

For welding steel such as:

Outokumpu	EN	ASTM	SS*	BS*	NF*
Avesta P5 is primarily used when surfacing unalloyed or low-alloy steels and when joining molybdenum alloyed stainless and carbon steels.					

* Obsolete national standards, replaced by EN 10088.

CHARACTERISTICS

AVESTA 309LMo is a molybdenum-alloyed wire of the 309LMo type, which is primarily designed for surfacing low-alloyed steels and for joining stainless and low-alloyed steels (dissimilar joints). When used for surfacing, the composition obtained is more or less equal to that of ASTM 316 from the very first run.

AVESTA 309LMo has a composition, which, under normal welding conditions, ensures a crack resistant weld metal with a ferrite content of min. 3%.

WELDING DIRECTIONS

When welding stainless steel to unalloyed or low-alloyed steels, it is advisable/necessary to reduce the dilution of the weld as much as possible. Welding should therefore be performed with a limited heat input of 50.8 kJ/in (2.0 kJ/mm) and appropriate bevel angle. The interpass temperature should not exceed 300°F (150°C.)

Welding to primer-coated sheet should be avoided, as there is a significant risk of pore formation. The paint should therefore be removed from all surfaces that are likely to be exposed to temperatures above 632°F (500°C.)

MIG welding can be performed as short, spray or pulsed arc. Welding with pulsed arc gives excellent possibilities for a good result in varying plate thicknesses in all positions. The highest flexibility using pulsed arc is achieved with Ø0.045" (1.14 mm) wire.

WELDING DATA

	Ø (inch)	Ø (mm)	Current (A)	Voltage (V)
Short arc	0.035"	0.89	110–140	19–22
Spray arc	0.035"	0.89	160–220	25–29
	0.045"	1.14	200–270	26–30
Pulsed arc	0.045"	1.14	250–330	29–32
			I _{peak} = 350–450 A I _{bkg} = 50–150 A Freq = 80–120 Hz	

For further recommendations, please contact Avesta Welding.

Shielding gas recommendations

Ar + 2% O₂ or Ar 2–3% CO₂

Welding can be performed using an addition of 30% helium (He), which will increase the energy of the arc. The fluidity is hereby improved and the welding speed can be increased.

Gas flow rate: 25–34 ft³/hour (12–16 l/min.)

Standard designations

EN 12072	23 12 2 L
AWS A5.9	ER309LMo

Chemical composition - Typical values, %

C	Cr
Si	Ni
Mn	Mo
Ferrite: 9 FN	DeLong
8 FN	WRC-92

Mechanical properties – Typical values, IIW

	Typ. values	Typ. values
Yield strength, R _{p0.2}	390 N/mm ²	57 ksi
Tensile strength, R _m	610 N/mm ²	88 ksi
Elongation, A ₅	31 %	31 %
Impact strength, KV	+20°C	75 J
	-40°C	60 J
Hardness	210 Brinell	44 ft-lb

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

Heat input: Max. 50.8 kJ/in (2.0 kJ/mm)

Heat treatment: Generally none. For constructions, which include low-alloyed steels in mixed joints, a stress relieving may be advisable. However, this type of alloy may be susceptible to embrittlement-inducing precipitation in the temperature range 1022–1742°F (550–950°C). 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 5–10 % ferrite.

Scaling temperature: Approx. 1742°F (950°C) (air).

Corrosion resistance: Superior to type 316L. The corrosion resistance obtained in the first layer when surface welding corresponds to that of ASTM 316.

Approvals: CWB