DAIKOWM 410

GMAW

FERRITIC - MARTENSITIC STAINLESS STEEL
410

DESCRIPTION

Solid wire 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

EN ISO 14343-A	G 13	**AWS A5.9**	ER410
Shielding	M12, M13	**Positions**	PA, PB, PC, PD, PE, PF, PG
Current	DC+	**Packaging Type**	Drums, B300, D200 and D100 spools.

ASME QUALIFICATIONS

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

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. PER STANDARD	PRODUCT
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

	1.0 mm	1.2 mm
Ampere	160A - 220A	200A - 270A
Voltage	25V - 29V	26V - 30V
Packaging	Ø 0,8÷1,6mm	Ø 0,8÷1,6mm
Packaging Type	Drums, B300, D200 and D100 spools.	Drums, B300, D200 and D100 spools.

ANTI-WEAR CHARACTERISTICS

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

NOTES

Flux cored wire available upon request.

DAIKO

410

DESCRIPTION

APPLICATION

These consumables are specifically designed for welding 12% Cr martensitic stainless steels, such as type 410, in both wrought and cast conditions. It is crucial that fabrication welds, with a similar composition, undergo appropriate post-weld heat treatment (PWHT) due to high hardness (~450 HV) and low ductility in the as-welded condition. Type 410 contains a sufficient amount of carbon to promote transformation through air hardening into a primarily martensitic microstructure. Structural performance below room temperature is limited by the relatively high ductile-brittle transition temperature (especially in welds) and modest creep resistance up to about 550 °C. It has good general corrosion resistance in non-aggressive environments, sulfide stress corrosion cracking resistance in sour crude oil conditions, and oxidation resistance up to about 800 °C. Typical applications include hydrocrackers, reaction vessels, distillation units, and associated piping in refineries; furnace components, linings; cladding for pinch 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

For thicker sections, preheating to a temperature between 150 and 250 °C is essential. After welding, components should be allowed to cool to room temperature before PWHT. Weld metal and heat-affected zones (HAZ) exhibit poor ductility and toughness in the as-welded condition; therefore, careful handling is advised prior to PWHT to minimize any physical impacts. A typical industrial PWHT for unalloyed 410 involves slow cooling to room temperature to ensure complete transformation (range: MS-350 °C, MF-100 °C), followed by tempering at 680-760 °C and subsequent air cooling. To ensure a hardness below 22 HRC (per NACE) in the weld area, a PWHT at 745 °C is preferred.