

Nickel Base Alloys

DATA SHEET

D-50

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PURE NICKEL

Alloy type

Low carbon pure nickel weld metal with titanium de-oxidation.

Materials to be welded

ASTM-ASME	BS	DIN
UNS N02200	NA11	2.4066
UNS N02201	NA12	2.4068
		2.4061

Proprietary alloys

Nickel 200 and 201 (Special Metals)
 Nickel 99.6 and 99.2 (VDM)

Applications

These consumables give low carbon pure nickel with the addition of titanium for refinement and de-oxidation. They are used for joining pure nickel to itself, for buffer layers, and for cladding joint faces and flanges. The solid wire is also useful for welding **cast iron** to give soft low strength deposit.

Applications include **tanks** and **vessels**, **process pipework** and **heat exchangers**, in **chemical plant** for **salt production**, **chlorination** and **evaporation of caustic soda**. Also used for handling **corrosive alkalis** and **halides**.

Microstructure

In the as-welded condition the microstructure consists of almost pure nickel austenite. It is strongly ferromagnetic at room temperature.

Welding guidelines

Pure nickel weld metals are sluggish and can lead to irregular weld beads which may require inter-run dressing.

Products available

Process	Product	Specification
MMA	Nimrod 200Ti	AWS ENi-1
TIG/MIG	Nickel 2Ti	AWS ERNi-1

NIMROD 200Ti

All-positional pure nickel MMA electrode

Product description	MMA electrode with special carbonate-fluoride-rutile flux system on matching core wire. Smaller diameters offer excellent all-positional operability. Recovery is about 100% with respect to core wire, 65% with respect to whole electrode.											
Specifications	AWS A5.11		ENi-1									
	BS EN 14172		E Ni 2061									
	DIN 1736		(EL-NiTi3, 2.4156)									
ASME IX Qualification	QW432 F-No 41											
Composition (weld metal wt %)		C	Mn	Si	S	P	Ni	Ti	Al	Fe	Cu	Nb
	min	--	--	--	--	--	92.0	1.0	--	--	--	--
	max	0.10	0.7	1.2	0.015	0.02	bal	4.0	1.0	0.7	0.2	0.5
	typ	0.04	0.5	0.6	0.005	0.005	97	1.5	0.1	0.3	0.1	<0.1
All-weld mechanical properties	As welded						min		typical			
	Tensile strength					MPa	410		450			
	0.2% Proof stress					MPa	200		295			
	Elongation on 4d					%	20		22			
	Elongation on 5d					%	18		20			
	Reduction of area					%	--		40			
	Impact energy				- 30°C	J	--		160			
Hardness					HV	--		160				

NIMROD 200Ti (continued)

Operating parameters	DC +ve																							
	∅ mm	2.5	3.2	4.0																				
	min A	60	70	90																				
	max A	80	110	145																				
Packaging data	∅ mm	2.5	3.2	4.0																				
	length mm	300	350	350																				
	kg/carton	12.3	13.5	15.0																				
	pieces/carton	720	414	300																				
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 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.</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>1</td> <td>10</td> <td>0.2</td> <td>10</td> <td>5</td> </tr> </tbody> </table>											Fe	Mn	Ni	Cu	F	OES (mg/m ³)		<1	1	10	0.2	10	5
	Fe	Mn	Ni	Cu	F	OES (mg/m ³)																		
	<1	1	10	0.2	10	5																		

NICKEL 2Ti

Solid pure nickel TIG and MIG wire

Product description	Solid wire for TIG & MIG.										
Specifications	<p>AWS A5.14 ERNi-1 BS 2901: Pt5 NA32 BS EN ISO 18274 SNi2061 DIN 1736 (SG-NiTi4 (2.4155)) UNS N02061 Also known generically as filler metal 61 (FM61)</p>										
ASME IX Qualification	QW432 F-No 41										
Composition (wire wt %)		C	Mn	Si	S	P	Ni	Ti	Al	Cu	Fe
	min	--	--	--	--	--	93.0	2.0	--	--	--
	max	0.15	1.0	0.7	0.015	0.020	bal	3.5	1.5	0.2	1.0
	typ	<0.02	0.4	<0.3	0.005	0.005	96	3	0.1	<0.02	0.1
All-weld mechanical properties	Typical values as welded					min	TIG				
	Tensile strength				MPa	410	585				
	0.2% Proof stress				MPa	200	335				
	Elongation on 4d				%	--	35				
	Elongation on 5d				%	25	31				
	Reduction of area				%	--	65				
Hardness cap/mid				HV	--	155/185					
Typical operating parameters		TIG				MIG					
	Shielding	Argon *				Ar or Ar-He		* Ar + 1-5%H ₂ also suitable.			
	Current	DC-				Pulsed					
	Diameter	2.4mm				1.2mm					
	Voltage	100A, 12V				150A, 29V (mean)					
Packaging data	∅ mm	TIG				MIG					
	1.2	--				15kg spool					
	1.6	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)				
	2	2	<0.1	68	0.1	<0.5	0.7				