DESCALING OR DEOXIDIZING

- TO REMOVE
  - RUST
  - WELD SCALE
  - HEAT-TREAT SCALE
  - HEAT EFFECTS FROM:
    - BENDING
    - STAMPING
    - MACHINING
    - MECHANICAL PREPARATION

ACID DESCALING

Acid descaling refers to the use of an acid bath to remove weld discoloration, heat treat residues, rust, or other surface oxides. In general, these undesirable films must be chemically dissolved by the bath, and the time, temperature, choice of acid, and concentration may be dependent upon the nature of the scale.

Residual scale on the surface of a part to be electropolished acts as an insulator to the flow of current. Low current density effects, such as "frosting", etching, or pitting may be observed in the scaled areas. The acids in the electropolishing bath can dissolve most oxide scales, but the variable effect of time may produce visible defects if the scale is not uniformly distributed.

Certain machining processes may leave oxide films which are essentially invisible. The tenacity of the film may also vary with raw material, machining method, and lubricant used. An acid descaling bath designed to remove the worst case scale can be cheap insurance to produce high quality electropolishing.

DESCALING / DEOXIDIZING METHODS

- **ELECTROLYTIC TECHNIQUES**
  - ALKALINE ELECTROCLEAN
  - ACID ELECTROCLEAN
- **NON-ELECTROLYTIC TECHNIQUES**
  - HOT ALKALINE DESCALERS
  - ACID BATHS
    - LIQUID ACIDS
      - SULFURIC
      - PHOSPHORIC
      - HYDROCHLORIC
      - NITRIC
      - CITRIC
    - DRY ACID SALTS
      - FLUORINATED
      - NON-FLUORINATED

SPECIAL DESCALING TECHNIQUES

In special cases, extreme treatment may be required to eliminate scale prior to electropolishing. These methods include electrochemical processes, such as electrocleaning or electrodescaling, commonly used in preparation for plating.

Some of the non-electrolytic methods include the use of alkaline descalers to remove heat treat scale. Such products usually contain high concentrations of sodium hydroxide, and neutralization after descaling is essential to prevent drag-in to the electropolishing tank.

Special formulations of acids for specific descaling problems are also available from the literature. These include the use of acids or acid mixtures, such as nitric/hydrofluoric to remove weld scale. Temperature, concentration, and soaking time can be varied to achieve best results. The hazards introduced by these mixtures can often be reduced through the use of specially formulated acid salts.

Recent publications have focused attention on the use of electrolytic baths containing phosphoric acid and heated baths containing citric acid as environmentally acceptable methods of removing scale.

Technical assistance should be requested before choosing a descaling method. Chemical drag-in of descaler to the electropolishing bath may change the conductivity of the bath and lead to etched or pitted parts.