

**C-31** 

# High Temperature Alloys

# **310H ELECTRODE TO MATCH HK40**

## Alloy type

0.4%C-25%Cr-20%Ni (3 10H) austenitic cast alloy for heat resisting service.

### Materials to be welded

ASTM	A351, A608 Grade HK40
DIN	1.4846 (X40CrNi 25 21)
	1.4848 (G-X40CrNiSi 25 20)
BS	3100 Grade 310C40
	1504 Grade 310C40
Proprietary	H20 (Doncasters Paralloy)
	Thermalloy 47 (Duraloy)
	Lloyds T47 (LBA)
	HR6 (Cronite)

### **Applications**

Thermet 3 10H is designed to weld HK40 which is one of the standard materials for centrifugally cast tubes operating at around 1000°C.

These alloys are used in **reformer** and **steam cracker coils** in **chemical** and **petrochemical plants**. Also for components such as **billet skids**, **calinating tubes**, **kiln nose segments**, **conveyor rolls**, and **furnace**  structural items in the cement, ceramic and steel industries.

DATA SHEET

SURREY, KT16 9LL

Tel:

Fax:

Fax:

Fax:

Email:

Internet:

METRODE PRODUCTS LTD HANWORTH LANE, CHERTSEY

+44(0)1932 566721

+44(0)1932 565168 Sales

info@metrode.com

+44(0)1932 569449 Technical +44(0)1932 566199 Export

http//www.metrode.com

#### **Microstructure**

In the as-welded condition the weld metal microstructure consists of austenite with eutectic and secondary carbides.

#### Welding guidelines

Generally no preheat or PWHT are required.

#### **Related alloy groups**

There are two other 310 alloy groups: the 3 10L (data sheet B-45) which is used for corrosion resistant applications not high temperature service, and the standard 310 alloys (data sheet C-30) which are used for the standard  $(0.1 \ \%C)$  base materials.

#### Products available

Process	Product	Specification
MMA	Thermet 310H	AWS E310H-15



THERMET 310H		Basic all-positional MMA electrode for HK40 type castings											
Product description	MMA optimi resista	electrode sed for E nt coating	e with b DC+ we g giving	basic flux lding in sound po	coating all positi prosity fr	made or ions incl ee depos	n 310 con uding fix its.	e wire to ted pipev	o give lo vork in .	w residua ASME 50	l levels. T 5/6G posit	he electro ions. Moi	ode is isture
	Recov	ery is abo	out 1209	% with re	spect to c	core wire	, 65% wi	th respec	t to who	le electrod	le.		
Specifications	AWS BS EI BS 29	AWS A5.4 BS EN 1600 BS 2926		E310 E 25 25.20	)H-15 20 H B 4 ).H.B	42							
ASME IX Qualification	QW43	QW432 F-No 5											
Composition		С	Mn	Si	S	Р	Cr	Ni	Мо	Cu			
(weld metal wt %)	min	0.35	1.0				25.0	20.0					
	max	0.45	2.0	0.70	0.025	0.030	28.0	22.0	0.50	0.50			
	тур	0.41	1./	0.5	0.01	0.02	26	21	0.1	0.03			
All-weld mechanical	As wel	ded					min	typic	al				
properties	Tensile	e strength			Μ	IPa	620	760	)				
	0.2% F	Proof stres	SS		Μ	IPa	350	550	)				
	Elonga	ation on 40	ч 2			% %	10	20					
	Reduction of area					%		25					
	Hardne	Hardness				HV			)				
					1	IIV		250	)				
	These the rar	alloys are 1ge 10-20	e design % are n	ed for ope ormal.	eration at	t elevated	 l tempera	tures and	, modest	ambient te	emperature	elongatio	ons in
Operating parameters	These the ran	alloys are 1ge 10-20 7e	e design % are n	ed for ope ormal.	eration at	t elevated	 I tempera	tures and	modest	ambient te		elongatio	ons in
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Operating parameters	These the ran DC +v ø mm min A	alloys are nge 10-20 /e	e design % are n	ed for ope ormal. 2.5 60	eration at	3.2 75		4.0 100	, modest	ambient te		elongatio	ons in
Operating parameters	These the ran DC +v ø mm min A max A	alloys are 1ge 10-20 7e	e design % are n	ed for op ormal. 2.5 60 90	eration at	3.2 75 120		4.0 100 155	, modest	ambient te		e elongatio	ons in
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Operating parameters Packaging data	These the ran DC +v ø mm min A max A ø mm length	alloys are nge 10-20 /e mm	e design % are n	ed for ope ormal. 2.5 60 90 2.5 300	eration at	3.2 75 120 3.2 350		4.0 100 155 4.0 350	modest	ambient te		elongatio	ons in
Operating parameters Packaging data	These the ran DC +v ø mm min A max A ø mm length kg/cart	alloys are nge 10-20 /e mm ton	e design % are n	ed for ope ormal. 2.5 60 90 2.5 300 11.4	eration at	3.2 75 120 3.2 350 13.5		4.0 100 155 4.0 350 14.4	modest	ambient te		e elongatio	ons in
Operating parameters Packaging data	These the rar DC +v ø mm min A max A ø mm length kg/cart pieces	alloys are ige 10-20 /e mm ton /carton	e design % are n	ed for ope ormal. 2.5 60 90 2.5 300 11.4 546	eration at	3.2 75 120 3.2 350 13.5 384		4.0 100 155 4.0 350 14.4 258	modest	ambient te			ons in
Operating parameters Packaging data Storage	These the rar DC +v ø mm min A max A ø mm length kg/cart pieces <b>3 herm</b> for lor moistu For ele <b>Redry</b> <b>Storag</b> recom	alloys are nge 10-20 /e mm ton /carton netically s nger than ire pick-u ectrodes that 200 – 25 ge of redr mended.	sealed r a worki p and ir hat havo ied elec Recom	ed for ope ormal. 2.5 60 90 2.5 300 11.4 546 ing shift of herease the been ex 2h to rest trodes at mended a	metal tin of 8h. E e risk of posed: 50 – 200 mbient st	3.2 75 120 3.2 350 13.5 384 Is per car xcessive porosity packed o 0°C in ho torage co	ton, with exposure condition olding ove	4.0 100 155 4.0 350 14.4 258 unlimite e of elect . Maxim en or hea for opene	d shelf li rodes to um 350° ted quiv d tins (us	fe. Direct humid co	use from ti nditions w es, 10h tot it, but max c lid): < 60	n is satisfa n is satisfa vill cause s al. iimum 6 w % RH, > 1	actory some veeks 18°C.
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