ronaldbritton
METAL POWDERS

Guide to Cold Metal Spraying/Liquid Metal

Introduction:
The process of cold metal spraying, or liquid metal, process involves applying a mixture of fine metal powder and resin binder to a surface or object. Once the mixture has cured the coating can be finished via a number of possible techniques to achieve a very realistic metal effect having the appearance of cast metal. The surface finish may be smooth or a texture may be applied before curing to give a wide range of effects.

MDF letters sprayed with Ronald Britton Iron powder -300 mesh and Irregular Copper powder -325 mesh.

This process offers cost advantages, lower weight and greater design potential compared with casting or fabricating in metal. Fittings and furniture can be produced in MDF or similar and then coated when complete. The process also allows metallic finishes to be added to items for both indoor and outdoor use that would normally not be cast or fabricated in metal.

Metals: Commonly used metal powders are Bronze, Brass, Aluminium, Copper, Iron, Nickel Brass (also called Nickel Silver), Tin and Zinc. Finer powders, typically -240 mesh or finer are preferred for spraying, however coarser powders can also be used.

Resin: Polyester or Polyurethane systems are commonly used, although water-based systems are available. Resin suppliers are able to offer advice for suitability on various substrates, or alternatively please contact us for recommendations.

Equipment and Application: The surface of the work piece should be pre-treated to obtain a clean, dry and smooth surface. A gravity feed cup gun is recommended for metal spraying: 1.8 fluid tip and air pressure 50 psi. Settings may vary with make and model of gun used. Metal powder to lacquer mixing ratio depends on the metal used (please refer to separate sheet), for most of our metal powders this is 3:1 metal to lacquer. Spray in multiple passes to get thorough coverage, wet on wet with no more than 30-60 seconds between coats depending on the resin used. The sprayed surface should not have too wet an appearance, as this would indicate a layer of lacquer on top of the metal powder layer. Metal powder usage at 3:1 metal to lacquer ratio and based on 2 coats is approximately 1kg/m^2, but will vary with substrate or system used. For coating small areas or objects, brushing can be used as a simple and effective application method.

Polishing: With some systems it may be necessary to remove an oxide layer from the surface, this can be done by wiping with acetone or other degreaser or by light sandblasting or cleaning with steel wool. After which, cut back starting with 240 grit, through 320, 400, 600, 1200, 2000, possibly even 3000, followed by polishing with compound as required. Depending on the desired finish some of these steps may be left out. With textured finishes, less work is generally needed.

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Further Finishing: Chemical patinas may be used to obtain an aged look, such as black/green effects with Bronze or rust with Iron. Waxes or topcoat may be applied to the polished surface to increase durability.

The drainpipe above is a black uPVC pipe spray-coated with Ronald Britton Iron powder -300 mesh. The metal coating was then allowed to rust by exposing the piece to a combination of rainwater and vinegar. The work boot was also sprayed with Iron powder -300 mesh and given similar corrosion treatment.

Coating Irregular Objects:

The resin figure shown was coated using Ronald Britton 70/30 Brass powder -240 mesh. Several coats were applied to ensure adequate coverage.

The coating was then cut back using a combination of 400 grit and 600 grit abrasive, followed by steel wool and 800 grit for the final polish. This proved sufficient to give a very realistic cast metal effect on the irregular and textured surface found on the figure.

This is a good example of the versatility and effectiveness of the cold metal spraying/liquid metal method.

This guide is based on customer feedback and our own experience. Conditions may vary depending on application and the resin used. We always recommend customers test in application before use. We welcome any customer feedback on the above guidance.

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