**SOLDER POTS: A GENERAL OVERVIEW**

*Topic*: A general understanding of Solder Pots and their applications.

Solder Pots provide a method of conduction soldering referred to as dip soldering, that may be used in a wide variety of applications. In dip soldering the solder pot serves as the source of heat and the solder supply. The solder alloy is kept molten in the pot, which maintains the required soldering temperature. The overall heat content of this mass is generally large enough to offset any small heat losses that take place during the dip-soldering application. The pre-fluxed parts are simply dipped into the Solder Pot at the required rate of speed and then withdrawn. The amount of solder that adheres to the assembly is controlled in part by the temperature and by gravity. With this method (assuming the assembly has been properly designed and that the dip-soldering application is correctly performed) a large number of quality and uniformly soldered connections can be made at the same time.

Most of the Solder Pots that are currently being manufactured are heated electrically and there are a wide variety of shapes, sizes and styles that are available. When deciding on the correct Solder Pot to be used, there are some basic considerations that should be taken into account. Some of these include the specific soldering application, the types of materials that will be used, the required temperature range and the acceptable operating tolerance allowed.

The bottom of a Solder Pot should maintain a higher level of heat than the sides do, in order to cause a natural convection action to take place. This will keep the solder mildly agitated, which will help in maintaining a high degree of uniformity throughout the molten solder. This requirement is easily accomplished by designing the Solder Pot with the heating elements located on the bottom. Then the highest solder temperature will usually be in the middle third of the solder pot.

Temperature control is often of great importance and for some applications a very tight tolerance must be maintained throughout the soldering process. The operating temperature of most general purpose Solder Pots is usually regulated with a bi-metal thermostat, which will only give a limited measure of control. This can be improved upon by using a voltage controller to regulate the supply voltage thereby controlling the operating temperature. There are Solder Pots with more sophisticated temperature controlling devices available that will operate within the tightest tolerance requirements. All Solder Pots should be operated at their lowest possible temperature that still meets the requirements of the application. This is generally at 100-150° F above the liquid temperature of the solder alloy being used. Operating a solder pot in its upper ranges will significantly reduce the life of the heating element and increase the rate of oxidation and the level dross production that takes place during your dip-soldering application.

When operating a Solder Pot the work area should always be properly ventilated. There are various ventilation systems available for removing potentially harmful fumes or vapors and offensive odors that may be given off during the soldering application. The ventilation system used may cause some air movement around and over the pot, which
can contribute to a certain amount of cooling of the solder surface. You may need to adjust the operating temperature to offset this effect.

**Operating parameters:** The following information is provided to assist in maintaining a high level of quality soldering.

The surface of the solder alloy must be skimmed periodically, to remove the dross and oxides that form there. These oxides create a thermal insulating barrier (impeding good wetting action) between the solder and the work. This skimming action is performed with the use of a “dross skimmer” that is specifically designed for the task, or a material that is non-wettable and can withstand the temperatures of the solder without dissolving into the solder alloy and contaminating it.

The purity of the solder alloy should be monitored because it substantially contributes to the quality and uniformity of the solder joints being made. When impurities or contaminants reach an undesirable level, the solder should be cleaned or replaced with fresh material.

**Cleaning tip:** Some contaminants solidify at a higher temperature than the solder alloy that is being used. When this is the case, you will only need to lower the temperature setting to the appropriate level (not below the liquid temperature of the solder alloy) and allow the pot to cool down to that temperature. After the contaminants have cooled and separated, they may either float or sink dependent on their specific gravity. They can be removed with a perforated non-wettable tool.