DAIKOFCW 420

FCAW

FERRITIC - MARTENSITIC STAINLESS STEEL
420

DESCRIPTION

Martensitic flux cored wire for hardfacing

The weld metal is similar to 410 with higher chromium and carbon contents and is used for surfacing operation requiring corrosion resistance and wear resistance on matching base materials and also on CMn steels. Suitable for cladding of continuous casting rolls. It requires preheat and inter-pass temperatures of not less than 225°C, followed by slow cooling. Post weld heat treatment is used to temper the weld deposit. The wire shows good wetting behaviour and a finely rippled surface pattern.

SPECIFICATIONS

ISO 14700	T Fe 8	AWS	-
DIN	-	Werkstoff Number	-
Certifications	-	Shielding	M21
Positions	PA, PB, PC	Current	DC+

ASME QUALIFICATIONS

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

FERRITE

-

PREN

13

HARDNESS

40HRC - 50HRC PWHT

CHEM. COMP. %

	DEFAULT
C	0.4
Mn	0.6
Ni	0.5
Cr	13
P	0.03
S	0.03
Si	0.5
Cu	0.3

MECHANICAL PROPERTIES

	MIN	VARIANT
Tensile strength R_m MPa	-	280
Yield strength $R_{p0.2}$ MPa	-	140
Elongation A (L_0=5d_0) %	-	20
Impact Charpy ISO-V	-	50J @ 20°C
Impact Charpy ISO-V	-	-

WELDING PARAMETERS

	1.2 mm	1.6 mm
Ampere	120A - 290A	180A - 350A
Voltage	20V - 30V	30V - 34V
Packaging	Ø 1,2÷1,6mm	Ø 1,2÷1,6mm
Packaging Type	BS300 spool	BS300 spool

ANTI-WEAR CHARACTERISTICS

Adhesive wear	▲▲▲△△
Abrasive wear	▲▲▲△△
Impact	▲▲▲△△
Corrosion	▲▲△△△
Heat	▲▲▲△△

APPLICATION

Sharing similarities with ER410, this alloy distinguishes itself through a slight increase in both chromium and carbon contents. Its utilization extends to a myriad of surfacing operations where a combination of corrosion resistance (attributed to its 12 percent chromium composition) and augmented hardness for heightened wear resistance is paramount. This alloy finds its primary application in surfacing the sealing faces of valves employed in gas, water, and steam piping systems, especially under service temperatures reaching up to +450 °C. Beyond this, its versatility encompasses various applications, including welding similar parental metal, weld overlay, thermal spraying, and the cladding of continuous casting rolls. Remarkably, if the envisaged application demands the use of parts in the "as-welded" condition, achieving a ductile joint is entirely feasible. This is achieved through the application of austenitic fillers, with options such as 22 12 L/309, 18 8 Mn/307, or 25 20/310 proving suitable for this purpose.

ALLOY TYPE

Ferritic martensitic stainless steels.

MICROSTRUCTURE

The microstructure comprises tempered martensite and some carbide.

MATERIALS

Corrosion resistant Cr-steels as well as other similar-alloyed steels with C-contents ≤ 0.30 % (repair welding), heat resistant Cr-steels of similar chemical composition.

EN W.Nr.: 1.4006 (X12Cr13), 1.4021 (X20Cr13), +

ASTM: 410, 420.

WELDING & PWHT

Implementing pre-heating and meticulous interpass temperature control during welding, coupled with a deliberate and gradual cooling process followed by Post Weld Heat Treatment (PWHT), serves as effective preventive measures against cracking. For joint welding, a recommended preheating temperature of +200 - 300 °C is advisable, the specific value depending on the alloy type and strength levels. Correspondingly, the interpass temperature should be maintained within the same range. Ensuring an optimal heat input is crucial, avoiding extremes with a recommended range of 0.5 - 1.5 kJ/mm. The hardness of the deposit is contingent upon the degree of dilution with the base metal and its chemical composition. Generally observed is the correlation where higher degrees of dilution and higher C-content in the base metal result in increased deposit hardness. Post-weld heat treatment becomes a requisite to reinstate ductility to the weld zone. This involves tempering at temperatures ranging from +700 - 750 °C, a process aimed at enhancing the toughness of the welded structure. This comprehensive approach guarantees the mechanical integrity and performance of the welded joints.