



## Technical Data

Ferguson Metals, Inc. ♦ Hamilton, Ohio

### Precipitation-Hardening

### Stainless Steel

### Type 17-7PH (S17700)

#### GENERAL PROPERTIES

Type 17-7PH Precipitation-Hardening Stainless Steel in sheet and strip forms provides valuable property combinations particularly well suited for aerospace applications. This special alloy also provides benefits for other applications requiring high strength and good corrosion resistance, as well as excellent properties for flat springs at temperatures up to 600°F (316°C).

17-7PH is a precipitation-hardening stainless steel that provides high strength and hardness, excellent fatigue properties, good corrosion resistance and minimum distortion on heat treatment.

In the heat treated conditions, 17-7PH stainless steel possesses excellent mechanical properties at temperatures up to 900°F (482°C). Fabrication practices for 17-7PH stainless steel are similar to those used for other chromium-nickel stainless steels.

17-7PH stainless steel and strip is available in thicknesses from 0.015" to 0.135". Material is supplied in the annealed Condition A, ready for fabrication by the user. Sheet and strip 0.050 and thinner can also be supplied in the hard-rolled Condition C for applications requiring maximum strength.

#### CHEMICAL COMPOSITION

Element	Percent by Weight Type 17-7PH
Carbon	0.09 maximum
Manganese	1.00 maximum
Phosphorous	0.04 maximum
Sulfur	0.03 maximum
Silicon	1.00 maximum
Chromium	16.00-18.00
Nickel	6.50-7.75
Aluminum	0.75-1.50

#### RESISTANCE TO CORROSION

Corrosion resistance of Type 17-7PH stainless steel in all heat-treated conditions, like other types of stainless steels - will develop superficial rust in some environments. For example, in a marine atmosphere, stainless steels show evidence of rusting after relatively short exposure periods. However, after exposure of one or two years, the amount of rust present is little more than that present at six months. As with all martensitic steels, 17-7PH stainless steel may be subject to cracking when exposed under stress in environments containing hydrogen sulfide. Such applications are not recommended.

#### PHYSICAL PROPERTIES (Annealed Condition)

**Melting Range** 2560-2625°F (1404-1440°C)  
**Density** 0.282 lb/in<sup>3</sup>

#### MEAN COEFFICIENT OF THERMAL EXPANSION (Annealed Cond)

Temperature Range		Mean Coefficient of Thermal Expansion	
°C	°F	mm/mm/°C	in/in/°F x 10 <sup>6</sup>
21-93	70-200	15.3	8.5
21-204	70-400	16.2	9.0
21-316	70-600	17.1	9.5
21-427	70-800	17.3	9.6

#### THERMAL CONDUCTIVITY (TH 1050 Condition)

Temperature Range		Btu/(hr ft <sup>2</sup> /in <sup>2</sup> /°F)	
°C	°F	W/m • K	
149	300	16.87	117
260	500	18.46	128
449	840	21.05	146
482	900	21.05	146

#### MAGNETIC PERMEABILITY (Annealed Condition)

at 25 oersteds (1989 A/m)	1.4 - 3.4
at 50 oersteds (3978 A/m)	1.4 - 3.6
at 100 oersteds (7956 A/m)	1.4 - 3.5
at 200 oersteds (15,912 A/m)	1.4 - 3.2
maximum	1.4 - 3.6

#### ELECTRICAL RESISTIVITY (Annealed Condition)

Microhm-cm
80

#### TYPICAL MECHANICAL PROPERTIES ROOM TEMPERATURE (Annealed)

Ultimate Tensile Strength psi(MPa)	0.2% Tensile Yield Strength psi(MPa)	Elongation % in 2" (50mm)	Hardness Rockwell
130,000 (896)	40,000 (276)	35	B85

*Data shown are typical, and should not be construed as maximum or minimum values for specification or for final design. Data on any particular piece of material may vary from those shown herein.*