DAIKOWT 12CrMoV

GTAW

CREEP RESISTING STEELS
12CrMoV

DESCRIPTION

Rod for 12% Cr creep-resistant steels for high temperatures

This rod has been developed for welding steels designed for creep-resistant services, with particular effectiveness for extended applications at temperatures up to +550 °C. The deposit ensures high resistance to creep rupture and good toughness properties even under long-term stress. Preheating and interpass temperatures between 400 and 450 °C allow for an austenitic deposit, while working between 250 and 300 °C results in a martensitic structure. It is recommended to perform root passes mainly in the martensitic range.

SPECIFICATIONS

EN ISO 21952-A	W CRMoWV12SI	**Shielding**	I1
Positions	PA, PB, PC, PD, PE, PF	**Current**	DC-
Packaging Type	5kg carton tube		

CHEM. COMP. %	DEFAULT
C	0.2
Mn	0.7
Ni	0.6
Cr	11
V	0.3
P	0.1
S	0.05
Mo	1
Si	0.3
W	0.5

MECHANICAL PROPERTIES	PRODUCT
Tensile strength R_m MPa	750
Yield strength $R_{p0.2}$ MPa	600
Elongation A (L_0=5d_0) %	20
Impact Charpy ISO-V	50J @ 20°C

WELDING PARAMETERS	1.6 mm	2.4 mm
Ampere	95A - 135A	145A - 205A
Voltage	-	-
Packaging	Ø 1,2÷3,2mm	Ø 1,2÷3,2mm
Packaging Type	5kg carton tube	5kg carton tube

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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.