DAIKOWM 323

GMAW

CAST IRON
NiFe-CI

DESCRIPTION

Wire rod for welding and repairing graphitic cast irons

Nickel/iron based wire rod for welding and repair of graphitic and mechanical cast irons. Also suitable for joining cast iron with steel in general. Its main applications are in the repair and maintenance of machine tool bases, engine blocks, casting defects elimination, pumps, cylinders, pistons. Making small beads and hammering the deposit are recommended to avoid cracks. Castings containing phosphorus levels higher than normal, approximately 0.20%, are more readily welded using these electrodes than with an electrode of the ENi-CI classification.

SPECIFICATIONS

AWS A5.15	ERNiFe-CI	**Shielding**	I1, M13
Positions	PA, PB, PC, PD, PE, PF, PG	**Current**	DC+
Packaging Type	Drums, B300, D200 and D100 spools.		

HARDNESS

170HB - 200HB

CHEM. COMP. %	DEFAULT
C	0.03
Mn	0.3
Ni	55
S	0.02
Si	0.2

MECHANICAL PROPERTIES	MIN. PER STANDARD	PRODUCT
Tensile strength R_m MPa	270	450
Yield strength $R_{p0.2}$ MPa	250	230
Elongation A (L_0=5d_0) %	6	10
Impact Charpy ISO-V	-	-
Impact Charpy ISO-V	-	-

WELDING PARAMETERS	1.0 mm	1.2 mm
Ampere	170A - 210A	180A - 220A
Voltage	24V - 28V	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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DESCRIPTION

APPLICATION

The NiFe alloy is designed to weld various types of cast iron, with a particular focus on spheroidal graphite (SG), nodular or ductile cast irons, as well as some special cast iron alloys. This alloy provides an optimal combination of strength, ductility, and toughness, while ensuring good workability. NiFe consumables are versatile and can also be used on certain high-alloy austenitic cast irons (Ni-Resist). For flake graphite cast iron grades, preheating of 300-350 °C is recommended; however, for SG grades, a buttering procedure using low heat input and low temperature techniques is advised to avoid hot cracking in the heat affected zones (HAZ). It is important to note that Ni-Hard martensitic and white cast irons are generally unweldable due to their high susceptibility to cracking. NiFe consumables are also ideal for creating transition joints between cast iron and cast steels or between cast iron and mild/low-alloy steels. Common components include **machine bases, pump bodies, engine blocks, gears, and gearbox housings**.

ALLOY TYPE

Nominally Fe-40% 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

In many cases, welding can be performed without preheating; however, for heavy multi-pass deposits or joints with high constraints, preheating between 150-250 °C may be necessary. Prior to welding, surfaces must be prepared by gouging and/or grinding, minimizing heat input to prevent crack propagation. It is essential that the area to be welded is as free from contaminants like sand, oil, grease, paint, or rust as possible. Preheating can be helpful in eliminating oil impregnated in castings to be repaired. If proceeding without preheat, it is preferable to limit the width of the HAZ using low heat input and low interpass temperature welding techniques. Using a fractional welding technique can be advantageous. For welding of thicker sections or with high constraints, preheating in the range of 150-250 °C might be necessary. Additionally, light peening to reduce contraction stresses can be beneficial, but it's crucial not to compromise the ductility of the weld metal. Buttering of the joining faces or sides of the repair cavity is also recommended before completion, regardless of the preheat applied. After welding, gradual cooling of the piece, with insulation if necessary, is highly recommended.

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