

Inert Gas Blanketing in Solder Reflow Ovens

Many printed circuit board (PCB) manufacturers employ the process of reflow soldering to attach electronic surface mount components to the boards due to the mass production capabilities that it enables.



PCB's are used in many popular electronic devices such as laptop computers, tablets and smartphones. Quality control and repeatability are of paramount importance in order to manufacture high-quality products.

Solder paste is comprised mainly of powdered metal and solder flux and is used to adhere components to the board. This is then passed through a solder reflow oven, which has heated the solder to melting point within the hottest section. The solder reflows over the components, fixing them to the PCB.

The Importance of Inert Gas Blanketing

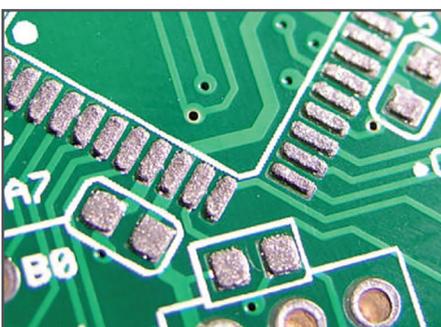
Heat within the oven increases the reaction between the metals and oxygen present within, resulting in the formation of oxides, which prevent the solder from adhering to the metals.

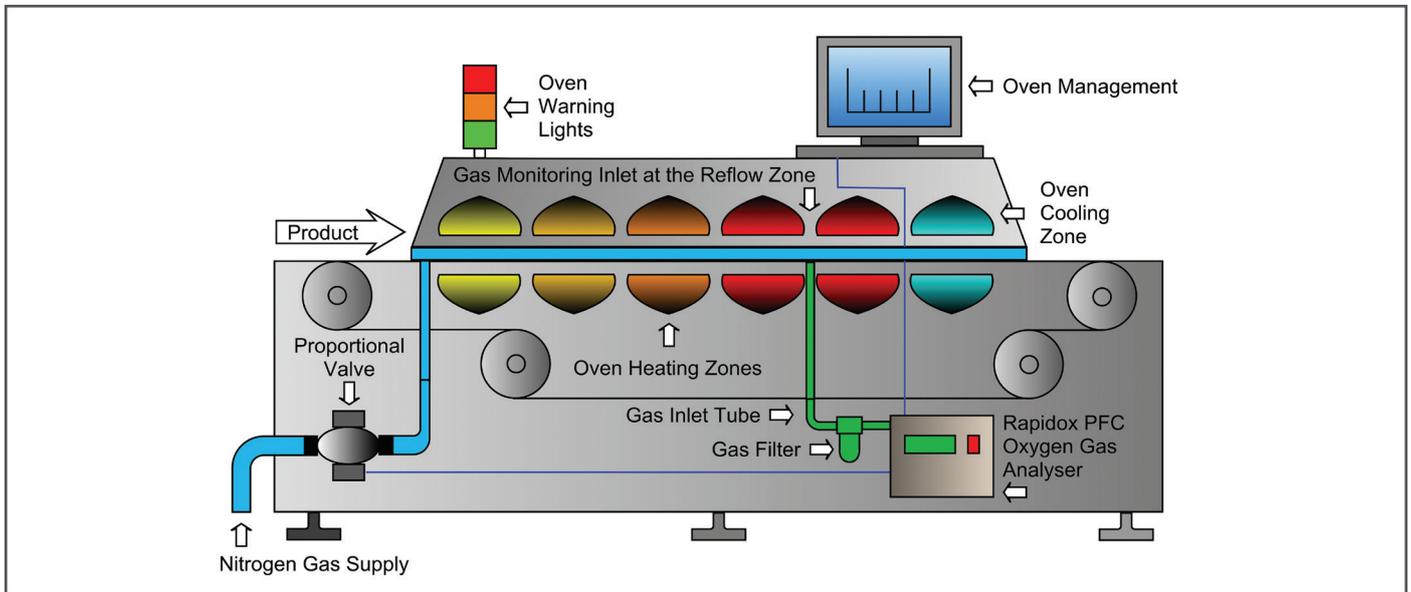
As a consequence, inert gas blanketing with gases such as nitrogen has been introduced to the process to prevent such reactions, increase reliability and produce improved wetting angles and shinier solder joints.

Closed-Loop Process

Tighter quality control is maintained within the soldering process by using a closed-loop process to control the nitrogen level in the solder reflow ovens. The closed-loop system is an innovative method for reducing nitrogen consumption by maintaining a pre-set PPM level of oxygen within the reflow tunnel.

This is particularly true for applications such as fine-pitch and double-sided assemblies, as well as bare copper PCB's. In addition, advanced technologies such as flip chip, which uses ultra-low residue fluxes with very low levels of activity, produce improved results when processed in a nitrogen atmosphere.





Why is Gas Analysis Essential?

Oxygen analysis allows for the maintenance of nitrogen purity within the oven, ensuring consistently good profiles and solder joints throughout the solder reflow process. The ability to fully control the atmosphere within the oven provides significant savings in expensive nitrogen gas.

About Cambridge Sensotec

Cambridge Sensotec is an established manufacturer of the Rapidox range of high precision gas analysers. The company's technical team collaborated with one of the world's leading solder reflow oven manufacturers to fine-tune the form and function of the Rapidox 1100 oxygen analyser to suit their stringent requirements.

The Rapidox 1100 analyser measures O₂ in parts per million (ppm). A closed loop function controls the proportional valve situated under the oven bed via a wired input. Parameters are set via the Rapidox closed-loop software which integrates seamlessly into oven management software, allowing the operator full control.



As a privately-owned company, staffed by highly skilled technologists, Cambridge Sensotec is perfectly placed to react to its customers specialised gas analysis requirements. Dynamic and flexible, the company are able to design and supply solutions to suit a variety of gas analysis applications. For further information please visit our website.

www.cambridge-sensotec.co.uk