EN 1.4509
UNS S43940, UNS S43932

Product Information
April, 2009

Ferritic dual-stabilized stainless steel

Type X2CrTiNb18 stainless steel:
EN 1.4509, UNS S43940, "AISI 441"

- Stabilized both with titanium and niobium (columbium)

Applications

- Tubular products for automotive industry and for process equipment like heat exchangers are the main application areas.
- This material is used also in architectural applications, like elevators and door frames. Additionally, various structures in catering and household are among the application areas.
- High chromium content makes this grade well suited for some selected applications for replacing standard austenitic grades.

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.
- Generally welded structures show lower ductility compared to that of base material.

Forming and machining

- Grade 1.4509 can be formed using typical forming processes like folding, bending, drawing, etc.
- It has slightly higher proof strength than standard austenitic stainless steel grade 1.4301 / AISI 304 in combination with lower work hardening.
- Due to the titanium stabilization, its r-value is higher compared to non-stabilized ferritic stainless steel.
- These characteristics means excellent deep-drawability.

Corrosion resistance

- Outokumpu produces grade 1.4509 typically with a chromium content of about 18 wt-%.
- Titanium and niobium alloying reduces sensitivity for intergranular corrosion.
- Relatively high chromium content improves resistance to crevice corrosion that is better when compared to some other ferritic stainless steels, like 1.4016.
- Oxidation resistance is good up to 950°C.
- In chloride containing environments 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: 10x10^{-6}1/K (T = 20…100°C)
- Thermal conductivity at 20°C: 25 W/(m x K)
- Modulus of elasticity: 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	**1.4509**	Min. 250	430...630	Min. 18
UNS	**S43940**	Min. 250	Min. 430	Min. 18
UNS	**S43932**	Min. 205	Min. 415	Min. 22

- 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
1.4509	230	220	210	205	200	180

Chemical composition (typical)

EN	C wt-%	Cr wt-%	Mn wt-%	Ni wt-%	Ti+Nb wt-%	Fe wt-%
1.4509	0,02	18,0	-	-	0,6	Bal.

Further information

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

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