

Nickel Base Alloys

DATA SHEET

D-70

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CUPRONICKEL ALLOYS

Alloy type

70/30 and 90/10 copper-nickel alloys.

Materials to be welded

	70/30	90/10
ASTM	C71500 C96400 (cast)	C70600 C96200 (cast)
DIN	2.0882 2.0883	2.0872
BS	CN106 CN107 CN108	CN102
CDA	CA715	CA706
Proprietary	Kunifer 30 (IMI) Cunifer 30 (Krupp VDM)	Kunifer 10 (IMI) Cunifer 10 (Krupp -VDM)

The Cupromet N30 and 70CuNi can be used for welding the 70/30 and 90/10 base materials; the 90CuNi is only suitable for the 90/10 alloys.

Applications

These consumables deposit a copper-nickel weld metal; the MMA electrode and 70CuNi solid wire are both nominally 67%Cu and 30%Ni, whereas the 90CuNi solid wire is nominally 86%Cu and 10.5%Ni. The 70/30 consumables are suitable for welding 70/30, 80/20 and 90/10 base materials. The 70/30 consumables match the 70/30 base materials for strength and colour and overmatch the 90/10 alloys for strength.

The consumables are suitable for surfacing and

cladding provided the need for an appropriate buttering layer is addressed, normally either alloy 400 (D-60) or pure nickel (D-50).

Applications include **offshore construction, desalination plant, evaporators, condensers** etc, in **salt and sea water** processing systems.

Microstructure

Solid solution, single phase alloy.

Welding guidelines

Preheating not normally required, maximum interpass temperature 150°C and no PWHT. Contamination of the weld zone with foreign material, particularly any source of lead, tin or zinc (eg. Gun metals) must be scrupulously avoided to prevent weld metal cracking.

Related alloy groups


No closely related alloys but the alloy 400 (D-60) or pure nickel (D-50) consumables may be required as a buffer layer for cladding applications.

Products available

Process	Product	Specification
MMA	Cupromet N30	AWS ECuNi
TIG/MIG	70CuNi	AWS ERCuNi
TIG	90CuNi	BS C16

CUPROMET N30

All-positional MMA electrode for cupronickel

Product description	MMA electrode made on matching 70/30 core wire with a special basic flux system giving very low residuals (S, P, Pb, Sn, Zn etc) and hence maximum crack resistance. Suitable for all-positional welding. Recovery is about 105% with respect to core wire, 65% with respect to whole electrode.																										
Specifications	AWS A5.6 DIN 1733		ECuNi EL-CuNi30Mn (2.0838)																								
ASME IX Qualification	QW432 F-No 34																										
Composition (weld metal wt %)		C	Mn	Si	S	P	Cu	Ni	Fe	Ti	Pb	Sn *	Zn *														
	min	--	1.00	--	--	--	bal	29.0	0.40	--	--	--	--														
	max	--	2.50	0.50	0.015	0.020	--	33.0	0.75	0.50	0.02	--	--														
	typ	0.03	1.8	0.2	0.005	0.010	67	30	0.6	0.15	0.002	0.01	0.005														
* Total maximum = 0.50%.																											
All-weld mechanical properties	As welded						min	typical																			
	Tensile strength						MPa	350	420																		
	0.2% Proof stress						MPa	--	270																		
	Elongation on 4d						%	20	39																		
	Elongation on 5d						%	--	34																		
	Reduction of area						%	--	57																		
	Impact energy						+ 20°C	J	--	115																	
Hardness						HV	--	120																			
Operating parameters	DC +ve 																										
	∅ mm	2.5		3.2		4.0		5.0																			
	min A	60		75		100		130																			
	max A	90		120		155		210																			
Packaging data	∅ mm	2.5		3.2		4.0		5.0																			
	length mm	280		345		345		345																			
	kg/carton	12.6		15.0		15.0		16.5																			
	pieces/carton	684		450		297		198																			
Storage	<p>3 hermetically sealed ring-pull metal tins per carton, 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.</p> <p>For electrodes that have been exposed: Redry 250 – 300°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.</p>																										
Fume data	<p>Fume composition, wt % typical:</p> <table border="1"> <thead> <tr> <th></th> <th>Fe</th> <th>Mn</th> <th>Ni</th> <th>Cu</th> <th>F</th> <th>OES (mg/m³)</th> </tr> </thead> <tbody> <tr> <td></td> <td>< 1</td> <td>2</td> <td>3</td> <td>16</td> <td>15</td> <td>1.2</td> </tr> </tbody> </table>														Fe	Mn	Ni	Cu	F	OES (mg/m ³)		< 1	2	3	16	15	1.2
	Fe	Mn	Ni	Cu	F	OES (mg/m ³)																					
	< 1	2	3	16	15	1.2																					

