Qualicoat 3.0

CWCT position, June 2025

Qualicoat 3.0 is an enhanced quality scheme intended to be employed on a project basis. It has been developed following an increase in failures found during routine Qualicoat testing for corrosion on coated samples. The Qualicoat investigations found that the quality of the aluminium matrix, as well as the surface quality, were factors in these failures.

Qualicoat 3.0 should not be confused with Class 3 (hyper-durable) powders.

Qualicoat 3.0 requires tests on the extruded alloy to be used, and the coater is required to be operating under the Qualicoat 'Seaside' class which requires etching to remove 2g/m^2 of the aluminium extruded surface and for filiform corrosion testing to be carried out on samples of the coated material.

The required tests on the alloy are

- Optical Emission Spectroscopy (OES),
    - Used to assess elemental composition of alloy,
- Anodic Cyclic Polarisation (ACP),
    - Used to evaluate a potential sensitivity to corrosion initiation,
- Metallographic Study
    - Used to assess microstructure of the alloy.

Details of these test requirements are given in AppendixA13 of the Qualicoat specification.

There is currently debate within the industry regarding the validity of this testing, and further research is ongoing. Therefore, early engagement with powder coating applicators is recommended.

Implications of Qualicoat 3.0 specification

Composition of the aluminium alloy

There is currently some confusion over the precise composition limits for the aluminium.

The Qualicoat specification valid from January 2023 refers to the limits in EN 573-3 however Qualicoat Technical Information Sheet 3 issued in May 2023 has tighter limits for some elements; in particular copper is limited to less than 0.03% in Technical Information Sheet 3 whereas the limit in EN 573-3 is 0.10%. In Technical Information Sheet 3 there is a reference to higher copper content being permitted if it is balanced with the zinc content, specifically for recycled alloys. This is understood to be related to pretreatment prior to anodising when spangling due to the presence of zinc is reduced when there is copper present. This is not relevant when the aluminium is to be powder coated.

The presence of copper is associated with a higher risk of corrosion. The 0.03% limit for copper has historically been widely accepted as an appropriate limit for powder coated aluminium and is achievable with virgin aluminium and aluminium with limited quantities of recycled material. It is impractical to meet the 0.03% limit when using recycled aluminium with a high proportion of post-consumer material which is desirable from a sustainability point of view. For example, Hydro quote a copper content in the range of 0.01% to 0.04% for their Hydro 75R-696022 material which has a minimum 75% post-consumer recycled content.

Published research (Lutz et al) suggests that satisfactory corrosion resistance is achievable with copper content in excess of 0.03%. Samples with copper content up to 0.05% satisfied the Qualicoat requirements for filiform corrosion with both standard and Seaside etching and samples with 0.09% copper met the Qualicoat requirements for filiform corrosion with Seaside etching.

Capacity of testing

There is also some concern about the capacity of testing laboratories to carry out the required testing if these requirements are widely adopted

Summary

This note outlines the current position however there is ongoing research which may lead to some modification to the requirements for Qualicoat 3.0.

There is a risk that specifications requiring Qualicoat 3.0 may be difficult to meet when using recycled aluminium with a high proportion of post-consumer material. It is recommended that the implications of the Qualicoat 3.0 specification should be considered and discussed with relevant parties at the project outset.

References

Qualicoat Specifications 2023 Appendix 13 Qualicoat 3.0

Qualicoat Technical Information Sheet 3 Recommendations for aluminium alloys, May 2023 edition

Lutz, A., Halseid, M. C., De Graeve, I., Corrosion performance of powder coated aluminium profiles with increased trace element composition, Materials and Corrosion, 2022, 1-11, https://doi.org/10.1002/maco.202213173.

Hydro 75R-696022 data sheet
https://materiales.gbce.es/wp-content/uploads/2019/09/75R-Billet_data-sheet_2019.pdf