Architectural Powder Coating

Architectural powder coating is a specialist process which enables a colour-stable coating to be applied to metal components used throughout buildings. The advanced technology of the process means that a single coat can provide a hard, stable, durable coating which is chemically bonded to the metal surface, providing the appropriate pre-treatment is applied prior to coating by a quality coater approved by the powder manufacturer. The process is well suited to highly automated, efficient and environmentally friendly coating plants.

A large range of colours, shades, gloss levels and metallic finishes has been developed by specialist manufacturers of architectural powders. Bright colours and whites are readily available and the resulting finishes should be totally consistent regardless of the underlying metal substrate. Architectural powder coating is suitable for architectural aluminium in all its forms including fabricated and welded components.

The durability of the coating is dependent on the quality of the constituents of the powder, which should have been developed specifically for architectural use. The adhesion of the coating to the substrate relies on the correct pre-treatment of the metal surface and on carefully controlled curing of the applied powder.

Coating for architectural use should only be undertaken by specialist applicators using dedicated plant with full pre-treatment and quality control systems. The coater should work in partnership with and be approved by a specialist manufacturer of architectural powder.

Process Sequence

The Process is in three parts.

Pre-treatment – correct surface preparation of the metal is vital to ensure that the paint or powder coating gives the full durability as expected by the coating manufacturer. Pre-treatment of aluminium involves a multi-stage aqueous process applied by either spray or immersion, which includes cleaning, surface etching and conversion coating of the metal.

Cleaning and etching can be carried out separately but is often combined. This is carried out in alkali or acid cleaning agents to allow a controlled surface etch, ensuring that an even surface is provided and that scratches and surface defects do not show through the finish coating. Rinsing is required following all chemical stages and is especially important following alkali cleaning and/or etching. The etching process can generate a smut on the surface which needs removal in a suitable acidic solution where appropriate. After rinsing, the work is treated in a suitable conversion coating process which is either based on chromate, the traditional method, or with more recently developed processes, based on alternatives which are free of hexavalent chromium or in many cases free of any chromium. Post rinsing needs to be thorough and a final rinse should be of clean demineralised water.

Powder application – is by electrostatic spray. Dry powder is fed by air guns which impart an electrostatic charge to the powder particles which then adhere to the work piece. Control of film thickness is a skilled task. Over-sprayed powder can be collected and recycled.

Curing – is the carefully controlled heating of components, normally to 200C, which results in the cross linking of the polyester molecules and bonding to the aluminium surface. Curing schedules need to be adjusted for different products depending on the time taken to reach the required temperature.

Colour Availability and Durability

Architectural powder coatings are available in almost any colour, with a very wide range of existing products that match RAL or British Standard. There are very few BS 4800 shades still available as stock items. A full range of gloss, satin and matt finishes is available in most colours. Metallic finishes, and wood-effect finishes are also available.

Architectural powder coatings inherently have good colour stability. Developments of 'superdurables' and 'enhanced durability' coatings have further extended life expectancy, allowing suppliers to offer longer exterior performance guarantees.