

Rutile electrode

Classification

AWS A5.1-91 : E6013
 EN 499-94 : E 38 0 RC 11

General description

Rutile general purpose, all position electrode, including vertical down
 Soft arc therefore suitable for relative thin plates and bridging wide gaps
 Excellent in pipe welding and construction
 Good start and restart behaviour
 Also weldable with low Open Circuit Voltage transformers (min. OCV 42V)
 Good X-ray soundness

Welding positions



Current type

AC / DC electr. -

Approvals

DB	TÜV
+	+

Chemical composition (w%), typical, all weld metal

C	Mn	Si
0.09	0.4	0.3

Mechanical properties, all weld metal

Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation (%)	Impact ISO-V(J) 0°C
Required: AWS A5.1-91	min. 331	min. 414	min. 17	not required
EN 499-94	min. 380	470-600	min. 20	min. 47
Typical values	AW 500	540	24	60

Packaging, available sizes and identification

	Diameter (mm)	2.0	2.5	3.2	4.0	4.0	5.0
Length (mm)		300	350	350	350	450	450
Unit: box	Pieces / unit (nominal)	235	180	155	120		70
	Net weight/unit (kg)	2.4	3.2	4.8	5.4		6.4

Identification Imprint: 6013/Pantafix

Tip colour: green

Pantafix: rev. EN 15

Materials to be welded

Steel	Code	Type
General structural steel	EN 10025	S185, S235, S275
Ship plates	ASTM A 131	Grade A, B, D
Cast steel	EN 10213-2	G P 240R
Pipe material	EN 10208-1	L210, L240, L290
	EN 10208-2	L240, L290
	API 5LX	X42, X46
	EN 10216-1/ EN 10217-1	P235, P275
Boiler & pressure vessel steel	EN 10028-2	P235, P265, P295
Fine grained steel	EN 10113-2	S275
	EN 10113-3	S275

Calculation data

Sizes Diam. x length (mm)	Current range (A)	Current type	Arc time - per electrode at max. current - (s)*	Energy E(kJ)	Dep.rate H(kg/h)	Weight/ 1000 pcs. (kg)	Electrodes/ kg weldmetal B	kg Electrodes/ kg weldmetal 1/N
2.0 x 300	40 - 75	AC	41	58	0.5	10.4	178	1.98
2.5 x 350	50 - 90	AC	60	130	0.68	17.8	88	1.57
3.2 x 350	70 - 130	AC	66	206	1.0	29.5	53	1.58
4.0 x 350	130 - 175	AC	72	333	1.3	43.6	37	1.61
4.0 x 450	130 - 175							
5.0 x 450	185 - 230							

*stub end 35 mm

Welding parameters, optimum fill passes

Welding position Diameter (mm)	PA/1G Current (A)	PB/2F	PC/2G	PF/3G up	PG/3G down	PE/4G
2.5	80	75	75	75	75	75
3.2	120	115	125	115	125	115

Application advice

Vertical down only applicable for "clean" structural steel