

Drying and storage recommendation for printed circuit boards

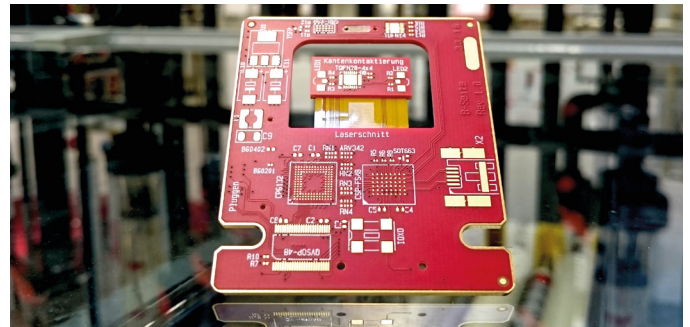
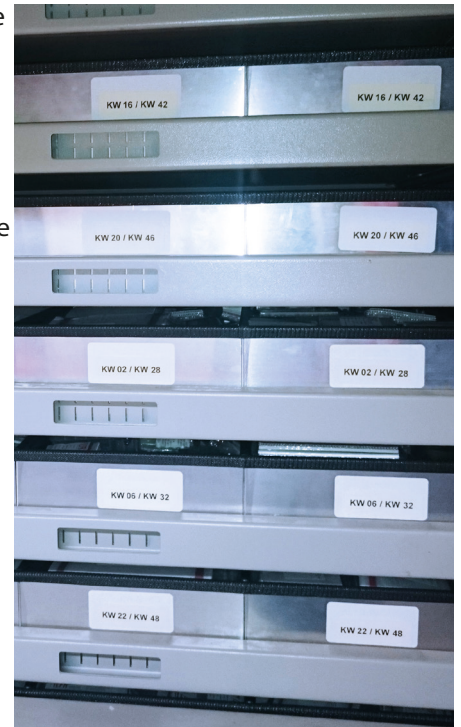
Printed circuit boards, especially multilayer, flexible and rigid-flexible printed circuit boards, are extremely hygroscopic, i.e. they absorb and bind the moisture in the air. A dried polyimide film, for example, will have reached its moisture saturation level again after just a few hours.

Problem definition:

The moisture present in the PCB can cause it to evaporate explosively during the soldering process. The consequence of the abrupt evaporation of the moisture can cause failures due to delamination, bubble formation, cracks, etc. in the PCB. The problem is exacerbated by the lead-free soldering process, due to the higher temperatures.

Storage recommendation:

The printed circuit boards should be packed, stored in a dry room and at a uniform temperature. It should be noted that a rapid drop in temperature of more than 7° C can already lead to condensation on the packed printed circuit board.



Drying:

Although our goods are dried during the manufacturing process, it should be noted that transport circumstances in particular are unpredictable (transport of printed circuit boards takes place in any weather and temperature). Furthermore, the storage conditions are not always optimal. Therefore, it is recommended to dry the printed circuit boards before processing. It must not be dried in a stack, but free-standing. Processing should take place immediately after the annealing process, as the hygroscopic properties of the PCBs remain.

It should be borne in mind that the effect of heat on the surfaces of chemical tin and OSP causes artificial aging, which can have a negative effect on the soldering behavior. It can be assumed that a drying time of 2 hours at 120 °C corresponds to an aging of approx. 2 months.

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Recommended parameters for drying							
single & double sided FR 4	Multilayer FR 4	Multilayer hybrid	Flexible up to 2 layers	Flexible from 3 layers	Rigid-flex up to 4 layers	Rigid-flex 5 up to 8 layers	Rigid-flex over 8 layers
120°C 2 h	120°C 2 h - 4 h**	120°C 2 h - 8 h*	120°C 2 h	120°C 2 h - 4 h**	120°C 2 h - 4 h**	120°C 4 h - 6 h**	120°C 4 h - 8 h**
Drying prescribed							

Maximum processing times after drying							
single & double sided FR 4	Multilayer FR 4	Multilayer hybrid	Flexible up to 2 layers	Flexible from 3 layers	Rigid-flex up to 4 layers	Rigid-flex 5 up to 8 layers	Rigid-flex over 8 layers
24 h	8 h	8 h	8 h	6 h	6 h	6 h	6 h

* Due to the use of different materials, the time required for the drying process can vary considerably, as the hygroscopic properties of the materials used in hybrid buildups can differ from FR4. This also applies to edge contacts.

** The time required depends on the material thicknesses of the flexible layers, the acrylic adhesive thicknesses on the cover layer and the layout. If large copper areas are present, especially on outer layers but also on inner layers, moisture expulsion from the PCB is delayed because the copper seals these areas. This also applies to edge contacts.