

Rutile electrode

Classification

AWS A5.1-91 : E6013
 EN 499-94 : E 38 0 R 12

General description

Rutile, all position electrode (except vertical down)
 Excellent for pipe welding and construction work
 Smooth side wall wetting
 Good X-ray soundness

Welding positions



Current type

AC / DC electr. -

Approvals

ABS	BV	CTL	DNV	GL	LR	TÜV
2	2	+	2	2	2,2Y	+

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

C	Mn	Si
0.1	0.5	0.4

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	25	55

Packaging, available sizes and identification

	Diameter (mm)	2.0	2.5	3.2	4.0
	Length (mm)	300	350	350	350
Unit: box	Pieces / unit (nominal)	230	150	175	115
	Net weight/unit (kg)	2.3	2.9	5.2	5.3

Identification Imprint: 6013/Cumulo

Tip colour: white

Cumulo® 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, 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 - 65	AC	51	69	0.4	10.0	164	1.64
2.5 x 350	65 - 90	AC	52	120	0.8	18.7	86	1.61
3.2 x 350	85 - 130	AC	66	181	1.1	29.7	51	1.53
4.0 x 350	130 - 180	AC	62	345	1.6	46.5	36	1.69

*stub end 35 mm

Welding parameters, optimum fill passes

Welding position Diameter (mm)	PA/1G Current (A)	PB/2F	PC/2G	PF/3G up	PE/4G	PF/5G up
2.0	55					
2.5	95	85	85	75	75	75
3.2	135	135	120	120	120	120
4.0	160	160	155	140	140	