PH 13-8MO Stainless Steel

Typical Applications

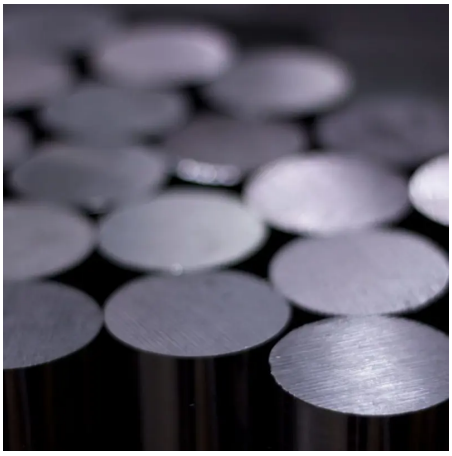
Fasteners

Valves

Fittings

Petrochemical Components

Aircraft Structural parts



AMS 5629, AMS 5864 Suppliers and Stockholders

Dynamic Metals is a specialist supplier and stockholder of PH 13-8 Mo stainless steel, supplying aerospace and high-performance industries with certified material to AMS 5629 and AMS 5864. No minimum order quantities.

PH 13-8 Mo is a martensitic precipitation hardening stainless steel combining exceptional strength, toughness and resistance to stress corrosion cracking. It sits at the top of the precipitation hardening stainless steel family — and in applications where standard alloys cannot deliver the mechanical performance required, PH 13-8 Mo becomes the material of choice.

Strength is developed through controlled precipitation heat treatment, with tensile strength ranging from 931 MPa in the H1150 condition through to 1517 MPa at H950. Critically, these properties are consistent across both longitudinal and transverse directions — a requirement driven directly by AMS 5629 and AMS 5864, and one that reflects how demanding structural components are loaded in service.

The alloy is produced by Vacuum Induction Melting followed by Vacuum Arc Remelting. This dual-melt process is a mandatory specification requirement under both AMS 5629 and AMS 5864 — not an optional upgrade — and it is what gives PH 13-8 Mo its cleanliness, consistency and predictable behaviour in safety-critical applications. AMS 5629 covers bars, wire, forgings, flash-welded rings and extrusions. AMS 5864 covers plate up to 3 inches (76.2 mm) nominal thickness. Both specifications require solution heat treatment prior to supply, with age hardening carried out by the customer to their required condition. All material is supplied with full certification and traceability to the original melt heat.

Related Products

15 5Ph Stainless Steel

17 4Ph

17 7Ph

431 - 1-4057 STAINLESS STEEL

A286 Bar

A286 Sheet

Aermet 100

Ph 13 8Mo

S145 Stainless Steel

A286

Key Features and Benefits

• High strength across six selectable ageing conditions — from 931 MPa (H1150) to 1517 MPa (H950)

• Consistent mechanical properties in both longitudinal and transverse directions, as required by AMS 5629 and AMS 5864

• Outstanding resistance to stress corrosion cracking — particularly important under sustained mechanical load in corrosive environments

• Mandatory VIM + VAR dual-melt production ensures premium aircraft-quality material cleanliness throughout

• Supplied solution annealed, ready for customer age hardening to the required condition. Available in bar, wire, forgings, extrusions and plate — covering the full range of machined and structural applications

Technical specification

Related Specifications

AMS 5629

AMS 5864

UNS S13800

Specific Gravity

7.76 g/cm3

Chemical Composition (WT %)

	Min	Max
C	-	0.05
Si	-	0.10
Mn	-	0.10
P	-	0.01
S	-	0.008
Cr	12.24	13.25
Mo	2.00	2.50
Ni	7.50	8.50
Al	0.90	1.35
N	-	0.010
Fe	Bal	-

Typical Mechanical Properties in the Annealed condition

	H950	H1000	H1025	H1050	H1100	H1150

0.2% Proof Stress	MPA	Min	1413	1310	1207	1138	931	621
Tensile Strength	MPA	Min	1517	1413	1276	1207	1034	931
Elongation	%	Min	10	10	11	12	14	14
Reduction of area	%	Min	45	60	50	50	50	50
Reduction of area	%	Min	35	40	45	45	50	50
Hardness	HRC	Min	45	43	41	40	34	30

Applications

PH 13-8 Mo is specified wherever high strength, fracture toughness and corrosion resistance must be achieved within a single material. Typical applications include aircraft structural fittings, aerospace fasteners in safety-critical assemblies, landing gear components, helicopter rotor hubs and rotating structural parts, petrochemical valves and fittings operating under sustained load, and structural applications across the defence sector.

