Powder Coating

What is powder coating

Powder coating is a method of coating a substrate in a polymer powder via directional spray equipment.

The big difference between this and wet spraying is that the wet spray principle requires a carrier or solvent to allow the material to be successfully atomised and transferred from gun to the substrate, here the powder is carried out of the spray equipment with low pressure air and is drawn towards the substrate via an electrostatic charge which is induced at the exit of the spray equipment.

The powder is then cured via an oven to flow the powder out across the surface fusing the particles together in a chemical crosslink.

There are two types of powders used, Thermo plastic, which re-melts with any further application of heat and the more common Thermosetting powders which are much more widely used.

The Thermoset system are primarily composed of relatively high molecular weight solid resins of between 30 and 50 um in particle size and cure agent or catalyst which forms or assists in the formation of crosslink between the polymer chain to form a none reversible polymer film that will not re-melt if subjected to heat for a second time..

The primary resins used in the formulation of thermosetting powders are:

- Epoxy
- Polyester
- Polyester /Epoxy blends (known as Hybrids)
- Acrylic
- Polyurethane

plus some more specialist blend and variations of the above.

Powder types

Epoxy powders are one of the most common used systems and are produced in a wide range for differing formulations depending upon the final use, and the field that the item will be used in. They provide excellent gloss, toughness, adhesion, chemical resistance, corrosion resistance and flexibility, and, as such, are useful for under bonnet and under body automotive applications, as well as office equipment.

The primary drawback in line with wet paint systems is that epoxies will chalk when subjected to long term UV exposure. For this reason they are rarely specified for full outdoor applications. They also have a poor heat tolerance and yellow at raised tempertures.

Polyester powders: general performance can be categorised between epoxy and acrylic powders. They have excellent durability and a high resistance to yellowing under ultra-violet light. Polyester resin systems are available with two types of crosslinking systems, urethane or triglycidyl isocyanurate (TGIC)

Whilst there are subtle differences between the systems, most modern powders are TGIC free, they both are able to offer resistant weather properties and exterior durability, and also offer very good visual appearance on fairly low film thicknesses.

They are used for exterior applications such as patio furniture, automotive wheels and trims, lawnmowers and a wide range of other products requiring high quality, decorative finishes comparable to wet coatings.

Anochrome Group

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Powder Coating

Epoxy Polyester Hybrids

Epoxy Polyester "Hybrids",a blend of the two materials, sometimes in excess of 505 polyester, with the aim of giving reasonable chemical resistance and adhesion with improvement in durability and outdoor weatherability.

The resultant powders are tough, flexible and competitively priced and are frequently used in the same application as epoxies.

Acrylic

Like the polyesters, acrylics give good gloss and colour retention excellent exterior durability as well as heat and alkali resistance, however they are not as flexible but can be applied as a thick film.

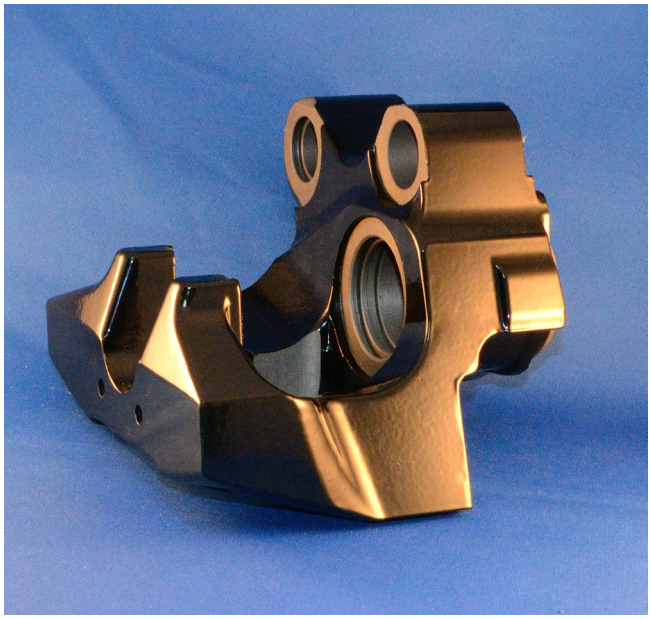
Polyurethane powders: provide good all-round physical and chemical properties as well as giving good exterior durability.

There are many advantages that make the choice of applying thermosetting powder coatings so attractive;

- Powder coatings emit zero or near zero VOC.
- Powder is immediately ready for use.
- Less powder wastage during the application process, as overspray can be recycled.
- Reduced health hazard in case of exposure of operators.
- Robust cured-film properties.
- Coatings can be achived in one coat without primers.
- Ability to mask or hide flaws in machined of cast surfaces.

Anochrome Group offers Thermoset Epoxy, Polyester and a hybrid range of Akzo Nobel powders which are applied via a manual application process.

Pre-treatment which is critical to obtaining good adhesion and longevity, can be carried out in house in the forms of anodised, phosphated, sandblasted or electrocoated prior to application.



	Powder types and properties				
Property	Epoxy	Acrylic	Polyester	Hybrid	Polyurethane
Weatherability	Poor	Excellent	Excellent	Fair -Poor	Good
Corrosion Resistance	Excellent	Good	Very Good	Excellent-Very Good	Very Good
Chemical Resistance	Excellent	Very Good	Very Good	Very Good	Very Good
Heat Resistance	Very Good	Good	Good	Very Good - Good	Very Good
Impact Resistance	Excellent-Very Good	Good -Fair	Good	Very Good	Very Good
Hardness	HB-5H	HB-4H	HB-4H	HB-2H	HB- 3H
Flexibility	Excellent-Very Good	Good - Fair	Very Good	Very Good	Very Good
Adhesion	Excellent	Good - Fair	Excellent	Excellent	Very Good

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