

NILSIL

Product description

MMA electrode with a special rutile alumino-silicate flux on high purity mild steel core wire. In common with E6013 type electrodes, the as-deposited weld metal hydrogen may exceed a hydrogen potential of 15ml/100g. Metal recovery is about 95% with respect to core wire, 65% with respect to whole electrode.

Specifications

No relevant national specifications, nearest AWS A5.1 E6013.

ASME IX Qualification

QW432 F-No -, QW442 A-No -.

Materials to be welded

Low silicon steels.
BS 2858.
Armco iron.

Applications

Nilsil deposits mild steel weld metal with a very low silicon content of 0.10% maximum. It is designed specifically for the fabrication and repair of hot-dip zinc galvanising baths and lead pots. The steels used for these applications are usually either Armco iron, aluminium killed or rimming steel which are almost silicon free.

A low silicon content is necessary to resist corrosion/erosion by molten zinc at the operating temperature of 450-500°C, particularly at the molten metal/air interface. Residual zinc may also attack pots used for molten lead. Weld metals with more than 0.10% silicon are particularly subject to attack and at 0.4% silicon a four-fold increase would be typical. Manganese in the weld metal is also held at the optimum of about 0.5%.

Nilsil is also recommended for welding articles made from low silicon galvanising steels intended for subsequent bright zinc coating. Welds of a higher silicon content can give a dull and uneven surface.

Additional information

In the process of hot-dip galvanising, a thin bonding layer of Fe-Zn alloy is formed at the steel interface. Silicon content of the steel has a controlling influence on the Fe-Zn reaction and coating quality. Modern zinc baths may have about 0.1%Ni added to improve brightness of coatings on higher silicon steels.

Microstructure

Ferritic.

Composition (weld metal wt %)

	C	Mn	Si *	S	P
min	--	0.2	--	--	--
max	0.10	0.8	0.10	0.03	0.03
typ	0.05	0.5	0.06	0.01	0.02

* Analysed silicon will include a small proportion present as non-metallic silicate inclusions. Alloyed silicon is therefore lower than analysed.

All-weld mechanical properties

As welded	typical
Tensile strength	MPa 450
0.2% Proof stress	MPa 380
Elongation on 4d	% 30
Reduction of area	% 60

Parameters

DC ±ve or
AC (OCV: 70V min)



ø mm	2.5	3.2	4.0	5.0	6.0
min A	70	80	100	140	200
max A	110	140	180	240	300

Sizes larger than 3.2mm not recommended for positional welding.

Packaging data

ø mm	2.5	3.2	4.0	5.0	6.0
length mm	350	380	450	450	450
kg/carton	15.0	18.0	21.0	21.0	20.4
pieces/carton	810	543	342	225	153

Storage

3 hermetically sealed ring-pull metal tins per carton, with unlimited shelf life. Direct use from tin satisfactory for longer than 8h working shift.

For electrodes that are damp:

Redry 100-120°C/1-2h. Maximum 150°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	Cu	Pb	F	OES (mg/m ³)
25	5	<0.2	<0.1	<2	5