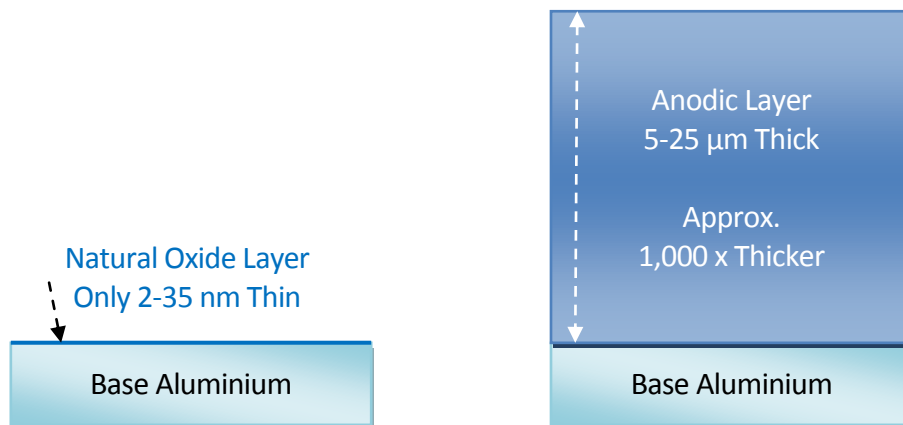
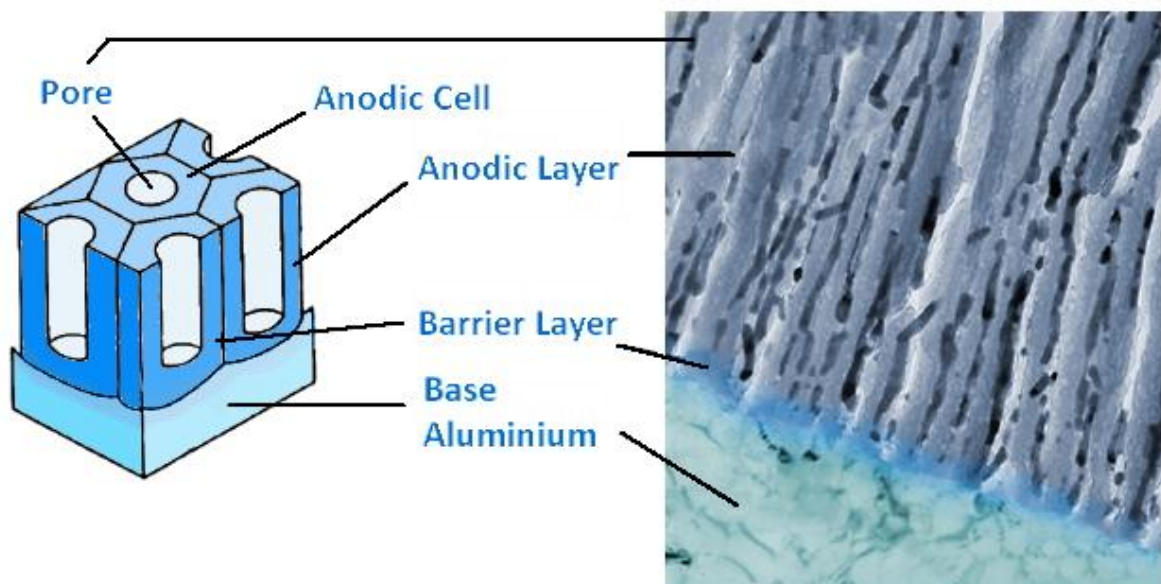


Thickness of the Anodic Film

The moment aluminium is exposed to oxygen in air it instantly forms a very thin (\cong 2-35 nanometres) aluminium oxide layer, giving aluminium its good corrosion resistance. However, the Aluminium Oxide layer that forms as a result of the anodise process, is about 1,000 times thicker (5-25 microns) as well as much harder than that which naturally forms, significantly improving its protective ability.



