STAINLESS GROUP

High performance Alloys - Medical - Aerospace - Microtechnics - Motorsport - Industry

GRADE 1.4548
17-4PH
AISI 630
ASTM A564

GENERAL INFORMATION

*Alloy **1.4548 or 17-4PH** is a martensitic, structure-hardening stainless steel that combines a hardness of approximately 43 HRC with very good corrosion resistance. This grade has a hardening peak at 480°C, which makes it easy to age after machining in an initially solution-treated state (condition A). The grade is also available in a pre-treated H1025 state (1.4548.4). This aerospace-grade alloy is produced by VAR (Type 1) or ESR (Type 2) remelting in order to limit sulfur and phosphorus content and optimize inclusion cleanliness and microstructure. Ultrasonic testing is performed as standard on round products in accordance with AMS STD 2154 Class AA.*

Stainless has 1.4548.4 Type 2 in stock, as well as various formats and product conditions to best meet your application needs. This product can also be cut into pieces by our service centers.

APPLICATIONS

Due to its good corrosion resistance, high hardness when treated (43HRC), and resilience, this grade is used in particular in the manufacture of aerospace components and in applications in the defense and energy sectors.

STANDARDS AND DESIGNATIONS

Numerical designations:
W. Nr 1.4548 – AISI 630 – UNS S17400

Standards :
AMS 5622 (VAR Type 1 or ESR Type 2 remelted)– AMS 5643 (unremelted form) -ASTM A564 – EN 10088-3 – WL 1.4548.4

Brands:
UGI®4548, X17U4®,...

Contact our Technical Support

TYPICAL CHEMICAL ANALYSIS (mass %)

	Carbon	Manganese	Phosphorus	Sulfur	Silicon	Chromium	Nickel	Copper	Niobium+ Tantalum	Molybdenum	Iron
MIN	---	---	---	---	---	15.0	3.0	3.0	5 x %C	---	BALANCE
MAX	0.07	1.0	0.025	0.015	1.0	17.50	5.0	5.0	0.45	0.50	

METALLURGY

The manufacturing process involves VAR (Type 1) or ESR (Type 2) remelting, which improves the cleanliness and homogeneity of the product. The hot working process produces a controlled microstructure and macrostructure. In the treated state, the microstructure consists of martensite and nanometric intermetallic precipitates that grow during aging. The AMS 5643 and AMS 5622 standards also guarantee less than 5% ferrite.

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PHYSICAL PROPERTIES AT 20°C

Density.....7,8 g.cm^{-3}.
Coefficient of thermal expansion (between20 and 200°C).....10,8 x 10^{-6} m/m.°C
Young's modulus.....197x 10^{3} MPa
Thermal conductivity.....17 W.m^{-1}.K^{-1}
Ferromagnetic grade that can be magnetized

MECHANICAL PROPERTIES OF THE BARS

Grade 1.4548 is available as standard in the pre-treated condition H1025. The table below shows the mechanical properties depending on the delivery condition:

Delivery status	Hardness	Rm (MPa)	A4D %	(1) Resilience (ISO V) - Joules
Solution treated or annealed (condition A) WL 1.4548.9	< 363 HBW < 39 HRC	< 1207	--	--
Pre-treated H900 (482°C/1h)	> 40 HRC	> 1310	>10	20
Pre-treated H1025 (552°C/4h) – P1070 WL 1.4548.4	> 34 HRC	> 1069	>12	25
Pre-treated H1075 (579°C/4h) -	> 31 HRC	> 1000	>13	28
Pre-treated H1150 (621°C/4h) – P930	> 28 HRC	> 931	>16	42

(1) Typical values, not contractually binding

PROCESSES

Forgeability

The grade can be hot forged in the temperature range 950/1200°C. Solution treatment will be necessary to achieve maximum hardness.

Weldability

The alloy can be welded using most processes. Welding should preferably be carried out before aging to avoid embrittlement of the heat-affected zone.

Typical heat treatments

For a target hardness ≥ 40HRC

- **Heating 1030/1050°C**
- **Oil quenching (water or air) - cooling below 32°C**
- **Aging H900 (482°C)**

A volume contraction of up to approximately 0.07% is to be expected during aging.

CORROSION RESISTANCE

This grade is highly resistant to corrosion and ranks among the best martensitic stainless steels. The microstructure contains little or no chromium carbides, making it highly resistant to intergranular corrosion.

STANDARD SHAPE

- Round bars, pre-treated condition H1025 – Surface peeled or ground depending on diameter
- Other formats: please contact us