

# 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	<b>Nimrod 200Ti</b>	AWS ENi-1
TIG/MIG	<b>Nickel 2Ti</b>	AWS ERNi-1

## NIMROD 200Ti

All-positional pure nickel MMA electrode

<b>Product description</b>	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.													
<b>Specifications</b>	<b>AWS A5.11</b>		ENi-1											
	<b>BS EN 14172</b>		E Ni 2061											
	<b>DIN 1736</b>		(EL-NiTi3, 2.4156)											
<b>ASME IX Qualification</b>	<b>QW432</b> F-No 41													
<b>Composition (weld metal wt %)</b>		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		
<b>All-weld mechanical properties</b>	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																
	ø mm	2.5	3.2	4.0													
	min A	60	70	90													
	max A	80	110	145													
Packaging data	ø 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><b>3 hermetically sealed ring-pull metal tins</b> 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:  <b>Redry</b> 200 – 250°C/1-2h to restore to as-packed condition. Maximum 350° C, 3 cycles, 10h total.  <b>Storage</b> 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): &lt; 60% RH, &gt; 18°C.</p>																
Fume data	<p>Fume composition, wt % typical:</p> <table border="1"> <thead> <tr> <th>Fe</th> <th>Mn</th> <th>Ni</th> <th>Cu</th> <th>F</th> <th>OES (mg/m<sup>3</sup>)</th> </tr> </thead> <tbody> <tr> <td>&lt;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 <sup>3</sup> )	<1	1	10	0.2	10	5
Fe	Mn	Ni	Cu	F	OES (mg/m <sup>3</sup> )												
<1	1	10	0.2	10	5												

## NICKEL 2Ti

Solid pure nickel TIG and MIG wire

Product description	Solid wire for TIG & MIG.										
Specifications	<b>AWS A5.14</b> ERNi-1 <b>BS 2901: Pt5</b> NA32 <b>BS EN ISO 18274</b> SNi2061 <b>DIN 1736</b> (SG-NiTi4 (2.4155)) <b>UNS</b> N02061 Also known generically as filler metal 61 (FM61)										
ASME IX Qualification	<b>QW432</b> 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 <sub>2</sub> also suitable.			
	Current	DC-				Pulsed					
	Diameter	2.4mm				1.2mm					
	Voltage	100A, 12V				150A, 29V (mean)					
Packaging data	ø 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 <sup>3</sup>	Ni	Mo	Cu	OES (mg/m <sup>3</sup> )				
	2	2	<0.1	68	0.1	<0.5	0.7				