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WORKHARD 13MN

PRODUCT DESCRIPTION

MMA electrode with basic metal powder type flux made on low carbon steel core wire. Electrode coating is designed to give sound porosity-free deposits coupled with smooth operation. Recovery is about 120% with respect to core wire, 65% with respect to whole electrode.

SPECIFICATIONS

AWS A5.13	EFeMn-B
BS EN 14700	E Fe9

ASME IX QUALIFICATION

QW432 F-No 71

MATERIALS TO BE WELDED

13%Mn Hadfield steel. Used for surfacing other steels using a suitable buffer layer

APPLICATIONS

Workhard 13Mn electrode deposits a fairly soft ductile weld metal which rapidly work hardens under heavy impact and battering to become wear and abrasion resistant. The parent steel, developed by Hadfield in 1883, is the oldest alloy steel and its resistance to gouging abrasion is exceptional and unique.

Used for the reclamation, surfacing and joining of 13%Mn steel. Applications include d**redger, bucket and grab tips; hammers and rolls in crushing plants**; various equipment in quarries and other **mineral extraction** industries. Also used for **rail track points, crossings and frogs; and prison bars.**

MICROSTRUCTURE

In the as-deposited condition the microstructure consists of a soft manganese alloy austenite which rapidly work hardens under impact loading.

WELDING GUIDELINES

C and Mo are carefully controlled to minimise the risk of carbide embrittlement but the weld metal and particularly base material are susceptible to embrittlement when exposed to temperatures in the range 370-590°C. To minimise embrittlement and cracking the weld and work piece must be kept cool (below 150°C). Use no preheat, low heat inputs, small weld beads and cool with water, swabs or air blasts if necessary.

A buffer layer, such as MetMax 307R, should be used prior to surfacing mild or alloy steels with WorkHard 13Mn. MetMax 307R should also be used as a buffer to avoid the need for large multi-pass deposits of WorkHard 13Mn.

CHEMICAL COMPOSITION (WELD METAL WT %)

	C	Mn	Si	S	P	Cr	Mo
min	0.5	11.0	0.3	--	--	--	0.6
max	0.9	16.0	1.3	0.03	0.03	0.5	1.4
typ	0.8	13	0.6	0.01	0.02	0.2	1

ALL-WELD MECHANICAL PROPERTIES

Typical hardness:	As deposited	Work Hardened
Brinell (HB)	170-220	380-550
Vickers (HV)	180-230	400-580
Rockwell	87-96 HRB	41-54 HRC

WELDING POSITIONS (ISO/ASME)

OPERATING PARAMETERS, DC +VE OR AC (OCV: 70V MIN)

Diameter (mm)	3.2	4.0	5.0
min. A	80	100	140
max. A	140	180	240

PACKAGING DATA

Diameter (mm)	3.2	4.0	4.0
Length (mm)	380	450	450
kg/carton	15.0	16.5	16.8
Pieces/carton	357	219	147

STORAGE

3 hermetically sealed ring-pull metal tins per carton, with unlimited shelf life. Direct use from tin is satisfactory. 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: Recommended ambient storage conditions for opened tins (using plastic lid): < 60% RH, > 18°C.

FUME DATA

Fume composition, wt % typical:

Fe	Mn	Cr	F	OES (mg/m³)
19	23	0.1	10	2.2