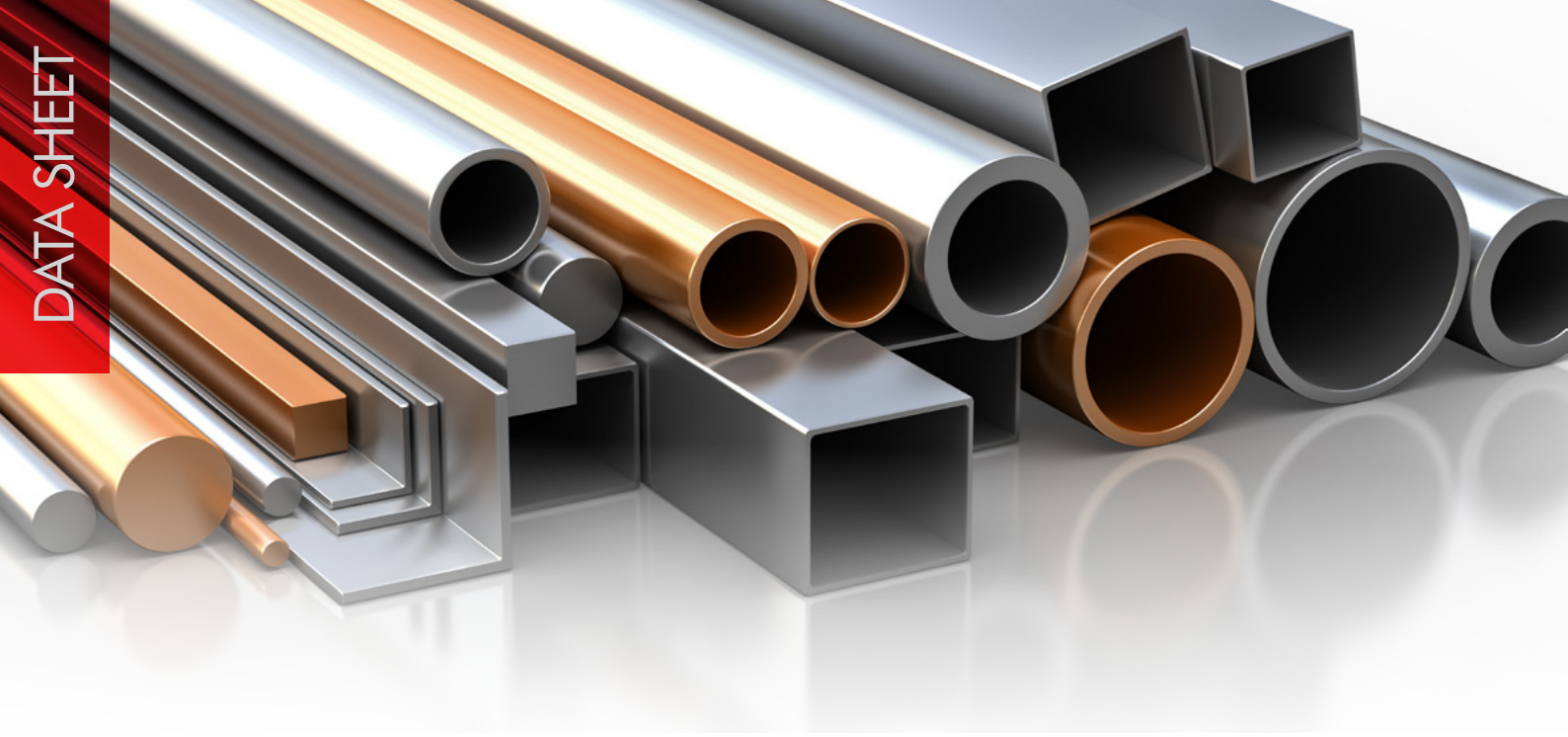
DATA SHEET



S. S. 17 - 4 PH

UNS No - S17400

S.S.17-4 PH is one of the most common grades of martensitic, precipitation hardenable (PH) alloys. 17-4 gives a remarkable combination of high strength, very good mechanical properties at temperatures up to 600°F (316°C), and short-duration, low-temperature heat treatments which minimize war page and scaling. Its good corrosion resistance, formability as well as weldability make it perfect for a different variety of applications in aerospace, petrochemical, and other structural applications. In the annealed condition Stainless Steel 17-4 PH keeps up high mechanical properties, making some forming operations difficult.

