

AI-1804

Description and Applications

AI 1804 is a unique self-bonding wire specially developed for arc spraying.

Based on nickel, chrome, aluminium alloy, **AI 1804** offers a coating that eliminates the need for a bond coat.

AI 1804 provides a dense coating with an extremely low coefficient of friction making it a suitable general build up alloy.

AI 1804 provides an excellent surface finish when machined and therefore, is highly recommended for areas where grinding facilities are not available. However, superb finishes can be achieved by grinding as well.

Coating can be machined to a feathered edge. The high interparticle strength together with the bond strength makes it a suitable coating where surface preparation is by pre-machining only.

Coating is less technique dependent when thick coatings are called for. There is no reasonable limitation on coating thickness. **AI 1804** is a low shrink coating.

Applications: Bearing Journals, Pump Plungers, Bull Blocks, Bearing Seats, Pumps, Mis-machined or worn parts.

Typical Analysis

Cr	Ni	Fe	Mo	Al
8.00	75.00	5.00	5.00	7.00

Mechanical Properties

Deposit Efficiency	:	80%
Melting Point	:	1580°C (approx)
Bond Strength	:	66 MPa on blasted surface.
Coating Tensile Strength	:	120 MPa
Hardness	:	HRC 34 (312HV)
Coating Density	:	8.0 gm/cm ³ (average)
Abrasion Resistance	:	Good
Machineability	:	Excellent
Impact, Sharp Edge & Bend	:	Good
Resistance	:	Good
Coefficient of Thermal Expansion	:	7 x 10 ⁻⁶ in/in/°F
Electrical Resistivity	:	200 micro ohm cm (approx.)
Heat Resistance	:	Good



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Spraying Properties

Spray Rate	:	5.0 kg/hr/100 amps
Coverage	:	1.15kg/m ² /100 microns
Spray Pattern	:	Variable depending on system used
Length of Wire	:	56 m/kg (approx)

Spray Parameters

	VOLTS	AMPS	AIR	DISTANCE
BOND PASS	29-31	150	345kPa (50psi)	100-125mm
BUILD UP	29-31	150-350	414-621kPa (60-90psi)	150-175mm

Welding Instructions

An exceptionally good finish can be achieved by turning:

Surface Speed of Part		0.50-1.5 m/sec (100-300 fpm)
Traverse Speed	Rough Cut	0.05-0.08 mm/rev
	Finish Cut	0.013-0.05 mm/rev
Depth of Cut	Rough Cut	250 micron (0.010-0.020 in)
	Finish Cut	125 micron (0.001-0.003 in)

Coated tungsten carbide and ceramic tools can be used to obtain a finish of 32 AA. Grinding can also be used to obtain a good smooth finish. Dress frequently and do not permit coating to overheat. Cutting oil is not required. Best possible finishes can be obtained with a Polycrystalline Diamond insert with a negative rake.

High nickel alloys are difficult to finish. If a grinding wheel is used, it may tend to load up which in turn tends to smear the coating or increase pullout. If a cutting tool is used, even a ceramic or diamond tool, pull out may be a problem on very hardest coatings. However, it is fairly easy to generate a 20 microinch finish using the correct grinding wheel and grinding technique. A 15 microinch finish can be obtained with care. Secondary finishing is required below 10 microinch.

A typical grinding wheel specification obtained from Norton and others could be:

- Silicon Carbide.
- 37 C.
- I Hardness.
- 8 Porosity.
- Vitrified Open Wheel.



Typical Grinding Setup

Wheel rpm	:	Med/High
Shaft rpm	:	Low
SFPM	:	High with the work running opposite direction to the wheel.
Amount removed per pass	:	0.0005

Note: Use very light pressure and clean wheel.

Super finishing with either silicon carbide or diamond cloth using a mineral base (non-sulphur) 5 to 10 weight hydraulic oil or kerosene can produce finishes below 10 microinches AA. Typically, it is a good idea to start with a 240 grit paper, then progress to 320, 400 and perhaps to 600, 1200 and even 4000. If diamond cloth is selected, one should use a 9 to 15 micron particle size (obtained from 3M or others).

The objective is to use the 240 cloth to completely remove the grinding marks from the 37C - wheel. Then, use the 320 cloth to remove the marks from the 240 cloth. Then use the 400 --- and so on. If one switches to the finer cloths too soon, a high polish will result on the "high spots", but many of the original deep grinding marks will remain.

Speeds & Feeds	Dry Grinding	Wet Grinding
Wheel Speed SFPM	6000	6000
Work Speed SFPM	60	70 rough
Wheel Traverse IPM	7 rough 2.5 finish	12
In Feed (inches)	0.001 rough 0.0005 finish	0.001 0.0005
Coolant	-	Water Sol, 1-50

Available sizes

1.6mm on spools of 10kg

Disclaimer

All figures in this datasheet should be considered indicative only. No guarantee is made as to their accuracy. All figures subject to change without notice. Batch analysis is available for all products sold. Should you require any further information, please contact us at sales@alloysint.com.au.

