

# High Temperature Alloys

DATA SHEET

C-80

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## ALLOY 22H HEAT RESISTANT AUSTENITIC STAINLESS STEEL

### Alloy type

0.5% C-28% Cr-50% Ni-5% W cast high temperature alloy.

### Materials to be welded

DIN: 2.4879 G-NiCr28W  
 G-X45NiCrWSi 48 28

### Proprietary cast alloys:

22H (Duraloy)  
 Super 22H (Duraloy; +2% Co)  
 Paralloy H48T (Doncasters Paralloy)  
 Centralloy 4879 (Schmidt & Clemens – Centracero)  
 Marker G4879 (Schmidt & Clemens)  
 Pyrotherm G 28/48/5W (Pose-Marre)  
 HR23 (Cronite)  
 Lloyds T75 (LBA)  
 Thermax 70 (Sheepbridge)  
 Manaurite 50W (Manoir Industries)  
 Thermalloy T75 (Manoir Electroalloys)

### Applications

This electrode is designed to match similar high carbon cast alloys originating from Blaw-Knox (Now Duraloy) alloy 22H.

The high carbon 28% Cr-50% Ni-5% W matrix provides excellent hot strength and oxidation resistance at typical service temperatures of 950-1250°C. High nickel gives the alloy good resistance

to carburisation and under oxidising conditions high chromium provides useful resistance to sulphidation.

Applications include highly stressed **furnace parts, sintering and calcining muffles, cement kiln components resistant to hot abrasion, radiant tubes and pyrolysis coils.**

### Microstructure

The as-welded microstructure consists of high alloy austenite with primary eutectic and secondary carbides.

### Welding guidelines

Preheat is often recommended owing to the low ductility of this alloy, coupled with high strength and residual stress levels of multipass welds. For thicker sections, preheat of 300°C or more may be advisable.


### Related alloy groups

In an alternative alloy for similar applications about 15% Ni is replaced with cobalt, see data sheet C-70.

### Products available

Process	Product	Specification
MMA	<b>Thermet 22H</b>	--

# THERMET 22H

<b>Product description</b>	All-positional basic MMA electrode designed to match similar cast alloys. Basic flux system with alloy additions on high purity NiCr core wire. Recovery is about 140% with respect to core wire, 65% with respect to whole electrode.									
<b>Specifications</b>	There are no national specifications for this electrode.									
<b>ASME IX Qualification</b>	<b>QW432</b> F-No --									
<b>Composition (weld metal wt %)</b>		C	Mn	Si	S	P	Cr	Ni	W	Fe
	min	0.40	0.5	0.5	--	--	27.0	47.0	4.0	--
	max	0.60	1.5	1.2	0.020	0.030	30.0	54.0	6.0	bal
	typ	0.50	1	0.7	0.006	0.010	28	51	5	14
<b>All-weld mechanical properties</b>	As welded					min *		typical **		
	Tensile strength				MPa	440	780			
	0.2% Proof stress				MPa	--	590			
	Elongation on 4d				%	--	7			
	Elongation on 5d				%	4	6			
	Reduction of area				%	--	6			
	Hardness				HV	--	270			
	* Minimum values for DIN 2.4879 castings.									
	** The high strength of the weld metal is derived from the chill-cast microstructure coupled with carbide precipitation and strain-hardening by successive weld beads. Room temperature elongation has little significance for weld metal designed for elevated temperature service.									
<b>Operating parameters</b>	DC +ve									
	ø mm	2.5		3.2		4.0		5.0		
	min A	70		85		110		140		
	max A	95		120		160		200		
<b>Packaging data</b>	ø mm	2.5		3.2		4.0		5.0		
	length mm	260		310		310		310		
	kg/carton	10.5		12.0		12.3		12.0		
	pieces/carton	492		300		198		120		
<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> 150 – 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>	Fume composition, wt % typical:									
		Fe	Mn	Ni	Cr	Cu	F	OES (mg/m <sup>3</sup> )		
		3	6	9	7	<0.2	22	0.7		