

Polyamide Profiles Handling Instructions

These instructions were issued from the AFA (Aluminium Finishing Association), after consultation with powder coaters and polyamide manufacturers. Fabricators and powder coaters should be aware of issues that may affect rolling, stoving, storage and shear strengths.

Use of Proper Materials

There are a number of different strip materials used to achieve a thermal break in aluminium. Only polyamide, produced using Nylon 66, is suitable for powder coating. Use of under specification materials will result in failure of the thermal break during coating.

Rolling Problems

Poor knurling during the rolling of polyamide, prior to coating, is one of the major causes of problems such as:

- Shear failure between the two sections
- Distortion of the profile including banana shape distortion

Problems from this source are best checked by retention of 200mm of each type of section prior to coating.

Polyamide Damage Due to Temperature

Polyamide softens as temperature increases. Unless the melting point of polyamide (circa 255°C) is closely approached, this softening is reversed. In this respect there is minimal difference in the use of stoving schedules of 180°C - 200°C for 10 minutes. Indeed little permanent damage can be expected unless much longer exposure times or temperatures above 220°C are experienced. However, please refer to the section on moisture ingress.

Shear Strength Reduction at Stoving

Polyamide relaxes following as a natural process. This will happen at ambient temperature over a period of up to 2 years. The resultant reduction in shear strength is up to 50%.

Stoving accelerates the above, so that a stoved product will have experienced all of this relaxation in the few minutes taken to stove polyester coating. However, the resultant shear strength is no lower than would have occurred naturally with time and does not decrease thereafter. The maximum temperature experienced by the polyamide has minimal effect unless temperatures near melting point are experienced. It is essential that initial rolling achieves a shear strength sufficient to allow for this natural phenomenon. A suggested industry standard is a shear strength of 5000-6000N/100mm on a newly rolled joint. This value must be achieved by correct knurling and good form. It must not be due to rolling pressure alone. Provided this is correct and there are no flaws in assembly this is generally an accepted value.

Jigging

Increased demands on the environmental performance of glazing are leading to heavier sections which place increased demands on the means by which sections are supported during stoving. Particularly heavy or intricate sections may have to be supported in the middle of the section, with resultant jig marks. Whether sections are subjected to a 180°C or 200°C stoving schedule has very little impact on any potential distortion. Clearly there are economic considerations in this situation which may require discussion between the powder coater and the fabricator.

Moisture Ingress

Polyamide in dry warehouse storage conditions at ambient temperature will achieve an equilibrium moisture content of about 1.8% over a period of approximately 150 days. At this level it can be safely stoved at 180°C or 200°C without a problem. Stoving at 220°C could start to cause micro bubbling at the surface of the polyamide due to the pressure of steam bubbles formed in the plastic.

If the polyamide is allowed to get very wet and to stay in this condition for a prolonged length of time – for instance being stored unprotected in the rain or being shipped in polythene sleeves where water has been trapped in the sleeve and then left in this condition – moisture contents of up to 6% can be reached. At this level any powder stoving technique will result in massive bubbling, in extreme cases leading to rupture of the polyamide.

Wet polyamide can be recovered by heating for 5-6 hours at 100°C.

Fabricator Note

All fabricators should be aware that a powder coater to test shear strengths will cut approximately 200mm of the bar. Before ordering optimised bars for specific contracts this should be taken into account.

Polyester Powder Coater Note

Quality Checks

A critical element of polyester powder coating is to ensure that the profile is not damaged prior to coating. Comar urges powder coaters to quality check the profile before coating, as transport damage can occur and our customers expect that the profile delivered is of the highest quality, ready for fabrication to strict site deadlines. Any quality issues discovered should be notified immediately to Esther Marchese or Clare Lister, as soon as possible.

Handling of Profiles

Aluminium in its mill state is subject to damage, profiles should never be dragged from their stillages; they should be lifted by two personnel, one at each end. The resultant drag marks will cause a poor quality finish.

Low Bake Paints.

Due to temperature sensitivity of polyamide we would urge all polyester powder coaters to use the latest “low-bake paints”. These paints can be used at 180°C and therefore minimise the potential of exceeding the polyamide melting point.

Sources: Aluminium Finishing Association (AFA), Barley Chalu, Technoform.