

For welding steel such as:

Outokumpu	EN	ASTM	SS*	BS*	NF*
4541	1.4541	321	2337	321S31	Z6 CNT 18-10
-	1.4550	347	2338	347S31	Z6 CNNb 18-10

* Obsolete national standards, replaced by EN 10088.

CHARACTERISTICS

AVESTA 347 is used for welding titanium and niobium stabilised steel of type 19 Cr 10 Ni Ti or similar.

A stabilised weldment possesses improved high temperature properties, e.g. creep resistance, compared to low-carbon non-stabilised materials. 347 is therefore primarily used for applications where service temperatures exceed 752°F (400°C). Constructions with lower service temperatures can be welded with AVESTA 308LSi, which offers better resistance to hot cracking.

WELDING DIRECTIONS

MIG welding can be performed as short, spray or pulsed arc. Short arc is preferably used for thin gauges, both for horizontal and positional welding. Spray arc increases the deposition rate.

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
	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 + 2% O₂ or Ar + 2–3% CO₂.

The addition of O₂ or CO₂ provides good arc stability. Welding can also be performed using an addition of 30% helium (He), which will increase the energy of the arc. The fluidity is hereby improved and the weld is generally wider. The welding speed can therefore be increased. Addition of He will give increase the blackening slightly.

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

Standard designations

EN 12072 19 9 Nb
AWS A5.9 ER347

Chemical composition – Typical values, %

C	0.05	Cr	19.5
Si	0.40	Ni	10.0
Mn	1.2	Nb	>12xC
Ferrite: 10 FN		DeLong	
	7 FN	WRC-92	

Mechanical properties – Typical values, IIW

	Typ. values	Typ. values
Yield strength, R _{p0.2}	430 N/mm ²	62 ksi
Tensile strength, R _m	620 N/mm ²	90 ksi
Elongation, A ₅	36 %	36 %
Impact strength, KV	+20°C	100 J
	-40°C	90 J
Hardness	210 Brinell	66 ft-lb

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

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

Heat treatment: Generally none. 347 type wire can be used for cladding, which normally requires stress relieving at around 1094°F (590°C). Such a heat treatment will reduce the ductility at room temperature. Always consult the supplier of the parent metal or seek other expert advice to ensure that the correct heat treatment is carried out.

Structure: Austenite with 5–10% ferrite.

Scaling temperature: Approx. 1562°F (850°C) (air).

Corrosion resistance: 347 is primarily intended for high temperature service or applications that should be heat treated. However, the corrosion resistance corresponds to that of 308H, i.e. good resistance to general corrosion.

Approvals: CWB