Powder Coating

ITS Tutorial

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What is Powder Coating?

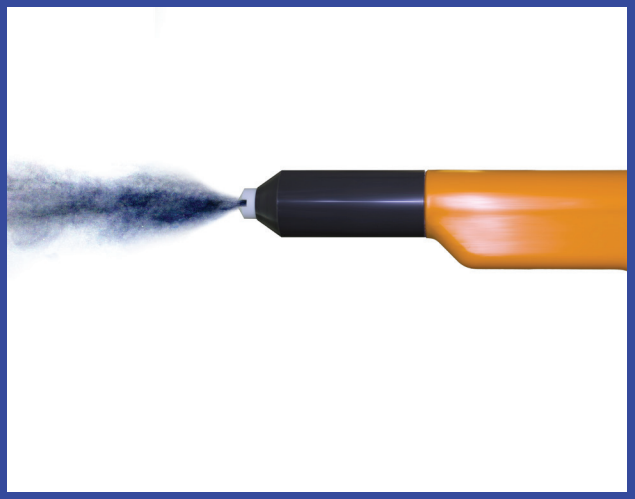
Powder coating is a coating that is applied as a free-flowing, dry powder. Powder coating was introduced in America in the 1960's and represents over 15% of the total industrial finishing market.

The coating for commercial applications is typically applied electrostatically and is then cured under heat to allow it to flow and form a "skin". Powder paint is typically used to create a hard finish that is stronger than conventional paint. Powder coating is mainly used for coating of metals, such as household appliances, aluminum extrusions, drum hardware, automobile and bicycle parts. Overall, more companies are specifying powder coating because of the high quality durable finish it provides. Powder coatings are available in an almost limitless range of colors.

Powder coatings are based on polymer resins and other additives. The process of electrostatic spray deposition (ESD) is used to apply the powder coating to a metallic substrate, but it can also be used on plastic and medium density fiber board. The application uses a spray gun to apply an electrostatic charge to the powder particles which are then attracted to a part that has been grounded.

After the part has been coated the part enters a curing oven. When a powder is exposed to elevated temperature, it begins to melt and then chemically reacts to form a polymer. This cure process, called cross-linking, requires a certain temperature for a certain length of time in order to reach full cure and establish the full film properties for which the material was designed. Typically powders cure at approximately 400 °F. The curing time and temperature could vary according to the powder manufacturer's specification. The heat processing can be accomplished by convection cure ovens.

Powder coating is a coating that is applied as a free-flowing, dry powder.



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Different types of ovens can be used to cure powder:

Batch Oven: Batch type ovens are used for various applications and at various temperatures and work well with products that can vary in size, weight and shape. Products can be loaded or hung from carts that can be pushed in and out of the oven. Products can also be hung from ceiling mounted conveyor rails with attachments and hooks allowing the user to easily move product in and out of the oven. With conveyor rails that extend outside the oven products can be staged while a batch of products are in the oven curing. An option to the batch process is a variable frequency drive for the recirculation blower, this provides low flow air during a period of time that allows the powder to set (begin to flow) once the powder has set the blower can be sped up to allow the product to cure, this keeps powder from being blown off the product.

Continuous Oven: Continuous type ovens typically use overhead monorail type conveyor systems and allow a user to have a closed loop system (load area, powder paint booth, cure oven and an unload area) Product is painted on a continuous basis as the conveyor moves product throughout the system. Oven length is based on throughput at a given speed with product located at certain centerlines. A low-flow duct design in the first few feet of the oven allow the powder to set before a hi-flow duct design cures the powder.

In either batch or continuous systems the heat source can be numerous types with the most common being either electric or gas.

Powder coating provides a high quality durable finish. Powder coatings are available in an almost limitless range of colors.

Powder coating ovens are available as Batch Ovens and Continuous Ovens.

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Air flow inside the oven is one of the most important factors to obtain the best coating finish.

Air flow technology: There are numerous air flow technologies that are used in powder cure ovens; International Thermal Systems can offer our patented TURBO FLOW air flow on select ovens rather than our standard air flow options. TURBO FLOW enhances heat transfer and minimizes temperature gradients throughout the oven chamber. TURBO FLOW substantially increases the amount of airflow throughout the work chamber without increasing the overall recirculation blower size. Temperature differentials less than ±5°F in large batch and continuous ovens are common using this air flow technology.

Powder coatings overall are easy to use, environmentally friendly, tough and last a long time. The coatings can be found on many of the products that we use each day. These coatings are used in commercial and household products alike.

Powder coated table and chairs

For more information on powder coating ovens,
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