



# DAIKOWM 657



NICKEL ALLOYS  
50/50Nb

## DESCRIPTION

Solid wire 55% nickel and 44% chromium alloys

The weld metal matches Alloy 657 and has exceptional resistance to corrosion. It is suitable for the overlaying of carbon steels and stainless steels to provide a nickel-chromium alloy corrosion resistant surface. The high chromium level provides excellent resistance to high temperature corrosion between 800 and 950°C, including fuel-ash atmospheres containing sulphur and vanadium. It is used in a wide range of components in oil-fired furnaces and boilers such as tube sheets, tube hangers, supports and spacers in ships, power stations, refineries, and petrochemical plants.

## SPECIFICATIONS

EN ISO 18274	S Ni6072 (NiCr44Ti)	AWS A5.14	ERNiCr-4
Shielding	I1, I3	Positions	PA, PB, PC, PD, PE, PF, PG
Current	DC+	Packaging Type	Drums, DIN 760 reel, B300, D200 and D100 spools.

## ASME QUALIFICATIONS

		PREN
F-No (QW432)	43	44
A-No (QW442)	-	

CHEM. COMP. %	DEFAULT	MECHANICAL PROPERTIES	MIN. PER STANDARD	PRODUCT
C	0.01	Tensile strength $R_m$ MPa	690*	740
Mn	0.1	Yield strength $R_{p0.2}$ MPa	0	500
Ni	55	Elongation A ( $L_0=5d_0$ ) %	0	30
Cr	44	Impact Charpy ISO-V	-	130J @ 20°C
P	0.002	Impact Charpy ISO-V	-	110J @ -50°C
S	0.002			
Si	0.1			
Cu	0.2			
Fe	0.2			
Ti	0.6			
		<b>WELDING PARAMETERS</b>	1.0 mm	1.2 mm
		Ampere	140A - 200A	150A - 210A
		Voltage	23V - 27V	25V - 29V
		Packaging	Ø 0,8÷1,6mm	Ø 0,8÷1,6mm
		Packaging Type	Drums, DIN 760 reel, B300, D200 and D100 spools.	Drums, DIN 760 reel, B300, D200 and D100 spools.

## NOTES

\* Typical weld metal tensile strength, only as indication.





# 50/50Nb

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## APPLICATION

Specifically designed to adapt to the IN-657 alloy, this subfamily is also suitable for welding the machined version containing titanium of the IN-671 alloy. The IN-657 alloy, characterized by a high chromium content, offers exceptional resistance to hot corrosion in the temperature range between 800 and 950 °C. This resistance is crucial to counteract the corrosive attack of combustion ashes containing vanadium pentoxide and alkali metal sulfates, often resulting from the combustion of lower-grade heavy fuel oils. Castings made from IN-657 alloy are widely used in various components of oil furnaces and boilers, such as tube sheets, pipe supports, and spacers, used in ships, power plants, refineries, and petrochemical plants. At lower concentrations of chromium and niobium, primary dendrites belonging to the gamma phase form during solidification, which may increase the tendency for crack formation. A higher content of chromium and niobium promotes the formation of the primary dendritic alpha phase, which, although less ductile, is more prone to cold cracking during cooling. The presence of carbon and nitrogen reduces ductility and therefore their content is kept to a minimum. It is essential to maintain a short arc length to avoid nitrogen absorption. Preheating is generally required: 150-200 °C for 10 mm thicknesses, 200-250 °C for most applications, and up to 450 °C for thicker sections. It is crucial to maintain interpass temperatures and allow slow cooling.

## ALLOY TYPE

50Cr-50Ni alloy for high temperature corrosion resistance.

## MICROSTRUCTURE

Cr-rich alpha phase (bcc) and a Ni-rich gamma phase (fcc). The precise structure depends on thermal cycle and effects on the control of weld metal cracking.

## MATERIALS

**EN W.Nr.:** 2.4678, 2.4680, 2.4813

**ASTM:** A560 gr. 50Cr-50Ni-Cb

**PROPRIETARY:** IN-657, IN-671 (Inco Alloy Products), Paralloy N50W (Doncasters Paralloy), 50-50 Cb (Duraloy)

