

DEVICE FOR APPLYING POWDER MATERIALS

Pham V.A., Cherkashina H.M., Blyznyuk O.V.

National Technical University "Kharkiv Polytechnic Institute", Kharkiv

When using powder materials for painting products instead of paint and varnish systems, it becomes possible to obtain a coating of a given thickness with a single application. Also, powder materials are fire-safe and non-toxic substances, which prevents harmful emissions into the atmosphere, allows to completely automate the painting process, as well as to improve sanitary and hygienic working conditions when applying protective and decorative coatings. Therefore, compositions based on thermoplastic (high and low pressure polyethylene, polyvinyl butyral, pentaplast, etc.) and thermoset polymers (epoxy, polyester, acrylic, etc.) have found wide use.

The quality of coatings based on powder polymer materials depends on the initial composition and properties of the powder material, strict adherence to the technology of obtaining a powder coating: preparation of the surface of the product for painting, the method of applying the powder material, as well as compliance with the conditions for the formation of coatings (heat treatment and cooling). The mode of heat treatment of powder materials was selected depending on the nature of the polymer, the technology of preparation of the surface of the product chosen by us, and the method of powder coating.

To obtain a coating, a stationary layer of powder material was brought into suspension under the influence of an air flow, then a product heated to the melting point of the powder material was placed in a "fluidized bed", the powder particles settled on the surface of the product and formed a film, then the product was placed in an oven, the resulting coating was cooled.

A study was conducted on the mode of processing powder materials based on polyester oligomers, on the development of the technology of preparation of various surfaces (different grades of steel and aluminum) and the development of a simplified design of a tribostatic gun with uniform supply of the air-powder mixture to the nozzle, and then to the surface to be painted. The main difference between the simplified design of the gun and the typical industrial application systems is that there is no need to install a compressed air supply system or to install membranes of a special design. The entire design ensures uniform application of the powder material to the surface to be covered in the painting process without agglomerates. The gun can be used to apply protective, anti-corrosion, decorative and other coatings in various industries.