

For welding steel such as:

Outokumpu	EN	ASTM	SS*	BS*	NF*
4845	1.4845	310S	2361	310S16	Z8 CN 25-20

* Obsolete national standards, replaced by EN 10088.

CHARACTERISTICS

AVESTA 310 is designed for welding high temperature steels such as ASTM 310S and similar. It can also be used for welding certain ferritic chromium steels, 14%-Mn steels and stainless to mild steel connections.

AVESTA 310 produces a fully austenitic 26 Cr and 21 Ni type weld metal.

WELDING DIRECTIONS

MIG welding of 310 materials is best performed using spray arc or pulsed arc. The weldability using short arc is somewhat limited and the welding of thin gauges <0.12" (<3 mm) and in position is best performed using pulsed arc.

The fully austenitic structure makes the weld metal somewhat susceptible to hot cracking. High welding currents and big weld pools should be avoided. The heat input should be maximised to 25.4 kJ/in (1.0 kJ/mm) and the material should be allowed to cool to below 212°F (100°C) between successive passes.

The joint should be prepared with a sufficient root gap to ensure full penetration.

WELDING DATA

	∅ (inch)	∅ (mm)	Current (A)	Voltage (V)
Short arc	0.030"	0.76	90–120	18–22
	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
	1/16"	1.60	250–330	29–32
Pulsed arc	0.045"	1.14	I _{peak} = 350–450 A I _{bk} = 50–150 A Freq = 80–120 Hz	

For further recommendations, please contact Avesta Welding.

Shielding gas recommendations

Ar or Ar + 30% He

The helium addition improves the fluidity and gives a slightly wider penetration. Helium increases the energy in the arc and the heat should therefore be kept at a lower level than when welding without helium to compensate for the higher temperature in the arc. Addition of helium will increase the blackening slightly.

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

Standard designations

EN 12072	25 20
AWS A5.9	ER310

Chemical composition - Typical values, %

C	0.12	Cr	25.5
Si	0.35	Ni	21.0
Mn	1.6		

Ferrite: 0 FN

Mechanical properties – Typical values, IIW

	Typ. values	Typ. values
Yield strength, R _{p0.2}	360 N/mm ²	52 ksi
Tensile strength, R _m	570 N/mm ²	83 ksi
Elongation, A ₅	35 %	35 %
Impact strength, KV +20°C	120 J	88

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

Heat input: Max. 25.4 kJ/in (1.0 kJ/mm)

Heat treatment: Generally none. In special cases quench annealing at 2012-2102°F (1100–1150°C).

Structure: Fully austenitic.

Scaling temperature: Approx. 2102°F (1150°C)(air).

Corrosion resistance: Intended primarily for constructions running at high temperatures. The wet corrosion properties are moderate.

Approvals: CWB