

## Stainless steel electrode

### Classification

AWS A5.4-92 : E309-16\*  
EN 1600-97 : E 23 12 R 32\*

\* Deviation: see remarks

### Temperature Range

pressurized parts: -10 ... +400°C  
scaling resistance: 1100°C

### General description

A rutile basic all position stainless steel electrode  
Special developed for high temperature applications like industrial furnaces (ovens)  
High resistance to oxidation up to 1050°C  
Weldable on AC and DC

### Welding positions



ISO/ASME PA/1G PB/2F PC/2G PF/3G up PE/4G PF/5G up

### Current type

AC / DC electr. + / -

### Approvals

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

C	Mn	Si	Cr	Ni	FN
0.10	0.8	1.6	22.0	11.0	3-8

### Mechanical properties, all weld metal

	Condition	0.2% Proof strength (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Elongation (%)	Impact ISO-V(J) +20°C
Required: AWS A5.4-92		not required	min. 550	min. 30	not required
EN 1600-97		min. 350	min. 550	min. 25	not required
Typical values	AW	500	700	30	50

### Packaging, available sizes and identification

	Diameter (mm)	2.5	3.2	4.0
	Length (mm)	350	350	350
Unit: Box	Pieces / unit (nominal)	120	130	90
	Net weight/unit (kg)	2.6	4.8	4.9

### Identification

Imprint: 309-16/Arosta 309H

Tip colour: yellow

Arosta® 309H: rev. EN 15

## Materials to be welded

Steel grades	EN 10088-1/-2	EN 102 13-4	W.Nr.	ASTM/ACI	UNS
		GX30 CrSi 6	1.4710		
	X10 CrAl 7		1.4713	502	
	X10 CrAl 13		1.4724	410/414-TP405-CA15	
		GX40 CrSi 13	1.4729		
		GX40 CrSi 17	1.4740		
	X10 CrAl 18		1.4742	430-TP430-CB30	
	X10 CrAl 24		1.4762	TP443	
		GX25 CrNiSi 18-9	1.4825		J92502
		GX40 CrNiSi 22-9	1.4826		
	X15 CrNiSi 20-12		1.4828	TP309	S30900
		GX25 CrNiSi 20-14	1.4832		
	X12 CrNiTi 18-9				

## Calculation data

Sizes Diam. x length (mm)	Current range type (A)	Current	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
2.5 x 350	40 - 110	DC+	47	71	1.1	19.7	73	1.44
3.2 x 350	60 - 120	DC+	58	140	1.5	31.9	42	1.33
4.0 x 350	80 - 140	DC+	58	226	2.2	53.7	29	1.55

\* stub end 35mm

## 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
2.5	70	70	70	60	60	60
3.2	100	100	100	70	70	70
4.0	140	140	140	80		

For root passes DC- is recommended.

## Remarks

Deviations: chemical composition:

Si = max. 2.0%

AWS: Si = max. 0.90%

EN: Si = max. 1.2%

Cr = 21.0 - 23.0%, AWS: Cr = 22.0 - 25.0%

Ni = 11.0 - 13.0%, AWS: Ni = 12.0 - 14.0%