The Valspar Corporation
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General Information

Aluminium is the general term for ultrapure and pure aluminium. Aluminium corrosion resistance can be excellent due to a thin surface layer of aluminium oxide that forms when the metal is exposed to air, effectively preventing further oxidation, thickness of 0.05µm, which looks dull, silvery gray. At a pH=4 until pH=9, this protective oxide layer is highly corrosion resistant. Aluminium is the most abundant metal in the earth's crust, the melting point of 660.4°C. Aluminium it is a relatively light, soft and stringy material which is increasingly used in the manufacturing industry to make lighter vehicles to help with fuel savings.

The production of aluminium is very energy-intensive. 13 to 17.8 kWh of electrical energy are required in the electrolysis to produce one kilogram of aluminium. When alloyed with magnesium, silicon and other metals, the properties of aluminium alloy are comparable to steel. Aluminium should not be in direct contact with other metal parts such as steel, otherwise it will form contact corrosion.

Caution is advised when condensation is present! This is a result from a temperature difference between ambient air and the component to be coated. Before the application of coatings or other materials, the workpiece should be at room temperature. For example, if a component in the open air at low temperatures is brought into the heated zone/spray booth, a film of moisture is formed on the metal surface which is barely visible to the eyes. However, this thin layer will jeopardise the adhesion of any coating.
Remedy: Store or place components in a heated building at max. 70°C relative air humidity overnight 12-16 hours. Another possibility is to bring the cold workpieces into the spray booth before painting and heat them at 40-50°C for 2-3 hours, depending of the material thickness.

Aluminium surfaces are treated partly it distinguishes:

Pure Aluminium:	Surface is not treated; however, a thin oil coat is always to be expected.
Anodised Aluminium:	Anodising (electrolytic oxidation of aluminium) is an artificial enhancement of the anodic oxide layer. Suitable solutions are treated (e.g. Sulphuric or chromic acid) are electrolytically treated and decomposed by electric current. A 5-25µm layer of oxide is formed on the anode surface. This produces a hardness of between 200-400 HV (Vickers-hardness). After anodizing the aluminium can be dried, it is immersed in a hot coloured solvent and then purged.
Chromated Aluminium:	In this chemical method the aluminium surfaces are formed by the action of chromic acid complex chromium, hydrochloric acid, which will etch the base material. The dissolved metal ions move into the chromate layer. Chromate coatings have a thickness from 0.05 to 1.5µm and they rank among passivated protective layers. Depending of the kind of chromate process different colours are used.
Coated Aluminium:	Varnish, paint coat or be powder coated.

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Substrate: Aluminium TI – S 3 / USA

When aluminium is to be coated an assessment of the surface, substrate and testing for the further processing and treatment of the substrate is of great importance:

Testing of	Method	Distinguishing marks
Oily surface	Press on absorbent paper (Time about 1-2 minutes)	Paper becomes transparent by oil
Metal blank aluminium	Scratch test with a coin or knife back	Coin runs at low pressure leaves scratches
Anodised aluminium (anodic oxidised aluminium)	Scratch test with a coin or knife back	Coin runs at low pressure leaves **no scratches**
Chemically treated aluminium	Scratch test with a coin or knife back	Coin runs at low pressure leaves scratches
Chromated aluminium	Visible	Transparent coloured layer
Lacquered aluminium	Visible Test with solvent	Transparent or colour coating swells and can be peeled off.

Pre-treatment before coating of aluminium

When grinding aluminium workpieces, highly explosive dust is created. Therefore, only appropriate tools and equipment with anti-static properties shall be used in compliance with EU directives. At the same time make sure that there is adequate ventilation and personal protective equipment is worn. To avoid contact corrosion and possible later claims by customers, use only proper and certified grinding media and grinding tools when processing any aluminium workpieces.

The appearance of the coating and the smoothness of the film surface are closely related to the state of the substrate. No direct lacquer or primer can effectively cover up poor surface conditions (e.g. deep sanding marks, coarse blasting structure). In this case and if a smoother finish is desired, the primer coating must be ground to the desired surface finish.

Mechanical:	
Caution:	Wear gloves when working with aluminium!
Cleaning:	Degrease with IME.RS607 Universal Reducer slow, wipe dry!
Sanding - hard aluminium: (sanding Filler back)	Sand areas with P150 grinding machine, alternative Scotch-brite red (fine)
Sanding - hard aluminium: (paint DTM or Primer wet/wet)	Sand areas with P240 grinding machine, alternative Scotch-brite grey (extra fine)
Sanding - soft aluminium: (sanding Filler back)	Sand areas with P240 grinding machine, alternative Scotch-brite grey (extra fine)

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Sanding - soft aluminium: (paint DTM or Primer wet/wet)	Sand areas with P240 grinding machine, alternative Scotch-brite grey (extra fine
Anodized aluminium	Primer on anodized coating is no solution. - This hard coating must be completely removed by suitable blasting or grinding systems.
Corroded aluminium	White rust is visible and must be removed by suitable blasting or sanding system (P150 – P240).
Aluminium profiles	Joins, rivets and corrugations can be worked with rotary grinders. These are suitable for stainless steel brushes, brass brushes and korflex brushes. Rivets shall not be damaged during grinding (tensile strength).
Blasting	Select suitable abrasive blasting systems for aluminium, e.g. Glass bead, dry ice blasting etc. (do not use iron-containing abrasives).
Sanding dust to aspirate or to blow down	After the grinding/sanding work, the grinding residue must be thoroughly extracted with a vacuum cleaner (observe explosion protection) or removed by compressed air.
Cleaning:	Thorough cleaning with IME.RS607 Universal thinner, until the cloth is no longer turns black.
Painting:	Recoating must be executed without any undue delay (within 60-90 minutes), otherwise the aluminium surface through exposure to the atmosphere will develop a non-contacting surface layer with poor adhesive properties. Depending on the requirements and demands on the coating, direct lacquers or primers with topcoat can be applied (Epoxy, Polyurethane or wash-primers).

Note:

Coating work shall not be executed below 8°C, e.g. paint work at the open air. Ideal conditions for adhesion and high quality coatings are room temperatures of 18°C and up. Do not apply any paint to objects which are subject the influence of moisture, rain, fog and condensation. Before applying paint to old coatings, perform an adhesion test by cross-cutting and test the possibility of applying another coating by performing a solvent test.