

SS 409, Type 409, WNR 1.4512, UNS S40900, AISI 409, ASTM 409, Grade 409, AFNOR Z6CT12

Introduction :

Stainless steel 409 is a Ferritic steel. With applications that demand weldability and applications in exhaust systems of automobiles, 409 stainless steel is commonly considered as a chromium stainless steel. It offers good mechanical properties and high-temperature corrosion resistance. Grade 409 stainless steel is also available in highly stabilized forms, such as grades S40920, S40930 and S40910. By the presence of niobium, titanium, or both, in the composition of steels, the stability of these grades is provided. Superior to that of 410 martensitic grades with 12% chromium and 3CR12, SS 409 provides excellent resistance to exhaust gas and atmospheric corrosion.

Chemical Composition

	SS 409	TYPE 409	WNR 1.4512	UNS S40900	AISI 409	ASTM 409	GRADE 409	AFNOR Z6CT12
Carbon	0.08max	0.08max	0.08max	0.08max	0.08max	0.08max	0.08max	0.08max
Manganese	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max
Phosphorus	0.045 max	0.045 max	0.045 max	0.045 max	0.045 max	0.045 max	0.045 max	0.045 max
Sulfur	0.045 max	0.045 max	0.045 max	0.045 max	0.045 max	0.045 max	0.045 max	0.045 max
Silicon	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max
Chromium	10.5-11.74	10.5-11.74	10.5-11.74	10.5-11.74	10.5-11.74	10.5-11.74	10.5-11.74	10.5-11.74
Nickel	0.50 max	0.50 max	0.50 max	0.50 max	0.50 max	0.50 max	0.50 max	0.50 max
Iron	Bal	Bal	Bal	Bal	Bal	Bal	Bal	Bal

Mechanical Properties

	SS 409	TYPE 409	WNR 1.4512	UNS S40900	AISI 409	ASTM 409	GRADE 409	AFNOR Z6CT12
Ultimate Tensile Strength, ksi	55 min	55 min	55 min	55 min	55 min	55 min	55 min	55 min
0.2% Offset Yield Strength, ksi	25 min	25 min	25 min	25 min	25 min	25 min	25 min	25 min
Elongation in 2 inches, %	20 min	20 min	20 min	20 min	20 min	20 min	20 min	20 min
Reduction in Area, %	-	-	-	-	-	-	-	-
Hardness, Rockwell B	88 max	88 max	88 max	88 max	88 max	88 max	88 max	88 max

Standard Available in forms :

ASTM A182/ ASME SA182 Stainless Steel Pipe Fittings
 ASTM A213 / ASME SA213 Seamless Stainless Steel Pipes
 ASTM A240/ ASME SA240 Stainless Steels Sheets / Plates
 ASTM A249/ ASME SA249 Stainless Steel Welded Tubes
 ASTM A269/ ASME SA269 Stainless Steel Tubes
 ASTM A270/ ASME SA270 Stainless Steel Sanitary Tubes
 ASTM A312/ ASME SA312 Stainless Steel Pipes
 ASTM A403/ ASME SA403 Stainless Steel Pipe Fittings
 ASTM A554/ ASME SA554 Stainless Steel Welded Tubes
 ASTM A731/ ASME SA731 Stainless Steel Pipes
 ASTM A789/ ASME SA789 Stainless Steel Tubes
 ASTM A790/ ASME SA790 Stainless Steel Pipes
 ASTM A791/ ASME SA791 Stainless Steel Tubes

Products Available in forms :

- SS 409, Type 409, WNR 1.4512, UNS S40900, AISI 409 Plates
- SS 409, Type 409, WNR 1.4512, UNS S40900, AISI 409 Pipes
- SS 409, Type 409, WNR 1.4512, UNS S40900, AISI 409 Round Bar
- SS 409, Type 409, WNR 1.4512, UNS S40900, AISI 409 Tube
- SS 409, Type 409, WNR 1.4512, UNS S40900, AISI 409 Flanges
- SS 409, Type 409, WNR 1.4512, UNS S40900, AISI 409 Wire
- SS 409, Type 409, WNR 1.4512, UNS S40900, AISI 409 Fittings

Corrosion Resistance

- Grade 409 stainless steels have excellent resistance to exhaust gas and atmospheric corrosion, superior to that of 410 martensitic grades with 12% chromium and 3CR12.
- However, the corrosion resistance is lower than that of grade 430 steels containing 17% chromium.
- The surface of grade 409 steels is liable to mild corrosion, which limits the usage of steels for decorative purposes.

Heat Resistance

- Grade 409 stainless steels offer scaling resistance at temperatures up to 675°C during continuous operation, and up to 815°C under intermittent conditions.
- These temperatures pertain to specific service environments.

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Heat Treatment

- Annealing of grade 409 steels is carried out at temperatures ranging from 790 to 900°C, followed by air-cooling.
- Thermal treatment does not harden grade 409 steels.

Welding

- Grade 409 steels must be pre-heated to temperatures of 150 to 260°C before welding.
- Although grade 430 and 409 filler rods or electrodes can be used during welding of grade 409 steels, grade 309 electrodes or filler rods are strongly recommended by AS 1554.6.
- Care should be taken to weld grade 409 steels with minimum heat, in order to mitigate grain growth.
- Ductility of the welded products can be improved by annealing post-welding at temperatures of 760 to 815°C.
- However, this is not required for thin welded products. Welding of exhaust tubing of automobiles is carried out without filler rods.

Applications

The typical applications of grade 409 stainless steels are listed below:

- Automotive exhaust tubing
- Catalytic converter systems
- Mufflers



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