AVESTA NiCrMo-3

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Welding wire TIG

For welding steel such as:

Outokumpu	EN	ASTM	SS*	BS*	NF*
254 SMO®	1.4547	S31256	2378	–	–
4529	1.4529	N08926	–	–	–
Also for welding stainless steels and nickel base alloys to low-alloyed and mild steel.					

* Obsolete national standards, replaced by EN 10088.

CHARACTERISTICS

AVESTA NiCrMo-3 is a nickel base alloy designed for welding 6Mo-steels such as 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, e.g. between stainless and nickel-based alloys and mild steel.

Another area of application is surfacing or cladding of mild steel components to achieve a non-corrosive surface.

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} can be used.

WELDING DIRECTIONS

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

When welding fully austenitic and nickel-based steels, great care should be taken to minimise the risk of getting hot or solidification cracking. The heat input should not exceed 38.1 kJ/in (1.5 kJ/mm) and the interpass temperature should be max. 212°F (100°C). The construction should also be properly designed with a sufficient root gap of 0.08-0.1" (2-2.5 mm) to ensure full penetration and as little dilution as possible of the base material.

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

WELDING DATA

∅ (inch)	∅ (mm)	Current (A)	Voltage (V)
1/16"	1.60	80–110	10–12
3/32"	2.40	120–150	16–18
1/8"	3.20	140–180	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 ft^3/hour (6–8 l/min).

Addition of about 30% helium (He) or 1–5% hydrogen (H_2) will increased the energy of the arc. This will produce a wider weld and better fluidity of the weld pool.

Welding tubes, pipes etc. often requires a purging gas protection. Common purging gases are pure Ar and Formier gas (90%N_2+10%H_2), with a flow of 20-42 ft^3/hour (10–20 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, $R_{p0,2}$		490	N/mm²	71	ksi
Tensile strength, R_m		740	N/mm²	107	ksi
Elongation, A5		37	%	37	%
Impact strength, KV	+20°C	130	J	96	ft·lb
	–40°C	120	J	88	ft·lb
Hardness		220	Brinell		

Interpass temperature: Max. 212°F (100°C)

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

Heat treatment: Generally none. In special cases quench annealing at 1922°F (1050°C.)

Structure: Fully austenitic.

Scaling temperature: Approx. 2012°F (1100°C) (air).

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

Approvals: CWB