Afrox NiCu-7

Afrox NiCu-7 is an electrode for the welding of Monel® and Monel® plated steels, and for the cladding of steel. It is used mainly in the chemical industry and in shipbuilding for propellers, shafts and pumps. It can be used for welding alloy 400 and similar parent materials to itself and to others in the NiCu alloy system, such as pure nickel and cupro-nickel. 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 Afrox NiCu7, 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.

Storage and Re-baking

Re-dry at 250°C for 2 hr to restore to as-packed condition. Maximum 350°C, 3 cycles, 10 hr total.

Storage of re-dried electrodes at 50–200°C in holding oven or heated quiver: no limit, but maximum 6 weeks recommended.

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

Classifications		
AWS	A5.11	ENiCu-7
EN	14172	ENi4060 (NiCu30Mn3Ti)

Typical Chemical Analysis (All weld metal)			
% Carbon	0,15 max	**% Copper**	27,0 - 34,0
% Manganese	4,0 max	**% Nickel**	62,0
% Silicon	1,0 max	**% Titanium & % Niobium**	0,6
% Sulphur	0,015 max	**% Iron**	< 3,0
% Phosphorous	0,02 max		

Typical Mechanical Properties (All weld metal in the as welded condition)	
0,2% Proof Stress	520 MPa
Tensile Strength	400 - 600 MPa
% Elongation on 5d	30
Impact Energy at +20°C	110 J
Hardness	160 - 180 HV

Packing Data and Operating Current (DC+)

Diameter (mm)	Electrode Length (mm)	Current (A)	Pack Mass (kg)	Item Number
2,5	350	70 - 90	5,0	W075972
3,2	350	80 - 125	5,0	W075973
4,0	350	105 - 165	5,0	W075974

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