



Cycletime Tips - Automotive

Volume 10: Chrome Plating of Thermoplastics

Electroplating is not a new technology. Its origin has been determined as far back as ancient Egypt through uncovered artifacts. Today the desire still exists to alter the appearance of components to produce a more pleasing surface. In our industry, we often select emulsion-type ABS or ABS/PC alloys to apply chrome plating in order to give a metallic appearance. Automotive applications include exterior nameplates and trim pieces to interior instrument panels and control components. The purpose of this tip is to maximize part quality through process and part handling.

As we've been taught, in order to minimize the inevitable stress levels witnessed in injection molding we strive to fill the mold cavity as quickly as possible. When we evaluate parts produced while observing this strategy, the result is as predicted. In plating, we desire very low stress levels on the part surface and this leads us down an alternative route. While fast fill rates produce less stress throughout the part, it often generates a highly stressed "skin" on the component to be plated. Because of this phenomenon, we typically fill slower and run very high mold temperatures. Our goal is to produce a part that can be easily etched before the plating process is begun.

The etching process is instituted to remove polybutadiene from the ABS surface so a microporous-bonding site is provided for proper adhesion. When polycarbonate is added to the mix to improve thermal and mechanical properties, we reduce the peel strength of the plating by 25 to 50 percent when compared to emulsion ABS. A highly stressed surface will not allow for proper etching and what's known as "skip plating" occurs which leaves an unplated or laminated surface. The etching process uses a solution of chromic acid and sulfuric acid at elevated temperatures to remove the rubber from the ABS matrix.

When handling parts, we need to insure against contaminants being introduced to the parts surface. We want a material whose composition does not encourage additive migration over time. Additionally, we don't want to apply mold release to molds to combat a design issue. Sink marks are magnified after plating and some molders are forced to overpack the part to eliminate the sinks caused by poorly designed projections. This creates sticking and stress. Hence the need for mold release to alleviate sticking. Proper care must be given to part design considerations so this can be avoided.

These are just a few tips worth considering when looking at the complex process of chrome plating as a potential secondary operation. ABS and ABS alloys are just two of many families that can be plated but these tend to be preferred due to the relative ease of plating. Please understand that plating houses prefer to maximize output and minimize alterations to the "normal" plating process. Observing proper design, process, and part handling will minimize costly deviations from the accepted plating process. Please

contact the Automotive Technical Service Team if you should encounter issues or require further information.

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