

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-VDX AC/DC is a rutile-acid type electrode that offers good weldability in vertical-down position welding, a property made possible by the development of a very special coating. Its very good restriking properties together with its stable arc also make this electrode suitable for site welding.

Welding in the vertical down position is a rapid procedure that was previously rather unreliable, since only short runs could be welded before slag started to interfere with the welding. Furthermore, very poor penetration was obtained. AVESTA 308L/MVR-VDX gives neat welds in butt joints, corner joints, lap joints and fillet joints. An application of particular interest is the welding of linings.

AVESTA 316L/SKR 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

Welding is best performed using DC+, but AC can also be used. Welding in the vertical down position requires well-adapted amperages. The degree of difficulty increases from the butt joint, through the corner joint and lap joint to the fillet joint. In the latter case it is especially important to use small tack welds or, in the case of stringent requirements, to interrupt welding and grind the tack weld.

Penetration increases with increasing amperages and also with increasing electrode inclination and has its maximum at 90°C. However, for optimum weldability, an inclination of approximately 60-70° is recommended.

Weld deposit data at maximum welding current

Diam. mm	Length mm	N	B	H	T	Metal recovery, approx. %
2.0	250	0.66	184	0.71	28	104
2.5	300	0.72	96	0.94	40	103
3.25	350	0.73	48	1.45	52	104

Packaging data

Diam. mm	Length mm	Weight/ capsule, kg	Approx. No. of electrodes/ capsule	Weight/ carton, kg
2.0	250	1.60	184	9.60
2.5	300	1.90	121	11.40
3.25	350	5.20	179	15.60

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	0.7	0.7	18.5	12.5	2.8
Ferrite		5 FN DeLong			

Mechanical properties

	Typical values (IIV)	Min. values EN 1600
Yield strength, R _{p0.2}	480 N/mm ²	320 N/mm ²
Tensile strength, R _m	630 N/mm ²	510 N/mm ²
Elongation, A ₅	30 %	25 %
Impact strength, KV		
+20°C	50 J	
-40°C	35 J	
Hardness approx.	210 Brinell	

Welding data

DC+ or AC	Diam., mm	Current, A
	2.0	35- 60
	2.5	50- 80
	3.25	80-120

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 chlorine containing environments. Intended for severe service conditions, e.g. in dilute hot acids.

Approvals: CWB, DNV, TÜV

Welding positions

