Vitronics Soltec

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Flux application control

Introduction

For a good soldering process the right amount of flux should be applied on a board.
The flux supplier should give figures about the necessary amount and how to apply.
The fluxing unit should be able to apply the correct flux amount under controlled circumstances.

Flux amount

A common range for flux application lies between 13 and 25 g/m^2.
The correct information about how much flux should be applied per Unit Square should be available on the data sheets of the flux that is used.

It is important not to go over the specified upper limit mentioned in the data sheet, since this can turn out to be negative for passing the so called cleanliness test.

When these data are not available, but the data sheet says that the flux can also be used for foam fluxing, one knows that the board may be soaked with flux. Because that is what happens if one uses a foam fluxer.

Application control

Although the fluxer manual will in general provide a lot of good items and settings that play a role in the application of the flux, they are not sufficient to make a sound calculation for the amount of flux that one can expect on a board.
One reason is that the type of flux is a decisive parameter in this process. Further the flux loss during spraying is a factor that is not constant and is also flux depending.

One can however use a method to calculate at least the amount of flux coming from the sprayfluxer nozzle at a given setting during a certain time. However one even then does not know how much flux will be applied on the board. One can only say that that will be the maximum amounts that can be expected.

The method is based on spraying the flux in a beaker for a given period e.g. 120 seconds with a known setting for the pressure, the nozzle type and the type of flux.
Next weigh the flux amount and one knows how much flux per time will come out from the nozzle.
One can do this for several fluxer settings, to see how the flux amount depends on these settings.

Knowing how long (in time) a board is over the fluxer (board length divided by conveyor speed) one then can calculate the amount of flux that is presented to the board area, provided the fluxer movement is covering the board area during the fluxing action.

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In this way one has at least a good estimation on how much flux will be used for that board at a given setting. Depending on the rate of loss the correct flux amount is known.

The rate of loss however is also an unknown factor, which means that the applied amount of flux on the board is not exactly known. The best way to calculate the flux amount on a board is therefore by weighing a test board that is fluxed.

Weighing a test board

It is often not so practical to weigh a wet flux layer. On the other hand when the flux is pre-dried first, the remaining layer will be very thin and gives often an extremely low weight increase.

This will be explained by the following example:

Given a board of 100×160 mm. The wet flux should be applied with 20 g/m^2. The flux has a solid content of 4% by weight.

Now the weight increase of the board by the pre-dried flux layer should be:

$$20 \text{ g/m}^2 \times 0.04 \times (100 \times 160 / 1000000) \text{ m}^2 = 0.0128 \text{ g}$$

This calculation example shows that it is necessary to use an accurate balance in order to measure the flux layer that is applied on the board.

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