Technical Data Sheet

PRODUCT NAME

Alumaclad™ – 3 Pak
Alumaclad™ – 2 PakV & 2 PakH
Alumaclad™ – 1 PakV & 1 PakH

PRODUCT DESCRIPTION

Silicon Derivatives' Alumaclad™ is a proprietary silicon polymer system developed to protect aluminum, copper, brass and brass alloys from many forms of corrosion and to prevent these surfaces from oxidation and tarnishing. Alumaclad™ is an inorganic siloxane coating that chemically reacts with the substrate, to produce a thin glass like surface, highly resistant to a wide range of chemicals (see chemical resistance chart). Alumaclad™ also adds a thin, abrasion resistant ceramic surface to naturally soft metals such as aluminum, copper, and brass to protect from scratching and marring.

In addition, Alumaclad™ is embedded with a silicon quaternary ammonium salt (a permanent biostatic compound) to further inhibit the growth of microbiological materials on the coated substrate.

Some Alumaclad™ products maybe subject to US EPA AAIM VOC regulation depending upon the carrier employed. Alumaclad™ contains less than 5% but no more than 35% PCC's.

CHEMISTRY/ACTIVE INGREDIENTS

Alumaclad™ is produced as a one, two or three part silicon system that is either hydrolyzed in the field or pre-hydrolyzed at the time of manufacture.

Alumclad 3 Pak – is a proprietary *solvent-based*, three part silane blend that when catalyzed produces a ultra thin glass coating that may be applied on either horizontal and vertical surfaces.

Alumaclad™ 2 PakH – is a low viscosity, *solvent-based*, Alumaclad™ blend that may be applied only on horizontal surfaces

Alumaclad™ 2 PakV – is a higher viscosity, *solvent-based*, Alumaclad™ blend that will allow application on vertical surfaces.

Alumaclad™ 1 PakH – is a low viscosity, *water-based* Alumaclad™ siloxane blend that will catalyze under ambient conditions and which can be applied on horizontal surfaces.

Alumaclad™ 1 PakV – is a higher viscosity, *water-based* Alumaclad™ siloxane blend that will catalyze under ambient conditions and which can be applied on vertical surfaces.

The Alumaclad™ blend of silanes couples methyl, phenyl and propyl polyorganosilanes to produce an inorganic siloxane polymer coating with high levels of hydrophobicity. Water and solvent based solutions employ differing rheology modifiers to assure coating efficacy (no pinholes, blisters, etc.) when applied to either vertical or horizontal surfaces.

APPLICATION

Silicon Derivatives Alumaclad™ is employed to prevent corrosion and tarnishing of non-ferrous, soft-metals such as copper, brass, bronze and aluminum. Applications for Alumaclad™ include:

- Protection of HVAC/R aluminum and copper coils and fins from MIC and salt water corrosion
- Reduction of tarnishing actions on decorative bronze and brass fixtures
- Protection of aluminum extrusions from MIC and salt water corrosion
- Protection of electronic circuit boards from atmospheric pollution and moisture.

Alumaclad™ 1PakV and Alumaclad™ 1PakH may also be employed as a penetrating sealer for

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masonry and highly porous natural stone systems including limestone, granites, slates, and aggregate cements. All Alumaclad™ products may be employed on non-ferrous substrates.

PHYSICAL PROPERTIES

The Alumaclad™ product line shares some common physical properties as follows:

Color	Clear to light yellow
pH	11.0
Density	0.94
Flash Point	N/A
Freeze Point	28˚F
VOC	700g/l
PCC's	60%
Application	Spray, dip, brush, short knap roller, electrochemical deposition

However, the physical properties affecting field application vary substantially as shown below:

Alumaclad™ 3 Pak

Shelf Life	12 Months
Hydrolysis time	1 hour/quarts 4 – 12 hours/gallons
Pot life	4 – 6 hours @ 70ºF
Tack	1 – 2 hours Tack @ 70ºF and 60% RH
Dry to touch	8 – 12 hours
Full cure	5 – 7 days
VOC's	700 gm/l

Alumaclad™ 2 PakV

Shelf Life	24 Months
Hydrolysis Time	3 hour/quarts 12 – 36 hours/gallons
Pot life	12 – 36 hours @ 70ºF
Tack	4 – 8 hours Tack @ 70ºF and 60% RH
Dry to touch	12 – 24 hours
Full cure	7 – 10 days
VOC's	600 gm/l

Alumaclad™ 2 PakH

Shelf Life	24 Months
Hydrolysis Time	3 hour quarts 12 – 36 hours gallons
Pot life	12 – 36 hours @ 70ºF
Tack	4 – 8 hours Tack @ 70ºF and 60% RH
Dry to touch	12 – 24 hours
Full cure	7 – 10 days
VOC's	600 gm/l

Alumaclad™ 1 PakV

Shelf Life	6 Months
Hydrolysis Time	N/A
Pot life	1 – 3 Days @ 70ºF
Tack	8– 12 hours Tack @ 70ºF and 60% RH
Dry to touch	24 – 28 hours
Full cure	7 – 10 days
VOC's	60 gm/l

Alumaclad™ 1 PakH

Shelf Life	6 Months
Hydrolysis Time	N/A
Pot life	1 – 3 Days @ 70ºF
Tack	8– 12 hours Tack @ 70ºF and 60% RH
Dry to touch	24 – 28 hours
Full cure	7 – 10 days
VOC's	60 gm/l

PRODUCT SAFETY AND HANDLING

Alumaclad™ can cause skin irritation and serious respiratory injury, so proper personnel safety precautions should be employed when spraying or applying this material.

