement	Typical values
NAMLT (Nitric Acid Mass Loss Test)	ASTM G67	<15 mg/cm ²	<3 mg/cm ²
SCC	ASTM G47		250 MPa, 30 days without failure
ASSET (Assessment of Exfoliation Corrosion Test)	ASTM G66		PB



GAME CHANGER – WITHOUT DESIGN CHANGE

APPLICATION

AlMgSc low density sheets are recommended for use as fuselage skin sheet with medium strength but excellent damage tolerance and corrosion properties. This material can potentially replace traditionally used 2xxx alloys such as 2024 T3 as a drop-in solution without change of the structural design. The material is supplied in bare condition.

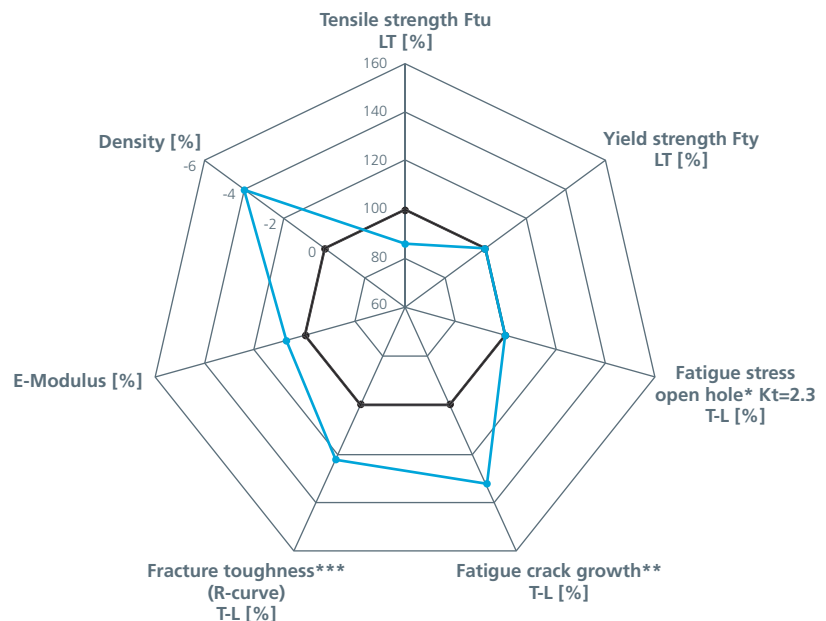
ADVANTAGES OF AlMgSc SHEET

- low density
- exceptional weldability
- excellent damage tolerance
- good corrosion resistance
- creep-formable
- thermally stable
- easy-to-recycle

AVAILABILITY

AlMgSc sheets are typically produced in gauges between 1.6 and 7.0 mm (0.063 and 0.275 in) and supplied in annealed condition. Other dimensions as well as a material safety data sheet are available upon request.

TYPICAL PERFORMANCE OF AA5028 VS. AA2024



■ Baseline AA2024T351

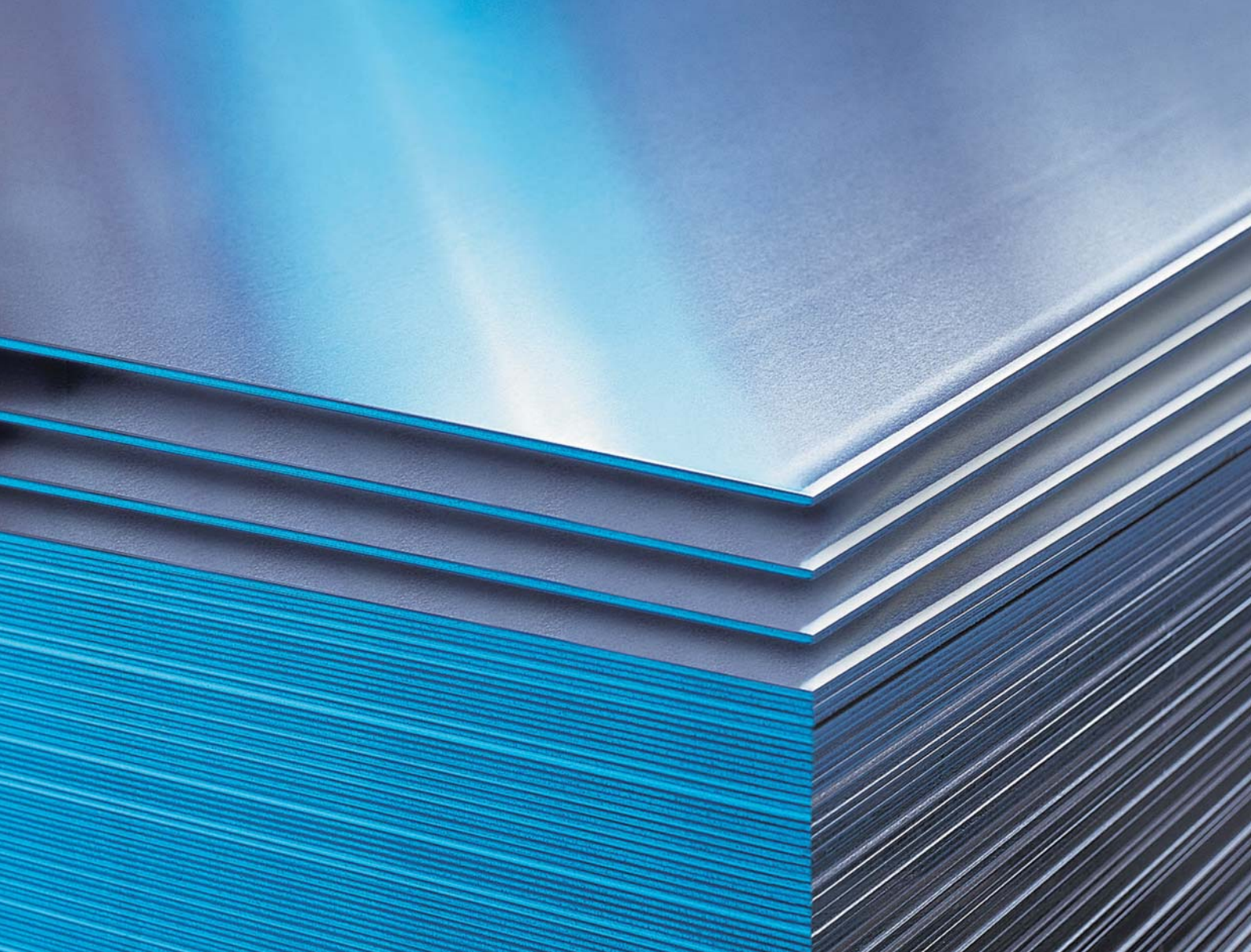
■ Aleris AlMgSc AA5028 H116

* Fatigue stress at 1E5 cycles
 ** da/dN: ΔK at 1E-2 mm/cycle
 *** R-curve: K_{eff} at Δa = 40 mm



ALERIS AlMgSc ALLOY AA5028 H116

- has **greater potential** than baseline material AA2024.
- is the perfect material for lighter weight and **significant cost reduction**.
- offers at least **4% weight savings** even **without design change** (drop-in).

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The Aleris logo features the word "Aleris" in a bold, red, sans-serif font. A grey swoosh underline is positioned above the letters "e" and "r".

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Charges may apply.