TwenTech

Production Equipment & ATE

Vapour phase soldering

Vapour phase soldering as a good alternative for soldering in Infra-red or reflow oven.

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After the introduction of lead-free soldering it turned out that this manner of soldering is more sensitive for failures at the connection between the components and the printed circuit boards (PCB's). At the same time costumers require higher quality standards from the boards.
For above mentioned reasons better soldering methods were sought and one of the solutions was found in the vapour phase soldering. This is an already well known technique that was rediscovered and that currently is growing steadily as an alternative for infra-red and reflow soldering. Especially for Dutch assemblers, that are mainly concentrated on a smaller production runs with very high quality requirements, vapour phase soldering seems to be a very good alternative.

IBL SLC 500 vapor fase

What is vapour phase soldering?
In a **sealed** area an inert (chemically and electrically neutral) liquid heated to its boiling point. This creates above the liquid a saturated **vapour** with practically the same temperature as the boiling liquid.
When in this area the assembled PCB's are being brought in the vapour will condense on the surface. This process continues until the whole surface, both boards and components, have reached the same temperature as the surrounding vapour. At this stage the on the surface condensed liquid will evaporate as well. This is the same principle like someone wearing glasses coming in from the cold open air into in a warm chamber, first the glasses will covered with condensation and than gradually the condensation drops will evaporate.
The solder that has a slightly lower melting temperature then the temperature of the surrounding vapour will become entirely liquid. When the PCB's are taken out the temperature drops and the solder will harden.

Important Benefits
The vapour phase method for soldering SMD parts has several important benefits above of the existing mentioned processes:

- The soldering takes place in a area entirely filled with inert gas, so gasses like oxygen or other gasses will not come in contact with the part you solder. For this reason it is no shielding gasses like nitrogen are necessary.
- The warmth transfer takes place by a liquid **film** that works much more directly and more effectively than radiation or air heating. This results in a very high efficiently.
- All parts will be warmed evenly irrespective of the shape or place on the board or the shape of the component, like a BGA (Ball Grid Array).
- Overheating is not possible because the temperature of the vapour and the condensing liquid is not higher then the boiling point of the liquid.

Not suitable for Bulkprocessing
The use of closed areas for vapour phase soldering, is in contrast to soldering with infra-red or reflow ovens, a discontinue process.
Because of that vapour phase soldering cannot be applied in large production lines that must produce in a bulk.
This apparent disadvantage is however for the most Dutch assemblers not relevant because they only produce a relative small lots

Our prognosis is that a important part of the Dutch assemblers in the near future will switch to vapour phase soldering machine .
In the meanwhile TwenTech has already an amount of used vapour phase machines delivered and still some in the offer.

For more information you can contact TwenTech:

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