

ULTRAMILD

PRODUCT DESCRIPTION

Special low strength MMA electrode made with a basic low hydrogen coating on pure iron core wire. Moisture resistant coating gives weld metal hydrogen content <5ml/100g. Recovery is about 120% with respect to core wire, 65% with respect to whole electrode.

SPECIFICATIONS

AWS A5.1M E6018 H4

ASME IX QUALIFICATION

QW432 F-No 71
QW442 A-No 1

MATERIALS TO BE WELDED

Mild and CMn steels.

APPLICATIONS

Ultramid gives a soft, ductile low strength weld metal designed to absorb high shrinkage strains and minimise the build-up of residual stresses. It is a basic low hydrogen electrode with the lowest levels of alloying, microalloying and deoxidation compatible with satisfactory radiographic quality, resulting in ductile weld metal of about 300MPa yield strength.

Applications include **repair** of fabrication-induced cracks in CMn and low alloy steels, **buttering** layers to avoid lamellar tearing in areas of high restraint, **restrained root runs** under adverse conditions of low ambient temperature (-20°C) and minimal or no preheat, and welding of **steel conductor rails** requiring **high electrical conductivity**.

MICROSTRUCTURE

In the as-welded and PWHT conditions, the microstructure consists of low strength ferrite.

WELDING GUIDELINES

Preheating requirements will be dependent on the grade and thickness of the base material.

ADDITIONAL INFORMATION

Although Ultramid has tensile properties which match those of the commonly used low strength grades of structural and pressure vessel steels, it would not normally be chosen for the complete welding of highly stressed or pressure containment welds. It can, however be used to advantage in the repair of such welds particularly in root areas, buttering layers, and the filling of deep grooves where the high restraint can be absorbed in the weld metal and so minimise the risk of cracking. The bulk of the joint can be completed using the usual higher strength consumable without any loss in performance resulting from the use of Ultramid.

CHEMICAL COMPOSITION (WELD METAL WT %)

	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Nb	V
min	--	--	--	--	--	--	--	--	--	--	--
max	0.03	0.6	0.4	0.015	0.020	0.10	0.30	0.10	0.10	0.05	0.05
typ	0.02	0.4	0.3	0.010	0.010	0.02	0.05	0.01	0.03	0.01	0.01

ALL-WELD MECHANICAL PROPERTIES

As welded	Min.	Typical
Tensile strength (MPa)	430	460
0.2% proof strength (MPa)	330	370
Elongation (%)		
4d	22	33
5d	--	29
+20°	--	200
Impact ISO-V(J)		
-20°C	--	100
-30°C	27	45
Hardness cap/mid HV	--	160/150

WELDING POSITIONS (ISO/ASME)



PA/1G



PB/2F



PC/2G



PF/3Gu



PE/4G

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

Diameter (mm)	2.5	3.2	4.0
min. A	70	80	100
max. A	110	140	180

PACKAGING DATA

Diameter (mm)	2.5	3.2	4.0
Length (mm)	380	380	450
kg/carton	13.5	15.0	18.0
Pieces/carton	663	408	264

STORAGE

3 hermetically sealed ring-pull metal tins per carton, with unlimited shelf life. Direct use from tin will give hydrogen <5ml/100g weld metal during 8h working shift.

For electrodes that have been exposed:

Redry 250-300°C/1-2h to ensure H₂ <10ml/100g, 300-350°C/1-2h to ensure H₂ <5ml/100g. Maximum 420°C, 3 cycles, 10h total.

Storage of redried electrodes at 100-200°C in holding oven or 50-150°C in heated quiver: no limit, but maximum 6 weeks recommended. Recommended ambient storage conditions for opened tins (using plastic lid): < 60% RH, >18°C.

FUME DATA

Fume composition, wt % typical:

Fe	Mn	Ni	Cr	Cu	Pb	F	OES (mg/m ³)
15	3	<0.1	<0.1	<0.1	<0.1	17	5