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

METRODE
WELDING CONSUMABLES
A Lincoln Electric Company

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 ECuNi

ASME IX Qualification

QW432 F-No 34

Composition (weld metal wt %)

	Cu	Mn	Si	S	P	Ni	Fe	Ti	Pb
min	bal	1.00	--	--	--	29.0	0.40	--	--
max	--	2.50	0.50	0.015	0.020	33.0	0.75	0.50	0.02
typ	67	1.8	0.2	0.005	0.010	30	0.6	0.15	0.002

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

ø mm	2.5	3.2	4.0	5.0
min A	60	75	100	130
max A	90	120	155	210

Packaging data

ø mm	2.5	3.2	4.0	5.0
length mm	300	345	345	345
kg/carton	12.6	15.0	15.0	15.0
pieces/carton	684	450	297	198

Storage

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.
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.

Fume data

Fume composition, wt % typical:

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 ERCuNi
BS EN ISO 24373 S Cu 7158 / CuNi30Mn1FeTi
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	C
min	0.5	--	--	--	bal	29.0	0.40	0.20	--	--
max	1.0	0.25	0.01	0.02	--	32.0	0.7	0.50	0.02	0.04
typ	0.8	0.01	0.005	0.003	67	31	0.5	0.3	0.001	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

ø 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 EN ISO 24373 S Cu 7061 / CuNi10

ASME IX Qualification

QW432 F-No 34

Composition (wire wt %)

	Mn	Si	S	P	Cu	Ni	Fe	Ti	Pb	C
min	0.5	--	--	--	bal	9.0	0.5	0.1	--	--
max	1.5	0.2	0.02	0.02	--	11.0	2.0	0.5	0.02	0.05
typ	0.8	0.02	0.001	0.002	86	10.5	1.2	0.3	0.001	0.01

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

ø mm	TIG
1.6	2.5kg tube
2.4	2.5kg tube
3.2	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