Aluminum Alloy Data Sheet - Extruded Product

EN AW-5083 | AlMg4,5Mn0,7

EN AW 5083 is a high-strength, non-heat-treatable aluminum–magnesium–manganese alloy (AlMg4.5Mn0.7) specifically developed for applications requiring exceptional corrosion resistance, particularly in marine and chemically aggressive environments. Its superior performance in both mechanical strength and stress corrosion resistance under as-welded conditions makes it one of the most reliable choices for structural applications subjected to harsh conditions. The alloy exhibits excellent weldability, good cold formability, and retains high strength after welding, making it highly suitable for shipbuilding, offshore structures, cryogenic vessels, pressure equipment, and transport tanks. Due to its resistance to saltwater and industrial atmospheres, EN AW 5083 is frequently specified in defense, transportation, and civil engineering sectors. The alloy is commonly delivered in tempers such as O, H111, H116, and H321, depending on performance requirements.

Chemical Composition [1] (weight %)

Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others
≤0,40	≤0,40	≤0,10	0,40-1,0	4,0-4,9	0,05-0,25	≤0,25	≤0,15	Each ≤0,05 Total ≤0,15

[1] according to EN 573-3:2024

Typical Applications

Marine and Shipbuilding

- Hulls, superstructures, decks, and bulkheads of commercial and naval vessels
- Offshore platforms, gangways, and pontoon structures
- Ballast tanks and structural reinforcements exposed to seawater

Transportation and Automotive

- Cryogenic and chemical tankers (road and rail)
- Pressure vessels and fuel tanks
- Structural floor panels and load-bearing chassis components in trailers and military vehicles

Aerospace and Defense

- Armored vehicle plating (due to ballistic resistance)
- Ground support and maintenance platforms exposed to aggressive environments

Chemical and Process Industries

- Storage tanks and silos for corrosive media
- Piping, ducting, and reactor components in chemical processing plants

Construction and Architecture

- Bridge components and structural frames in corrosive environments
- Cladding panels and building envelope solutions in coastal or industrial areas

Energy Sector

- LNG and LPG storage tanks
- Wind and solar infrastructure components with environmental exposure

Mechanical Properties [2] (Extruded Rod/bar, Tube, Profiles)

Temper	Wall Thickness t (mm)	R_m (MPa)	$R_{p0,2}$ (MPa)	A (%)	A_{50mm} (%)	Hardness Typical Value HBW
F [a]	all [b]	270	110	12	10	70
O, H111	all [b]	270	110	12	10	70
H112	all [b]	270	125	12	10	70

[2] according to EN 755-2:2016 for extruded profile, minimum values unless else specified
[a] F Temper: property values are for information only.
[b] For rod/bar Diameter ≤200 mm

Temper Designation [3]

F	as fabricated (no mechanical property limits specified)
O	annealed - products achieving the required annealed properties after hot forming processes may be designated as 0 temper
H111	annealed and slightly strain-hardened during subsequent operations such as stretching or levelling
H112	slightly strain-hardened from working at an elevated temperature or from a limited amount of cold work (mechanical property limits specified)

[3] according to EN 515:2017

Physical Properties (Typical Values) [4]

Property	Value	Unit
Density	2,66-2,68	g/cm^3
Melting Range	570-640	°C
Thermal Conductivity	~121	W/m.K
Electrical Conductivity	16-19	MS/m
Modulus of Elasticity	~70	GPa
Coefficient of Expansion	25.8	$10^{-6}K^{-1}$

[4] The values presented above are typical for Aluminum Alloy 5083 and may vary depending on manufacturing process, temper condition, and specific application. They are intended for general information purposes only and should not be considered as guaranteed specifications

Weldability

EN AW 5083 exhibits excellent weldability, particularly when welded using MIG (GMAW) or TIG (GTAW) processes. The alloy is well-known for its ability to retain high strength in the as-welded condition, which is critical for structural applications in marine, transport, and pressure vessel industries.

Minimal susceptibility to hot cracking

Good resistance to stress corrosion MIG vcracking in the heat-affected zone (HAZ)

No post-weld heat treatment required; mechanical strength remains sufficient for many structural uses

Weld discoloration and oxidation can be minimized with proper shielding and surface preparation

Note: EN AW 5083 is non-heat-treatable, so its strength derives from strain hardening and cold working rather than precipitation hardening. Welding may reduce local strength in strain-hardened tempers (e.g., H116, H321), but the overall corrosion resistance remains excellent.

Recommended Storage Condition

Store in dry, covered, and well-ventilated environments.

Protect from direct sunlight, high humidity, and chemical vapours.

Prevent mechanical damage by using proper packaging or vertical stacking when possible