DAIKOWT 9CrMo

GTAW

CREEP RESISTING STEELS
9CrMo

DESCRIPTION

Rod with 9% Cr-1% Mo for high-temperature service

Rod formulated for 9% Cr and 1% Mo alloy steels, ideal for applications in pressurized hydrogen in oil refineries subjected to prolonged service and high temperatures up to around 650 °C. Developed to ensure high toughness and improved corrosion resistance in the presence of superheated steam, hot hydrogen gas, and crude oil with a high sulfur content, surpassing the performance offered by 5% chromium and 0.5% molybdenum steels.

SPECIFICATIONS

EN ISO 21952-A	W CrMo 9 Si	**AWS A5.28**	ER80S-B8
Shielding	I1	**Positions**	PA, PB, PC, PD, PE, PF
Current	DC-	**Packaging Type**	5kg carton tube

ASME QUALIFICATIONS

F-No (QW432)	6
A-No (QW442)	5

CHEM. COMP. %	DEFAULT
C	0.07
Mn	0.6
Ni	0.1
Cr	9
P	0.015
S	0.01
Mo	1
Si	0.5
Cu	0.1

MECHANICAL PROPERTIES	MIN. PER STANDARD	PRODUCT
Tensile strength R_m MPa	550	710
Yield strength $R_{p0.2}$ MPa	470	590
Elongation A (L_0=5d_0) %	17	23
Impact Charpy ISO-V	-	40J @ -20°C
Impact Charpy ISO-V	-	-

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

NOTES

Preheat and interpass temperature 200 to 300 °C, post-weld heat treatment of test piece 740 to 780°C for 2h.

9CrMo

DESCRIPTION

APPLICATION

Designed for high-temperature applications, 9CrMo offers a reasonable degree of corrosion resistance in superheated steam, hot hydrogen gas, and high-sulfur crude oil, surpassing the performance of 5% Cr-0.5% Mo steels. It is particularly suitable for welding heat-treatable steels, quenched and subsequently tempered. Ideal for piping and components resistant to caustic embrittlement, it maintains its effectiveness up to service temperatures of 600 °C. It is primarily used for **boiler superheater piping, heat exchangers, pipelines** and **pressure vessels in oil refineries and power plants**.

ALLOY TYPE

9%Cr-1%Mo martensitic alloy for elevated temperature service.

MICROSTRUCTURE

In the PWHT condition the microstructure consists of tempered bainite.

MATERIALS

EN W.Nr.: X12CrMo 9 1 (1.7386), X7CrMo 9 1 (1.7388), GS-12CrMo 10 1 (1.7389)
ASTM: A387 gr. 9, A335 gr. 9, A234 gr. WP9 (fittings), A199 gr. T9, A213 gr. T9, A182 gr. F9, A336 gr. F9, A217 gr. C12

WELDING & PWHT

Given the hardness of the material in its deposited state (up to 450 HV) and the poor fracture resistance of the martensitic microstructure, preheating and a minimum interpass temperature of 200 °C are required to prevent hydrogen-induced cracking. By using well-controlled electrodes, the weld metal can maintain hydrogen levels below 5 ml/100 g. For TIG welds and particularly for root TIG passes, preheating below 150 °C may be acceptable. During the welding process, transformation might not complete between 200-350 °C; hence, partial cooling to about 150 °C is recommended before direct transfer to post weld heat treatment (PWHT), followed by non-destructive examinations (NDE). If PWHT is performed after full cooling and NDE, the preheat temperature must be adequately maintained according to thickness, to facilitate hydrogen dispersion. This precaution is less critical for solid wire TIG and MAG processes. PWHT for weld tempering is usually performed between 705-780 °C (as indicated, for example, by ASME B31.3 between 705-760 °C). The minimum recommended holding time is two hours. For castings, the minimum recommended PWHT temperature is slightly lower, with the possibility of dropping to 670 °C.