Structure of an Anodic Layer



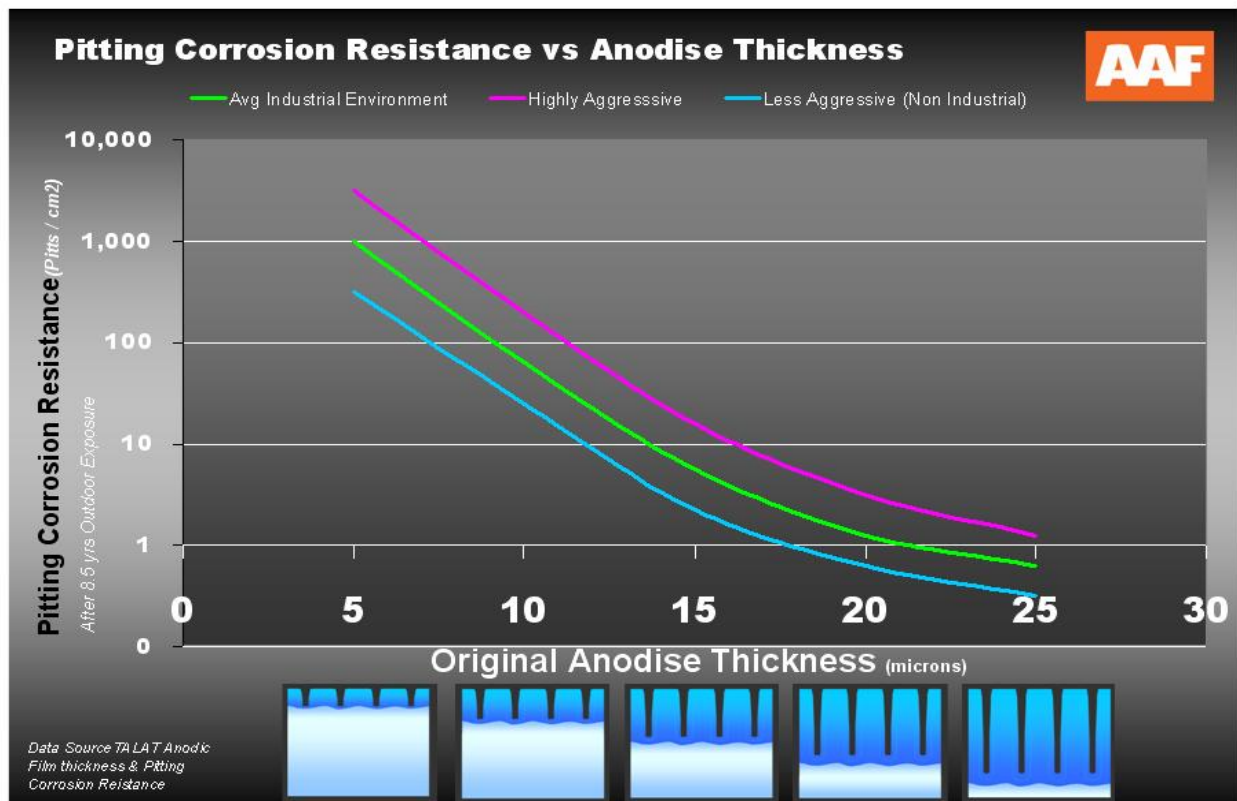
Did you know? Aluminium Oxide (Al_2O_3) is also known as **Corundum**. Gem varieties of Corundum include Ruby, Sapphire, & Emery. Among the natural gems only **Diamond** is harder than Corundum. This explains why the Anodised Aluminium surface is so hard!

Pitting Corrosion Resistance

All metals are susceptible to a natural process known as corrosion. Both natural and man-made environments help reduce metals to their natural form, though the extent at which this occurs can vary considerably.

Of all the various types of corrosion, pitting corrosion is the more common type that can occur on aluminium alloy products. They can occur when negatively charged ions (e.g. Cl⁻, from salt water) accumulate on the metal surface at microscopic discontinuities such as scratches or inclusions and can cause breakdown of the protective oxide. Each pit is discrete and minute in size and are more or less round, with a cavity which is roughly hemispherical.

In increasing the level of aluminium oxide thickness by anodising, the corrosion resistance offered of an aluminium alloy is substantially higher. In the chart below, test samples were subjected to 8 ½ years outdoor exposure in three different environment types, from less aggressive (non-industrial) through to highly aggressive. It is clearly seen that the higher anodic thicknesses provide the greatest pitting corrosion resistance. Note pitting rate Scale on the Y-axis is logarithmic.



AS1231-2000 Recommendations for Choice of Anodic Thickness

ISO 9223: ATMOSPHERIC CLASSIFICATIONS, Referenced in:		Examples	Thickness Grade Recommendation
AS1231-2000			
<i>Summary based on Appendix H - Guidance on the Choice of Coating Thickness Grades & Appendix I - Atmospheric Environments</i>			
Category 1:	Interior Environments	not subject to moisture condensation	5
Category 2:	Interior Environments	subject to moisture condensation	10, 15
	Interior Severe*	Indoor Swimming Pool	20
	Interior Very Severe*	Indoor Swimming Pool	25
Category 3:	Exterior Mild (to Moderate)	Areas remote from the coast (> 5km from marine coastline), industrial fallout and the tropics. E.g. rural, urban, light industrial	15, 20, 25
Category 4:	Exterior Tropical	Remote from coastal activity & Industrial Fallout. Typically 65-100% humidity year round. Coastal areas of nth QLD, NT, n-w WA, PNG & Pacific islands, except where directly affected by salt spray.	25
Category 5:	Severe Industrial	Around major industrial complexes inland from the sea. E.g. around smelters in Port Pirie and Newcastle	25
	Severe Coastal Marine	Moderate influence by coastal salts (sea spray) upto 5 km inland. E.g. Areas of Perth, Wollongong, Sydney and Newcastle	25
	Very Severe Coastal Marine*	Beachfront near rough seas or surf beaches	25

* These could not be defined in AS1231-2000

Summary

Higher Thickness;

- 25µm should be specified for Moderate to Severe environments (AS1231)
- Is the single most critical factor in achieving superior pitting corrosion Resistance
- Are a better electrical insulator
- Can be more prone to excess heat induced crazing (under certain conditions)

Lower Thickness;

- Can achieve brighter lustres
- Have some influence on lowering risk of excess heat induced crazing (under certain conditions)
- Offers lower level of protection from weathering, traffic & harmful materials
- Not recommended for exterior moderate to severe environments

All else being equal, **thicker Anodic layers provide significantly superior pitting corrosion resistance and provide greater level of protection from weathering, natural and urban pollutants.** Further, specialised grades of Evershield Warranty anodising can be specified. These not only offer higher anodic layer thicknesses, but are further advanced in producing an even more durable finish via thermo-electrochemical process controls.

Reference

- Australian Standard (AS) Australia, (AS 1231-2000, App. H - Guidance on the Choice of Coating Thickness Grades & Appendix I – Atmospheric Environments)
- Corrosion of Aluminum and Aluminum Alloys, ASM International, Edited by J.R. Davis

Note

Details contained herewith do not constitute specific advice, merely they are provided as a matter of courtesy and as general information only. Reference should also be made to Australian Aluminium Finishing Pty Ltd (AAF) Terms and Conditions of Sale as well as latest releases of the relevant Australian Standard for the finish concerned are available for purchase via the following website; <http://www.saiglobal.com/shop>

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