

Q8: What are the reasons and the recommended countermeasures for the discoloration of the appearance of the castings after the impregnation treatment and the acid spitting (Oxidation) after electroplating?

A8: During the die-casting process, due to gas remain, cooling, phase change and shrinkage, etc., it is inevitable to form a large number of micropores, blisters, cracks, etc., while the leakage of micropores brings hidden concerns to the use of mechanical equipment, even if it is used in non-pressure requirements. Chemical acids used in electroplating, painting and other surface treatments may enter the parts, causing internal corrosion and shortening the life of the parts.

**Q : What is the reason for the discoloration (yellow) on the surface of the casting after impregnation? Can you provide a solution?**

Impregnation is to put the castings with leakage on the surface into a vacuum container. Firstly, vacuumize the gas in the micropores. Use pressure and capillary principle to make the impregnation liquid penetrate the micropores, and then heat to solidify the micropores which will be sealed. In the past, manufacturers could not accept the impregnation treatment method. The main concern was that after the holes of the casting surface were sealed, there would be residues on the surface of the casting, high defect rate, unsustainable sealing effect, and environmental pollution. In recent years, the development of low-viscosity sealants with the improvement of impregnation equipment, even thin-shell die castings can be used in hydraulic systems or combustible gases after being processed by the impregnation system without worrying about leakage.

After the casting is impregnated, the yellow surface may be caused by the residual sealant, chemical acid, water, or pollutants in the micropores on the surface. During electroplating or painting, the chemical electrolyte cannot penetrate the micropores. The appearance of the casting is blistering, paint peeling, discoloration, etc. Provide several key points to solve the problem, including the confirmation of the pre-treatment process (degreasing, cleaning, drying, cooling), complete vacuum extraction, no residues in the micropores, use of suitable impregnation liquid, correct solidify time and temperature, etc.; of course, It can also be covered by sandblasting or baking varnish for the discolored appearance, but it is not a cure for the root cause.

**Q : Castings (zinc alloy) appear light yellow blocks after electroplating. What are the possible reasons for that? What is the countermeasure?**

After the casting is electroplated and placed for a period of time, a small irregular

light-yellow spot will appear on the surface of part of the casting, which is called acid spitting or oxidation. Generally speaking, the acid spitting phenomenon of castings after electroplating can be roughly divided into two categories. One is the plunger oil or release agent that is involved in the casting when forming, and it remains inside the final filling position of the mold cavity, because the temperature of the molten metal is lower. It cannot diffuse effectively and forms a loose grain structure. When electroplating, the residual grease overflows along the loose grain boundaries by heating, making the surface of the casting appear dark coffee color; the other is that the low-temperature oxide at the front edge of the molten metal cannot be smoothly released to the overflow groove, and reflow in the mold cavity to form a loose grain structure. During the pretreatment of electroplating, the acid or alkali liquor infiltrates the loose structure along the grain boundary, and overflows to the surface of the casting during electroplating, and the surface appears white or lighter in color. Zinc alloy castings need to be acid cleaned or alkaline washed before electroplating. If the surface of the casting is loose or there are tiny holes under the surface, the acid cleaning or alkaline washing solution may remain in the holes. After the subsequent copper and nickel plating, the surface is intact at first, but the remaining liquid will gradually corrode the copper and nickel coatings over time, and ooze out of the surface to form light yellow patches. There are two main suggestions. One is that the castings must be dried after acid cleaning or alkaline washing, and then the subsequent electroplating operation; the other is to avoid loose surface structure of the casting or the existence of tiny holes under the surface to solve the problem fundamentally.

**This issue extracts the content of recent member consultations, so that readers who encounter similar problems on the production line can have a basis for reference. In the future, our periodical is expected to take 2-3 issues as a cycle, in the form of a small column of [DITSA come to answer], sort out the problems encountered by our members, and make a thematic introduction; at the same time, all members are also welcomed to share in advance The company's technical strength and advantages. If you would like to contribute an article, please contact the DITSA Alliance Office.**