ALUMINIUM COATING

Vacuum metallising:

Vacuum metallising is the process of evaporating a film of metal on to products under vacuum also known as Vacuum coating or Physical Vapour Deposition (PVD) and within this coating system there are various types of process such as low friction process, cathodic arc evaporation, pulsed laser ablation, magnetron sputtering etc.

The finish produced is almost identical to electroplating but it is achieved using Vacuum metallising. The process is suitable for Suitable for Plastic: ABS, Polycarbonate, Nylon, Polyester, and Polypropylene (using primer first).

You can vacuum metallise many materials including plastic, metal, glass, fiberglass, and more. There are many different applications for Vacuum Metallising including; automotive and motor sport accessories, automotive interior trim, sporting goods, toys, models, novelty items, display items, decorative fixtures, cosmetic closures, etc.

The products coated using this method are car headlamps, car trims, gift items, picture frames, handles, plastic caps etc. mostly plastic products and metal products too. The thickness achieved few microns to 10 microns.

The main advantages of vacuum metallising are finish, flexibility and price. Vacuum metallising allows for highly reflective, bright mirror finishes to be achieved. Any colour is possible in a variety of finishes i.e. Gloss, Matt, Satin, Textured or Wrinkle. However vacuum metallising has a number of advantages over electroplating. Unlike electroplating, that requires a specific plating grade of ABS to be used, vacuum metallising is far more versatile, successfully coating most types of plastic. Also, unlike electroplating it is possible to mask off mouldings, so that only specific areas are metallised. It is also a cost effective alternative to traditional plating processes, offering a comparable quality of finish, yet providing considerable cost savings. Also it is much more environmentally friendly and cost effective than chrome plating or chrome painting.

Process:

To metallise a product the process typically consists of three sub-processes, Base-coating, Metallising, then Top-coating. Though some plastics may require to be primed before they will accept the basecoat.

Spray basecoat lacquer >> cure 60 degrees or UV cured >> Vacuum Chamber >>> Top coat lacquer. The base coat and top coat lacquers are special lacquers for this vacuum metallising process.

To begin the metallising process, parts are loaded onto holding jigs. These jigs are specifically designed for the products loaded onto them, thus ensuring the best metallising coverage possible is achieved.

Base Lacquer:

Before the parts can be metallised, an adhesive base lacquer is sprayed onto the parts. There are many different types of lacquers that can be applied. Base lacquering maximises the metallising process and ensures that the desired effect is achieved.

Once sprayed, a flash off period is given to the parts. Parts are allowed to air dry in a controlled air conditioned clean room. This helps to ensure an even finish, free of drips,

sags and runs is achieved. Once the parts have been flashed off, the parts are transferred into ovens for the base lacquer to cure. Again the temperature and duration in the oven is specific to the base lacquer applied to the parts.

The materials to be metallised are coated with a lacquer which prepares the surface by chemically attacking it, and as this lacquer has high electro-static properties it allows the metal to more easily adhere to the surface. Often for this lacquer to dry it has to be stove as its chemical properties do not allow it to dry in normal atmospheric conditions.

Metallising:

Once the parts have been cured, they are taken from the oven and loaded onto vacuum chamber trolleys. These trolleys are loaded into the vacuum chamber and the metallising stage can begin. The chamber is pumped down to a pre determined pressure specific to the parts being processed. When this has been achieved, 99.9% pure aluminium is evaporated in the chamber and the resulting vapour coats the products with a uniform film of metal.

Top Coat Lacquer:

As described above the metallising process coats the parts with a very high grade of aluminium. It is this, that once applied is highly reflective, and a clear top coat lacquer is applied over the top of the metallised material to prevent scratching, or alternatively pigments can be added to achieve different looks, such as red pigment for a gold effect.

For some parts however, a chrome finish is not the desired effect. The coating of aluminium is then used as a base from which an array of different coloured lacquers can be applied. You can also add dyes to the topcoat to achieve bright chrome, gold, bronze, copper colour finish, as well as satin and antique finishes. Again the parts are given specific time in the oven to cure.