



# G-TECH 410HR

SMAW

FERRITIC - MARTENSITIC STAINLESS  
STEEL  
410

## DESCRIPTION

High recovery rutile coated electrode for 12% Cr martensitic stainless steels

High performance synthetic electrode with rutile coating. Soft melting free from splashes, easy to remove slag, very easy to use and high welding speed. This electrode is designed for welding similar parental metal, martensitic 12%Cr stainless steels, and for weld overlay 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 3581-A	E 13 R 52	AWS A5.4	E410-26
Shielding	-	Positions	PA, PB, PC
Current	DC+, AC	Packaging Type	Carton box

## ASME QUALIFICATIONS

	PREN	HARDNESS
F-No (QW432)	4 13.43	230HV
A-No (QW442)	6	

CHEM. COMP. %	DEFAULT	MECHANICAL PROPERTIES	MIN. PER STANDARD	PRODUCT
C	0.09	Tensile strength R <sub>m</sub> MPa	450	480
Mn	0.6	Yield strength R <sub>p0.2</sub> MPa	250	320
Ni	0.4	Elongation A (L <sub>0</sub> =5d <sub>0</sub> ) %	15	20
Cr	13.1	Impact Charpy ISO-V	-	47J @ 20°C
P	0.015	Impact Charpy ISO-V	-	-
S	0.01			
Mo	0.1			
Si	0.7			

WELDING PARAMETERS	2.5 mm	3.2 mm	4.0 mm	5.0 mm
Ampere	50A - 80A	80A - 110A	100A - 160A	150A - 200A
Voltage	-	-	-	-
Packaging	30 pcs/kg	18 pcs/kg	12 pcs/kg	8 pcs/kg
Packaging Type	Carton box	Carton box	Carton box	Carton box

## ANTI-WEAR CHARACTERISTICS

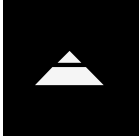
Adhesive wear	▲ ▲ ▲ ▲ ▲
Abrasive wear	▲ ▲ ▲ ▲ ▲
Impact	▲ ▲ ▲ ▲ ▲
Corrosion	▲ ▲ ▲ ▲ ▲
Heat	▲ ▲ ▲ ▲ ▲

## NOTES

Pcs/kg is indicative, actual number may vary ± 5%.



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DESCRIPTION

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STEEL  
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## 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.

