

Use of nitrogen in the Selective soldering machines

Introduction

The main purpose of the use of nitrogen in these machines is to prevent excess oxide formation on the solder surfaces of the SelectWave and the MultiWave. Further the nitrogen also prevents excess dross formation during flushing of the MultiWave nozzles.

Use of nitrogen on the SelectWave

The nitrogen flow around the SelectWave nozzle prevents the formation of an oxide layer on the wave surface and will as such support the flux activity in the soldering process.

How clean the nitrogen must be depends on the necessary assistance that the process needs.

Of course the nitrogen with the highest purity will give the best assistance with the lowest consumption. On the other hand nitrogen with less purity may do the job as well with some higher nitrogen consumption, or even with the same flow rate. It all depends on the product and the fluxes that are used.

One should be aware that the nitrogen from the supply cone would immediately mix with the air that surrounds the nozzle. So the final purity at the soldering position is never the purity of the supplied nitrogen. What purity will give a good process depends on the production demands.

It is finally the solder process quality that decides what is needed.

Production cycle for MultiWave soldering and the function of nitrogen

After a soldering cycle the glass covers are closing over the solderbath. From this moment on the nitrogen flow will displace the air (oxygen) from the solderbath environment. When the PCB approaches the MultiWave bath the waves are flushed and after that the covers are opened, so that the PCB can come to the nozzles and can be soldered. As the PCB has been lifted from the nozzles after soldering, the covers are closed again.

The function of the nitrogen flushing is to assure that the wave is sufficiently clean for soldering and to reduce the oxidation of the flushing solder.

When the cycle times are short a stronger flow is needed to remove sufficient oxygen.

Also higher nitrogen purity will be of assistance in this case. This will reduce dross formation and maintenance.

When no high purity nitrogen is available a larger flow rate or a longer cycle time may give the same results. If cycle time must be kept short and the flow rate is at its maximum, then the nitrogen with a higher oxygen content will create some extra dross during flushing. Since dross has to be removed regularly, this can mean that the cleaning intervals in this case will become shorter.

Conclusion

Nitrogen is needed to support the Selective soldering process.

The necessary purity depends on the process demands. The high purity nitrogen will in general give less nitrogen consumption. On the other hand nitrogen with a lower purity level may be sufficient to give a reliable process with a good solder quality.

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