

PH13-8Mo (UNS S13800 / XM-13)

Precipitation Hardening Stainless Steel — Forged Components Technical Datasheet

AMS 5629 · ASTM A564 / A705 · Nuclear · Aerospace · Marine · Oil & Gas

1. ALLOY OVERVIEW

Common Name / Grade	PH13-8Mo · 13-8 PH · PH 13/8 Mo · Grade 13-8
UNS Number	S13800
AISI / AMS Designation	XM-13 · AMS 5629
Material Family	Martensitic Precipitation-Hardening Stainless Steel
Key Alloying Elements	~13% Chromium, ~8% Nickel, ~2.25% Molybdenum, ~1.1% Aluminum
Melting Process	VIM (Vacuum Induction Melting) VAR (Vacuum Arc Remelting) — Type 1, Aerospace / Nuclear ESR (Electroslag Remelting) — Type 2, Oilfield / Marine
Supply Condition	H950 · H1000 · H1025 · H1050 · H1100 · H1150 (precipitation hardened)
Applicable Standards	AMS 5629 · AMS 5864 · AMS STD 2154 ASTM A564 / SA564 · ASTM A705 · ASTM A751 · ASTM A370 · ASTM A604 ASME · API 6A · IMO MARPOL Boeing HMS 6-1105 · Rockwell ST0160LB0013 · Schlumberger SH350516
Quality Certifications	ISO 9001 · CE · EN 10204-3.1 Material Certificate

2. KEY CHARACTERISTICS & INDUSTRIAL APPLICATIONS

PH13-8Mo is a high-performance martensitic precipitation-hardening stainless steel offering exceptional corrosion resistance, stress corrosion cracking resistance, and superior mechanical properties under extreme working conditions. It is the preferred alloy for critical high-stress components in aerospace, nuclear power, offshore oil & gas, and marine environments.

Industry	Typical Components	Preferred Condition
Aerospace / Turbomachinery	Turbine disks, compressor impellers, blisks, APU components	H950
Nuclear Power	Reactor coolant pump impellers, seal chambers, coolant system parts	H950 / H1000
Offshore Oil & Gas	Valve bodies, valve stems, ball valves, fluid control forgings	H1050
Downhole / Oilfield	Splined shafts, mud motor shafts, ESP shafts, drilling tools	H1000
Marine Engineering	Propeller shafts, rudder stocks, ship structural forgings	H1100
Process & Hydraulic	Tube sheets, ultra-high pressure waterjet parts, chemical pump casings	H1050 / H1100

3. CHEMICAL COMPOSITION — ASTM A751 Certified (wt %)

Element	Symbol	Min (wt%)	Max (wt%)	Key Function
Carbon	C	—	0.05	Ensure corrosion resistance; reduce carbide formation
Manganese	Mn	—	0.10	Improve ductility; reduce inclusions
Silicon	Si	—	0.10	Deoxidation during smelting; improve mechanical properties
Phosphorus	P	—	0.010	Strictly controlled — reduces brittleness
Sulfur	S	—	0.008	Ultra-low — ensures high material purity
Chromium	Cr	12.25	13.25	Core element for corrosion and oxidation resistance
Nickel	Ni	7.50	8.50	Enhance toughness; promote precipitation hardening
Molybdenum	Mo	2.00	2.50	Improve stress corrosion cracking and pitting resistance
Aluminum	Al	0.90	1.35	Key element for precipitation hardening reaction
Nitrogen	N	—	0.010	Stabilize alloy microstructure; ensure high purity

4. STANDARD HEAT TREATMENT PARAMETERS — ASTM A370

Condition	Temp (°F ±10)	Temp (°C ±6)	Key Application Scenario
H950	950	510	Aerospace, turbomachinery — high strength / high temperature
H1000	1000	538	Oil & gas, downhole tools — high torque / corrosion resistance
H1025	1025	552	Fluid control, valve components — balanced strength / toughness
H1050	1050	566	Offshore valves, marine equipment — high toughness / corrosion
H1100	1100	593	Marine shafts, pressure equipment — maximum toughness
H1150	1150	621	General industrial, low-stress corrosion applications

