DAIKOWM 2594

GMAW

DUPLEX - SUPERDUPLEX
2507

DESCRIPTION

Solid superduplex stainless wire rod for welding 25% Cr ferritic-austenitic stainless steel

The deposit of this rod wire, designed for welding ferritic-austenitic superduplex steels, possess, in addition to high tensile strength and toughness, also excellent resistance to stress corrosion cracking, pitting and to inter-crystalline corrosion. The operating temperature range is -50 °C up to 250 °C. To ensure particularly good weld metal properties care must be taken to achieve controlled dilution and thorough back purging. It offers very high quality standards for ease of operation and good mechanical properties.

SPECIFICATIONS

ISO 14343-A	G 25 9 4 N L	**AWS A5.9**	ER2594
DIN	-	**Werkstoff Number**	-
Certifications	-	**Shielding**	M12, M13
Positions	PA, PB, PC, PD, PE, PF, PG	**Current**	DC+

ASME QUALIFICATIONS

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

FERRITE

-

PREN

42.2

HARDNESS

290HV - 310HV

CHEM. COMP. %

	DEFAULT
C	0.01
Mn	0.55
Ni	9.3
Cr	25
N	0.25
P	0.02
S	0.015
Mo	4
Si	0.4
Cu	0.1

MECHANICAL PROPERTIES

	MIN	VARIANT
Tensile strength R_m MPa	620	860
Yield strength $R_{p0.2}$ MPa	550	650
Elongation A (L_0=5d_0) %	18	24
Impact Charpy ISO-V	-	60J @ -50°C
Impact Charpy ISO-V	-	-

WELDING PARAMETERS

	1 mm	1.2 mm
Ampere	160A - 220A	200A - 270A
Voltage	25V - 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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APPLICATION

Superduplex stainless steel pipes, plates, fittings, and forgings exhibit a microstructure comprising approximately equal parts of austenite and a ferrite matrix. This unique composition, in conjunction with a general alloying level, imparts notable characteristics: Superduplex exhibits high strength in comparison to standard austenitic steels like type 316L. Its robustness extends to good general corrosion resistance across diverse environments. Additionally, the alloy demonstrates exceptional resistance to chloride-induced stress corrosion cracking (CSCC) and pitting attacks in chloride-rich environments, such as seawater. In scenarios involving dilute sulfuric acid contaminated with chloride ions, 2507 outperforms 904L—a highly alloyed austenitic steel designed for pure sulfuric acid resistance. These alloys are increasingly finding broader applications in the offshore oil/gas, chemical, and petrochemical process industries. Their versatile use encompasses pipework systems, flowlines, risers, manifolds, and other critical components.

ALLOY TYPE

25%Cr ferritic-austenitic superduplex stainless steels.

MICROSTRUCTURE

Austenite-ferrite duplex microstructure in AW or solution annealed condition with an approximate 30- 60% ferrite level, depending on heat cycle conditions.

MATERIALS

EN W.Nr.: 1.4410 (X2CrNiMoN25-7-4).
ASTM: A182 F53, A182 F55, A890 Gr5A, A890 Gr6A.
UNS: S32750, S32760, J93404.
PROPRIETARY: SAF 2507 (Sandvik), Uranus® 47N (Industeel).

WELDING & PWHT

Preheating is typically deemed unnecessary, with stringent control over the interpass temperature, capped at 150°C. While a heat input ranging between 1.0 and 2.0 kJ/mm (depending on material thickness) is generally deemed acceptable, it's worth noting that numerous codes impose a stricter maximum limit, often restricting it to 1.5 or 1.75 kJ/mm. Notably, welds in wrought duplex stainless steels are customarily left in the as-welded condition. However, for substantial repairs to castings, specifications often recommend adopting the solution-treated condition. Drawing from accumulated experience, it has been observed that desirable material properties can be attained through a treatment regimen involving exposure to 1120°C for a duration of 3-6 hours, followed by a water quenching process. This established procedure has demonstrated positive outcomes in enhancing the structural characteristics and overall performance of the welded components.

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