DAIKOWT 323

GTAW

CAST IRON
NiFe-CI

DESCRIPTION

Rod for welding and repairing grey iron

Nickel/iron-based rod designed for welding and repairing grey iron and mechanical cast iron, and for joining iron castings to steel. It is particularly useful in the repair and maintenance of machine tool bases, engine blocks, pumps, cylinders, and pistons. To avoid cracking, short weld beads and peening the deposit are recommended. Especially suitable for castings with a higher phosphorus content than standard (up to 0.20%), where it offers greater ease of welding compared to ENi-CI electrodes.

SPECIFICATIONS

AWS A5.15	ERNiFe-CI	**Shielding**	I1
Positions	PA, PB, PC, PD, PE, PF	**Current**	DC-
Packaging Type	5kg carton tube		

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	1.6 mm	2.4 mm
Ampere	80A - 120A	130A - 160A
Voltage	10V - 13V	14V - 18V
Packaging	-	-
Packaging Type	5kg carton tube	5kg carton tube

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DAIKO

NiFe-CI

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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