

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 P5 is a molybdenum-alloyed wire of the 309MoL type, which is primarily designed for surfacing low-alloyed steels and joining stainless steels with low-alloyed steels (dissimilar joints). When used for surfacing, the composition obtained is more or less equal to that of AISI 316 from the very first run.

AVESTA P5 has composition, which under normal welding conditions ensures a crack resistant weld metal with ferrite content not less than 3%.

WELDING DIRECTIONS

Welding is performed using direct current negative polarity (DC). Welding can also be performed using pulsed current, which can be advantageous when welding in positions and for the welding of thin gauge material.

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 and appropriate bevel angle.

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 932°F (500°C).

WELDING DATA

Ø (inch)	Ø (mm)	Current (A)	Voltage (V)
0.045"	1.20	60– 80	9–11
1/16"	1.60	80–110	10–12
3/32"	2.40	130–160	16–18
1/8"	3.20	160–200	17–19

For further recommendations, please contact Avesta Welding.

Shielding gas recommendations

The most frequently used shielding gas is pure argon (Ar) with a gas flow of 12-17 ft³/hour (6–8 l/min).

Addition of about 30% helium (He) or 1–5% hydrogen (H₂) will increase the energy of the arc. This will give a wider weld and a better fluidity of the melt pool. It is also advantageous because the welding speed can generally be increased why these kind of shielding gases are often used in automatic welding.

Standard designations

EN 12072	23 12 2 L
AWS A5.9	ER 309MoL*

*Cr lower and Ni higher than standard

Chemical composition – Typical values, %

C	0.02	Cr	21.5
Si	0.35	Ni	15.0
Mn	1.5	Mo	2.7
Ferrite:	9 FN	DeLong	
	8 FN	WRC-92	

Mechanical properties – Typical values, IIW

	Typ. values	Typ. values
Yield strength, Rp0,2	470 N/mm ²	68 ksi
Tensile strength, Rm	640 N/mm ²	93 ksi
Elongation, A5	30 %	30 %
Impact strength, KV	+20°C	140 J
	–40°C	90 J
Hardness	210 Brinell	103 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-alloy 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° (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 316L. The corrosion resistance obtained in the first layer when surface welding corresponds to that of ASTM 316.

Approvals: -