

For welding steel such as:

Outokumpu	EN	ASTM	SS*	BS*	NF*
4436	1.4436	316	2343	316S33	Z7 CND 18-12-03
4432	1.4432	316L	2353	316S13	Z3 CND 17-12-03
4429	1.4429	S31653	2375	316S63	Z3 CND 17-12 Az
4571	1.4571	316Ti	2350	320S31	Z6 CNDT 17-12

\* Obsolete national standards, replaced by EN 10088.

#### Characteristics

AVESTA 316L/SKR rutile has a rutile-basic type coating which gives the electrode similar reliability and position welding properties as basic type electrodes in cases where high X-ray requirements are stipulated.

AVESTA 316L/SKR rutile is used for welding austenitic Cr-Ni-Mo steels of the ASTM 316 and 316L types. It can also be used for welding niobium and titanium stabilised steels, such as ASTM 316Ti and 316Nb in cases where the welded component will be operating at temperatures not exceeding 400°C. For higher temperatures a stabilised welding consumable (AVESTA 318/SKNb) should be used.

#### Welding directions

AVESTA 316L/SKR rutile should be welded using a short arc and DC (positive polarity) but welding with AC is also possible. High amperages causing overheating of the electrode should be avoided. To avoid large weld pools, it is important to choose the proper amperage and welding speed.

#### Packaging and weights

Diam. inch	Diam. mm	Length mm/inch	Weight/ capsule, lbs	Electrodes/ capsule, approx.	Weight/ carton, lbs
3/32	2.5	300 / 12		206	
1/8	3.25	350 / 14		125	
5/32	4.0	350 / 14		95	

**Approvals:** CWB, DNV, ABS

#### Standard designations

AWS A5.4 E 316L-16

#### Typical analysis % (All weld metal)

C	Si	Mn	Cr	Ni	Mo
0.03	0.6	1.6	18.5	12.0	2.2

Ferrite 10 FN DeLong

#### Mechanical properties

	Typical values (IIW)			
Yield strength, Rp <sub>0.2</sub>	460 N/mm <sup>2</sup>	66	ksi	
Tensile strength, R <sub>m</sub>	600 N/mm <sup>2</sup>	87	ksi	
Elongation, A <sub>5</sub>	40 %	40	%	
Impact strength, KV +20°C	75 J	55	ft-lb	
Hardness approx.	210 Brinell			

#### Welding data

DC+ or AC	Diam. inch	Current A
Current	3/32	60 - 80
	1/8	80 - 110
	5/32	120 - 150

**Interpass temperature:** Max. 300°F (150°C).

**Heat input:** Max. 50.8 kJ/in (2.0 kJ/mm).

**Heat treatment:** Generally none. In special cases quench annealing at 1922°F (1050°C).

**Structure:** Austenite with 5–10 % ferrite.

**Scaling temperature:** Approx. 1562°F (850°C) (air)

**Corrosion resistance:** Excellent resistance to general, pitting and intercrystalline corrosion in chloride containing environments. Intended for severe service conditions, e.g. in dilute hot acids.

#### Welding positions

