

The 15-5 alloy was designed to have greater toughness than 17-4 PH. The 15-5 alloy is martensitic in structure in the annealed condition and is further strengthened by a relatively low temperature heat treatment which precipitates a copper containing phase in the alloy. 15-5 is also referred to as XM-12 in some specifications.

### Chemistry

	Ni	Cr	Mn	Cu	Si	Cb+Ta	C	P	S	Fe
Min	3.5	14.0	-	2.5	-	0.15	-	-	-	-
Max	5.5	15.5	1.0	4.5	1.0	0.45	0.07	0.04	0.03	bal

### Specifications

**UNS:** S15500

**W. Nr.:** 1.4545

**AMS:** 5659, 5862

**ASTM:** A 564, A 693, A 698, A 705, A 564

**AMSE:** SA 564, SA 693, SA 705

### Physical Properties

Density	0.282 lb/in <sup>3</sup>
Melting Range	2560 - 2625°F
Poisson Ratio	0.272
Electrical Resistivity	589 μΩ • in
Coefficient of Thermal Expansion (68°F - 212°F)	6.3 μin/in •°F
Thermal Conductivity (212°F)	10.6 BTU/(hr•ft•°F)
Modulus of Elasticity (68°F)	28.5 • 10 <sup>6</sup> psi

### Mechanical Properties

Condition	H900	H1025	H1075	H1150	H1150M
Ultimate Tensile Strength, ksi	190	155	145	135	115
0.2% Offset Yield Strength, ksi	170	145	125	105	75
Elongation, % 2" minimum	10	12	13	16	18
Reduction of Area, %	35	45	45	50	55
Hardness, Brinell	388	331	311	277	255
Hardness, Rockwell	40	34	31	28	24

\* Minimum specified properties per ASTM A 564

### Heat Treatment

Designation	Processing
Condition A	Heated at 1900°F for ½ hour, air (Solution Treated) cooled or oil quenched to below 90°F. Normally performed at mill.
H900	Condition A material heated at 900°F for 1 hour and air cooled. Maximum hardness, but low toughness. Sensitive to stress corrosion cracking. Heating 4 hours improves toughness with about 4 ksi reduction in tensile and yield.
H1025, H1075, H1150	Condition A material heated 4 hours at specific temperature, and air cooled.
H1150M	Condition A material heated at 1400°F for 2 hours, air cooled, then heated at 1150°F for 4 hours and air cooled.

### Features

- Precipitation hardening
- High strength
- Moderate corrosion resistance to 600°F

### Applications

- Aerospace applications
- Chemical applications
- Petrochemical applications
- Pulp and paper
- Food processing equipment

