

# Vitronics Soltec

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## Wave soldering of boards with long protruding leads

### Introduction

Long protruding leads demand specific attention to reduce the risk of solderbridging.

In fact it is almost impossible to solder such boards without soldering failures if no special attention is paid to the specific difficulties related to soldering long leads.

### Common failures related to long protruding leads

A soldered joint is finalised at the point where the board separates from the solderwave.

To separate the solder between individual joints during this process we need a clean oxide free environment. Usually the flux should be able to create this environment.

The flux is however only present on the solderside of the board and not at the wave or the joints that separate from the wave during their formation.

This means that the area in which the flux activity can be effective is limited.

In fact this activity diminishes very fast as the board gets a greater distance from the wave surface.

With long leads the final separation between the leads and the solderwave takes place at a much larger distance between board and wave surface. As a result the flux activity effectiveness might have become so low that oxide formation will become unavoidable when soldering under air. This again will result in flags or spikes and increased solderbridging.

### Precautions

The main objective is to keep the solderwave surface free from oxides. At least at the point where the leads are separating from the wave. This is necessary to prevent these solder failures.

A strong flux might prevent such problems, however this will give no warranty that they will not occur. Moreover such fluxes demand often a cleaning process after soldering.

Another approach is to keep the solderwave surface as clean as possible. This might be possible by adding an "injection" liquid dripped at the backplate region. Such a liquid is often based on resin dissolved in a high boiling solvent. A film of this liquid should cover the solderwave to keep it free from oxidation.

The best way of preventing oxidation is to make use of a completely inert system like a nitrogen environment. In this way solderwave oxidation can be prevented, resulting in solderjoints that are free from spikes and flags. If oxides caused bridges also these bridges will not be present anymore. Bridging as a result of capillary forces between separate joints will however in general not be reduced by these measurements.

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