



DAIKOWT 410

GTAW

FERRITIC - MARTENSITIC STAINLESS
STEEL
410

DESCRIPTION

Solid rod for 12% Cr martensitic stainless steels

This 12% Cr alloy is an air-hardening steel. Preheat and post weld heat treatments are required to achieve welds of adequate ductility for many engineering purposes. The most common application of filler metal of this type is for welding alloys of similar composition. It is also used for deposition of overlays on carbon steels to resist corrosion, erosion, or abrasion. Applications include reaction vessels, pipework in refineries, furnace parts, turbine parts, cast valves, etc. ...

SPECIFICATIONS

ISO 14343-A	W 13	AWS A5.9	ER410
DIN	-	Werkstoff Number	-
Certifications	-	Shielding	11
Positions	PA, PB, PC, PD, PE, PF	Current	DC-

ASME QUALIFICATIONS

F-No (QW432)	6
A-No (QW442)	6

FERRITE

-

PREN

13.165

HARDNESS

230HV

CHEM. COMP. %

	DEFAULT
C	0.05
Mn	0.45
Ni	0.2
Cr	13
P	0.02
S	0.005
Mo	0.05
Si	0.3
Cu	0.1

MECHANICAL PROPERTIES

	MIN	VARIANT
Tensile strength R_m MPa	450	690
Yield strength $R_{p0.2}$ MPa	250	530
Elongation A ($L_0=5d_0$) %	15	22
Impact Charpy ISO-V	-	50J @ 20°C
Impact Charpy ISO-V	-	-

WELDING PARAMETERS

	1.6 mm	2.4 mm
Ampere	80A - 100A	110A - 160A
Voltage	-	-
Packaging	Ø 1,0÷4,0mm	Ø 1,0÷4,0mm
Packaging Type	5kg carton tube	5kg carton tube

ANTI-WEAR CHARACTERISTICS

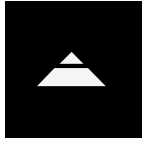
Adhesive wear	▲ ▲ ▲ ▲ ▲
Abrasive wear	▲ ▲ ▲ ▲ ▲
Impact	▲ ▲ ▲ ▲ ▲
Corrosion	▲ ▲ ▲ ▲ ▲
Heat	▲ ▲ ▲ ▲ ▲

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The information in this datasheet is the result of detailed research and is considered accurate as of the publication date. However, we cannot guarantee its complete accuracy, and it is subject to change without notice. Actual results may vary due to many factors like welding procedures, material composition, temperature conditions, bevel configuration, and specific manufacturing techniques. We accept no liability for any errors or omissions in this datasheet. For the most current information, please visit www.daikowelding.com.

DAIKO



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APPLICATION

Designed for welding martensitic 12%Cr (type 410) stainless steel, these consumables require tempering in suitable post-weld heat treatment (PWHT) to address challenges arising from high hardness (~450HV) and low ductility in the as-welded condition. Type 410, with precisely calibrated carbon content, undergoes air-hardening, resulting in a predominantly martensitic microstructure. Structural properties are constrained below ambient due to its relatively high ductile-brittle transition temperature, especially in weldments, and up to about 550°C by modest creep resistance. It exhibits practical resistance to general corrosion, sulphide-induced stress corrosion cracking (SCC) in sour crude oil service, and oxidation up to about 800°C. Applications include hydrocrackers, reaction vessels, distillation plants, pipework in refineries; furnace parts, linings; surfacing run-out rolls in steel mills; cast valve bodies, turbine parts, and burner nozzles.

ALLOY TYPE

12%Cr (410) martensitic stainless steel.

MICROSTRUCTURE

In the PWHT condition the microstructure consists of tempered martensite with some retained ferrite.

MATERIALS

EN W.Nr.: 1.4006 (X10Cr13), 1.4006 (G-X10Cr13), 1.4000 (X6Cr13), 1.4024 (X15Cr13).

ASTM: 410, 410S, 403, A487 gr. CA15.

UNS: S41008, S40300.

WELDING & PWHT

Preheating within the range of 150-250°C becomes imperative for heavier sections. Subsequent to the welding process, it is essential to allow components to cool to room temperature before subjecting them to Post Weld Heat Treatment (PWHT). Both the weld metal and Heat-Affected Zones (HAZs) exhibit suboptimal ductility and toughness in the as-welded condition. Hence, careful handling is strongly advised before PWHT to minimize any potential physical shock. In the context of plain 410 welding, a typical industrial PWHT procedure involves a gradual cooling process to room temperature, allowing for complete transformation to occur (within the range of Ms-350°C to Mf-100°C). This is followed by tempering at temperatures between 680-760°C, succeeded by air cooling. For the specific requirement of achieving hardness below 22HRC (NACE) in the weld area, a preferred PWHT temperature is 745°C. Adhering to these prescribed steps ensures the desired mechanical properties and performance of the welded components.

