



Grade	Code	EN	Precipitation-Hardening Stainless Steels
13-8PH / 13-8 Mo	X3CrNiMoAl13-8-2	1.4534	

Steel Characteristics

13-8PH is a martensitic precipitation-hardening stainless steel that offers high strength, good fracture toughness and resistance to stress-corrosion cracking. Its mechanical properties can be tailored through solution treatment and ageing, and it is produced to provide the high metallurgical cleanliness and uniformity required for critical components.

Chemical Composition (13-8PH)

C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Al %	N %	Fe %
≤0,05	≤0,10	≤0,10	≤0,01	≤0,008	12,25– 13,25	7,50– 8,50	2,00– 2,50	0,90– 1,35	≤0,010	Bal.

Mechanical Properties (Condition A)

Product	Rp0,2 [MPa]	Rm [MPa]	Elongation [%]	Hardness [HB]	Density [g/cm ³]
Bar	827	1.103	17	≈311*	7,76

* The listed properties are **typical production-bar values**. For Condition A, **AMS 5629 sets a maximum hardness of 363 HB**.

Applications

Industry	Products
Aerospace	Landing gear components, actuator shafts, structural fasteners
Defense Industry	Missile structural parts, high-strength pins, locking hardware
Oil, Gas and Petrochemicals	Valve stems, pump shafts, wellhead fasteners
Nuclear Energy	Reactor internals, control-rod drive shafts, high-strength reactor fasteners
Marine	Propeller shaft nuts, seawater pump parts, corrosion-resistant fasteners
Machinery and General Industry	High-performance shafts, pins, lock washers
Plastic Injection Moulding	Mould cores, mould cavities, wear-resistant mould components
Medical	Surgical tools, dental tools, high-strength medical device parts



Description

13-8PH is distinguished by deriving its strength not from carbon-based hardening, but from extremely fine nickel-aluminium precipitates formed during ageing within the martensitic matrix. The material can be machined close to its final dimensions in Condition A and then brought to the required mechanical properties through a single-stage, low-temperature ageing treatment. For **13-8PH**, selecting a condition within the H950–H1150 range allows the balance among strength, hardness, ductility, fracture toughness and resistance to stress-corrosion cracking to be tailored to the application. The VIM-VAR double-vacuum melting route limits gas, inclusion and segregation levels, helping to provide uniform and reliable transverse mechanical properties, particularly in thick sections. With a suitable heat-treatment condition, it can retain its mechanical properties up to approximately **315–316 °C**.

Designations

13-8 PH, PH 13-8 Mo, 13-8 Mo, XM-13, UNS S13800, EN/DIN 1.4534, X3CrNiMoAl13-8-2,

Standards

Product Form	ASTM	AMS
Bar	ASTM A564/A564M – XM-13	AMS 5629
Plate	ASTM A693/A693M – XM-13	AMS 5864

Alternative Grades

- 15-5 PH** – Offers similar precipitation hardening, high strength and good fracture toughness.
- 17-7 PH** – Offers high mechanical strength and an age-hardenable structure.
- S165M** – Offers high strength, good toughness and corrosion resistance.