See MSDS Sheet

BENEFITS

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Silicon Derivatives Alumaclad™ offers a number of benefits including:

- Chemical resistance to a wide range of acids, alkali's and organic solvents
- Thin coatings < 10 microns
- Clean flat finish
- High level of hydrophobicity (inhibits the growth of mildew and mold)
- Resistance to UV light
- Highly resistant to microbiological corrosion
- Resists growth of mold, mildew and algae

LIMITATIONS

Silicon Derivatives Alumaclad™ is not suitable for coating ferrous metals or plastics. It is soluble in strong sodium and potassium alkali solutions. Siloxane coatings are difficult to recoat or top coat. Repair to damaged coating is problematic and the damaged coating should be first stripped before recoating is attempted. See Silicon Derivatives Alkagel Technical data sheet for removal of siloxane polymer coatings.

TEST AREAS

Always test the substrate on a specific in an inconspicuous are to be certain of appropriate coverage. Allow the test area to dry a minimum of 72 hours before inspection.

DILUTION

Alumaclad™ solvent-based solutions may be thinned by addition Silicon Derivatives of Alumaclad™ Flow Agent. Mix in a clean polypropylene bucket with only modest stirring. Alumaclad™ water-based solutions should not be diluted.

SITE PREPARATION

For highly contaminated surfaces remove loosely adhering contamination by hydro-blasting, mechanical, hand tool cleaning, or light abrasive blasting. Do not exceed a 2 mil profile.
For surfaces coated with microorganisms such as algae, fungus, mold or mildew first remove heavy build up mechanically – hydro-blasting, hand tools or light abrasive blasting. Then wash surface with Organowash™ solution. If the surface remains contaminated with oils and greases, wash with Oileowash™. Then spray Alumaclad Neutralizer™ on surface as outlined in on the technical data sheet. Once this procedure has been completed proceed with coating application.

For virgin or slightly contaminated surfaces wash surface thoroughly with lightly with Silicon Derivatives Oileowash™ solution followed by flooding with fresh water. Spray surface with Alumaclad Neutralizer™ and flood with fresh water.

SITE HYDROLYSIS

Alumaclad™ 3 Pak is a three part solution that must be mixed in the field prior to application.

Once aluminum surface has been thoroughly cleaned and neutralized mix the three component system as follows:

1. Pour the A component liquid into a clean, white HDPE plastic bucket. Then, pour the B component liquid into the A component. For small quantities, pour Part B into the carafe bottle labeled Part A. Avoid striking the side of the pail with the paddle when mixing. When mixing parts A and B in a bottle, gently swirl (not shake) with the cap on. Periodically remove the cap to release reaction vapors (alcohol). AVOID HEAVY AGITATION – mix solution lightly.

2. Allow the combined parts A and B to combine. As the two components react a moderate exothermic reaction will be noticed during blending and the solution temperature will rise approximately 20˚F

3. Once the solution temperature has peaked and returns to less than 100˚F (approximately 30 minutes to 1 ½ hour), add Part C into the mixture of A & B. and once again gently agitate. Allow the combined solution to continue to cool to ambient temperature (an additional 15 – 30 minutes).

4. Place a cover (lid) over the bucket or cap the bottle to extend pot life. Pot life at this point is approximately 12 – 24 hours in a closed container and approximately 6 hours in an open container. NOTE: Pot life may be extended several months by storing the catalyzed solution at 5˚F.

Alumaclad™ – 2 PakV & 2 PakH are both two component systems that must be catalyzed in the field as follows:

1. Pour the A component liquid into a clean, white HDPE plastic bucket. Then, pour the B component liquid into the A component. For small quantities, pour Part B into the carafe bottle labeled Part A. Avoid striking the side of the pail with the paddle when mixing. When mixing parts A and B in a bottle, gently swirl (not shake) with the cap on. Periodically remove the cap to release reaction vapors (alcohol). AVOID HEAVY AGITATION – mix solution lightly.

2. Allow the combined parts A and B to combine. As the two components react a moderate exothermic reaction will be noticed during blending and the solution temperature will rise approximately 10˚F. Once the solution temperature has peaked and returns to less than 80˚F (approximately 30 minutes to 1 ½ hour), the combined product is ready for application.

3. Place a cover (lid) over the bucket or cap the bottle to extend pot life. Pot life at this point is approximately 24 – 48 hours in a closed container and approximately 6 hours in an open container. NOTE: Pot life may be extended several months by storing the catalyzed solution at 5˚F.

