

For welding steel such as:

Outokumpu	EN	ASTM	SS*	BS*	NF*
254 SMO®	1.4547	S31254	2378	–	–
20-25-6	1.4529	NO8926	–	–	–

* Obsolete national standards, replaced by EN 10088.

CHARACTERISTICS

AVESTA NiCrMo-3 is a nickel base alloy designed for welding 6Mo-steels such Outokumpu 254 SMO and similar, where the corrosion requirements are very high. The consumable is also suitable for the welding of nickel-based alloys such as Inconel 625 and Incoloy 825, but also for dissimilar welds between stainless or nickel base alloys and mild steel.

AVESTA NiCrMo-3 produces a fully austenitic weld metal with good properties at low temperatures. However, if extremely high impact strength is required AVESTA P12-0^{Nb} may be used.

WELDING DIRECTIONS

The weldability of NiCrMo-3 is good, especially when using 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.

When welding fully austenitic and nickel based steels, great care should be taken to minimise the risk of getting hot or solidification cracking. Heat input, interpass temperature and dilution with parent metal should be kept at a minimum.

The joint preparation should be designed with a root gap of 0.08-0.1" (2-2.5 mm) to ensure full penetration and the lowest possible dilution with the base materials.

It is also essential to perform a good post weld cleaning, e.g. brushing, followed by pickling of weld and heat affected zone.

WELDING DATA

	Ø (inch)	Ø (mm)	Current (A)	Voltage (V)
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 _{avg} = 50–150 A	
			Freq = 80–120 Hz	

For further recommendations, please contact Avesta Welding.

Shielding gas recommendations

Ar + 30 % He + 2.5% CO₂. The helium addition improves the fluidity and gives a slightly wider weld. Helium increases the energy in the arc and the heat should therefore be kept at a lower level than welding without helium to compensate for the higher temperature in the arc. Addition of helium will increase the blackening slightly.

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

Standard designations

EN 18274 Ni Cr 22 Mo 9 Nb
AWS A5.14 ERNiCrMo-3

Chemical composition - Typical values, %

C	0.01	Cr	22.0
Si	0.1	Ni	65.0
Mn	0.1	Mo	9.0
Fe	1.0	Nb	3.6

Ferrite: 0 FN

Mechanical properties – Typical values, IIW

	Typ. values	Typ. values
Yield strength, R _{p0.2}	480 N/mm ²	70 ksi
Tensile strength, R _m	750 N/mm ²	109 ksi
Elongation, A ₅	42 %	42 %
Impact strength, KV	+20°C	170 J
	–40°C	150 J
Hardness	220 Brinell	111 ft·lb

Interpass temperature: 212° (100°C)

Heat input: 38.1 kJ/in (1.5 kJ/mm)

Heat treatment: Generally none. In special cases quench annealing at 1832°F (1050°C).

Structure: Fully austenitic.

Scaling temperature: Approx. 1850°F (1100°C) (air).

Corrosion resistance: Excellent resistance to general, pitting and inter crystalline corrosion in chlorine containing environments.

Approvals: CWB