

High Temperature Alloys

DATA SHEET

C-70

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HIGH CARBON 25Cr-35Ni-WCo

Alloy type

0.5% C-25% Cr-35% Ni-15% Co-5% W cast alloy for elevated temperature service.

Materials to be welded

Proprietary cast alloys:

MORE 6 (Duraloy)
 Supertherm (Duraloy)
 Lloyds T66 (LBA)
 Centralloy ET35Co (Schmidt & Clemens – Centracerco)
 Manaurite 35K (Manoir Industries)

Applications

This electrode matches similar cast alloys originating from the Abex alloy Supertherm, which is itself related to the cobalt free Blaw-Knox alloy 22H (data sheet C-80).

The high carbon high alloy matrix provides excellent hot strength and oxidation resistance at typical service temperatures of 950-1250°C. Cobalt and tungsten are important for maintaining matrix strength beyond about 1150°C when carbides are progressively dissolved.

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


The cobalt free 22H alloy is related to this alloy and is used for similar applications (data sheet C-80).

Products available

Process	Product	Specification
MMA	Thermet HP50WCo	--

THERMET HP50WCo

MMA electrode for matching high carbon austenitic cast alloys

Product description	<p>All-positional basic MMA electrode designed to match similar cast alloys. Basic flux system with alloy additions on high purity NiCrFe core wire.</p> <p>Recovery is about 150% with respect to core wire, 65% with respect to whole electrode.</p>													
Specifications	There are no national specifications for this electrode.													
ASME IX Qualification	QW432 F-No -, QW442 A-No -.													
Composition (weld metal wt %)		C	Mn	Si	S	P	Cr	Ni	Co	W	Mo	Cu	Fe	
	min	0.40	0.5	0.2	--	--	24.0	34.0	13.0	4.0	--	--	--	
	max	0.60	1.5	1.2	0.020	0.030	28.0	40.0	18.0	6.0	0.5	0.5	bal	
	typ	0.50	0.6	0.5	0.008	0.010	25	35	14	4.6	0.05	0.05	19	
All-weld mechanical properties	As welded							min *	typical **					
	Tensile strength							MPa	450	840				
	0.2% Proof stress							MPa	240	610				
	Elongation on 4d							%	3	8.5				
	Elongation on 5d							%	--	8				
	Reduction of area							%	--	6				
	Hardness							HV	--	265				
	<p>* Minimum values are for static castings. Average strength of centrispun tube is typically 550MPa with <10% elongation.</p> <p>** 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.</p>													
Operating parameters	DC +ve 													
	ø mm	2.5		3.2		4.0								
	min A	70		85		110								
	max A	95		120		160								
Packaging data	ø mm	2.5		3.2		4.0								
	length mm	265		320		320								
	kg/carton	10.5		12.0		13.2								
	pieces/carton	396		267		159								
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 150 – 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	Fume composition, wt % typical:													
		Fe	Mn	Ni	Cr	Cu	Co	F	OES (mg/m ³)					
		3	6	8	7	<0.2	2	22	0.7					