

Selective Plating: A Simple Way To Repair Molds On The Press

A portable, high speed process allows molders to make minor surface defect repairs in mold cavities without removing molds from the press.

Plastics molders, operating both captive and job shops, are frequently plagued with downtime due to repairs that must be made on damaged or worn molds. Conventional machine shop practices commonly employed to repair plastics molds share a serious drawback - they all require that the mold be removed to carry out the needed repair. SIFCO Process® of selective plating will allow the repair of plastics molds in-situ. This process reduces downtime substantially. Typical repairs include damaged cavities, worn gate areas, and parting lines that cause flashing of molded parts.

High-Speed Selective Plating

The process deposits metals with excellent adhesion to all classes of steel, aluminum, and beryllium-copper molds, as well as to chrome or electroless-nickel plated mold cavities.

Repairing Cavity Damage

Occasionally, plant or maintenance personnel will accidentally leave a foreign object such as a cap screw in the chrome-plated cavity. And, sometimes a molded part or runner may not be ejected properly. Under the pressures of injection molding, such objects will form an indentation in the cavity. With selective plating, copper or nickel is deposited to fill in the damaged area and is then blended in to re-form the cavity contour. The nickel repair is then selectively capped with nickel-tungsten, nickel semi-bright, or chrome to enhance mold release characteristics. Such repairs, along with nicks or dings in chrome or electroless-nickel plated cavities may be accomplished without the need to strip and re-chrome the entire mold cavity.



Corrosion Protection

PVC Molding. Hydrochloric acid is a byproduct generated by incipient decomposition during the molding of polyvinyl chloride, as well as of other polymers. The liberated acid etches or pits the mold cavity. Chrome plating helps, but does not provide a totally satisfactory answer, since hydrochloric acid is actually used to strip chrome plating. However, by selectively depositing a thin layer of gold in areas where the acid tends to pocket, the pitting can be eliminated. **Mold storage.** Mild steel molds are frequently selectively coated with cadmium while out of production for extended periods of time. Cadmium, because of its position relative to iron in the electromotive force series, will actually form a galvanic cell with the steel and preferentially corrode sacrificially, thus protecting the steel.

Selective Plating Applications in Plastics Molding

Application	Metal Deposited	Capping Metal
Mold Cavity Damage(a)	Nickel or Copper	Nickel Semibright, nickel-tungsten, or chrome
Flash correction in gate areas or parting lines(b)	Nickel or Copper	Nickel Semibright, nickel-tungsten, or chrome
Corrosion protection(c) PVC molding	Gold	NA(d)
Mold storage	Cadmium	NA(d)
Water-cooled molds	Cadmium	NA(d)
Resizing core pins and bushings(e)	Nickel or Cobalt	NA(d)
Machine maintenance(f) Hydraulic Repairs	Copper	Nickel Semibright
Resizing shafts, journal areas, and bearing fits(g)	Nickel or Cobalt	Tin or Zinc

- (a) Nickel is used for cavity repairs in injection molds; copper may be used in low-pressure molding.
 (b) Only nickel-semibright should be used for parting lines.
 (c) Gold resists hydrochloric acid; cadmium prevents rusting of steel molds and is effective in water channels and back plates.
 (d) Not Applicable.
 (e) Resize to dimension without subsequent machining.
 (f) No need to strip chrome.
 (g) Shear-fit to resize.



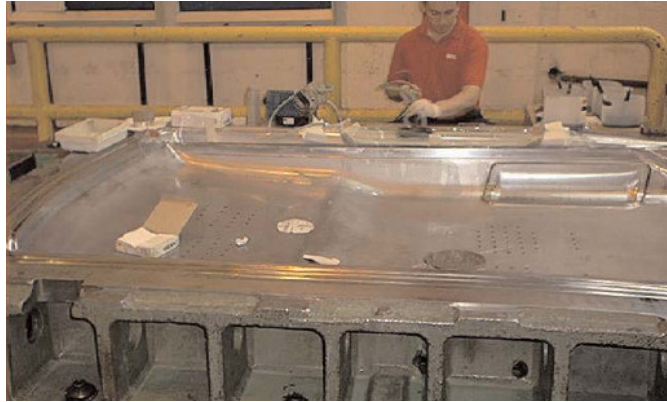
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Resizing Core Pins and Bushings

As wear occurs and pin and bushing dimensions deviate from needed tolerances, it becomes necessary to discard and replace core pins and core bushings. With the digital ampere-hour meter, these parts may be selectively plated back to size, and put back in service, often without finish machining. Nickel and Cobalt are excellent choices for selective deposition in these applications, since they have good toughness characteristics, in addition to excellent wear resistance. If a harder surface is required, nickel-tungsten, nickel-cobalt, and cobalt-tungsten alloys may be selectively deposited in a hardness range of Rockwell C 60 to 68



Worn gate areas or damaged parting lines may be repaired to eliminate flashing by the use of selective plating. After the amount of wear in the gate area is measured, the digital ampere-hour meter is used to control the amount of metal deposit needed to resize the gate precisely without the need for subsequent machining. Chipped or damaged parting lines are repaired in similar fashion. However, most parting lines coincide with sharp angles in the mold.

Flash Correction

Worn shafts and journal areas may be resized rapidly by the selective plating process. Totally round and concentric bearing fits are obtainable by selective plating.

Machine Maintenance

Many plastics molders who utilize the selective plating process for mold repair have found the process equally useful in press or machine maintenance. Scores or scratches in chromed hydraulic actuating cylinders are filled with copper and then capped with nickel or cobalt. Again, this repair is performed without disassembling the cylinder from the press and without the need to strip and re-plate chrome.



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