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The Coating of Polyamide Strips

Disruption to the Polyester coating where it is applied over Polyamide strips is caused by the forced evaporation of the moisture content held within the strips, as the profiles pass through the cure oven. It occurs when the Polyamide is heated, and is in effect the passage of steam through the coating film when it is in a semi-liquid state.

Due to the purpose designed ability of the Polyamide material to reduce the transmission of heat/cold, the powder on the surface of the strip heats more readily than the Polyamide itself, allowing it to start to flow before the moisture in the strip has reached evaporation temperature thus making it necessary for the steam to erupt through the coating as it vaporises.

In order to attain the high quality finish we apply to all coated profiles, it is necessary to ensure that the maximum amount of flow to the powder particles is attained. To achieve this we need to raise the temperature of the material entering the cure oven as quickly as possible, in order to give the powder the maximum opportunity to flow before the material cross links and the surface solidifies.

Slowing the process speed or reducing the initial temperature can only have a detrimental effect on the final finish of the article, as the powder will not be allowed to flow properly before it cross links. It will not alter the effervescence on the surface of the strip as the temperature differential will remain the same.

If the coating on the Polyamide strip is very thin, which is the requirement on some secondary surfaces; it is possible that little or no visible effect of the disruption will remain apparent on the surface. However, on areas adjacent to the main faces of the profile where a full thickness coating is required, the disruption will be more severe and will remain visibly different in surface texture to the surrounding aluminium.

Because the process of moisture absorption from the air is slow, the method of storing rolled material can also have an effect on the amount of moisture absorbed. Material stacked closely together would create a reduction in air movement between the bars, which could itself cause a variation in the amount of moisture absorption between the strip one side of a bar and the strip on the other.

Likewise, the upper and lower faces of material which has gathered dust for a long period might also show a marked difference in the amount of surface disruption when coated, as the dust would absorb moisture and hold it against the surface.

Polyamide strips are manufactured from Nylon based composite material, which is by nature slightly hygroscopic when compared to other major polymers and has the ability to absorb water to about 8%. Absorption of water is not dependent on the material becoming physically wet from total immersion as in a pre-treatment application, as short term

immersion has little detrimental effect if properly drained. However, storage outside or in conditions of high humidity can have a lasting adverse effect to the point where heat causes total disruption of the Polyamide itself rather than simple eruption on the surface of the coating.

Overview

The absorption of water into the Polyamide is a naturally occurring phenomenon which happens over time by the simple extraction of moisture from the surrounding air.

It is not possible to eliminate it as it cannot be seen or wiped away prior to coating and it is generally either accepted in the Industry or eliminated by pre-coating the Aluminium.

The majority of customers have come to prefer their material to be coated prior to rolling, as it eliminates the problem with effervescence on the coated strips and gives a sharper cleaner look to the finished article. It also eliminates the risk of the coating shelling away from the strip at some point in the future and becoming unsightly.

Whereas, it can be understood that long runs of material, for stock purposes, might be preferably coated after rolling shorter runs and small individual jobs, especially those using coloured powder could only benefit from being coated before rolling.

Not only does the pre-coated product ultimately look more professionally finished than material processed in the mill form, it is also less likely to cause disruption to time schedules by virtue of the fact that it becomes easier to process and even re-process before value added procedures are initiated.

Pre-coating the aluminium eliminates the chance of heat distortion to the composite, it simplifies re-processing of any rejected coating and it makes fabrication of the composite easier as the crimping pressures can be lowered, reducing the very real risk of distortion during set up on single bars and short runs.