

Non-Ferrous Metals

1.4.1

What are Non-Ferrous Metals?

Non-ferrous metals refer to metals that are not derived from iron ore, such as **aluminium** and its alloys, **copper**, **brass** and **bronze**. Whilst iron (mild steel) will readily oxidize to red rust (iron oxide), non-ferrous metals usually exhibit only tarnishing (surface corrosion). Aluminium finds ready use in window- and door-frames, handrails, balustrades and architectural work generally. Copper is used in water pipes and guttering.

The malleability (softness) of most non-ferrous metals usually limits use to non-structural elements such as decorative work.

Although many non-ferrous metals are chosen specifically for their colour and lustre, there are occasions when, for one reason or another, the metal must be painted in a protective coating.

In order for the protective coating to adhere and perform satisfactorily, careful surface preparation must be carried out, as non-ferrous metals usually present with a very shiny, extremely smooth surface that provides poor adhesion for coatings. They are often coated in a thin oily deposit, either from the manufacturing process or as a water-repellent to delay surface oxidation.

Careful cleaning to remove greases, oils and other surface contaminants and thorough abrasion of the surface must be carried out prior to painting to ensure maximum coating adhesion and performance.

Aluminium & Alloys

The surface of aluminium and its alloys rapidly oxidise on exposure, forming a chemically inert, protective layer that protects the metal from further corrosion. This oxidation layer is the same colour as the aluminium metal but without the metallic lustre. Aluminium and its alloys are often extremely smooth.

Anodised Aluminium

Anodising is an electro-chemical process, which physically alters the surface of the metal to produce a very smooth, tough, dense, invisible oxide layer on the surface. The aluminium surface is 'passivated' and sealed and therefore unable to bond with any organic coating, including powder coatings unless proper surface preparation is carried out to ensure adequate adhesion of the applied finish.

Copper

Copper metal has a dull brown metallic lustre but will oxidise to the familiar chalky green patina often seen on copper domes on heritage buildings. This green patina must be completely removed prior to painting.

Brass

Brass is an alloy of copper and zinc. Brass can be polished to a bright, shiny, lustrous, metallic golden appearance but is highly prone to tarnishing, particularly on contact with skin, and therefore should not be handled with bare hands.

Bronze

Bronze is an alloy of copper and tin and has a shiny, lustrous brown metallic appearance that is prone to tarnishing to a dusty green patina with time.



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Surface Preparation of Non-Ferrous Metals

The following is a suggested method for surface preparation. For large projects, consult your Dulux Protective Coatings Technical Consultant.

1. Remove all surface contamination such as oil, grease or dirt by washing with an alkaline detergent and rinse with fresh potable water. Refer to AS1627.1 Part 1.4.4 - 1.4.6.
2. Dry abrasive "brush blast" clean ("whip blast") the surface using a non-metallic abrasive such as garnet. The abrasive size and blast pressure shall be such that all oxidation products and other surface contaminants are completely removed and that the surface is lightly profiled to provide a suitable key for adhesion of the coating system.
3. If the item being painted is not suitable for brush blasting (eg sheet metal or thin extrusions) then use non-metallic abrasive sanding pads to remove any existing oxidation and provide a suitable key for coating adhesion. Note that this preparation method is likely to be less effective than brush blasting and should only be used where brush blasting is not suitable.
4. Remove all spent abrasive and residual dust by using dry compressed air or, preferably, vacuum cleaning prior to application of the coating. Avoid handling abraded metal with bare hands.
5. Inspect the surface prior to coating to ensure no contamination is present and no surface defects exist.
6. If either contaminants or defects are present, rectification is required before any coating is applied.
7. Apply first or primer coat as soon as practical after preparation and before the surface oxidises or becomes re-contaminated.



Recommended Coating Systems for Non-Ferrous Metals

A surface tolerant epoxy primer is the preferred primer for most non-ferrous metals. Dulux Durebild STE will adhere to just about any clean and abraded metal, and offer an exceptional barrier to water, ions and oxygen, effectively preventing oxidation and degradation of the substrate.

If the metal is to be used for the collection of drinking water, Dulux Duremax GPE with Fast Cure Hardener will offer a highly durable coating that conforms to Australian Standard AS4020 Testing of products for use in contact with drinking water.

If the surface is to be exposed to UV, then a topcoat of Dulux Weathermax HBR will offer a UV resistant and weathering resistant finish.

For more information, please contact the Dulux Protective Coatings Technical Consultant in your state.