

For welding steel such as:

Outokumpu	EN	ASTM	SS*	BS*	NF*
4301	1.4301	304	2333	304S31	Z7 CN 18-09
4307	1.4307	304L	2352	304S11	Z3 CN 18-10
4311	1.4311	304LN	2371	304S61	Z3 CN 18-10 Az
4541	1.4541	321	2337	321S31	Z6 CNT 18-10

\* Obsolete national standards, replaced by EN 10088.

#### Characteristics

AVESTA 308L-LF rutile produces a low carbon weld metal with a low ferrite (LF) content (max. 3 FN). 308L-LF offers particularly good resistance to selective corrosion.

AVESTA 308L-LF rutile is primarily used in circumstances where a low ferrite content is required. Examples of applications are:

1. Equipment in the chemical industry where low ferrite content is required, e.g. urea production plants.
2. Equipment which, during manufacture or service, is subjected to temperatures high enough (600-800°C) and annealing times long enough to cause partial transformation of the ferrite occurring in normal weld metal into sigma phase.
3. Equipment where good impact strength properties are required.
4. For welding nitrogen bearing 304 materials, particularly in cases where the equipment is subjected to annealing and quenching after welding.
5. Constructions where low magnetic permeability is required.

#### Welding directions

AVESTA 308L-LF rutile should be welded using a positive pole DC, with the lowest possible heat input, i.e. avoiding high amperages and broadening of the weld. It is also important to allow the material to cool to below 100°C before the next run is welded.

#### Weld deposit data at maximum welding current

Diam. mm	Length mm	N	B	H	T	Metal recovery, approx. %
3.25	350	0.64	50	1.25	61	104
4.0	350	0.65	32	1.70	68	100

#### Packaging data

Diam. mm	Length mm	Weight/ capsule, kg	Approx. No. of electrodes/ capsule	Weight/ carton, kg
3.25	350	4.10	124	12.30
4.0	350	4.90	100	14.70

#### Standard designations

EN 1600      E 199 LR  
AWS A5.4      E 308L-15

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

C	Si	Mn	Cr	Ni
0.03	0.3	1.8	18.5	10.5
Ferrite		2 FN DeLong		

#### Mechanical properties

	Typical values (IIW)	Min. values EN 1600
Yield strength, R <sub>p0.2</sub>	420 N/mm <sup>2</sup>	320 N/mm <sup>2</sup>
Tensile strength, R <sub>m</sub>	570 N/mm <sup>2</sup>	510 N/mm <sup>2</sup>
Elongation, A <sub>5</sub>	39 %	30 %
Impact strength, KV		
+20°C	85 J	
-196°C	34 J	
Hardness approx.	200 Brinell	

#### Welding data

DC+	Diam., mm	Current, A
	3.25	70-110
	4.0	100-150

**Interpass temperature:** Max. 100°C.

**Heat input:** Max. 1.5 kJ/mm.

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

**Structure:** Fully austenitic.

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

**Corrosion resistance:** Very good under fairly severe conditions, e.g. in oxidising acids and cold or dilute reducing acids.

**Approvals:** -

#### Welding positions

