

Ferritic stabilized stainless steel

Type 12Cr-Ti stainless steel:
EN 1.4512, AISI 409

Applications

- Automotive exhaust system parts: mufflers, pipes, catalytic converters, support parts.
- Constructional structures used in elevated temperatures.

Welding

- Conventional welding methods and filler materials applied to austenitic 300-series can be used.
- Titanium stabilized to be resistant against sensitization in Heat Affected Zone (HAZ).
- Shielding gases should be based on Ar/He, mixed with some oxygen to improve arc stability. Hydrogen and nitrogen must not be used.
- Heat input in welding should be kept in a minimum level.

Fabrication

- Grade 1.4512 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 mean excellent deep-drawability and other forming related properties.

Corrosion resistance

- Outokumpu produces grade 1.4512 with a typical chromium content of 11,5 wt-%.
- Good corrosion resistance in moderate corrosive environment
- Grade 1.4512 is not susceptible to chloride induced stress corrosion cracking.
- 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 fully ferritic, and therefore material is ferromagnetic as soft annealed condition.
- Density: 7,7 g/cm³
- Coefficient of thermal expansion: 11x10⁻⁶/K (T = 20...100 °C)
- Thermal conductivity at 20°C: 25 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	1.4512	220 Min.	380...560	25 Min.
AISI	409	170 Min.	380 Min.	20 Min.

- Minimum values of 0,2 % proof strength (R_{p0,2}, N/mm²) at elevated temperatures, EN 10088-2.

EN	100	150	200	250	300	350
1.4512	200	195	190	185	180	160

Chemical compositions (typical)

EN	C wt-%	Cr wt-%	Ni wt-%	Ti wt-%	Fe wt-%
1.4512	0,01	11,5	0,1	0,2	Bal.

Further information

- Standard Specification EN 10088-2:2005
- Standard Specification ASTM A 240 - 09
- Technical Customer Service

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