70CuNi

Solid 70/30 cupronickel wire for TIG and MIG

Product description	Solid wire for TIG and MIG.												
Specifications	AWS A5.7 BS 2901: Pt3 DIN 1733 UNS		ERCuNi C18 SG-CuNi30Fe (2.0837) C71581 Also known generically as filler metal 67 (FM67)										
ASME IX Qualification	QW432 F-No 34												
Composition (wire wt %)		Mn	Si	S	P	Cu	Ni	Fe	Ti	Pb	Al	C	
	min	0.5	--	--	--	bal	30.0	0.40	0.20	--	--	--	
	max	1.00	0.1	0.01	0.01	--	32.0	0.75	0.50	0.007	0.03	0.05	
	typ	0.8	0.01	0.005	0.003	67	31	0.5	0.3	0.001	0.01	0.03	

70CuNi (continued)

All-weld mechanical properties	Typical values as welded		TIG				
	Tensile strength	MPa	365				
	0.2% Proof stress	MPa	200				
	Elongation on 5d	%	40				
	Hardness	HV	105				
Typical operating parameters		TIG		MIG			
	Shielding	Argon or Ar + 1-5%H ₂		Argon or Ar-He			
	Current	DC-		Pulsed			
	Diameter	2.4mm		1.2mm			
	Voltage	100A, 12V		160A, 28V (mean)			
Packaging data	∅ mm	TIG		MIG			
	1.2	--		15kg spool			
	1.6	2.5kg tube		--			
	2.0	2.5kg tube		--			
	2.4	2.5kg tube		--			
Fume data	MIG fume composition (wt %) (TIG fume negligible)						
	Fe	Mn	Cr ³	Ni	Mo	Cu	OES (mg/m ³)
	<1	5	<0.1	22	<0.1	72	0.3

90CuNi

Solid 90/10 cupronickel wire for TIG

Product description	Solid wire for TIG.											
Specifications	BS 2901: Pt3		(C16)									
	DIN 1733		SG-CuNi10Fe (2.0873)									
ASME IX Qualification	QW432 F-No 34											
Composition (wire wt %)		Mn	Si	S	P	Cu	Ni	Fe *	Ti	Pb	Al	C
	min	0.5	--	--	--	bal	10.0	1.0	0.20	--	--	--
	max	1.0	0.1	0.01	0.01	--	11.0	2.0	0.50	0.007	0.03	0.05
	typ	0.8	0.02	0.001	0.002	86	10.5	1.2	0.3	0.001	0.005	0.01
	* BS range Fe = 1.5-1.8%.											
All-weld mechanical properties	Typical values as welded		TIG									
	Tensile strength	MPa	365									
	0.2% Proof stress	MPa	200									
	Elongation on 5d	%	40									
	Hardness	HV	105									
Typical operating parameters		TIG										
	Shielding	Argon or Ar + 1-5%H ₂										
	Current	DC-										
	Diameter	2.4mm										
	Parameters	100A, 12V										
Packaging data	∅ mm	TIG										
	1.6	2.5kg tube										
	2.4	2.5kg tube										
Fume data	Fume composition (wt %) (TIG fume negligible)											
	Fe	Mn	Cr ³	Ni	Mo	Cu	OES (mg/m ³)					
	2	5	<0.1	8	<0.1	80	0.3					