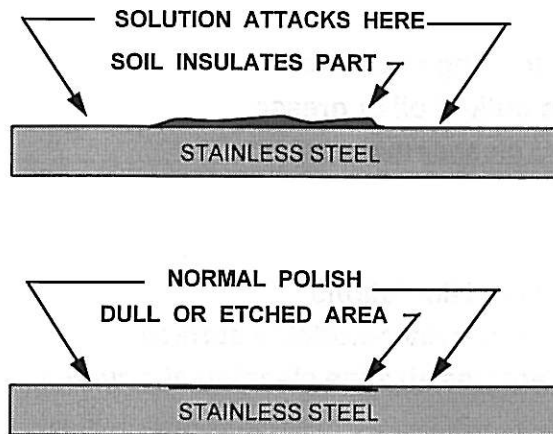


## CLEANING PRIOR TO ELECTROPOLISHING



### CLEANING PRIOR TO ELECTROPOLISHING

Oily, greasy, or waxy residues on the surface of the work create a barrier to direct contact between the electrolyte and the metal being electropolished. If not removed prior to electropolishing, such residues often create visible surface defects.

The film will gradually be removed by a combination of the heat of the electropolishing bath, the heat of the electrochemical reactions, the erosion of the basis metal, and the generation of oxygen gas at the surface. Nevertheless, on critical work, the insulating effect of the film delays the flow of current between the metal beneath the contaminated areas and the cathode. As the film is removed, the area of contamination shrinks in size, allowing the current density in that area to rise gradually. The existence of low or intermediate current density areas for even short periods of time may create surface etching which then cannot be completely removed by electropolishing.

The contaminants are usually removed by the time the electropolishing cycle is complete, and trouble shooting may be very difficult. The use of AES or ESCA surface profiles can be a valuable aid in detecting the presence of organic residues which cannot be otherwise identified.

Surface oxides, such as rust, weld scale, or heat treat scale provide a porous, crystalline surface which readily absorb oily or greasy contaminants. The combined effect of an oily film absorbed by a sponge-like scale can substantially increase quality defects. Rinse waters and acid baths generally cannot penetrate oily contaminants, so it is important that the oily or greasy materials be removed first, before attempting to remove the oxides.

Modern electropolishing lines are equipped with one or more cleaning treatments, with intervening rinsing, to remove all surface contamination before electropolishing.

## **CLEANING FOR ELECTROPOLISHING VAPOR DEGREASING**

### **■ PROS**

- Reduces loading of cleaner
- Removes bulk of oil or grease
- Minimizes cleaner maintenance

### **■ CONS**

- Environmental limitations
- Seldom leaves water-wettable surface
- Usually requires alkaline cleaning afterwards

## **SOLVENT CLEANING**

Cleaning with organic solvents is an excellent way to remove the bulk of the oily or greasy film left by machining lubricants. Parts precleaned in solvent are more easily prepared for the metal finishing operations which follow.

In general, solvent cleaning thins the soluble organic contaminants present in lubricants, but still leaves a film which cannot be wetted with water. Solutions of inorganic chemicals, including electropolishing acids, cannot penetrate the residual film, and this fact leads to numerous quality defects in electropolishing. Consequently, alkaline soak cleaning is favored after solvent cleaning to remove all traces of machining lubricants and to leave a suitably clean surface for technical quality electropolishing.

The use of organic solvent cleaners has declined in recent years, due to environmental pressure against the chlorinated hydrocarbons which are the most effective of the traditional products. Substitute solvents should be reviewed for potential effects on the cleaning process