

# Rutile electrode

## Classification

AWS A5.1 : E6013  
 ISO 2560-A : E 42 0 RC 11

## General description

Rutile general purpose, all position electrode, including vertical down  
 Applicable for "clean" structural steel  
 Smaller diameters excellent for hobby market  
 Very suitable for low open circuit voltage transformers

## Welding positions



ISO/ASME PA/1G PB/2F PC/2G PF/3Gup PG/3Gdown PE/4G

## Current type

AC / DC -

## Approvals

ABS	BV	DNV	GL	LR	RMRS
2	2	2	2	2	2

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

C	Mn	Si
0.07	0.5	0.5

## Mechanical properties, all weld metal

	Condition	Yield strength (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Elongation (%)	Impact ISO-V(J) 0°C
Required: AWS A5.1		min. 331	min. 414	min. 17	not required
ISO 2560-A		min. 420	500-640	min. 20	min. 47
Typical values	AW	520	550	26	60

## Packaging and available sizes

	Diameter (mm)	2.5	3.2	4.0
	Length (mm)	350	350	350
Unit: box	Pieces / unit	155	155	120
	Net weight/unit (kg)	2.8	4.8	5.4

## Identification

Imprint: 6013 / OMNIA

Tip Color: none

Omnia®: rev. EN 21

## Materials to be welded

Steel grades/Code	Type
<b>General structural steel</b>	
EN 10025	S185, S235, S275
<b>Ship plates</b>	
ASTM A 131	Grade A, B, D
<b>Cast steel</b>	
EN 10213-2	G P 240R
<b>Pipe material</b>	
EN 10208-1	L210, L240, L290
EN 10208-2	L240, L290
API 5LX	X42, X46
EN 10216-1/ EN 10217-1	P235, P275
<b>Boiler &amp; pressure vessel steel</b>	
EN 10028-2	P235, P265, P295
<b>Fine grained steel</b>	
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. (s)*	Energy E(kJ)	Dep.rate - current - H(kg/h)	Weight/ 1000 pcs. (kg)	Electrodes/ kg weldmetal B	kg Electrodes/ kg weldmetal 1/N
1.8 x 300	40 - 60	AC	40	38	0.4	8.4	210	1.75
2.5 x 350	65 - 90	AC	52	108	0.8	18.5	85	1.59
3.2 x 350	95 - 130	AC	65	229	1.0	31.1	53	1.67
4.0 x 350	130 - 160	AC	72	333	1.3	43.6	37	1.61
5.0 x 450	170 - 240	AC	106	740	2.1	92.2	16	1.47

\* stub end 35 mm

## Welding parameters, optimum fill passes

Welding positions Diameter (mm)	PA/1G	PB/2F	PC/2G	PF/3G up	PG/3G down	PE/4G
1.8					45A	
2.5	80A	75A	75A	75A	75A	75A
3.2	120A	115A	125A	115A	125A	115A
4.0	175A	165A	160A	160A	170A	160A
5.0	240A	240A			250A	

## Remarks/ Application advice

Vertical down only applicable for "clean" structural steel