

Product description

MMA electrode with a special basic flux covering on a nickel-iron alloy core wire. The electrode is optimised for DC+ welding in all positions including fixed pipework in the ASME 5G/6G positions.

Recovery about 115% with respect to core wire, 65% with respect to whole electrode.

Specifications

Currently no relevant national standard but there is a patent pending.

Materials to be welded

Designed for dissimilar joints between austenitic stainless steels (eg. 304H) and creep resisting CrMo (eg. P91). Suitable for as-welded, PWHT or N+T joints in CrMo steels.

Applications

EPRI P87 electrode is designed for welding high temperature creep resisting CrMo steels, including P91. The electrode can be used for dissimilar applications between CrMo creep resisting steels and austenitic stainless steels. The EPRI P87 electrode is also suitable for joining CrMo steels to themselves.

The EPRI P87 weld metal is also proposed for N+T joints in P91. The weld metal will allow joints to be buttered in the workshop and then subjected to a full N+T heat treatment; joints on the buttered faces can then be completed in the field without the need for PWHT.

The all-weld metal strength at ambient temperature may not meet that of P91 but transverse tests have shown strengths above the P91 base material requirement, and elevated temperature strength exceeds the minimum base material requirement.

Microstructure

High alloy austenite.

Welding guidelines

Preheat and PWHT requirements will be determined by the base material being welded. For example P91 is normally preheated to 200°C and PWHT at 760°C for 2 hours (or time appropriate to material thickness). Alternatively if P91 is subjected to a full N+T the heat treatment would typically be 1060°C/1 hour + 760°C/2 hours.

Additional information

The alloy is balanced to provide excellent resistance to carbide formation at the fusion boundary. The thermal expansion coefficient is also closer to the base material than with standard nickel base weld metals.

Composition (weld metal wt %)

	C	Mn	Si	S	P	Cr	Ni	Mo	Nb	Fe
typical	0.1	1.5	0.3	0.008	0.008	9	Bal	2	1	38

All-weld mechanical properties

Typical values		Hot strength 593°C		
		Ambient as-welded	as-welded	N+T
Tensile strength	MPa	560	530	440
0.2% Proof stress	MPa	360	340	225
Elongation on 4d	%	34	21	25
Reduction of area	%	49	24	33
Impact energy	+20°C J	80	--	--

Parameters

DC +ve



	2.5	3.2	4.0
ø mm	2.5	3.2	4.0
min A	60	70	90
max A	80	110	150

Packaging data

	2.5	3.2	4.0
ø mm	2.5	3.2	4.0
length mm	305	355	355
kg/carton	12.6	15.0	14.7
pieces/carton	684	420	264

Storage

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

For electrodes that have been exposed:

Redry 200-250°C/1-2h to restore to as-packed condition. Maximum 350°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	F	OES (mg/m ³)
9	5	6	2.5	<0.5	12	2