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AISI 409, 409L Stainless Steel Sheet Plate

General Characteristics:

ASTM a240 type 409 is titanium stabilized ferritic stainless steel containing about 11% chromium conforming to UNS S40910. The presence of chromium leads to the formation of a passive surface film which provides corrosion resistance. The addition of titanium prevents formation of harmful chromium carbides which can lead to inter granular corrosion in service. Titanium being a ferrite former also helps in avoiding hardening on cooling after welding. Furthermore, titanium also ties up with sulphur, leading to improved resistance to pitting corrosion. Atmospheric corrosion resistance of this grade is nearly 250 times that of mild steel. This grade is well suited for such mildly corrosive environments where good formability and weldability are required.

409 stainless steel sheet plates is especially suitable for the manufacture of automotive exhaustive systems on account of:

- Good cold workability similar to that of low alloy steels.
- Good corrosion resistance in natural atmospheres and in contact with moderatelycorrosive media.
- Good oxidation resistance up to 800 ^{0}C.
- Good weldability.

409 Stainless Steel Sheet Plate Physical Properties:

Young's Modulus in tension GPa	Density gm/cm3	Specific Heatat 23-100ºC J/Kg-K	Electrical resistivity μΩ-m	Thermal conductivity W/m. K(100ºC)	Mean Co-efficient of Thermal Expansion (25ºC-100ºC) (/°C)
200	7.8	458	590	25.4	11.2×10^{-6}

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SS 409 Sheet Plate Chemical Properties:

Designation		%C	%Mn	%S	%P	%Si	%Ni	%Cr	%N	%Ti
UNS S40910	Min	--	--	--	--	--	--	10.5	-	6*(%C+%N)
	Max	0.030	1.00	0.020	0.040	1.00	0.50	11.7	0.030	0.50

SS 409 Sheet Plate Mechanical Properties:

Mechanical properties	UTS (MPa)	YS (MPa)	%EL	Hardness
ASTM A240 - UNS S40910	380 min	170 min	20 min	88 HRB max

Products available:

Hot Rolled Plates & Coil, Cold Rolled Coil & Sheets

Applications:

SS 409 is primarily suited for the manufacture of car exhaust systems, and particularly of those components that are exposed to working temperatures up to 750-800^{0}C such as

- Manifolds
- Front pipes
- Catalytic shells
- Mufflers

Corrosion Resistance:

This alloy is effective in many applications where carbon steel, galvanized, aluminized or painted steel or aluminum give unsatisfactory life. The stabilization of carbon and nitrogen with titanium exhibits good resistance to intergranular corrosion.

In addition, stabilization of the sulphur by titanium increases the resistance to pitting corrosion. Being ferritic, 409 is relatively insensitive to stress corrosion cracking. This alloy resists thickness loss in many environments such as brick kiln atmospheres, automotive exhaust acids; but may form a light surface rust film. It should not beused in decorative applications unless painted.

Oxidation Resistance:

409 exhibits good oxidation resistance in normal combustion atmospheres up to approximately 800^{0}C. It provides sufficient oxidation resistance in exhaust systems. It forms a thin tenacious oxide film on the surface which withstands peeling under such thermal cycles.

Formability:

This stainless steel can be welded, drawn, bent, folded, blanked and fabricated into a variety of exhaustive system components without any difficulty. All welding processes must be carried out with minimum heat input to reduce grain growth effects. Conventional welding such as gas tungsten arc, electrical resistance or gas metal-arc can be used. Automotive exhaust tubing is easily welded without any filler metal. When weld filler is required, AWS ER309 is recommended.

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