

# DESIGN- AND DRYING SPECIFICATION FOR FLEX SOLUTIONS



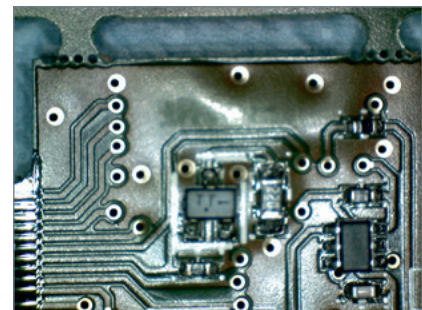
**Flexible and rigid-flexible PCBs must be dried before soldering, the copper layout must be modified for this purpose!**

**WHY?** Strictly speaking, PCBs are never completely dry, i.e. without moisture. That is why the original packaging is marked with this label:



This is equivalent to MSL6 for components according to IPC/JEDEC J-STD-033, drying before the soldering process is mandatory. Despite packaging, the PCBs may have a critical moisture content!

**WHAT CAN HAPPEN?** Typical defects are delaminations as shown in the picture on the right. *We would like to point out that any liability for delamination and its consequential damages is excluded if these recommendations are not followed and documented.*

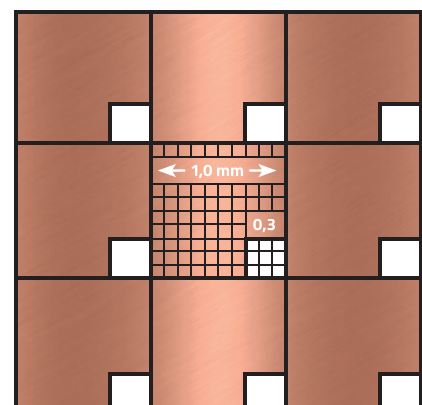


**WHAT DO YOU HAVE TO PAY ATTENTION TO?** To avoid damage, the following points must be checked and observed:

1. Copper layout with openings
2. Storage
3. Sufficient drying
4. Adapted logistics

## 1 COPPER LAYOUT THAT ALLOWS DRYING

Copper traps moisture, large copper surfaces prevent sufficient drying in reasonable drying times. Therefore, it is necessary to provide openings on copper surfaces **on all layers** to allow moisture to diffuse to the surface over a short distance. This applies to both the flexible and the rigid areas in the case of a rigid-flexible PCB!



→ Our recommendation for the design: copper openings with at least 0.3 mm of 1 mm copper length (up to 70 µm base copper thickness).

## **2 SHORT AND AS DRY AS POSSIBLE STORAGE**

Long storage periods, for example over several months, lead to ever higher moisture absorption and make extended drying times necessary to avoid damage during soldering. Printed circuit boards should always be stored in their original packaging.

→ Ideal storage for Flex and Rigidflex is in a dry storage cabinet 5% RH at room temperature.

## **3 SUFFICIENT DRYING**


Drying must take place in a suitable process. Article-specific drying parameters can be determined by establishing drying curves. This also applies especially to repairs, e.g. when replacing components. An impairment of the soldering behaviour due to the drying process must be taken into account if necessary. With our standard surface ENIG there are no problems in this respect.

General drying parameters from PCB manufacturers can only be understood as reference values or rough recommendations and must be verified by the processor on a product-specific basis. Both the design influences and the specific ambient, storage, drying and soldering conditions with the associated logistics play a major role.

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- An efficient drying temperature is 120 °C.
  - The drying time should be at least 4 hours, up to 24 hours may be required.
  - If the copper layout is not suitable, sufficient drying can require massively extended drying times or, in extreme cases, be impossible. A long storage period then has a very negative effect ("worst case").

## **4 ADAPTED AND MONITORED LOGISTICS**

Assembly and soldering must take place immediately after the drying process (within 2 hours), as the hygroscopic properties of the PCBs remain. In case of waiting times after drying or between several soldering processes, storage in a drying storage cabinet is recommended. Thus, another drying process can be saved.

 A detailed elaboration „Physics of moisture & process of drying printed circuit boards – a collection“ can be found here: [www.we-online.com/dryingprocess](http://www.we-online.com/dryingprocess)

### **HOTLINE TO OUR FLEXPERTS**

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