

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-PW AC/DC is a rutile-acid type electrode which is easy to weld and has good welding properties when used with either positive pole DC or AC.

AVESTA 316L/SKR-PW is primarily designed for position welding, but can also be used as a general-purpose electrode.

AVESTA 316L/SKR-PW produces a neat weld surface, has a stable arc and good slag removal properties and produces very little spatter. It is therefore often preferred to the basic type electrode, which is renowned for its good position welding properties.

AVESTA 316L/SKR-PW 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

In site welding using the "Point by Point" method, the pipe ends are joined by tack welding, using a gap width related to the wall thickness. As an alternative the pipe ends can be tacked edge to edge and then a slot of suitable length is ground with a cutting wheel, usually 2 mm thick.

Welding is carried out by a series of short welds, with the arc being extinguished and immediately struck again at 2-3 second intervals. When the slot has been filled an additional length of slot is ground and so forth. Properly used, this method ensures safe penetration.

#### Weld deposit data at maximum welding current

Diam. mm	Length mm	N	B	H	T	Metal recovery, approx. %
1.6	250	0.62	274	0.55	24	109
2.0	250	0.63	176	0.69	29	108
2.5	300	0.67	92	0.99	40	107
3.25	350	0.63	45	1.60	50	107
4.0	350	0.64	30	2.17	55	107

#### Packaging data

Diam. mm	Length mm	Weight/ capsule, kg	Approx. No. of electrodes/ capsule	Weight/ carton, kg
1.6	250	1.36	223	8.16
2.0	250	1.36	156	8.16
2.5	300	1.81	113	10.86
3.25	350	4.10	117	12.30
4.0	350	4.54	88	13.62

Approvals: CWB, DB, DNV, TÜV.

#### Standard designations

EN 1600 E 19 12 3 L R  
AWS A5.4 E 316L-17

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

C	Si	Mn	Cr	Ni	Mo
0.02	0.8	1.0	18.0	12.0	2.8

Ferrite 10 FN DeLong

#### Mechanical properties

	Typical values (IIW)	Min. values EN 1600
Yield strength, R <sub>p0.2</sub>	455 N/mm <sup>2</sup>	320 N/mm <sup>2</sup>
Tensile strength, R <sub>m</sub>	590 N/mm <sup>2</sup>	510 N/mm <sup>2</sup>
Elongation, A <sub>5</sub>	36 %	25 %
Impact strength, KV		
+20°C	60 J	
-40°C	60 J	
Hardness approx.	210 Brinell	

#### Welding data

DC+ or AC	Diam., mm	Current, A
	1.6	20– 45
	2.0	25– 60
	2.5	35– 80
	3.25	60–120
	4.0	100–160

Interpass temperature: Max. 150°C.

Heat input: Max. 2.0 kJ/mm.

Heat treatment: Generally none. In special cases quench annealing at 1050°C.

Structure: Austenite with 5–10 % ferrite.

Scaling temperature: Approx. 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

