



Grade	Code	AISI	Precipitation-Hardening Stainless Steels
17-7PH	1.4568	AISI 631	

Steel Characteristics

17-7PH is a semi-austenitic precipitation-hardening stainless steel grade. It offers good formability in the solution-annealed condition and develops high mechanical strength, hardness and fatigue resistance after suitable transformation and ageing treatments. Its low dimensional change during heat treatment helps maintain close tolerances. The grade also combines good corrosion resistance and elasticity with a high strength-to-weight ratio.

Chemical Composition (17-7PH)

C %	Mn %	Si %	P %	S %	Cr %	Ni %	Al %	Fe %
≤ 0.09	≤ 1.00	≤ 1.00	≤ 0.04	≤ 0.03	16.00 - 18.00	6.50 - 7.75	0.75 - 1.50	Bal.

Mechanical Properties (Condition H1050)

Product form	Rp0.2 [MPa]	Rm [MPa]	Elongation [%]	Hardness [HB]	Density [g/cm ³]
Bar	≥ 965	≥ 1172	≥ 6	≥ 363	7.65
Plate	≥ 1,035	≥ 1240	≥ 6	≥ 353	7.65

Application Areas

Sector	Common products
Aerospace	Aircraft control-system springs, pressure diaphragms, metal bellows
Automotive and transport	Exhaust-system springs, retaining rings, flexible connectors
Oil and gas	Downhole equipment springs, Belleville washers, valve springs
Chemical processing	Pump diaphragms, expansion bellows, fluid-seal springs
Medical	Surgical clips, surgical stapler springs, medical-device return springs
Electronics and metrology	Strain gauges, spring electrical contacts, sensor diaphragms
Energy and power generation	Turbine sealing rings, high-temperature springs, boiler and heat-exchanger connection elements
General machinery and industrial equipment	Disc springs, retaining rings, spring washers

Additional Information

17-7PH is a precipitation-hardening stainless steel whose mechanical properties can be set at different levels through the selected ageing temperature. The heat-treatment levels known commercially as **H1050**, **H1000** and **H900** establish the balance between strength, hardness, toughness and elasticity. **H1050** combines high strength with more balanced toughness and dimensional stability. **H1000** is an intermediate performance level with increased hardness and fatigue strength. **H900** is selected for components requiring maximum strength, elastic recovery and spring performance;



however, ductility and subsequent machinability are reduced in this condition. This feature allows **17-7PH** to be prepared at different performance levels according to the component's static load, vibration, repeated flexing and operating temperature.

Designations

17-7PH, AISI 631, UNS S17700, EN 1.4568, X7CrNiAl17-7

Standards

Product form	ASTM	AMS	Description
Bar	ASTM A564/A564M, Type 631	AMS 5644	Covers bars and forgings; it may be evaluated in Condition A or in hardened conditions.
Plate	ASTM A693/A693M, Type 631	AMS 5528	Covers solution-annealed plate products that can subsequently be hardened by ageing.
Sheet	ASTM A693/A693M, Type 631	AMS 5528, AMS 5529	AMS 5528 covers solution-annealed sheet; AMS 5529 covers solution-annealed and cold-rolled high-strength sheet.

Alternative Grades

- 1. 13-8PH** - Suitable for components requiring a combination of high strength, toughness and dimensional stability.
- 2. 15-5PH** - Distinguished by high strength, corrosion resistance and wider availability.
- 3. 1.4418** - May be considered for bars, shafts and thick-section components requiring both strength and impact toughness.