

## Stainless steel electrode

### Classification

AWS A5.4 : E316L-15  
EN 1600 : E 19 12 3 L R 21

### Temperature range

pressurized parts : -60...+400°C  
oxidation resistance : n.a.

### General description

A rutile-basic stainless steel electrode for welding 316L or equivalent steels  
Molybdenum level min. 2.7 %  
Specially developed for vertical down welding on DC  
Root passes in grooves with root opening  
High general corrosion resistance

### Welding positions



ISO/ASME PG/3Gdown

### Current type

AC / DC +

### Approvals

ABS	BV	DNV	GL	LR	TÜV
+	316L	316L	4429	316L	+

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

C	Mn	Si	Cr	Ni	Mo	FN
0.02	0.7	0.85	18.0	11.5	2.8	04-10

### 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	-20°C	-60°C
Required: AWS A5.4		not required	min. 490	min. 30	not required		
EN 1600		min. 320	min. 510	min. 25	not required		
Typical values	AW	500	620	35	50	45	35

### Packaging and available sizes

	Diameter (mm)	2.5	3.2
	Length (mm)	300	300
Unit: Box	Pieces / unit	190	130
	Net weight/unit (kg)	2.9	3.1

### Identification

Imprint: 316L-15 / VERTAROSTA 316 L Tip Color: brown

Vertarosta® 316L: rev. EN 21

## Materials to be welded

Steel grades	EN 10088-1/2	EN 102 13-4	W.Nr.	ASTM/ACI A240/A312/A351	UNS
<b>Extra low carbon (C &lt;0.03%)</b>					
	X2 CrNiMo 17-12-2		1.4404	(TP)316L CF-3M	S31603 J92800
	X2 CrNiMo 18-14-3		1.4435	(TP)316L	S31603
	X2 CrNiMoN 17-11-2		1.4406	(TP)316LN	S31653
	X2 CrNiMoN 17-13-3		1.4429		
<b>Medium carbon (C &gt;0.03%)</b>					
	X4 CrNiMo 17-12-2		1.4401	(TP)316	S31600
	X4 CrNiMo 17-13-3		1.4436		
		GX5 CrNiMo 19-11	1.4408	CF 8M	J92900
<b>Ti-, Nb stabilized</b>					
	X6 CrNiMoTi 17-12-2		1.4571	316Ti	S31635
	X6 CrNiMoNb 17-12-2		1.4580	316Cb	S31640
	X6 CrNiNb 18-10		1.4550	(TP)347	S34700
		GX5 CrNiNb 19-10	1.4552	CF-8C	J92710

## 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
2.5 x 300	60 - 70	DC+	44	71	0.83	14.9	98	1.47
3.2 x 300	80 - 110	DC+	47	118	1.3	23.9	59	1.41

\* stub end 35 mm

## Welding parameters, optimum fill passes

Welding positions	3G ( down)
Diameter (mm)	
2.5	70A
3.2	100A