



Guidance Note - No.2

UK & Ireland

Guide to correct specification of powder coated aluminium

September 2010

Scope

These recommendations cover specification guidance of painted aluminium extrusions and curtain wall panels. The guide is intended for specifying powder coated, architectural and aluminium extrusions such as window frames, door frames, railings and trim as well as curtain wall panels, column covers, spandrels, mullions, louvers, vertical trim, etc.

Purpose

These recommendations are intended to assist architects, contractors, owners and building managers who are concerned with the specification of painted, architectural aluminium.

General

Powder coating was introduced into the UK in the early 1970's and is the youngest of the surface finishing techniques in common use today. The finish is commonly used in various applications including white goods, automotive, and engineering as well as in construction.

Powder coating is the technique of applying dry paint to a part in the form of a fine powder which is electrically charged. The part is electrically 'earthed' so the powder is attracted to the part and stays in place through static electricity. The part is then placed in an oven and is subject to temperature which melts the polyester and allows the finish to flow and cure before the part is cooled and ready to use.

Powder coating differs from 'wet paints' which typically use a solvent where the solids are in suspension in a liquid carrier which must fully evaporate before the finish is ready to use.

The main advantage of using powder coating is the reduced impact to the environment as powder coating uses no solvents in the application process.

Polyester powder coating is the most commonly used system when coating architectural aluminium.

Polyester powder coating is available in a wide range of finishes from solid colours in various gloss levels, through to textured or metallic effects.

Process

In order to correctly specify a powder coat finish it useful to understand the basic process of powder coating as finish failure, as rare as it may be, is often not the failure of the powder finish itself.

Pre-treatment

Aluminium supplied direct from the extrusion process is often contaminated with oil and other residues which will effect the longevity of the final coating. Unfinished aluminium supplied from stock will have traces of natural oxidation on the surface. It is vital therefore that the pretreatment is correctly carried out to a very high standard.

The vast majority of powder coat failures can be put down to poor or inconsistent pre-treatment methods. The Pre-treatment offers two main benefits:

- Offers an air and watertight 'seal' to the aluminium
- Offers a good 'key' surface to the powder to adhere to

The basic procedure carried out in either immersion baths or vertical spray method is:

1. Clean
2. Rinse
3. Etch
4. Rinse
5. Desmut (only when using an alkaline etch)
6. Rinse
7. Chromate or Chrome Free Conversion
8. Rinse
9. Demin Rinse
10. Dry

At all times during the process the concentration of chemicals used in the baths or spray booths must fall within specified limits.

Powder Coating

Once dry the pretreated aluminium is placed on a moving overhead gantry which transfers the aluminium to a spray booth. Powder coating guns coat the aluminium extrusions, cast aluminium or sheet with a fine but controlled surface thickness of powder. Any over-sprayed powder can be collected and re-used giving a coating efficiency that can be in excess of 95%.

Without being handled the aluminium is transferred by the gantry into a continuous oven at between 160 to 210°C. In the oven the temperature heats the aluminium and the powder undertakes four basic stages to full cure, Melt, Flow, Gel and Cure. Once cooled the finished aluminium can be used immediately.

British Standards

The current British Standard and European Standard for powder coating is covered in:

BS EN 12206-1:2004 'Paints and varnishes - Coating of aluminium and aluminium alloys for architectural purposes'

This replaces the earlier British Standard BS 6496:1984.

The 2004 BS EN standard covers primarily the pre-treatment process and the testing of suitable test samples which accompany the material throughout the process.

Qualicoat Standard

The Qualicoat Standard, which can be downloaded from the European website www.qualicoat.net, offers a more in-depth specification of the process and importantly encompasses BS EN 12206-1:2004 in its entirety.

The Qualicoat standard is 'adopted' by members of the association in their various countries. Only when members meet the stringent levels laid down in the standard can they use the Qualicoat logo and seal of approval. In the UK all members are regularly visited, without prior notice, by an independent assessor, Exova. If quality standards laid down by Qualicoat are not being met the coater may lose his licence.

Qualicoat also qualify the powder manufacturers and pre-treatment chemical companies in vertical integration to ensure a complete up-stream compliance.

As the Qualicoat standard is constantly being reviewed and improved by its independent membership there needs to be a fixed reference. The use of 'Qualicoat' approved supply is sufficient to ensure material is provided by a Qualicoat Approved supplier in the UK or overseas in accordance with up to date Qualicoat standards.

How to Specify

To ensure the correct performance powder coating for architectural use is specified, the following statement should be included:

'Architectural powder coating to Qualicoat standard from approved supplier'

For projects located near to the coast there is a 'Seaside' class which offers a more intensive pre-treatment process, in this instance it should be specified:

'Architectural powder coating to Qualicoat 'Seaside' standard from approved supplier'

All powder coatings, however, will age over time and using higher durability powders will ensure that the surface finish looks better for longer. Higher durability powders can be used on high rise applications, or other places where access could be difficult or where there is a particularly harsh environment.

Powders for architectural coatings fall into three basic classes:

Class 1 - 1 year 'Florida' - weather exposure - standard

Class 2 - 3 year 'Florida' - weather exposure

Class 3 - 10 year 'Florida' - weather exposure

In class 1 the sample must retain at least 50% of its original gloss level at the end of the test, whereas for class 2 powders they must retain at least 75% and class 3 powders at least 90% over the same period of exposure. Colour variation over time is similarly more stringent on classes 2 and 3.

Further guidance on the use of any of the above standards is available from any approved Qualicoat member.

Disclaimer

The information provided in this document is for guidance only and is not intended to replace any manufacturers recommended procedures. Qualicoat UK & Ireland strongly recommend that a qualified member of the association is contacted and underwrites any procedures which apply to powder coated finishes.

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