

# 309L Bi-free

For welding steels such as					
Outokumpu	EN	ASTM	BS	NF	SS
Over-alloyed electrode for surfacing unalloyed steel, joining welding non-molybdenum alloyed stainless steel to unalloyed steen and for welding clad material.					

### Standard designations

EN 1600	E 23 12L R
AWS A5.4	E309L-16

### Characteristics

AVESTA 309L Bi-free is a highly alloyed low carbon electrode designed for the dissimilar welding of stainless to mild or low-alloy steels. It is also well suited for buffer layers when overlay welding on mild steel, giving an 18 Cr 8 Ni deposit already in the first layer. It can also be used for welding some high temperature steels such as ASTM 309S. Bismuth content < 0.002 %.

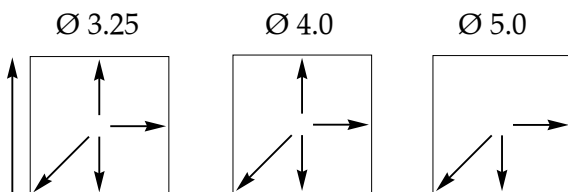
### Welding data

DC+ or AC	Diam., mm	Current, A
	3.25	80 – 100
	4.0	110 – 140
	5.0	160 – 220

### Weld deposit data at maximum welding current

Electrode diam. mm	length mm					Metal recov. ~%
		N	B	H	T	
2.0	300					
2.5	300	0.60	82	1.02	43	119
3.25	350	0.61	43	1.58	52	114
4.0	450	0.63	29	2.07	61	112
5.0	450	0.68	18	3.11	64	112

### Welding positions



### Typical analysis % (All weld metal)

C	Si	Mn	Cr	Ni
0.02	0.6	0.8	23.0	13.0

Ferrite 15 FN DeLong

### Mechanical Properties

	Typical values (IIW)	Min. values EN 1600
Yield strength R <sub>p0,2</sub>	450 N/mm <sup>2</sup>	320N/mm <sup>2</sup>
Tensile strength R <sub>m</sub>	550 N/mm <sup>2</sup>	510 N/mm <sup>2</sup>
Elongation A <sub>5</sub>	35 %	25 %
Impact strength KV		
+20°C	50 J	
-40°C	45 J	
Hardness, approx.	210 Brinell	

**Interpass temperature:** Max. 150°C.

**Heat input:** Max. 2.0 kJ/mm.

**Heat treatment:** Generally none. For constructions that include low-alloy steels in mixed joints, stress-relieving may be advisable. Always consult the supplier of the parent metal or seek other expert advice to ensure that the correct heat treatment process is carried out.

**Structure:** Austenite with 10 – 15 % ferrite.

**Scaling temperature:** Approx. 1000°C (air).

**Corrosion resistance:** Superior to 308L. When surfacing mild steel a corrosion resistance equivalent to that of ASTM 304 is obtained already in the first layer.

### Approvals

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