

Fluxless Soldering

Some applications are very sensitive to the use of a flux due to the post reflow residue that may be present. Also, flux may be a problem in a vacuum environment or in an application in which it must be free of corrosive or volatile materials.

If gold is used for the outer metallization on the parts to be joined, acceptable wetting may be possible without the use of a flux. If this is not possible, a reducing atmosphere may be used to remove the oxides and result in sufficient wetting. Following are suggestions and helpful hints for choosing a reducing atmosphere that fits your application.

- Common reducing atmospheres are:
 - 88% nitrogen, 12% hydrogen
 - 90% nitrogen, 10% hydrogen
 - 95% nitrogen, 5% hydrogen
 - 100% hydrogen
- The higher the reflow temperature, the more effective the oxidation removal using a reducing atmosphere. A reflow temperature that is 350°C and above is the best for oxide removal.

- Nitrogen or argon is sometimes used in fluxless soldering because it prevents the formation of oxides during reflow. However, these gases do not remove pre-existing oxides on the metallization – only the hydrogen can do that.

Fluxless soldering is also used when joining the two substrates together where flux residue would be detrimental to the operation of the final product. For example, voiding due to flux entrapment can result in poor performance because of reduced electrical or thermal conductivity.

In an application where a reducing atmosphere is not practical, two or more metallizations can be joined using flux in the initial pre-coating of the substrates. After pre-coating is complete, the flux residue can be removed using an appropriate solvent. The cleaned parts can then be assembled without a flux and reflowed a final time to join them. This method is especially effective when fairly large pieces need to be joined and flux entrapment can not be tolerated.

APPLICATION NOTE

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