

AI-1800-SP

Description and Applications

AI-1800-SP Superbond is a unique nickel, molybdenum, aluminium wire developed in Australia expressly for the production of a high quality, high tensile bondcoat for use exclusively with the arc spray process. The alloy wire produces coatings, which are tough, dense and resistant to high temperature oxidation, thermal shock and abrasion.

Although developed primarily as a bondcoat **AI-1800-SP** Superbond is also suitable for use as a one-step, one-coat system capable of being sprayed from a coarse to a fine texture and finished by either grinding or machining with carbide tools. A finish of 5 micro-inch is attainable.

The superb self-bonding properties of **AI-1800-SP** Superbond are attributed to the extremely high, superheated temperatures the alloy reaches in the electric arc (arc temperatures up to 6,650°C) and the consequent metallurgical bond formed between the alloy and the substrate upon impacting of the molten particle (micro impingement welding).

Applications: **AI-1800-SP** Superbond is self-bonding to a range of smooth metal surfaces including annealed or hardened carbon steels, alloy steels, stainless steels, nickel, cast-iron, titanium and tantalum. This self-bonding property greatly reduces the extensive substrate preparation generally required for successful thermal sprayed coating by its ability to successfully bond to a smooth, chemically cleaned surface. However, where possible and as a general rule, surface should be prepared by rough machining (threading) or grit blasting using 24 mesh aluminium oxide or chilled iron grit at a blasting pressure of 550kPa (80 psig).

It is interesting to note that bond-strengths achieved (as below) are in excess of plasma sprayed coatings of nickel-aluminium i.e. the super coatings and coatings in excess of 6-7mm (0.25") thick have been successfully applied.

Typical Weldmetal Analysis

Al	Mo	Ni
5.5	5.0	89.5

Mechanical Properties of Coating

Wire Diameter	1.6mm on spools of approx 10kg
Deposit Efficiency	73%
Melting Point	Approx 1700°C
Bond Tensile Strength	65.5 MPa on smooth clean surface 76.0 MPa on fresh blasted surface
Coating Tensile Strength	129 MPa
Coating Texture (as sprayed)	Variable - depending on air pressure
Hardness	25-30 HRc (Converted)
Coating density	7.9 gm/cm ³ (average)
Magnetic properties	Non-magnetic, slight magnetic susceptibility
Abrasion resistance	Good



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Impact, sharp edge + bend resist	Excellent
Heat resistance	No nickel alloy/substrate scaling with 0.5mm coatings after 3 days @ 538°C, 5 days @ 982°C, 15 minutes @1204°C

Spraying Properties

Spray rate	5.0kg/hr/100amps
Coverage	1.15kg/m ² /100microns
Spray Pattern	Variable depending on system used
Weight of Wire	55.8 metres/kg

Spraying Parameters

	Volts	Amps		
Al-1800 (Bond)	29-31	150 for Bond 150-350 Build up	345kPa (50psi) Bond 414-552kPa (60-80psi)	100-125 for Bond 150-175 build up

NOTE: Be sure not to overheat substrate as this reduces coating quality. If necessary stop to allow cooling or use air jet cooling if greater speed is required.

Finishing

Exceptionally good finishes can be achieved on a sprayed coating of **Al-1800-SP Superbond** using the following guidelines:

1. Turning using Tungsten Carbide Tip.

Surface speed 1.27 m/sec (250 fpm)
 Traverse speed 38 cuts/cm (906 cuts/in)
 Depth of cut 0.125mm (0.005") for first few cuts then 0.250mm (0.010") and finer to finish.

2. Grinding

Using medium grit Aluminium Oxide or Silicon Carbide (eg: carborundum AC 60-411-VR or PA 46-F8-V40).
 Use light cuts for roughing and finishing.
 Dress frequently and do not permit coating to overheat.

		<u>DRY</u>	<u>WET</u>
Wheel speed	(SFPM)	6,000	6,000
Work Speed	(SFPM)	60	70
Wheel traverse	(IPM)	7 rough 2.5 finish	12 rough 2.5 finish
In Feed	(INCHES)	0.001" rough 0.0005" finish	0.001"rough 0.0005" finish
Coolant		-	1:50 water solution

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

