This ACE Technical Document is intended for ACE representatives only. It was created to present the ACE philosophy and help further the understanding of the technical aspects of the selective soldering process when discussing ACE products with a client.

**Dross Mitigation**

The creation of dross has plagued the wave soldering processes for the past 40 years, and selective soldering is susceptible to the same problem. One of the issues with the impeller drive pump is a black powder substance created as the impeller shaft rotates in the molten solder while surrounded by air. The oxygen in the air tends to promote the manufacturing of this unwanted powder. This powder dross, which is really tin and lead oxide, can find its way down to the impeller and into the solder stream where it can be deposited on the solder joint.

ACE has found a way to mitigate this issue by installing a special composite high temperature graphite bushing around the impeller shaft. The graphite acts as a barrier at the interface of the rotating shaft and molten solder. The graphite also outgases a carbon monoxide atmosphere effectively eliminating this problematic phenomenon.

Another major dross creator is the molten solder itself as it cascades back into the reservoir, mixing and reacting with the oxygen in the atmosphere. Many machine manufacturers introduce nitrogen around the returning molten solder, attempting to minimize the oxidizing effects. ACE goes a major step further by covering the entire surface of the solder in the solder pot with a nitrogen blanket. This further minimizes any air to molten solder contact. The result of enclosing the solder pot has the effect of drastically reducing the consumption of nitrogen while maintaining a pristine bright and shiny solder at the nozzle tip.

The average dross creation is less than a few teaspoons per shift and most of that is flux residue. The maintenance frequency to remove this dross is limited to every few days, depending on the fluxed mass passed through the process. The actual procedure to remove the dross takes less than 10 minutes and can be done at the start or end of a shift as needed.