Applications

- Aerospace structural and parts
- Biomedical hand tools
- Chemical Processing
- Food Process Equipment
- Gate Valves
- Mechanical Components
- Nuclear Waste Processing and Storage
- Oil and Gas Production foils, helicopter deck platforms, etc.
- Pulp and Paper mill equipment

Characteristics

- High strength and hardness
- Good corrosion resistance
- Magnetic
- Easily welded

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shaping exotic metals

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Machining
Long and gummy chips describe this alloys machinability. It can be machined in the annealed condition, so the condition H1150M will yield best results. Post machining solution treatment of parts will be needed prior to final hardening if machining in this condition.

Forming
This alloy is fitting for being just mildly shaped. In any case, if forming is required, do as such the over age condition for best results.

Welding
By using common fusion and resistance methods it can be successfully welded. This alloy should not be combined by oxyacetylene welding. AWS E/ER630 filler metal is recommended if required.

Heat Treatment
Heat Treatment CONDITION A--Soak at 1900 F (1038 C) for 30 minutes and cool below 60 F (16 C) for complete martensite transformation. Heat Treatment CONDITION H 950- Treat Condition A material at 900 F (482 C) for 1 hour, air cool. CONDITION H925, H1025, H1075, H1100, H1150- Soak solution treated material for 4 hours at particular temperature, air cool, CONDITION H1150M- Soak solution treated material at 1400 F (760 C) for 2 hours, air cool, then re-heat to 1150 F (620 C) for 4 hours and air cool.

Forging
Soak for 1 hour at 2150 F (1177 C) preceding to forging. Try not to work beneath 1850 F (1010 C). Post-work solution treatment is required preceding to final hardening.

Hot Working
17-4 PH can be effectively hot worked with the help of the most common processes. It is recommended that the material should be solution treated at 1900 F (1038 C) then formed during cooling while the material is still austenitic. Post-work solution treatment is required prior to final hardening.

Cold Working
In spite of its high starting yield strength, 17-4 can be cold worked successfully by most common techniques.

Annealing
1900 F (1038 C) holds for 1/2 hour, fast cool.

Hardening
This alloy has good ductility and may be promptly formed by all standard techniques. This alloy is stronger than regular steel so that it requires more powerful equipment to manage forming. Heavy-duty lubricants should be utilized during cold forming.

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Chemical Properties

C	Si	P	S	Cr	Mn	Ni	Cu	Fe	Cb (Nb+Ta)
0.07 max	1.0 max	0.04 max	0.03 max	15.0 - 17.5	1.0 max	3.0 - 5.0	3.0 - 5.0	Remainder	0.15 - 0.45

Mechanical Properties

Tensile Strength (ksi)	0.2 Offset Yield Strength (ksi)	Elongation% in 2 inches
160	145	15

Physical Properties

Properties	Units	Temperature in °C
Density	7.8 g/cm^3	Room
Specific Heat	0.11 Kcal/kg.C	22°
Melting Point	1400-1440 °C	-
Modulus of Elasticity	200 KN/mm^2	20°
Electrical Resistivity	98 µΩ.cm	Room
Coefficient of Expansion	10.8 µm/m °C	20-100°
Thermal Conductivity	17.9 W/m-°K	149°

ASTM Specifications

Sheet / Plate	Forging
A 693	A 705

Availability

MANUFACTURING
Fasteners
Custom Machining
Custom Fabrication
Stamped Parts
Flanges

RAW MATERIALS
Sheets
Plates