

Cleaning Difficulties Associated with Paraffinated, Sulfurized and Chlorinated Oils During Processing of Zinc, Zinc-Iron, and Zinc Nickel Plated Parts

Paraffin oils may not respond well to conventional alkaline cleaners. If metal parts (or flat steel stock) are stored for long periods, the oils may oxidize into a hard film, especially at stacking pressure points where parts are touching or oils have pooled. This type of soil can be very difficult to remove because it tends to bond with metal similar to the way that paint does.

Metal parts formed with sulfurized or chlorinated oils are even more difficult to clean. These oils contain active chlorine or sulfur which are used as components to extend the life of forming tools. The chlorine and sulfur react under the forming pressure created by the machine tool leaving a barrier of oil bonded to the tool, and conversely the metal part. These oil types are even more difficult to clean than the paraffin type. Generally speaking, the longer chlorinated or sulfurized oil is left on a metal surface, the more difficult it is to clean.

Where paraffinated, chlorinated or sulfurized oils are applied to steel parts and must be processed on a plating line, there are few options to aid in cleaning. The applicator may use a combination of the following to get by:

- Increase cleaner process cycle (dwell) times
- Increase cleaning temperatures to near boiling
- Improve solution impingement, or agitation
- Increasing chemical concentration
- Add special cleaner additives, or solvents to existing formulas

However, even if the paraffinated or chlorinated/sulfurized oils can be removed, it may result in impractical cycle times for the applicator, especially on automatic plating machines. This could make cleaning the part impossible, or very expensive for the part manufacturer. Additionally, these types of oils can quickly migrate around the entire plating line because of sporadic removal during the cleaning process. This often causes expensive contamination of solutions that are intolerant of oil, including the plating bath itself. It is of paramount importance for the plating applicator to remove these oils during the preplate cleaning. Failure to do so will expose the plating applicator to substantial risk of plating defects.