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Baking Pressed Multilayer Panels

The practice of baking multilayer panels has been inconsistent in the printed circuit board industry. While some shops perform bake cycles, others perform none and do not always understand the reasons why they should bake.

The reason for baking is to drive off moisture that has been absorbed into the material prior to assembly. The moisture is either on the surface or is absorbed well into the dielectric material. Bake cycles should be chosen based on the nature of the moisture being removed.

In all cases, it is important to bake for the correct time and temperature given the objective. Underbaking means a waste of time and resources since the goal is not being accomplished. Overbaking can cause degradation of the material. It is also important that the oven has good air circulation and exhaust and that it is frequently calibrated to be sure the correct temperatures are maintained. Material must be stacked properly and supported well to prevent warpage.

Before Wave Soldering or Solder Fusing

Moisture in a PWB can cause measling or blisters during processes that involve thermal shock. Two schools of thought exist on the removal of this moisture prior to processing. The first is to bake at 250 ºF to get rid of surface moisture. The other is to bake at a higher temperature to drive out trapped internal moisture. To effectively eliminate measling or blisters the latter is recommended. Experience has shown the overall success of this bake is time/temperature related. Many shops have identified that the time required to eliminate measling at 250 ºF is excessive; in some cases this period approaches 16 hours. An additional 25 ºF can dramatically reduce the time necessary to eliminate moisture in the PWB.

Baking prior to wave soldering or solder fusing can be done on all work or on those orders which show a history of being prone to measling. If the latter is chosen, operators will need to be trained to watch carefully for problems so that entire batches are not scrapped before the problem is recognized. Boards must be promptly processed after the bake as moisture will be reabsorbed into the material within several hours of baking. Boards will have to be rebaked if moisture is reabsorbed.

Before Loading Boards

This bake is also for removal of moisture and all points regarding wave soldering or solder fusing apply to this bake. In addition, keep in mind that some components will not withstand high temperatures. For this reason, it is suggested that bare boards be baked prior to loading. If boards are already loaded, a much longer bake at a lower temperature will be necessary to eliminate measling and blisters.

Given the above, Table 1 summarizes those bakes which are recommended.
Table 1 – **Where In The Process SHOULD You Bake.**

Process	*Why Bake?*	*Cycle*	**Effect if Bake is Omitted**
Before loading components	Eliminate Moisture	2 - 4 hours @ 300 ºF	Potential for measling or blisters
Before wave soldering or solder fusing	Eliminate Moisture	2 - 4 hours @ 250 ºF	Potential for measling or blisters

Some components may not withstand 250 ºF. A much longer bake at 100 to 225 ºF may be necessary.