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Important notes for successful coating using the PVD process

Maximum loading capacity of the substrate carriage (carousel) dia. 800 mm, length 1200 mm, weight 500 kg
Maximum coatable substrate surface area (useful plasma volume) dia. 800 mm, length 1000 mm
Maximum substrate surface area for precision coating dia. 800 mm, length 850 mm

Materials

Metallic materials such as high-speed steels (HSS), hot and cold working steels, corrosion-resistant steels, quenched and tempered steels, case-hardened steels, ball bearing steels, nitrided steels, carbides and cermets can be coated. Other materials can be coated on request.

The hardness of the material of the part being coated must be selected so that there is a sufficient supporting effect for the coating. To meet this requirement, a material is generally selected that would be used even without coating.

Design and geometry

In order to fix the parts to the carousel, bores, threads or at least one surface must be available that can remain uncoated. Surfaces that are not to be coated must be indicated in the order documents. Inside contours such as bores, slots, etc. have a limited suitability for coating. Depending on the geometric conditions, increasing coating depths result in a drastic reduction in coating thickness and bonding strength.

Soldered joints must be heat resistant up to 600°C and be free from pores, fluxes and cadmium. Please note that the strength of the soldered joint is decreased due to the thermal load during the coating process. This applies also to vauum-compatible solders (without Cd+Zn).

Welded tools must be stress-relief annealed before coating.

The parts to be coated must not be bolted, press-fitted or glued. Pocket holes and inside threads must be free from hardening salts and other impurities. Cooling channels must be opened and cleaned. The surfaces must be free from rust, chips, wax, adhesive tape, paint, residues of plastic melts, mould inserts, etc. The parts being coated must be free from grinding dust, spots of cleaning agents, fingerprints, etc. and should also be demagnetised.

Heat treatment

The heat treatment must be performed so that the coating temperature (200°C for low-temperature processes up to 500°C for standard processes) does not result in any distortion or loss of hardness.

Surface finish

The surface finish of the parts being coated must be bare metal. Surface treatments such as burnishing, vapour annealing, bath nitriding, etc. are not suitable for a PVD coating and must be removed mechanically in advance (grinding, micro shot blasting, etc.).

Ground surfaces must be free from grinding cracks, oxides skins and rehardening zones. Blunt grinding wheels must not be used for preparation.

Cutting edges should be free of grinding burrs to prevent breaking the first time they are used.

Photo-etched surfaces can be coated without pre-treatment if they have no residues or spots.

Polished surfaces must be free of polishing agent residues.

(Hard) chrome-plated, (chemically) nickel-plated or plasma-nitrided parts are only coated on request.

(Micro) shot blasted surfaces must be cleaned or blown clean because residues of the shot blasting agents can result in point corrosion.

Intensive glass bead blasting of tools (e.g. to remove grinding burrs) can make the tool surfaces uncoatable, as contaminants are “hammered” into the surface in this way.

With spark-eroded surfaces, several recuts should generally be performed to reduce the formation of the “white layer”. A good coating bond is generally achieved after a pre-treatment of spark-eroded surfaces by micro shot blasting.

Decoating

In the case of decoating orders, please indicate exactly the coating to be removed and the material. We generally remove only coatings applied by us; however, competitors’ coatings can be removed on request. In some cases, it is not possible to remove the coating from carbide metal parts; we will be happy to advise you on the best solution.

Transport packaging

The parts being coated must be packed in such a way that they cannot be damaged by external effects or by contact with one another. The packaging provided will be used for the return transport and must therefore be reusable.

As protection against corrosion, the parts being coated should be treated with a water-repellent oil that must be able to be removed residue-free using the alkaline cleaning method employed by us. Highly polished surfaces should preferably be covered with an acid-free, at least 50 µm thick PVC film. Soft, abrasive materials such as wadding, paper or foam are not recommended.

Note

In order to save time, please indicate all the necessary information on the material, the heat treatment (annealing temperature) and on the last machining steps. Please indicate any desired pre-treatment or post-treatment processes on the order form.