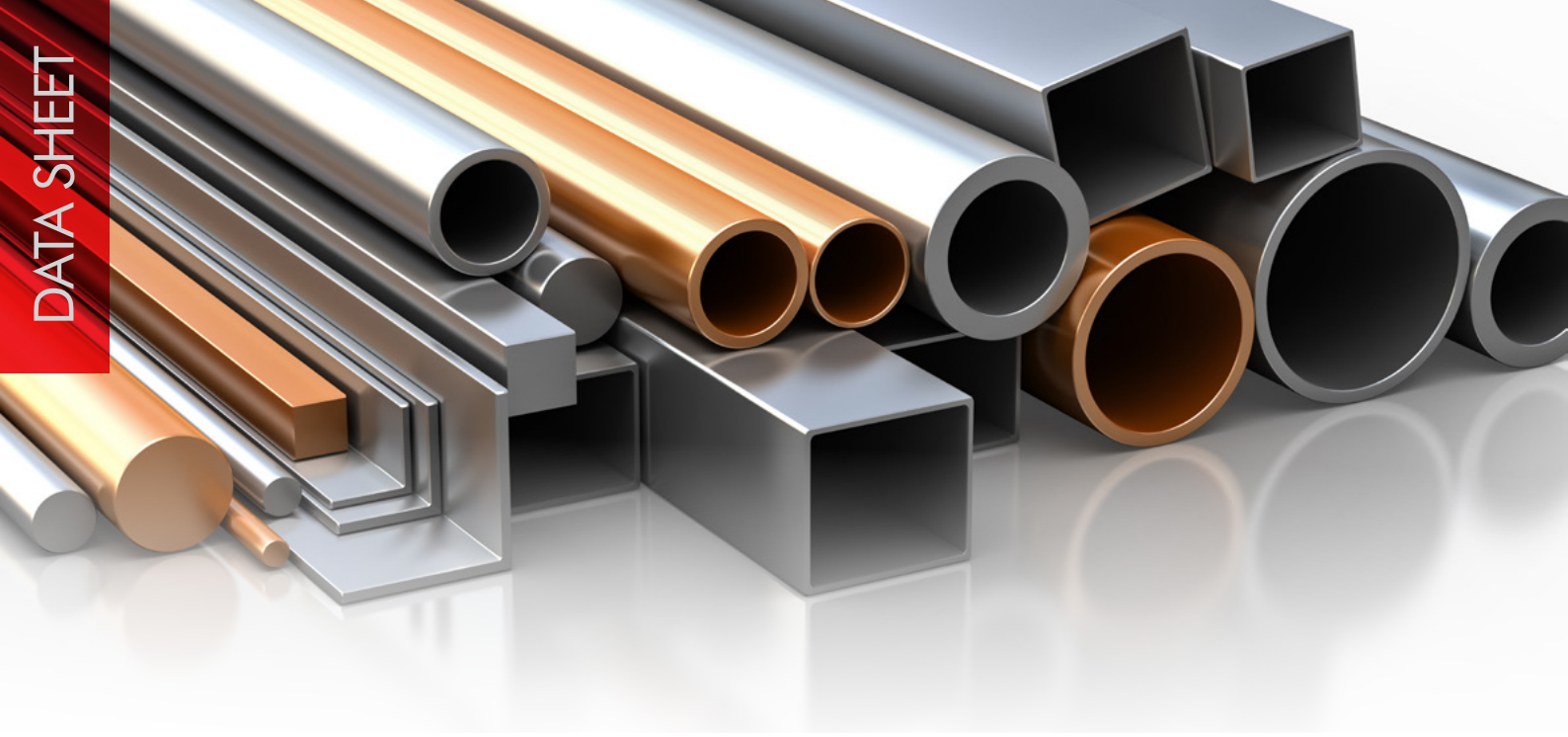
DATA SHEET



S. S. 17-7PH

UNS No - S17700

Stainless Steel 17-7PH® Precipitation Hardening Alloy is a semi-austenitic stainless steel which is austenitic in the annealed condition, however martensitic in the hardened condition. Stainless Steel 17-7 PH gives high strength and hardness, phenomenal fatigue properties, good corrosion resistance as well as minimum distortion upon heat treatment. It is effortlessly formed in the annealed condition, and then hardened to high strength levels by easy heat treatments to Conditions RH 950 and TH 1050. The incredibly high strength of Condition CH 900 offers many advantages where limited ductility and workability are permissible. In its heat treated condition, this alloy gives exceptional mechanical properties at temperatures up to 900°F (482°C).

