Aluminum 5083 H116 VS 5083 H321

Difference between 5083 H116 and 5083 H321

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ALUMINUM ALLOY PLATE 5083 is an aluminum alloy with magnesium and traces of manganese and chromium. It is known for exceptional performance in extreme environments. Aluminum 5083 is highly resistant to attack by both seawater and industrial chemical environments. It has the highest strength of the non-heat treatable alloys with an Ultimate Tensile Strength of 317 MPa and a Tensile Yield Strength of 228 MPa. It is not recommended for use in temperatures in excess of 65 °C. Alloy 5083 is best known as a plate for ship building. The alloy is also produced as extruded seamless tube and other extrusions and as forgings

Both **5083-H116** and **5083-H321** are marine-grade aluminum alloys derived from **AA5083**, known for their excellent corrosion resistance, high strength, and good weldability. The difference lies primarily in the **thermal stabilization process** and **intended application conditions.**

Comparison Table

Property / Feature	5083-H116	5083-H321
Temper Definition	Strain-hardened and stabilized for corrosion resistance	Strain-hardened and thermally stabilized
Corrosion Resistance	Excellent (especially in saltwater)	Excellent (also good at elevated temperatures)
Weldability	Excellent	Excellent
Post-Weld Properties	Retains strength and corrosion resistance	Retains strength and corrosion resistance
Mechanical Strength	Similar to H321	Similar to H116
Thermal Stability	Moderate (not heat-treated)	Enhanced via stabilization heat treatment
Typical Applications	Boat hulls, decks, tanks, marine structures	Pressure vessels, ship structures, higher-temp marine parts
Standards	ASTM B928/B209, ABS, DNV, BV, etc.	ASTM B928/B209, ABS, DNV, BV, etc.

Key Differences

- **H116** is strain-hardened and specifically processed to **maximize corrosion resistance** in marine environments. It is the go-to choice for **hull plating** and **saltwater exposure.**
- **H321** undergoes additional **thermal stabilization**, which makes it more dimensionally stable in **elevated temperatures** and **cyclic loading conditions.**

Aluminum 5083 H116 and H321 Mechanical Property

Temper	Specified Thickness, mm – over	Specified Thickness, mm – through	Tensile Strength, MPa – min	Tensile Strength, MPa – max	Yield Strength (0.2 % offset), MPa – min	Yield Strength (0.2 % offset), MPa – max	Elongation, min, in 50 mm	Elongation, min, in 5× Diameter (5.65 √A)
H116	1.6	12.5	305	...	215	...	10	...
H116	12.5	30	305	...	215	...	...	10
H116	30	40	305	...	215	...	...	10
H321	40	80	285	...	200	...	...	10
H321	3.2	5	305	385	215	...	10	...
H321	5	12.5	305	385	215	...	12	...
H321	12.5	40	305	385	215	...	...	10
H321	40	80	285	385	200	...	...	10

How Choose the right grade for your application.

- Choose **5083-H116** if:
  - Your application involves **direct seawater immersion**
  - You need **strong anti-corrosion performance**
  - You're building **ship hulls**, **tanks**, or **marine decks**
- Choose **5083-H321** if:
  - Your structure will face **temperature variations or thermal cycling**
  - You need **enhanced dimensional stability**
  - You're fabricating **pressure vessels**, **bulkheads**, or **fuel tanks**