

For welding steel such as:

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

\* Obsolete national standards, replaced by EN 10088.

#### Characteristics

AVESTA FCW-3D 308L/MVR is a new type of flux-cored wire with very good weldability in all welding positions. The flux composition ensures excellent arc stability, very little spatter, a smooth weld surface and self-releasing slag.

AVESTA 308L/MVR is designed for welding austenitic stainless steel type 19 Cr 10 Ni, but can also be used for welding titanium and niobium stabilised steels such as ASTM 321 and ASTM 347 in cases where the construction will be operating at temperatures below 752°F (400°C). For higher temperatures a niobium consumable should be used.

The chemical composition and mechanical properties of the weld metal meet the requirements of both EN 12073:1999 and AWS A5.22-95.

#### Welding directions

AVESTA FCW-3D 308L/MVR should be welded using direct current positive polarity (DC+) with a recommended wire stick-out of 15–20 mm. Compared to the MIG-method, the range of welding current and voltage is considerably wider.

#### Welding data

Ø inch	Horizontal		Vertical up		Overhead	
	A	V	A	V	A	V
0.045	170-280	26-31	130-180	23-26	150-200	24-29

The above parameters are intended for Ar+CO<sub>2</sub> shielding gas.

For further recommendations, please contact Avesta Welding.

#### Shielding gas recommendations

Welding is preferably done using an Ar-based shielding gas with addition of 15-25%CO<sub>2</sub>, which will give the best result with respect to arc stability, melt pool control and with a minimum of spatter. However, 100%CO<sub>2</sub> can also be used. If 100% CO<sub>2</sub> is used, the welding voltage should be increased by 2–3 V to ensure the right arc length.

Gas flow rate is typically 20–25 l/min.

#### Standard designations

EN 12073      T 19 9 L P M/C 2  
AWS A5.22      E308LT1-1/4

#### Chemical composition - Typical values, %

C	0.03	Cr	19.0
Si	0.7	Ni	10.0
Mn	1.7		
Ferrite:	9 FN DeLong		
	6 FN WRC-92		

#### Mechanical properties – Typical values, IIW

		Typ. values	
Yield strength, Rp <sub>0.2</sub>		341 N/mm <sup>2</sup>	49 ksi
Tensile strength, R <sub>m</sub>		538 N/mm <sup>2</sup>	78 ksi
Elongation, A <sub>5</sub>		37 %	37 %
Impact strength, KV	+20°C	61 J	45 ft-lb
	-196°C	29 J	21 ft-lb
Hardness		200 Brinell	-

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

**Heat input:** Max. 50.8kJ/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:** Very good. Equivalent to that of ASTM 304L, i.e. fairly good under severe conditions such as oxidising and cold dilute reducing acids.

**Approvals:**