Applications

Stainless steel grade 17-7 PH is basically utilized for applications requiring corrosion resistance, good strength, and mechanical properties up to 427°C (800°F) in operation. It is commonly utilized for intricate parts because of its low distortion in heat treatment. Stainless steel grade 17-7 PH finds uses in the following:

- Variety of springs and washers
- Chemical processing equipment
- Heat exchangers
- Power boilers
- Super heater tubes
- Components used in high-strength /high-temperature conditions

Characteristics

- High strength
- Moderate corrosion resistance

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shaping exotic metals

S. S. 17-7PH

Machining
Machinability of stainless steel grade 17-7 PH is rated at 75 % of B1112. On machining, this alloy shows long gummy chips and requires chip breakers. While machining will provide excellent results the slow speeds and constant feeds are recommended.

Forming
Forming attributes of this alloy are like to the 301 stainless steel. Intermediate annealing might be necessary for radical forming operations.

Welding
Most common arc and resistance strategies have been effectively utilized with 17-7 PH. It is recommended that inert gas shielding is utilized during fusion welding to decrease the oxidation of aluminum during the process. Preheating and post-weld annealing are not compulsory with this alloy.

Heat Treatment
CONDITION C - Results from heavy cold working (generally 45-50% reduction) of solution treated material. CONDITION CH900- Heat Condition C material to 900 F (482 C), holds for 1 hour, air cool. CONDITION A1750- After fabrication, heat solution treated material to 1750 F (955 C), hold for 10 minutes, cool rapidly to room temperature. CONDITION R100- Within 1 hour of treating to Condition A1750, cool to -100 F (-73 C) and hold for 8 hours. The Air warm to room temperature. CONDITION RH 950- From Condition R100 material, heat to 950 F (510 C), holds for 90 minutes, air cool. CONDITION T- After fabrication, heat to 1400 F (760 C) and hold for 90 minutes. Within 60 minutes, cool to 55 F (13 C), and hold for 1/2 hour. CONDITION TH1050- from Condition T, heat to 1050 F (565 C) and hold for 90 minutes, air cool.

Cold Working
In Condition A, this material can be effectively formed by utilizing most common process.

Annealing
1950 F (1066 C) for 3 minutes for each .1 inch (2.5 mm) of thickness, air cool.

Hardening
Solution anneal at 2150 F for 4 hours with air cooling. Follow with 1975 F for 4 hours and air cool, then 1550 F for 24 hours, air cool and 1400 F for 16 hours, air cool to finish the precipitation hardening process, resistant to liquid oxygen, hydrogen and ammonia. For optimum performance, material must be clean and free of scale and impurities.

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Chemical Properties

C	Al	Si	P	S	Cr	Mn	Ni	Fe
0.09 max	0.75 - 1.50	1.0 max	0.04 max	0.03 max	16.0 - 18.0	1.0 max	6.50 - 7.75	Remainder

Mechanical Properties

Tensile Strength (ksi)	0.2% Yield Strength (ksi)	Elongation% in 2 inches
120	45	35

Physical Properties

Properties	Units	Temperature in °C
Density	7.80 g/cm^3	Room
Specific Heat	0.11 Kcal/kg.C	22°
Melting Range	1406-1440 °C	-
Modulus of Elasticity	200 KN/mm^2	20°
Electrical Resistivity	80 µΩ.cm	Room
Coefficient of Expansion	11.1 µm/m °C	20-100°
Thermal Conductivity	16.4 W/m-°K	20°

ASTM Specifications

Sheet / Plate	Bar	Forging	Wire
A 693	A 564	A 579	A 313

Availability

MANUFACTURING
Fasteners
Custom Machining
Custom Fabrication
Stamped Parts
Flanges

RAW MATERIALS
Bars
Wires
Sheets
Plates