5. MINIMUM MECHANICAL PROPERTIES — ASTM A370

Condition	Orientation	Tensile Strength (MPa)	0.2% Yield Strength (MPa)	Elongation (4D, %)	Reduction of Area (%)
H950	Longitudinal	1517	1413	10	45
H950	Transverse	1517	1413	10	35
H1000	Longitudinal	1413	1310	10	50
H1000	Transverse	1413	1310	10	40
H1025	Longitudinal	1276	1207	11	50
H1025	Transverse	1276	1207	11	45
H1050	Longitudinal	1207	1138	12	50
H1050	Transverse	1207	1138	12	45
H1100	Long / Trans	1034	931	14	50
H1150	Long / Trans	931	621	14	50

6. PRODUCT RANGE

Product Form	Description
Round bars, square bars, flat bars, rectangular bars, solid rods, hollow bars	— forged, cut and heat-treated to client specifications for general industrial, hydraulic and mechanical applications

Round bars, square bars, flat bars, rectangular bars, solid rods, hollow bars — forged, cut and heat-treated to client specifications for general industrial, hydraulic and mechanical applications

Product Form	Description
Ring Forgings & Seamless Rolled Rings	Continuous rolled rings, guide rings, seal rings, labyrinth rings, casing rings — produced per international standards for pressure vessels, turbine casings and fluid components
Custom Shape Forgings	Hubs, housing, castrols, shaft forgings, blocks, forged plate — custom parts produced per client 2D/3D technical drawings; available in small test batches or large-volume production

7. QUALITY STANDARDS & MANDATORY TESTING

Category	Standards & Specifications
AMS	5629 (aerospace grade) · 5864 · AMS STD 2154
ASTM / ASME	A564 · SA564 · A705 (nuclear grade) · A751 · A370 · A604 · F899
Industry / OEM	API 6A (oil & gas) · IMO MARPOL (marine) Boeing HMS 6-1105 · Rockwell ST0160LB0013 · Schlumberger SH350516
System Cert.	ISO 9001 · CE · EN 10204-3.1 Material Certificate

Test Item	Standard	Requirement
Chemical Analysis	ASTM A751	Full elemental composition — raw materials & finished forgings
Macrostructure	ASTM A604	No pipes or cracks; porosity within Class 1–4 limits
Grain Size	ASTM E112	≤100 mm section: ASTM No.5 or finer; Larger forgings: ASTM No.4 or finer; Free of freckles, white spots, radial segregation and ring pattern
Mechanical Testing	ASTM A370	Tensile, yield, elongation, reduction of area per heat treatment condition
Non-Destructive Testing (NDT)	AMS STD 2154	100% UT/MT/PT inspection; full production traceability
Microstructure	AMS 5629	< 0.2% ferrite content (nuclear grade components)

8. MANUFACTURING CAPABILITIES & DELIVERY

Melting Process	VIM · VAR (Type 1, Aerospace/Nuclear) · ESR (Type 2, Oilfield/Marine)
Custom Forgings	Any shape / size per client 2D or 3D drawings; material selection & technical advice provided
Heat Treatment	H950 / H1000 / H1025 / H1050 / H1100 / H1150 — as per customer requirements
Lead Time	Standard sizes in stock; 45 days for mass production of custom forgings
Shipping Terms	FOB Shanghai / Ningbo · CIF Dubai / Rotterdam / Houston / New York / Singapore
Delivery (Transit)	North America & Europe: 20–30 days · Middle East & Southeast Asia: 10–15 days
Documentation	EN 10204-3.1 material certificate · Heat treatment charts · Full MTR (material test report)
Payment Terms	TT · L/C · Western Union · USD / EUR / GBP / SAR

9. MANUFACTURER CONTACT INFORMATION

Jiangsu Liangyi Co., Limited

Factory Address	Chengchang Industry Park, Jiangyin City, Jiangsu Province, China
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Working Hours	08:00 – 18:00 GMT+8 (Monday to Friday)
Global Offices	Technical support: New York · Frankfurt Logistics warehouse: Dubai After-sales service: Singapore
Response Time	All inquiries replied within 24 working hours

The mechanical property data listed above represent minimum values per ASTM A370 and applicable AMS/ASTM standards. Actual test results are provided with each order via EN 10204-3.1 material certificate. All data subject to change without notice. © Jiangsu Liangyi Co., Limited — PH13-8Mo (UNS S13800 / XM-13) Technical Datasheet