

TECHNICAL
BULLETIN



AUSTRALIAN ALUMINIUM FINISHING

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SHADE VARIATION IN ANODISED ALUMINIUM PRODUCT

At times, for a range of reasons, the appearance of Anodise product can be seen to vary to a degree when comparing one product with one another.

Understanding that anodising itself is a translucent finish, any inconsistencies with the supplied aluminium (including metallurgy, surface texture or grain structure) can become evident or accentuated after anodising. This is reflected in parts of the Australian Standard AS1231-2000 for Anodising;

“Additionally, anodic treatments may reveal lack of homogeneity, if present, in the aluminium.”). (AS1231-2000; Appendix B - Guidance on the Choice of Aluminium Grade)

“Anodic treatment may accentuate any lack of homogeneity or differences in the metallurgical condition of the aluminium. As a result, some non-uniformity of appearance may be encountered on different areas of a component and/or between different batches of material of the same specification, or where certain welding processes have been used.” (AS1231-2000; Appendix G - Guidance Visual Inspection after Anodising)

Given the above, if and when these phenomena do occur, they are not within an Anodisers (or AAF’s) ability to control.

FREQUENCY

These phenomena, though not occurring regularly, have been seen to occur from time to time with both smaller and larger job lots. This includes the locally produced 5205 alloy which is manufactured with tighter metallurgy tolerances than the standard 5005 alloy. Understandably, the probability of such increases with the greater number of items processed in a particular job.

PRECEPTIBILITY

Importantly, not all degrees of shade variation may be identified when viewing singularly or yet, a set of panels. The perceptibility of the above significantly increases when viewed at various angles as a large plane surface of abutted panels.

- We understand that the following is sometimes used by designers and builders to lessen the perceived shade variation;
- Deliberate arrangement of similarly shaded panels adjacent to one another.
- Introducing a visual break via a wider dark coloured joint (mastic).
- Having panels perforated.

Notwithstanding, the above potential still exists. This information is provided as a matter of courtesy and as general information; we suggest that you please review the risk of such in relation to the installation/use of these products on this or any other project.

WHAT CAN BE DONE TO REDUCE RISK?

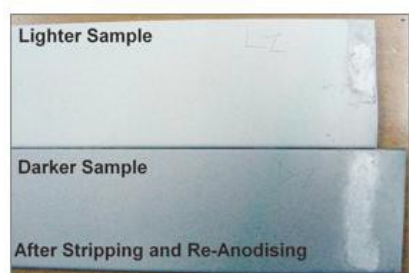
The following suggestions are listed to help minimise the risks of the above occurring;

- Notify your aluminium product supplier of requirements to reduce variation as much as possible; including metallurgy (Si & Fe...etc.), surface texture and grain structure.
- Source product from a single quality manufacturer rather than multiple suppliers
- As much as is possible, obtain consecutive product rather than a mix of older and newer batches
- Factor in the risk of such in your project and include measures to identify and manage such risks

Example 1 – Variances in alloy across aluminium parts

We are able to confirm these phenomena by way of re-processing the different appearing product off-cuts obtained from the one source and one batch. The Lighter and Darker off-cut extrusions (LHS) & Sheet product (RHS) were welded together before stripping and re-anodising. As can be seen in the photos below, the same off-cut appears darker and the other remains the lighter.

In each of these instances, it has been established that shade variation has arisen from an inconsistency with the supplied aluminium. Aside from the obvious metallurgical properties, it has been demonstrated that inconsistencies with the panels surface texture or grain structure may also result in shade variances. These may be the result of the manner by which the metal has been originally manufactured, rolled or tempered.



Example 2 – Incorrect weld alloy used

Mismatch of weld colour after anodising is most likely caused by the improper selection of filler wire.

If the welded assembly will be anodised, 5356 alloy filler wire should be used because the weld will colour is a closer match to alloy base material (assuming 6061 alloy extrusion). A weld with 4043 that is anodised will stick out since it will anodise a dark grey". "It's one limitation is that 5356 is not suitable for service temperatures exceeding 65°C". Refer to your welding supplier for more information.



Example 3 – Anodise Grade Sheet not used

"Zebra" (or Tiger) Striping" is not an uncommon phenomenon these days and is seen almost on a weekly basis across our Anodising plants. In as far as much, a few years ago, AAF embarked on sourcing High Quality, "True Anodise Grade" and "Zebra Stripe" free, sheets for your project. Contact AAF Sydney office (02) 8787 3999 for more information on "True Anodise Grade" sheet.

The patterned appearance on these sheets arises from inconsistencies within the supplied sheet itself. As detailed in AS1231-2000; Appendix B - Guidance on the Choice of Aluminium Grade. "Anodic treatment may accentuate any lack of homogeneity or differences in the metallurgical condition of the aluminium".

Novelis is a world leader in the production of aluminium coil/sheet product. In their article "Direct Chill (DC) Casting versus Continuous Casting (CC) - (coil production methods)". The article acknowledges that whilst sheet made by DC is cheaper, however, its uniformity is inferior to that of DC sheet.

The message from this is if you are purchasing sheet with the intention of having it anodised and want to reduce the risk of Zebra Stripes occurring. Be sure to purchase from your supplier sheet that is "True Anodise Grade" and have them ensure that it is that the sheet had been rolled from strips that were cast via the Direct Chill (DC) process.



...*"Additional manufacturing problems can occur if the surface of the final product is chemically treated, etched or anodized."* ... *"For all product applications where surface is critical, Continuous Cast products are to be avoided."* - The Tech Spot: Vol. 3, Issue 3, March 2009, www.ipg.novelis.com

Example 4 – Anodise Grade Sheet not used for Bright / Illustro Anodising

As can be seen in the photo below, when a Bright or Illustro anodise finish is specified on your project, it is especially important to purchase “True Anodise Grade” sheet in order to avoid the risk of pitting. At present, Novelis Anodise Grade J57S sheet from Europe is a premium choice. Alternatively, please enquire with AAF, as we have qualified alternative sources of “True Anodise Grade” sheet that may be more competitively priced. Contact AAF Sydney office (02) 8787 3999 for more information.



REFERENCE

Further information is available from the following Australian Standards. Australian Standard (AS) Australia, (AS 1231-2000), “Aluminium and Aluminium alloys - Anodic Oxidation Coatings”

NOTE

Details contained herewith do not constitute specific advice, merely they are provided as a matter of courtesy and as general information only. You should seek your specialist’s advice, to ensure that any information or suggestion meet your specific requirements. Reference should be made to the respective standards for the finish concerned as well as Australian Aluminium Finishing Pty Ltd (AAF) Terms and Conditions of Sale. Latest releases of Australian Standards are available for purchase via the following website; www.standards.com.au

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