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# 17-4 STAINLESS STEEL – AMS 5643 – AISI 630 – UNS S17400

17-4 Stainless is a martensitic chromium-nickel-copper stainless steel in the solution treated (annealed) condition. It can be further hardened to various strength levels by a single precipitation hardening heat treatment that minimizes scaling and distortion. Its strength and moderate corrosion resistant properties are maintained in service temperatures up to the 600° F to 800° F range. The alloy should not be used in the solution treated (annealed) condition.

Bars, Wire, and Forgings are usually a single-melt product offered to AMS 5643 for aerospace applications. A CEVM (Consumable Electrode Vacuum Melt) or VAR (Vacuum Arc Remelt) product is specified in AMS 5622. Both specifications require that bars and forgings be restricted to 8" Diameter or less, or 8" least distance between parallel sides. A provision is included to allow larger sizes, provided that the Buyer and Seller agree upon mechanical properties for the size in question.



## 17-4 Stainless Applications:

17-4 Stainless is suitable for a wide variety of applications in the commercial, oil and gas, aerospace, and nuclear industries. It's suitable for intricate parts requiring corrosion resistance and high strength that can be heat treated and welded with minimal distortion due to its precipitation hardening capabilities.



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## Common Trade Names:

- 17-4 PH
- PH17-4
- Type 630 Stainless
- SAT Type 630
- 17Cr-4Ni
- Custom 630

## Common Specifications:

- AMS 5643
- AMS 5643/H1025 for purchase in Solution Treated and Aged to H1025
- AMS 5604
- ASTM A564 Type 630
- ASME SA564
- AMS 5825 Welding Wire
- AMS 5827
- AMS 7474
- ASTM A693
- ASME SA693
- ASTM A705
- ASME SA705

## 17-4 Density:

Condition	Density
Cond A	0.280 #/in <sup>3</sup>
Cond H900	0.282 #/in <sup>3</sup>
Cond H1075	0.283 #/in <sup>3</sup>
Cond H1150	0.283 #/in <sup>3</sup>

## 17-4 Stainless Corrosion Resistance:

17-4 Stainless exhibits superior corrosion resistance compared to hardenable 400-Series Stainless chromium grades such as Type 410 Stainless. It is nearly comparable that of 300-Series Stainless chromium nickel grades such as Type 304 Stainless. 17-4 corrosion resistance can be affected by surface finish and precipitation hardening heat treatment.

## 17-4 Stainless Fabrication:

This grade is readily forged, hot headed, or upset in the range 2050° F and 2200° F, and not below 1850° F. It is usually solution treated after hot work prior to precipitation hardening.



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## 17-4 Stainless Machinability:

This material machines well in the Solution Treated (Annealed) condition, and about 50% better in Cond H1150.

## 17-4 Stainless Weldability:

It is readily weldable by commercial processes without being preheated or post-heated, as usually done for 400-Series Stainless grades.

## Chemical Composition:

Symbol	Element	Min %	Max %
C	Carbon	-	0.07%
Mn	Manganese	-	1.00%
Si	Silicon	-	1.00%
P	Phosphorus	-	0.040%
S	Sulfur	-	0.030%
Cr	Chromium	15.00%	17.50%
Ni	Nickel	3.00%	5.00%
Cb (Nb)	Columbium (Niobium)	5 times Carbon %	0.45%
Cu	Copper	3.00%	5.00%
Mo	Molybdenum	-	0.50%



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## 17-4 Stainless AMS 5643 Hardness & Minimum Tensile Properties:

For diameters 8" and below (or least distance between parallel sides)

Condition	Tensile	Yield 0.2% offset	Elongation (%in 2")	Reduction of Area	Brinell Hardness	Rockwell Hardness
H900	190 ksi	170 ksi	10%	40% (35% >3")	388-444 HB	40-47 HRC
H925	170 ksi	155 ksi	10%	44% (38% >3")	375-429 HB	38-45 HRC
H1025	155 ksi	145 ksi	12%	45%	331-401 HB	34-42 HRC
H1075	145 ksi	125 ksi	13%	45%	311-375 HB	31-38 HRC
H1100	140 ksi	115 ksi	14%	45%	302-363 HB	30-37 HRC
H1150	135 ksi	105 ksi	16%	50%	277-352 HB	28-37 HRC
Ann	-	-	-	-	363 max	39 HRC Max

See AMS 5643 Section 3.4.3.2 for Tensile Test and Temperature requirements  
17-4 Stainless is not used in the Solution Treated (Annealed) condition