Alumaclad™ – 1 PakV & 1 PakH are water based and have been hydrolyzed during the manufacturing process. As a result there is no need to site blend or hydrolyze.

APPLICATION AND CURING

Alumaclad™ can be applied using a conventional spray, short nap roller, or brush. The size and configuration of the surfaces to be treated will dictate the best method. Apply at a rate not to exceed 1 mil (25 microns) wet film thickness. Preferable wet film thickness is 0.5 microns (10 mills) or less. Mask, drop or protect any adjacent areas not be to coated. Control the immediate application area to prevent overspray.

Conventional Application: Use a short nap adhesive or mohair roller cover with a solvent resistant core. Pick up a small amount of material into the cover and gently apply using a series of one directional roller strokes. Avoid over rolling the material and avoid working back into partially set material. Maintain a functional working wet line during application and roll to natural breaks. Always mask, and protect surfaces not to be coated.

Spray Application. Use an air compressor that can deliver a minimum of 3 CFM @ 90 PSI. Use a dual regulated pressure pot with a good automotive type production gun (Binks, Kremlin, Devilbiss). Set the fluid (pot) pressure gauge at 10 to 12 PSI and the air pressure gauge at 8 to 10 PSI. Close down the fluid needle adjustment screw, on the back of the gun, to its tightest 'lock down' position. Then, turn the adjustment screw ½ turn counter clockwise to open up controlled material flow. Check the spray pattern and make minor adjustments to air pressure or needle settings.

Brush Application – Small surface areas or cut in edges can be blended in using a natural hair bristle brush or disposable foam applicator provided the initial application is still freshly wet. This may only be within several minutes in outdoor applications. This coating CANNOT be over-coated until fully cured. Over-coating and lay-on/lay-off application is NOT recommended.

Electrochemical Deposition - Alumaclad™ – 1 PakV & 1 PakH can be applied to the substrate electrochemically. For information contact Silicon Derivatives.

Alumaclad™ may take up to 7 days for complete a full cure. It will dry to touch in 1 to 2 hours and the surface is serviceable after overnight dry. Note: A full 7 day cure cycle must be allowed before submitting the surface cleaning, chemicals or solvents or immersion in water. After 7 days cure time, the surface may be readily cleaned using Silicon Derivatives recommended cleaners.

Do Not Apply if rain, fog or heavy dew is imminent within 12 hours of product application. Do Not Mix or Apply if the temperature will drop below 50ºF at any time during application or within 12 hours of product application.

CLEAN UP

Application tools and spray equipment should be cleaned using Silicon Derivatives AlkaWash Solvent/Tool Cleaner™. Flush the pump, hose, pressure pot and gun thoroughly until all coating has been cleaned from the spray system. Remove the tip and nozzle and clean thoroughly before replacing onto the gun.

Clean up drips, spills or over spray by saturating a cotton cloth with Silicon Derivatives Alkawash Solvent/Tool Cleaner. Wipe up drips, spills or over spray before the product dries to touch. Always dispose of saturated cloths in a safe and proper manner.

COVERAGE

The yield varies with substrate condition and application method. The yield can be as high as 1,200 ft^2 or as low as 600 ft^2 per gallon. Actual field conditions will dictate product yield.

SAFETY AND HANDLING

Always wear safety goggles, latex gloves, and protective clothing when working with Silicon Derivatives reactive silanols and cleaning products. Ensure adequate ventilation. When needed, use a carbon-filtered respirator (NIOSH/MSHA Black Cartridge) for added respiratory protection. Prohibit open flames or hot work within 50 feet of mixing or application. Always read specific label cautions and MSDS before working with Silicon Derivatives products. Always have MSDS on file and available at the job site.

COATING REMOVAL (SILOXNANE STRIPPING)

Silicon Derivatives AlkaWash™ is employed to remove previous coats of siloxane polymer coatings from hard surfaces. See the AlkaWash™ technical data sheet for the procedure to remove a siloxane polymer from a hard surface. .

AVAILABILITY

Silicon Derivatives Alumaclad™ – 3 Pak is available in one pint, one quart and one gallon kits, and has a self life of one year from the date of manufacture. Alumaclad™ – 2 PakV & 2 PakH is available in one pint, one quart and one gallon kits, and has a self life of 24 months from the date of manufacture. Alumaclad™ – 1 PakV & 1 PakH is available in one quart, one gallon and two and one half gallon containers and has a shelf life of 36 months.

TECHNICAL SERVICES

Silicon Derivatives service engineers and chemists are available to answer questions

concerning product performance, application methods and chemical composition

LIMITED WARANTEE

Silicon Derivatives warrants this product to be free from defects. Silicon Derivatives shall not be held responsible in any manner for any personal injury or property damage or related loss resulting from, or related to, the handling, storage, or use of this material. Since Silicon Derivatives has no control over the use or application of this product, Silicon Derivatives assumes no liability for loss or damage incurred from the improper use of such product.

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