

For welding steel such as:

Outokumpu	EN	ASTM	SS*	BS*	NF*
AVESTA P7 is specially designed for difficult-to-weld steels such as Mn-steels, tool steels and high temperature grades.					

\* Obsolete national standards, replaced by EN 10088.

### CHARACTERISTICS

AVESTA 312 is a high-alloyed consumable designed for welding C/Mn-steels, tool steels, spring steels, high temperature steels and other difficult-to-weld steels. 312 is also suitable for dissimilar welds between stainless and mild steel.

AVESTA 312 provides a ferritic-austenitic structure with a high resistance to hot and solidification cracking. The mechanical properties as well as the wear resistance are very good.

AVESTA 312 is also, due to its good corrosion resistance, suitable for some applications in the pulp and paper industry.

### WELDING DIRECTIONS

The weldability of AVESTA 312 is good, especially when using pulsed arc. The weldability using short arc is somewhat limited and welding thin gauges <0.12" (<3 mm) and in-position welding is best performed using pulsed arc.

When welding dissimilar joints between stainless and unalloyed or low-alloyed steels, it is advisable/necessary to reduce the dilution of the weld.

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).

Pre-heating is normally not necessary, but when working with constricted designs and materials susceptible to hardening, some pre-heating may be required.

### WELDING DATA

	∅ (inch)	∅ (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 <sub>peak</sub> = 350-450 A I <sub>bk</sub> = 50-150 A Freq = 80-120 Hz	

For further recommendations, please contact Avesta Welding.

### Shielding gas recommendations

Ar+30% He+2.5% CO<sub>2</sub> or Ar

Helium improves the fluidity and produces a wider weld, whilst carbon dioxide improves the stability of the arc.

Addition of He will increase the blackening slightly.

As an alternative, Ar may also be used with an addition of 2% O<sub>2</sub> or 2-3% CO<sub>2</sub> with good results.

Gas flow rate: 25-34 ft<sup>3</sup>/hour (12-16 l/min.)

### Standard designations

EN 12072      29 9  
AWS A5.9      ER312

### Chemical composition - Typical values, %

C	0.11	Cr	30.0
Si	0.45	Ni	9.5
Mn	1.9		

Ferrite: 60 FN    WRC-92

### Mechanical properties – Typical values, IIW

	Typ. values	Typ. values
Yield strength, R <sub>p0.2</sub>	560 N/mm <sup>2</sup>	81 ksi
Tensile strength, R <sub>m</sub>	750 N/mm <sup>2</sup>	109 ksi
Elongation, A <sub>5</sub>	25 %	25 %
Impact strength, KV +20°C	40 J	29 ft-lb
Hardness	240 Brinell	

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

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

**Heat treatment:** Generally none. Alloys of this type are susceptible to precipitation of secondary phases in the temperature range 1022-1742°F (550-950°C).

**Structure:** Austenite with 40-60 % ferrite

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

**Corrosion resistance:** AVESTA 312 offers very good corrosion resistance in wet sulphuric environments, e.g. in sulphate digesters used by the pulp and paper industry.

**Approvals:** CWB