Vitronics Soltec

Information Sheet 009

Soldering Pallets

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Introduction

Soldering pallets are often used when boards of different dimensions have to be handled on conveyor systems set at a fixed width. Pallets are also used to give a board sufficient support during soldering.

Pallet material

Soldering pallets are mostly made from epoxy glass material of 4 - 6 mm thick. This material does not absorb too much heat during the soldering process and it can withstand the soldering cycles relatively well. The material is relatively easy to machine to the contours of the boards that have to be fitted in the pallet.

It is important that the boards have a sufficient free space inside the pallet so that they can expand freely. Although the board material and the pallet material have more or less the same properties, due to the thicker material the pallet will stay much cooler during the soldering operation, so that it will have less thermal expansion. (Thermal expansion of epoxy FR4 $\approx 15.10^{-6}$).

Another problem is that the bending strength of the epoxy material reduces dramatically at higher temperatures. This makes it necessary to mount aluminium reinforcing strips on the top side of the pallet if dimensions are exceeding 200 mm. These strips should support the pallets width and should also be fitted lengthways on the pallet.

Pallet forms

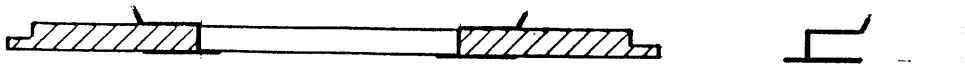
In principle the pallets are manufactured in two basic forms. The simplest one is with a full cut out of the board contours. (Plus expansion tolerance)

In this case the board is supported with separate clamping devices. These devices can be fit anywhere on the aperture edges so that they can support the board at any appropriate position (see annex figure 1). The sides of the pallet are machined so that the supporting edges in the finger conveyor are at the same level as the printed circuit board.

This is also the case if the pallet cut out is milled including supporting edges for the printed circuit board, which is the second pallet version (see annex figure 2). It is important that the supporting edges give free access for the solder to the printed circuit board. For that reason the edges are tapered.

If a finger conveyor soldering machine will only be fed with boards fitted in pallets it is advised to make the pallets so that the finger supporting edges are on the topside of the pallet. In that case the fingers never run through the solderwave. This keeps the fingers free from solder or oxide and thus easier to clean (see annex figure 3).

Fig.1 Pallet with seperate clamping devices.



clamping devices

Fig.2 Pallet with milled supporting edges.

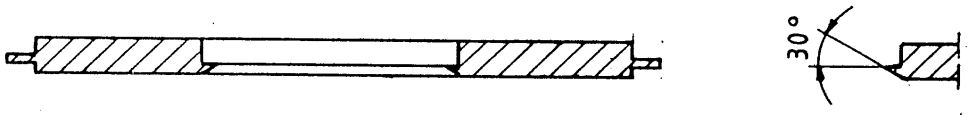


Fig.3 Pallet topside support.

A B

Note: In figure 'B' a reïnforcement profile is used as the pallet support for the finger conveyor.