G-TECH 12CrMoV

SMAW

CREEP RESISTING STEELS
12CrMoV

DESCRIPTION

Basic coated electrode for 12%Cr steel

Approved in long-term condition up to +650 °C service temperature. The deposit exhibits high creep rupture strength and good toughness properties under long term stresses. Preheating and interpass temperatures 400 – 450 °C (austenitic welding) or 250 – 300 °C (martensitic welding). Root passes should principally be welded in the martensitic range. Ease of slag removal reduces post-welding cleaning operations to a minimum.

SPECIFICATIONS

EN ISO 3580-A	E Cr Mo W V12 B 4 2 H5	**Shielding**	-
Positions	PA, PB, PC, PD, PE, PF	**Current**	DC+
Packaging Type	Carton box		

CHEM. COMP. %

C	0.2
Mn	0.7
Ni	0.5
Cr	11
V	0.3
P	0.015
S	0.01
Mo	1
Si	0.25
W	0.5

MECHANICAL PROPERTIES

	PRODUCT
Tensile strength R_m MPa	750
Yield strength $R_{p0.2}$ MPa	550
Elongation A (L_0=5d_0) %	24
Impact Charpy ISO-V	40J @ 20°C

WELDING PARAMETERS

	2.5 mm	3.2 mm	4.0 mm	5.0 mm
Ampere	65A - 90A	90A - 130A	140A - 180A	190A - 230A
Voltage	-	-	-	-
Packaging	45 pcs/kg	21 pcs/kg	14 pcs/kg	10 pcs/kg
Packaging Type	Carton box	Carton box	Carton box	Carton box

NOTES

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

DAIKO

12CrMoV

DESCRIPTION

APPLICATION

12% chrome CrMoV steels are specifically designed to operate under critical temperature conditions, offering notable creep resistance up to at least 550°C. The high chromium content ensures excellent performance regarding resistance to steam and combustion corrosion, surpassing those of lower composition CrMo steels ranging from 2% to 9%. These steels are mainly used in the production of cast and wrought components for high-pressure pipelines, steam headers, heat exchangers, and turbine parts, finding their primary application in the power generation sector and occasionally in petrochemical fields.

ALLOY TYPE

12%Cr creep resisting steel also with nominally 1%Mo-0.5%W-0.3%V. The matching base material is generically called X20.

MICROSTRUCTURE

In the PWHT condition the microstructure consists of tempered martensite.

MATERIALS

EN W.Nr.: X20CrMoV 12 1 (1.4935): G-X22CrMoV 12 1 (1.4931) cast.
ASTM: AISI Type 422

WELDING & PWHT

The hardness of the weld metal at room temperature exceeds 500 HV across a wide range of cooling conditions. The EN 3580 standard requires preheating to 400°C, with a maximum interpass temperature of 500°C. These temperatures exceed the austenite-martensite transformation range (Ms-Mf of about 350-150°C). Recent welding procedures have utilized preheating between 200°C and 350°C to reduce granularity and encourage some tempering of the weld metal during the partially transformed multipass cycle. Following welding, it is essential to cool the joint slowly to 120°C (with a range of 100-150°C) and hold it at this temperature for 1-2 hours to allow the transformation before post-weld heat treatment. If immediate heat treatment is not possible, cooling should be followed by post-heating at about 350°C for 1-4 hours to facilitate hydrogen release, before allowing cooling below 60°C. Under these conditions, the hardened weld area can be vulnerable to stress corrosion cracking (SCC) and should remain dry, minimizing the waiting time before PWHT. Post-weld heat treatment (PWHT) usually occurs at temperatures between 730°C and 770°C, requiring a minimum duration of three hours for processing, varying according to thickness; for further details, it is important to refer to the relevant application code.