Performance Characteristics

PH 13-8 Mo delivers tensile strength up to 1517 MPa in the H950 condition — among the highest available in any wrought stainless steel. Six precipitation hardening conditions (H950 through H1150) allow engineers to select the precise balance of strength and ductility their application demands. Minimum elongation of 10% is maintained even at H950, confirming genuine toughness at maximum strength. Mechanical properties are tested and certified in both longitudinal and transverse orientations per AMS 5629, and the alloy retains its characteristics from cryogenic temperatures through to 316°C (600°F) in service.

Corrosion Resistance

Stress corrosion cracking resistance is one of the defining characteristics of PH 13-8 Mo, and a primary reason it is specified over other precipitation hardening grades in aggressive environments. The combination of chromium, nickel and molybdenum within the composition forms a stable passive layer that performs reliably under simultaneous mechanical loading and corrosive exposure. The alloy is well suited to marine, coastal aerospace and chemical processing environments, and to applications where chloride-induced pitting is a concern.

Melting and Material Quality

Both AMS 5629 and AMS 5864 mandate production via Vacuum Induction Melting followed by Vacuum Arc Remelting. This dual-melt process eliminates non-metallic inclusions and ensures consistent chemistry across the full cross-section of every bar, plate and forging. It is a specification requirement — not an enhancement — and it underpins the fracture toughness and transverse mechanical properties that make PH 13-8 Mo suitable for the most demanding structural applications. Every heat undergoes macrostructure examination, chemical analysis and tensile property testing prior to certification.

Machining and Processing

PH 13-8 Mo should be machined in the solution annealed condition, before final age hardening to the required H-condition. In this state the material behaves more predictably than austenitic stainless steels, with a lower work hardening rate that makes toolpath planning more straightforward. Dimensional change during ageing is minimal, meaning complex geometries can be machined to

near-final dimensions before heat treatment without significant distortion risk. Where welding is required, this should be carried out in the solution annealed condition; for critical joints, re-solution treatment and re-ageing after welding is recommended. Applicable ageing conditions and temperatures are defined within AMS 5629 and AMS 5864.

Available Forms

Dynamic Metals supplies PH 13-8 Mo to AMS 5629 as bar, wire and forgings, and to AMS 5864 as plate up to 3 inches (76.2 mm) nominal thickness. All material is supplied in the solution heat-treated condition, ready for customer age hardening to the required H-condition. No minimum order quantities apply on stock items, making us equally suited to prototype development programmes and full production contracts.

Advantages of PH 13-8 Mo

PH 13-8 Mo occupies a unique position within the stainless steel family — delivering tensile strength levels that rival specialist alloy steels, while retaining the corrosion resistance expected of a stainless grade. The selectable ageing system means a single stock material can be processed to meet a range of application requirements. Consistent transverse mechanical properties — a direct result of the VIM/VAR melting process — make it suitable for components loaded across multiple axes, which eliminates many other high-strength steels from consideration. Machinability in the annealed condition, combined with minimal distortion during ageing, gives manufacturers a practical and reliable processing route even for complex, tight-tolerance parts.

Why Choose Dynamic Metals?

Dynamic Metals has supplied PH 13-8 Mo to aerospace and defence customers since 1997. We hold certified stock to both AMS 5629 and AMS 5864, supplied with full material certification and traceability to the original VIM/VAR melt heat. Our team can advise on ageing conditions, processing routes and specification requirements — and with no minimum order quantities, we can support both development programmes and production contracts alike. AS9100 certified. Fast UK delivery on standard stock sizes.

Need more information? ***Get in touch***

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