AFROX NIMROD 190

Afrox Nimrod 190 electrode is a special basic carbonate-fluoride-rutile flux system on matching 400 core wire to give low levels of residuals. Deoxidation system designed to ensure sound deposits. The raised levels of manganese and titanium help suppress hot cracking and porosity. Analysis is optimised to give the highest as-welded ductility and strength attainable in weld metal of this type. The smaller electrode sizes are particularly suitable for fixed pipework welds demanding qualification in the ASME 6G position. Recovery is about 110% with respect to core wire, 65% with respect to whole electrode.

Nimrod 190 deposits 65%Ni-30%Cu weld metal based on Monel alloy 400 with raised levels of manganese and titanium to suppress hot cracking and porosity. It is optimised to give the highest as-welded ductility and strength attainable in weld metal of this type.

For welding alloy 400 and similar parent material to itself and to others in the Ni-Cu alloy system, such as pure nickel and cupronickel. Welds in alloy K500 are satisfactory, but cannot match the strength of this precipitation-hardened alloy. Castings of alloy 400 with up to about 1.5%Si are welded with Nimrod 190, but higher silicon grades such as BS3071 NA2 and ASTM A743 M35-2 are virtually unweldable because of HAZ cracking.

For **dissimilar** joints between alloy 400 and other alloys or steels, sensitivity to dilution by Fe (20-30%) or Cr (3-6%) can lead to low ductility (or bend-test fissuring) in weld metal close to the fusion boundary. Direct welds to mild or low alloy steels are satisfactory with dilution control, although ENiCrFe-X (ERNiCr-3 wire) is preferable and necessary for stainless and higher chromium alloys. Alternatively, the steel or alloy can be buttered with pure nickel and this procedure is also useful when **surfacing** with alloy 400 consumables.

Alloy 400 has a useful combination of strength, thermal conductivity and resistance to corrosion by seawater, inorganic salts, sulphuric and hydrofluoric acids, hydrogen fluoride and alkalis.

APPLICATIONS

Applications include **heat exchangers**, **piping**, **vessels** and **evaporators** in the **offshore**, **marine**, **chemical**, **petrochemical** and **power engineering** industries.

MATERIALS TO BE WELDED

ASTM-ASME	BS	DIN	Proprietary
UNS N04400	NA13	2.4360	Monel alloy 400, R405, K500 (Special Metals)
UNS N04405	NA1 (cast)	2.4361	Nicorros (VDM)
UNS N05500	2.4365 (cast)		
A494 M-35-1 (cast)			
A494 M-35-2 (cast)			

CLASSIFICATIONS

AWS	A5.11	ENiCu-7
BS	EN (proposed)	ENi 6040
DIN	1736	EL-NiCu30Mn (2.4366)

CHEMICAL ANALYSIS (ALL WELD METAL)

% Carbon	0.15 max	**% Copper**	27.0-34.0
% Manganese	1.0-4.0	**% Titanium**	1.0 max
% Silicon*	1.5 max	**% Iron**	2.0-9.0
% Sulphur	0.015 max	**% Aluminium**	0.5 max
% Phosphorus	0.02 max		
% Nickel	62.0-69.0		

* DIN maximum 1.0% Silicon

For more information contact the Afrox Customer Service Centre,
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TYPICAL MECHANICAL PROPERTIES (ALL WELD METAL IN THE AS WELDED CONDITION)

0.2% Proof Stress	350 MPa	**% Reduction of area**	60
Tensile Strength	550 MPa	**Impact energy at -30°C**	110J
% Elongation on 4d	40	**Hardness**	160-180HV
% Elongation on 5d	35		

PACKING DATA AND OPERATING CURRENT

(DC+)

Diameter mm	Electrode Length mm	Current Amps	Item Number	Pack Mass Kg
2,5	300	60-80	077/675	4.2
3,2	350	70-110	077/676	5,0
4.0	330	90-145	077/677	5,0

STORAGE AND RE-BAKING

Hermetically sealed ring-pull metal tin with unlimited shelf life. Direct use from tin is satisfactory for longer than a working shift of 8h. Excessive exposure of electrodes to humid conditions will cause some moisture pick-up and increase the risk of porosity.
For electrodes that have been exposed:
Redry 200 – 250°C/1-2h to restore to as-packed condition. Maximum 350° C, 3 cycles, 10h total.
Storage of redried electrodes at 50 – 200°C in holding oven or heated quiver: no limit, but maximum 6 weeks recommended. Recommended ambient storage conditions for opened tins (using plastic lid): < 60% RH, > 18°C.

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