DAIKOWT 5CrMo

GTAW

CREEP RESISTING STEELS
5CrMo

DESCRIPTION

Rod with 5% Cr-1% Mo for high-temperature service

Rod specifically formulated for welding 5% Cr and 0.5% Mo alloyed steels, as well as for steels intended for service in pressurized hydrogen. Particularly suitable for applications in petroleum refineries subjected to long-term service and high temperatures, up to approximately 650 °C, such as piping, heat exchangers, pressure vessels, and boiler superheaters.

SPECIFICATIONS

EN ISO 21952-A	W CrMo 5 Si	**AWS A5.28**	ER80S-B6
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	0.08
Mn	0.6
Ni	0.05
Cr	5.5
P	0.01
S	0.01
Mo	0.6
Si	0.4
Cu	0.2

MECHANICAL PROPERTIES	MIN. PER STANDARD	PRODUCT
Tensile strength R_m MPa	550	650
Yield strength $R_{p0.2}$ MPa	470	550
Elongation A (L_0=5d_0) %	17	21
Impact Charpy ISO-V	-	50J @ -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 730 to 760°C for 1h.

5CrMo

DESCRIPTION

APPLICATION

Designed to operate in high-temperature services up to approximately 600 °C, this material offers significant corrosion resistance in conditions of superheated steam, hot gases containing hydrogen, and crude oil with high sulfur content. Primarily used in **boiler superheater tubing, heat exchangers, piping, and pressure vessels in the petroleum industry**, the 5CrMo weld metal has also proven effective for subsequent nitriding processes, such as in the repair of 3Cr-1Mo-V and 2Cr-Mo-1Al steels used for molds intended for plastic injection molding.

ALLOY TYPE

5%Cr-½%Mo steel for elevated temperature service up to 600°C.

MICROSTRUCTURE

In the PWHT condition the microstructure consists of tempered bainite.

MATERIALS

EN W.Nr.: 12CrMo 19 5 (1.7362), X7CrMo 6 1 (1.7373), X11CrMo 6 1 (1.7374), GS-12CrMo 19 5 (1.7363)
ASTM: A387 gr. 5, A335 gr. P5, P5b, A234 gr. WP5 (fittings), A199 gr. T5, A213 gr. T5, T5b, A182 gr. F5, F5a, A336 gr. F5, A217 gr. C5

WELDING & PWHT

Given the hardness of the deposited metal (up to 400 HV) and its bainitic microstructure with relatively reduced fracture toughness, 5CrMo requires preheating and a minimum interpass temperature of 200 °C to prevent hydrogen-induced cold cracking. The use of controlled and well-maintained electrodes ensures a hydrogen content in the weld metal of <5 ml/100 g. For root TIG welds or when fully employing TIG welding, a lower preheat of below 150 °C may be acceptable, although faster cooling may result in partially martensitic and harder deposits. The transformation of 5CrMo during welding is completed within the operating range of 200-350 °C, allowing direct transition (at > 150 °C) to post-weld heat treatment (PWHT), followed by non-destructive examinations (NDE). If PWHT is applied after full cooling and NDE, maintaining the preheat temperature for a set period, according to thickness, is essential to aid in the dispersion of residual hydrogen. This precaution is less critical in solid wire TIG and MAG processes. The PWHT temperature for weld tempering usually varies between 705-760 °C (in accordance with ASME B31.3 705-760 °C). The minimum recommended holding time is two hours. For castings, the minimum recommended temperature for PWHT is lower, reaching temperatures up to 670 °C.