

# Nickel Base Alloys

## ALLOY 625 CONSUMABLES

### Alloy type

Consumables matching the nickel base 625 alloy with typical composition of Ni-21%Cr-9%Mo-3.5%Nb.

### Materials to be welded

#### Matching Alloy 625

ASTM-ASME	DIN	BS
UNS N06625	2.4856	NA21
A494 CW-6MC (cast)		

#### Proprietary Alloys

Inconel 625 (Inco)  
 Nicrofer 6020hMo (VDM)  
 Nicrofer 6022hMo (VDM)

#### Other Alloys

High Nickel Alloys:	Superaustenitic alloys:
Inconel 601 (Inco)	UNS S31254
Incoloy 800H (Inco)	254SMO (Avesta)
Incoloy 825 (Inco)	904L
And equivalents	Similar alloys

Cryogenic:	Dissimilar:
9%Ni steels	Combinations of above

### Applications

These consumables are designed to match the composition and properties of alloy 625. Originally developed to give high temperature strength and structural stability, alloy 625 is also widely used for its resistance to general corrosion, pitting, crevice and stress corrosion cracking in severe chloride media. These properties are conferred by high levels of chromium, molybdenum and niobium, which also raise strength to the highest amongst standard nickel-base alloys. Useful properties from -269°C to above 1000°C are achieved.

In addition to matching alloy 625, suitable for welding **heat resisting** alloys including Inconel 601 (except severe sulphidising conditions), Incoloy 800/800H (preferred to

**Nimrod AKS** above about 900°C), or combinations of these with other alloys for **furnace equipment, petrochemical** and **power generation** plants. Some other applications include:

Overmatching corrosion-resistant welds in alloy 825, Hastelloys G and G3, alloy 28, 904L, 6%Mo super-austenitic stainless 254SMo, and also **overlays** on **pumps, valves** and **shafts**, often in **offshore** and **marine** environments where high pitting resistance (PRE = 50) and tolerance to weld metal dilution are essential.

Welds in **high strength** ferrous alloys including **cryogenic** 9% nickel steels and for reclamation of dies where rapid **work-hardening** and **toughness** are required.

### Microstructure

In the as-welded condition this nickel base weld metal consists of solid-solution strengthened austenite with carbides.

### Welding guidelines

No preheat required and maximum interpass of 250°C. When welding superaustenitic alloys the interpass temperature should be controlled to a maximum of 100°C.

### Related alloy groups

For welding superaustenitic stainless steels C276 (D-30), alloy 59 (D-31) and alloy C22 (D-32) are also suitable.

### Products available

Process	Product	Specification
MMA	<b>Nimrod 625</b>	AWS ENiCrMo-3
	<b>Nimrod 625KS</b>	AWS ENiCrMo-3
TIG/MIG	<b>62-50</b>	AWS ERNiCrMo-3
SAW	<b>62-50</b>	AWS ERNiCrMo-3
	<b>NiCr</b>	BS EN SA FB2

## General Data for all MMA Electrodes

<b>Storage</b>	<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>																
<b>Fume data</b>	<p>Fume composition, wt % typical:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Fe</th> <th>Mn</th> <th>Ni</th> <th>Cr</th> <th>Mo</th> <th>Cu</th> <th>F</th> <th>OES (mg/m<sup>3</sup>)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4</td> <td>9</td> <td>6</td> <td>1</td> <td>0.1</td> <td>20</td> <td>0.8</td> </tr> </tbody> </table>	Fe	Mn	Ni	Cr	Mo	Cu	F	OES (mg/m <sup>3</sup> )	1	4	9	6	1	0.1	20	0.8
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### NIMROD 625

Downhand MMA electrode for surfacing

<b>Product description</b>	<p>MMA electrode designed to combine easy operation with the deposition of high quality weld metal and a finished bead of good appearance. The electrode has a basic-rutile flux system and is made on a nickel core wire. <b>Nimrod 625</b> operates on AC or DC+ and is designed primarily for the downhand/flat or H-V positions. Optimised for surfacing and overlays, for joining Nimrod 625KS is preferred.</p> <p>Recovery is about 170% with respect to core wire, 65% with respect to whole electrode.</p>																																																
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## NIMROD 625KS

Basic coated MMA pipe-welding electrode for 625

<b>Product description</b>	MMA electrode with a basic flux system made on a 625 core wire. The electrode is designed to combine easy operation with the deposition of high quality, radiographically sound weld metal and a finished bead of good appearance. <b>Nimrod 625KS</b> is optimised for DC+ welding in all positions including pipework qualified in the ASME 6G position.  Recovery is about 120% with respect to core wire, 65% with respect to whole electrode.																																																							
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**62-50**

Solid wire for TIG, MIG and SAW

<b>Product description</b>	Solid wire for TIG, MIG and SAW.																
<b>Specifications</b>	<b>AWS A5.14</b>		ERNiCrMo-3														
	<b>BS EN ISO 18274</b>		SNi6625														
	<b>BS 2901: Pt5</b>		Grade NA43														
	<b>DIN 1736</b>		SG-NiCr 21 Mo 9 Nb (2.4831)														
	<b>Approvals</b>		DNV and LRS (TIG)														
<b>ASME IX Qualification</b>	<b>QW432</b> F-No 43																
<b>Composition (wire wt %)</b>		C	Mn	Si	S	P	Cr	Ni	Mo	Nb	Cu	Al	Ti	Fe			
	min	--	--	--	--	--	20.0	60.0	8.0	3.15	--	--	--	--			
	max	0.05	0.50	0.50	0.015	0.015	23.0	bal	10.0	4.15	0.50	0.40	0.40	1.0			
	typ	0.015	0.02	0.05	0.004	0.004	22	65	9	3.5	0.05	0.2	0.2	0.2			
<b>All-weld mechanical properties</b>	Typical values as welded						TIG	SAW + NiCr	TIG +165°C								
	Tensile strength						MPa	780	715	710							
	0.2% Proof stress						MPa	520	430	440							
	Elongation on 4d						%	42	50	42							
	Elongation on 5d						%	40	47	40							
	Impact energy						- 100°C	J	100	--	--						
	Impact energy						- 196°C	J	80	100	--						
	Hardness cap/mid						HV	205/225	235/255	--							
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<b>Typical operating parameters</b>		TIG *				MIG			SAW								
	Shielding	Ar				Ar or ArHe			NiCr flux								
	Current	DC-				Pulsed			DC+								
	Diameter	2.4mm				1.2mm			1.6mm								
	Parameters	100A, 12V				130A, 29V (mean)			260A, 26V								
* Also required as a purge for root runs.																	
<b>Packaging data</b>	ø mm	TIG				MIG			SAW								
	0.8	--				15kg spool			--								
	1.0	--				To order			--								
	1.2	--				15kg spool			--								
	1.6	2.5kg tube				--			25kg coil								
	2.0	2.5kg tube				--			--								
	2.4	2.5kg tube				--			25kg coil								
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<b>Fume data</b>	MIG fume composition (wt %) (TIG & SAW fume negligible)																
		Fe	Mn	Cr <sup>3</sup>	Ni	Mo	Cu	OES (mg/m <sup>3</sup> )									
		1	1	17	50	9	< 0.5	1									