DAIKOFCW 2209

FCAW

DUPLEX - SUPERDUPLEX
2209

DESCRIPTION

Rutile flux cored wire for flat and horizontal position for 22% Cr duplex ferritic-austenitic stainless steels

Rutile flux cored wire for welding and cladding in flat and horizontal position. The easy handling and the high deposition rate result in high productivity, excellent welding performance and very low spatter formation. It is designed to weld 2205, 2304 and other similar types of duplex. It is used in offshore oil&gas applications and in chemical and petrochemical industries

SPECIFICATIONS

ISO 17633-A	T 22 9 3 N L R M21 3	AWS A5.22	E2209T0-4
DIN	-	Werkstoff Number	-
Certifications	CE, TUV	Shielding	M21
Positions	PA, PB, PC	Current	DC+

ASME QUALIFICATIONS

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

FERRITE

% 25-50

PREN

36.92

HARDNESS

-

CHEM. COMP. %	DEFAULT
C	0.03
Mn	0.95
Ni	9.3
Cr	23.3
N	0.15
P	0.02
S	0.008
Mo	3.4
Si	0.75

MECHANICAL PROPERTIES	MIN	VARIANT
Tensile strength R_m MPa	550	690
Yield strength $R_{p0.2}$ MPa	450	550
Elongation A (L_0=5d_0) %	20	30
Impact Charpy ISO-V	-	45J @ -20°C
Impact Charpy ISO-V	-	-

WELDING PARAMETERS	1.2 mm	1.6 mm
Ampere	120A - 240A	200A - 350A
Voltage	20V - 28V	28V - 32V
Packaging	Ø 1,2÷1,6mm	Ø 1,2÷1,6mm
Packaging Type	BS300 spool	BS300 spool

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APPLICATION

Duplex stainless steel pipes, plates, fittings, and forgings exhibit a microstructure comprising approximately equal parts of austenite and a ferrite matrix. This composition, in tandem with a general alloying level, imparts notable characteristics. These alloys exhibit high strength compared to standard austenitic steels like type 316L, ensuring robustness in various applications. Their corrosion resistance extends across diverse environments, making them well-suited for challenging conditions. Notably, they demonstrate elevated resistance to chloride-induced stress corrosion cracking (CSCC) and pitting attacks in chloride-rich environments, such as seawater. In the offshore oil/gas, chemical, and petrochemical process industries, these alloys find expanding applications, encompassing pipework systems, flowlines, risers, manifolds, and more. Additionally, the filler metal derived from these alloys is utilized for welding stainless structures requiring exceptionally high strength.

ALLOY TYPE

22%Cr standard ferritic-austenitic duplex stainless steels.

MICROSTRUCTURE

Multipass welds in the as-welded condition contain about 25-50% ferrite depending on dilution and heat input/cooling rate conditions.

MATERIALS

EN W.Nr.: 1.4462 (X2CrNiMoN22-5-3), 1.4362 (X2CrNiN23-4).
ASTM: A182 Gr F51, A890 Gr 4A (cast).
UNS: S31803, S32205, S32101, S32304, S32001, J92205.
PROPRIETARY: SAF2205, SAF 2304 (Sandvik), Uranus® 45N, 35N (Industeel), A903 (voestalpine), Cronifer 2205LCN (VDM), Maresist F51 (Schmidt + Clemens), SM22Cr (Nippon Steel Corporation), LDX 2101 (Outokumpu).

WELDING & PWHT

Preheating is typically considered unnecessary in welding processes, and adherence to a maximum interpass temperature of 150°C is recommended. The acceptable range for heat input falls within 1.0-2.5 kJ/mm, contingent on material thickness, though certain codes impose more stringent limits, often capping it at 1.75 or 2.0 kJ/mm. While welds in wrought duplex stainless steels are commonly left in the as-welded condition, substantial repairs to castings are typically specified in the solution-treated state. Experience in the field has consistently demonstrated favorable material properties when employing a treatment regimen involving exposure to 1120°C for 3-6 hours, followed by a water quenching process. In some instances, incorporating an additional cooling step to 1060°C before quenching has shown promising results in further enhancing the structural characteristics and overall performance of the welded components.