EN 1.4521, AISI 444

Product Information
April, 2009

Ferritic chromium-molybdenum dual-stabilized stainless steel

Type 18Cr-2Mo-Ti stainless steel:
EN 1.4521, AISI 444

Applications

- Boilers, water heaters and heat exchangers are typical applications for grade 1.4521. Also storage tanks and tubes are suitable applications.
- This grade may also be used in pipes for tap water and in other use for drinking-water contexts.
- High chromium content and addition of molybdenum makes this grade an alternative for “acid-proof” austenitic grades for some selected applications.

Welding

- Conventional welding methods and filler materials applied to austenitic 300-series can be used. Heat input in welding should been kept in a minimum level.
- Shielding gases should be based on Ar/He and not to contain hydrogen, nitrogen or carbon dioxide, respectively.
- Generally welded structures show lower ductility compared to that of base material.

Fabrication

- Grade 1.4521 can be formed using typical forming processes like folding, bending, drawing, etc.
- It has higher minimum proof strength than standard austenitic stainless steel grade 1.4301 / AISI 304 in combination with lower work hardening behavior.
- Due to the stabilization, the r-value is higher compared to the non-stabilized ferritic stainless steel such as 1.4016.
- These characteristics means excellent deep-drawability.

Corrosion resistance

- Outokumpu produces grade 1.4521 with a typical chromium content of 18 wt-% and molybdenum content of 2 wt-%.
- Resistance to localized corrosion is close to grade 1.4404 / AISI 316 “acid-proof” austenitic.
- Grade 1.4521 is not susceptible to chloride induced stress corrosion cracking.
- In chloride containing solutions pitting and crevice corrosion is possible depending on various parameters like chloride concentration, temperature, pH value, redox potential, crevice geometry and others.
- The best material performance is reached usually with the help of adequate design, correct post-weld treatment and regular cleaning during use (if applicable).

Physical properties

- Crystal structure is ferritic, and therefore material is ferromagnetic as soft annealed condition.
- Density: 7,7 g/cm^3
- Coefficient of thermal expansion: 10,4x10^{-6}1/K
  (T = 20...100 °C)
- Thermal conductivity at 20°C: 23 W/(m x K)
- Modulus of elasticity at 20°C: 220 GPa

Mechanical properties

- For cold rolled materials.

	Grade	Proof strength $R_{p0,2}$ (N/mm^2)	Tensile strength R_m (N/mm^2)	Elongation after fracture A (%)
EN	**1.4521**	Min. 300	420...640	Min. 20
AISI	**444**	Min. 275	Min. 415	Min. 20

- Minimum values of 0,2 % proof strength ($R_{p0,2}$, N/mm^2) at elevated temperatures, EN 10088-2.

EN	100	150	200	250	300	350
1.4521	250	240	230	220	210	205

Chemical compositions (typical)

EN	C wt-%	Cr wt-%	Mo wt-%	Ni wt-%	Ti+Nb wt-%	Fe wt-%
1.4521	0,02	18,0	2,0	-	0,5	Bal.

Further information

- Standard Specification EN 10088-2:2005
- Standard Specification ASTM A 240 - 08
- Technical Customer Service

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