

## Material Data Sheet

### 1.4541 (X6CrNiTi18-10)

### Austenitic corrosion-resistant stainless steel

**Short description** 1.4541 is an austenitic chromium-nickel steel stabilized by the addition of titanium. This ensures carbon bonding, allowing the material to be welded without the risk of intergranular corrosion, regardless of thickness. This grade also exhibits high corrosion resistance and good cold formability, making it frequently used for welded parts in the food and chemical industries.

Standards and Designations	EN	1.4541
	DIN	X6CrNiTi18-10
	AISI	321
	UNS	S32100

#### Chemical Composition

	<b>C</b> Carbon	<b>Mn</b> (Mangan)	<b>Si</b> (Silicium)	<b>P</b> (Phosphor)	<b>S</b> (Sulfur)	<b>Cr</b> (Chrome)	<b>Ni</b> (Nickel)	<b>Ti</b> (Titanium)
min.	-	-	-	-	-	17,0	9,0	5xC
max.	0,08	2,0	1,0	0,045	0,030	19,0	12,0	0,7

General Properties	corrosion resistance	good
	mechanical properties	moderate
	forgeability	medium
	weldability	excellent
	machinability	poor

**Special Features** Usable up to 550°C  
Non-magnetic grade

**Corrosion resistance** Good corrosion resistance is achieved in natural environments. However, the salt and chlorine content should be low. 1.4541 is resistant to intergranular corrosion both in the as-delivered and welded condition, but not seawater-resistant.  
(PREN = 17.0 – 19.0)

#### Mechanical Properties at 20°C

Hardness HB	Yield strength Rp <sub>0,2</sub> N / mm <sup>2</sup>	Tensile strength R <sub>m</sub> N / mm <sup>2</sup>	Stretching A <sub>5,65</sub>	Elastic modulus kN / mm <sup>2</sup>
≤ 215	≥ 190	500 - 700	≥ 40%	200

**Forgeability** Before forging, all impurities should be removed from the forging. The forging process begins with a slow heating to approximately 1150°C – 1180°C. Forging takes place in a temperature range of 1180°C – 950°C.

Following this, the forging is cooled in air or water

**Weldability** 1.4541 can be welded using all common welding processes, with or without filler metal. Post-welding heat treatment is not required.

**Machinability** During machining, 1.4541 is prone to work hardening. Due to this and its poor thermal conductivity, tools made of carbide or high-speed steel should be used. Adequate cooling should be ensured.

**Application areas** Apparatus and container construction, automotive industry, construction industry, chemicals, petrochemicals, food industry, nuclear technology

**Physical Properties at 20°C**

Density kg/dm <sup>3</sup>	Electrical Resistance (ohm) mm <sup>2</sup> /m	Magnetizability	Thermal conductivity W/m K	Specific heat capacity J/kg K
7,9	0,73	gering	15	500

**Processing**

cold forming	yes
cold heading	yes
polishability	no
open-die and drop forging	yes
machining	yes

**Thermal treatment**

Solution annealing (+AT)	1020 - 1110°C (cooling: water or air)
Hot forming	1200 - 900°C (cooling: water or air))

**Notice** The values and information listed above regarding the properties and/or usability of the material are for informational purposes only. This information is based on the manufacturer's experience.

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