



PacFic : Preheating process window

Valid for the PacFic series

General

After flux application, a PCB-board is preheated because of two reasons. First of all the solvent has to be evaporated because it has no function anymore. The other reason is to limit the temperature shock of the PCB in the wave.

Water evaporates twice as slowly as alcohol. With PacFic fluxes, you can apply less flux (up to 50%) than with an alcohol based flux. This means that the flux consumption is lower and that less water has to be evaporated. This results in similar or slightly higher preheating settings than for alcohol based fluxes.

Hot air preheating facilitates the evaporation of the water and opens up the process window.

Preheating settings can influence through hole wetting, especially when soldering with lead-free alloys. When the solders is cooled down too much when it is penetrating the hole, it can reach the solidification temperature before total through hole wetting. Higher preheat temperatures can improve this problem.

Depending from board and carrier, the difference between top side and bottom side preheat temperature can be 10-40°C.

Ramp up

- In general the ramp up is limited to 3°C/s.
- The PacFic allows high settings for the first preheating zone because the water will limit too high temperature gradients.
- Typical temperature settings for the first preheating zone:
 - e.g. ERSA middle wave IR preheating : 500°C
 - Soltec Calrod : 400°C
 - Hot air preheating : 150°C

Temperature-Time

- A preheat temperature of 80°C to 160°C is advised. These are values of experience. For PacFic- fluxes, it is important that all water has been evaporated before wave contact. A sizzling sound when the PCB hits the wave indicates that there is still water. Small intermittent sizzles could indicate water that has been trapped between the carrier/fingers and the PCB board. This water is hard to evaporate without hot air preheating, but is mostly not problematic.



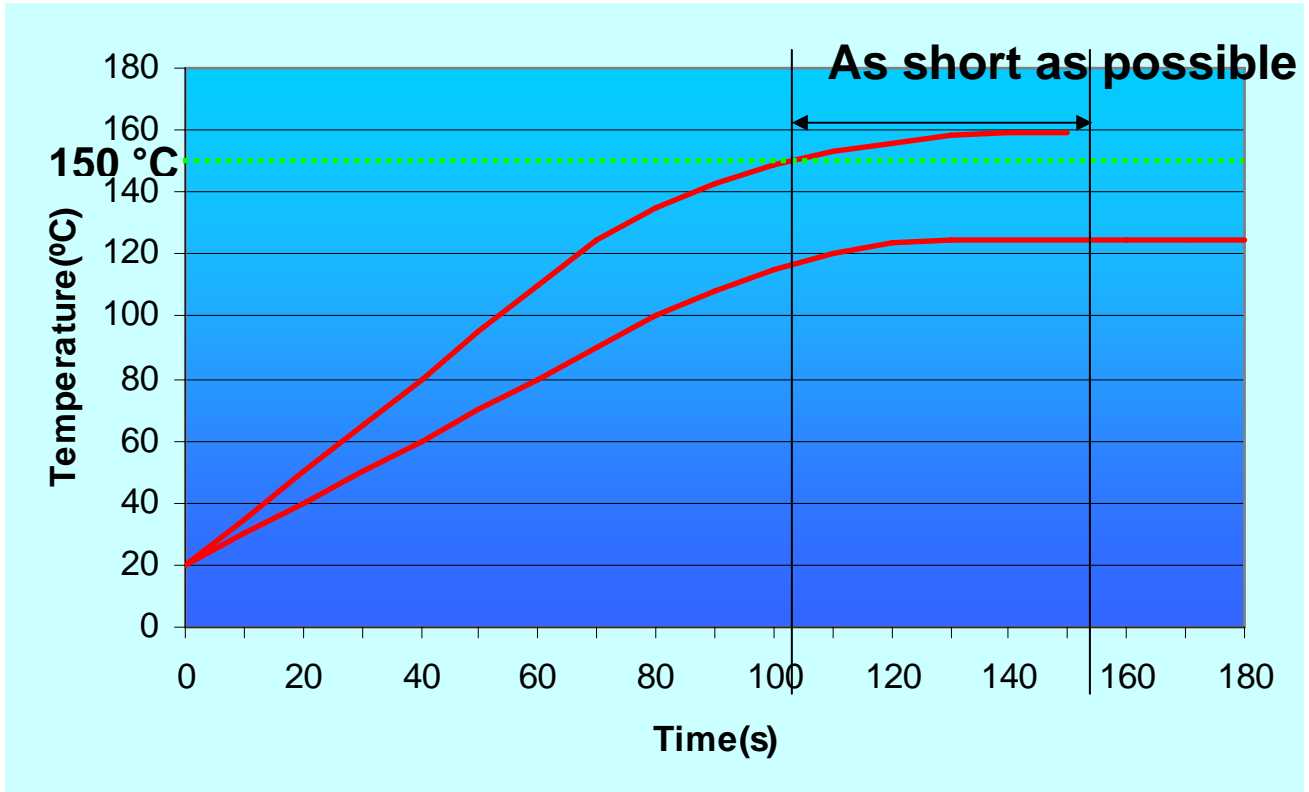
- Theoretically, the Pacific flux has no lower limit in temperature and time, it doesn't need to reach a certain temperature for a certain time. However, all water has to be evaporated before wave contact.
- Below 150°C, there is no limit in the preheating time.
Temperatures above 150°C are to be kept as short as possible
- Typical temperature settings for other preheating zones.
e.g. ERSA middle wave IR preheating : 450°C
Soltec Calrod : 350°C
Hot air preheating : 150°C
IR-radiators : setting depending from board to board

Flux Exhaustion / Selective Carriers

- When the flux reaches a too high temperature in the preheating, it can start activating, which in some cases, could leave not enough activation for the soldering process.
- Selective carriers are carriers where large parts of the solder side of the PCB board are covered and only the parts to be soldered are free. When measuring on a board like this, it is recommendable to use thermocouples and not an IR-camera. The thermocouples should be positioned very near to the components that are to be soldered, if possible also on the solder side. Because of the selective solder mask absorbing a lot of heat, the flux from the bottom side can be exhausted when trying to reach the wanted preheat temperature measured on the top side.
- Too high hot air preheating settings can also exhaust the flux. It is recommended to avoid hot air preheating zone settings higher than 150°C.



Preheating graph



- Everything below the green line of 150°C is okay.
- Temperatures above 150°C are to be kept as short as possible.
- All water has to be evaporated before wave contact.