Data Sheet A-42

METRODE PRODUCTS LTD HANWORTH LANE, CHERTSEY SURREY, KT16 9LL, UK Tel: +44(0)1932 566721 / Fax: +44(0)1932 565168 Email: info@metrode.com Website: www.metrode.com

TUFMET 3NiB

PRODUCT DESCRIPTION

3.5%Ni alloyed steel electrode with basic flux, metal powder type coating on low carbon mild steel core wire. Recovery is approximately 120% with respect to core wire, 65% with respect to whole electrode. Moisture resistant coating giving very low weld metal hydrogen levels.

SPECIFICATIONS

AWS A5.5M	E8018-C2 H4
BS EN ISO 2560-A	E 46 6 3Ni B 42
BS EN ISO 2560-B	E5518-N7 P

ASME IX QUALIFICATION

QW432 F-No 4

QW442 A-No 10.

MATERIALS TO BE WELDED

3.5%Ni alloyed steels specifically for service at cryogenic temperatures down to $-80^{\circ}{\rm C}$

Plate

BS1501Grade 503 and A203 Grades D,E,F

Forgings

BS1503 Grade 503 and ASTM A350 Grade LF3

Castings

BS1504 Grade 503 LT60 and ASTM A352 Grade LC3

Pipe

ASTM A333 Grade 3

APPLICATIONS

Construction of cryogenic plant and associated pipework eg. petrochemical industry, demanding resistance to weld brittle fracture when operating at temperatures down to -80°C in the manufacture, storage and distribution of volatile liquids and liquified gases.

As with **Tufmet 2Ni.B**, it can be used for welding C-Mn and low alloy steels for critical applications demanding a combination of strength and reliable toughness down to temperatures in the region of -60°C.

For applications specifying impact properties at -100°C, the use of matching 3.5%Ni weld metal may be unacceptable because of its sensitivity to procedure, heat input etc, which results in excessive scatter of the impact properties. In this situation nickel-base filler metals are usually recommended eg. Metrode 20.70.Nb TIG root, with Nimrod AKS or 182KS fill and cap. For all-TIG applications such as thin-wall pipework, Metrode 2Ni TIG root followed by 20.70.Nb may be used, or 20.70.Nb throughout.

MICROSTRUCTURE

In the as-welded condition the microstructure is ferritic with a component of acicular ferrite for optimum toughness

WELDING GUIDELINES

Preheat and interpass temperature according to base material thickness

WELDING POSITIONS (ISO/ASME)



CHEMICAL COMPOSITION (WELD METAL WT %)

	С	Mn	Si	S	Р	Ni
Min.		0.30				3.00
Max.	0.10	1.25	0.80	0.020	0.030	3.75
Typical	0.05	0.5	0.3	0.01	0.015	3.3

ALL-WELD MECHANICAL PROPERTIES

As welded or PWHT 605°C/1h®		min	typical
Tensile strength (MPa)		560-680	620
0.2% proof strength (MPa)		460	540
Elongation (%) 4d		19	> 22
	5d	20	25
Reduction of area %			70
Impact ISO-V(J) - 60°C			100
	- 75°C	30	> 90

BS & BS EN ISO-A properties are as-welded, AWS & BS EN ISO-B after PWHT. Maximum according to DIN 8529 is optional.

OPERATING PARAMETERS, DC +VE OR AC (OCV: 70V MIN)

Diameter (mm)	2.5	3.2	4.0	
min. A	70	80	100	
max A	110	140	180	

PACKAGING DATA

Diameter (mm)	2.5	3.2	4.0	
Length (mm)	350	380	450	
kg/carton	12.0	13.5	16.8	
Pieces/carton	627	393	243	

STORAGE

3 hermetically sealed ring-pull metal tins per carton, with unlimited shelf life. Direct use from tin will give hydrogen <5ml/100g weld metal during 8h working shift.

For electrodes that have been exposed:

Rebake 250-300°C/1-2h to ensure H2 <10ml/100g, 300-350°C/1-2h to ensure H2 <5ml/100g. Maximum 420°C, 3 cycles, 10h total.

Storage of rebaked electrodes at 100-200°C in holding oven or 50-150°C in heated quiver: no limit, but maximum 6 weeks recommended. Recommended ambient storage conditions for opened tins (using plastic lid): < 60% RH, >18°C.

RELATED ALLOY GROUPS

There is no matching TIG wire for this electrode, Metrode 2Ni TIG wire is available which is suitable for root runs (data sheet A-41).

FUME DATA

Fume composition, wt % typical:							
Fe	Mn	Ni	Cr	Cu	Pb	F	OES (mg/m ³)
14	5	< 0.5	<0.1	0.2	<0.1	18	5

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