



DAIKOFCW 5CrMo



CREEP RESISTING STEELS
5CrMo

DESCRIPTION

Rutile all position flux cored wire for 5Cr creep resisting alloy for elevated temperature service

Rutile flux cored wire designed for 5% Cr 0.5% 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 superheaters). The easy handling and the high deposition rate result in high productivity, excellent welding performance and very low spatter formation.

SPECIFICATIONS

EN ISO 17634-B	T55T1-1C/M - 5CM	AWS A5.29	E81T1-B6C/M
Shielding	M21, C1	Positions	PA, PB, PC, PD, PE, PF, PG
Current	DC+	Packaging Type	B5300 spool

ASME QUALIFICATIONS

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

CHEM. COMP. %	DEFAULT	MECHANICAL PROPERTIES	PRODUCT
C	0.06	Tensile strength R _m MPa	680
Mn	0.8	Yield strength R _{p0.2} MPa	590
Ni	0.01	Elongation A (L ₀ =5d ₀) %	20
Cr	5	Impact Charpy ISO-V	55J @ 20°C
P	0.01		
S	0.01		
Mo	0.5		
Si	0.3		
Cu	0.05		

WELDING PARAMETERS	1.2 mm	1.6 mm
Ampere	100A - 300A	160A - 420A
Voltage	16V - 28V	31V - 35V
Packaging	Ø 1,2÷1,6mm	Ø 1,2÷1,6mm
Packaging Type	B5300 spool	B5300 spool

NOTES

Preheat and interpass temperature 200 to 300 °C, post-weld heat treatment of test piece 730 to 760°C for 1h.





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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.

