MULTI Alloys

ADDING VALUE THROUGH EXPERIENCE

ALLOY 17-4PH | ALLOY INFORMATION SHEET | UNS S17400 W Nr 1.4542

HEAT AND/OR CREEP RESISTANT CORROSION RESISTANT OTHER

Alloy 17-4PH is a very high strength stainless steel with corrosion resistance similar to 304. It develops its mechanical property characteristics by 2 distinct mechanisms – a low carbon martensitic transformation combined with precipitate formation which puts this alloy in to the grouping of precipitation strengthening stainless steels.

Typical applications for Alloy 17-4PH arise from its high strength and include spindles and shafts, fasteners, high pressure valve components, foils and highly stressed components in marine craft, the offshore industry and machinery in which corrosion resistance and high strength are important criteria. This grade should not be used at very low temperatures or above 300 °C.

The alloy may be supplied in one of several heat treatment conditions and the designation for these may differ in accordance with the specifications. **To Illustrate:**

	ASTM A564	EN 10088
Solution treated and quenched (air or oil)	Cond A	Cond AT
Aged at Temperature indicated	H925 (925 °F)	
Aged to Minimum UTS		H930 (930MPa)

NOTE: *The mechanical property specification for this grade is listed below for metal in the aged condition only. Further fabrication, heat treatment and property data available on request.*

COMPOSITION (%) * = Maximum									
	Ni	Cr	Mo	Mn	Si	N	C	Fe	Other
Alloy 17-4PH	3.0-5.0	15.0-17.5		1.0	1.0		0.07*	Bal	3.0-5.0Cu 0.15-0.45Nb

APPLICABLE SPECIFICATIONS (ASTM)	
PLATE, SHEET & STRIP	A693
PIPE	
BAR	A564 / EN 10088-3
CASTINGS	A747 Grade CB7Cu-1
FORGINGS	A705
FITTINGS	
WELDING CONSUMABLES	AWS ER630 / E630

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MECHANICAL PROPERTIES in H925 #	
TENSILE STRENGTH (MPa) (min)	1170
0.2% PROOF STRENGTH (MPa) (min)	1070
ELONGATION (% in 50mm) (min)	10%
HARDNESS (Brinell) (min)	375

TYPICAL PHYSICAL PROPERTIES #	
DENSITY (kg / cu m.)	7800
YOUNGS MODULUS (GPa)	197
THERMAL CONDUCTIVITY (W/m.°C)	16
THERMAL EXPANSION (per °C)	0.0000108

 # - At room temperature

FABRICATION

Hot working of 17-4PH can be carried out in the range 1150-850 °C. Solution annealing requires heating into the range 1030 to 1060 °C followed by rapid cooling.

Details of aging heat treatments and the properties attainable are available separately.

Alloy 17-4PH is readily weldable but this is best done with the metal in the annealed condition and using GTAW, GMAW or SMAW processes. The interpass temperature should be below 100 °C. Complete heat treatment after welding will result in improved toughness of the weld.

Alloy 17-4PH can be machined in both the solution annealed and the hardened conditions. Machining parameters to be set in line with the hardness of the metal. Dimensional changes during heat treatment may necessitate a light final finishing operation.

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SUPPLEMENTARY ALLOY INFORMATION SHEET

HEAT AND/OR CREEP RESISTANT CORROSION RESISTANT OTHER

Aging Heat Treatments and Mechanical Properties

ASTM A564 for bar up to 200mm dia						
Designation		Brinell Hardness* HB	0.2% Proof* (MPa)	UTS* (MPa)	Elong.* (%)	Charpy V Impact* (J)
A	Cool from 1055-1025 °C as required	363max				
H1150D	Hold at 620 °C for 4 hours; air cool plus 4 hours at 620 °C for 4 hours; air cool	255-311	725	860	16	41
H1150M	Hold at 760 °C for 2 hours; air cool plus 4 hours at 620 °C for 4 hours; air cool	255	520	795	18	75
H1150	Hold at 620 °C for 4 hours; air cool	277	725	930	16	41
H1025	Hold at 550 °C for 4 hours; air cool	331	1000	1070	12	20
H925	Hold at 495 °C for 4 hours; air cool	375	1070	1170	10	6.8
H900	Hold at 480 °C for 1 hour; air cool	388	1170	1310	10	

**-minimum unless indicated otherwise*

EN 10088 for bar up to 100mm dia						
Designation		Brinell Hardness* HB	0.2% Proof* (MPa)	UTS* (MPa)	Elong.* (%)	Charpy V Impact* (J)
AT	Cool from 1030-1050 °C in oil or air	360 max		1200 max		
P800	Hold at 760 °C for 2 hours; air cool plus 4 hours at 620 °C; air cool		520	800-950	18	75
P930	Hold at 620 °C for 4 hours; air cool		720	930-1100	16	40
P960	Hold at 590 °C for 4 hours; air cool		790	960-1160	12	
P1070	Hold at 550 °C for 4 hours; air cool		1000	1070-1270	10	

**-minimum unless indicated otherwise*

Detailed technical data available upon request. *Note: Data shown are typical and full research should be done to determine the usefulness in any application or design. No warranty is expressed or implied and we assume no responsiblity for the accuracy, completeness or usefulness of the content.*

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