



DAIKOWM 9CrMo



CREEP RESISTING STEELS
9CrMo

DESCRIPTION

9%Cr-1%Mo solid wire for elevate temperature service

Especially formulated for 9% Cr 1% Mo alloyed steels and steels for pressurized hydrogen service, particularly in oil refineries prolonged elevated temperature service up to about 650°C, especially in oil refineries (piping, heat exchangers, pressure vessels, boiler superheater). The easy handling and the high deposition rate result in high productivity, excellent welding performance and very low spatter formation. The wire shows good wetting behaviour and a finely rippled surface pattern.

SPECIFICATIONS

EN ISO 21952-A	G CrMo 9 Si	AWS A5.28	ER80S-B8
Shielding	M20, M21	Positions	PA, PB, PC, PD, PE, PF
Current	DC+	Packaging Type	Drums, B300, D200 and D100 spools.

ASME QUALIFICATIONS

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

CHEM. COMP. %	DEFAULT	MECHANICAL PROPERTIES	MIN. PER STANDARD	PRODUCT
C	0.07	Tensile strength R_m MPa	550	710
Mn	0.6	Yield strength $R_{p0.2}$ MPa	470	590
Ni	0.1	Elongation A ($L_0=5d_0$) %	17	23
Cr	9	Impact Charpy ISO-V	-	40J @ -20°C
P	0.015	Impact Charpy ISO-V	-	-
S	0.01			
Mo	1			
Si	0.5			
Cu	0.1			
		WELDING PARAMETERS	1.0 mm	1.2 mm
		Ampere	180A - 240A	190A - 250A
		Voltage	22V - 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.



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DESCRIPTION

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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), G5-12CrMo 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.

