DAIKOFCW 321

FCAW

CAST IRON
NiFe-CI

DESCRIPTION

Ni-Fe flux cored wire for cast iron

This nickel alloyed tubular wire has 36 % Ni because at this Ni content an iron alloy has the lowest possible thermal expansion rate. Steel with this composition does not expand up to 200°C. This physical property makes the alloy suitable for the welding of cast iron parts and all applications where tension of shrinkage should be avoided. It is machinable. Used for joining and repairing nearly all types of cast iron. To limit internal stress of the base metal, hammering of the beads is recommended after each pass.

SPECIFICATIONS

ISO	-	AWS	-
DIN 17006	Ni 36	Werkstoff Number	1.3912
Certifications	-	Shielding	M21
Positions	PA, PB, PC	Current	DC+

ASME QUALIFICATIONS

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

FERRITE

-

PREN

-

HARDNESS

140HB - 230HB

CHEM. COMP. %	DEFAULT
C	0.1
Mn	2.5
Ni	35
S	0.02
Si	1

MECHANICAL PROPERTIES	MIN	VARIANT
Tensile strength R_m MPa	-	420
Yield strength $R_{p0.2}$ MPa	-	220
Elongation A (L_0=5d_0) %	-	12
Impact Charpy ISO-V	-	-
Impact Charpy ISO-V	-	-

WELDING PARAMETERS	1.2 mm	1.6 mm
Ampere	80A - 180A	100A - 260A
Voltage	18V - 26V	23V - 27V
Packaging	Ø 1,2÷1,6mm	Ø 1,2÷1,6mm
Packaging Type	BS300 spool	BS300 spool

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DESCRIPTION

APPLICATION

The NiFe alloy is well-suited for welding various grades of cast iron, with a particular emphasis on spheroidal graphite (SG), nodular, or ductile irons, as well as some alloy cast irons. This alloy offers a harmonious balance of strength, ductility, and toughness, complemented by favorable machinability. Additionally, NiFe consumables can be applied to high-alloy austenitic irons (Ni-Resist). When welding flake graphite grades, a preheat of 300-350°C is recommended, while SG grades benefit from low heat input and low-temperature techniques to mitigate the risk of heat-affected zone (HAZ) hot cracking. It is crucial to note that martensitic Ni-Hard cast irons and white irons are generally considered unweldable due to their heightened crack sensitivity. Furthermore, NiFe consumables prove effective in welding transition joints between cast iron and cast steels, as well as cast iron and mild/low alloy steels. Common components addressed by this welding process include machine bases, pump bodies, engine blocks, gears, and transmission housings.

ALLOY TYPE

Nominally Fe-55% Ni alloy for the repair and joining of cast iron.

MICROSTRUCTURE

The structure depends on the chemical composition and the speed of solidification and subsequent cooling down.

MATERIALS

The NiFe weld metals produce higher strength than the pure nickel cast iron types and are therefore preferable for dissimilar joints, higher strength cast irons and spheroidal graphite cast irons.
EN W.Nr.: 1563:2018 Spheroidal graphite cast irons, 1562:2019-06 Malleable cast irons.
ASTM: A602, A47, A338, A220.

WELDING & PWHT

Welding procedures are commonly executed without preheat, but situations involving heavy multipass deposits or highly restrained joints may necessitate preheat in the range of 150-250°C. Prior to initiating the welding process, meticulous preparation of surfaces is crucial, involving careful gouging and/or grinding with limited heat application to prevent crack propagation. The designated welding area should be diligently cleaned, removing contaminants such as sand, oil, grease, paint, or rust to the greatest extent possible. Preheating becomes particularly beneficial for eliminating impregnated oil on used castings undergoing repairs. In instances where welding is conducted without preheat, it is advisable to minimize the width of the Heat-Affected Zone (HAZ) by employing a low heat input and maintaining a low interpass temperature. The application of a skip welding technique can prove advantageous in achieving this objective. For welds involving thicker sections or highly restrained conditions, preheating within the range of 150-250°C may become imperative. Light peening, aimed at reducing contraction stresses, can offer additional benefits, although caution is warranted to prevent the depletion of weld metal ductility. In certain scenarios, buttering the joint faces or the sides of the repair cavity before the filling process can be a desirable practice, regardless of whether preheat is applied. Upon completion of the welding process, it is recommended to allow the workpiece to cool gradually, with the option of insulation if deemed necessary for optimal results.