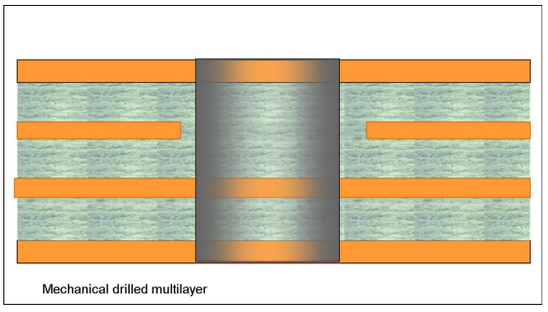
Multilayer production step by step Part 2

Production of Multilayer board– final board preparation (For production of single or double sided board the production will start here)

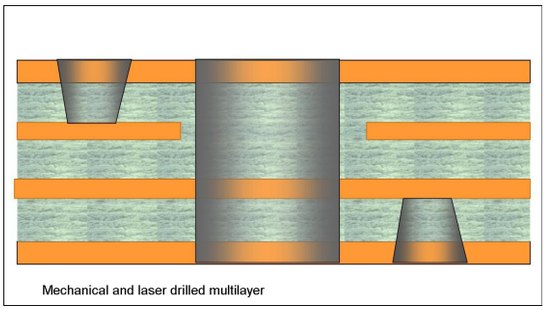
Drilling

In this stage most of the holes will be drilled.
Hole sizes 0.3mm or less reduce possible drill stack height, just as thicker panels, increasing costs.

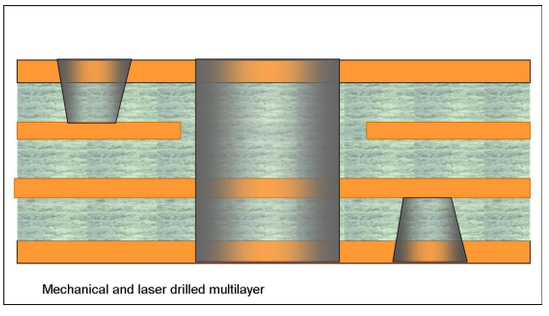


Laser drilling

If panels require micro-vias these are drilled in a special laser drill machine.

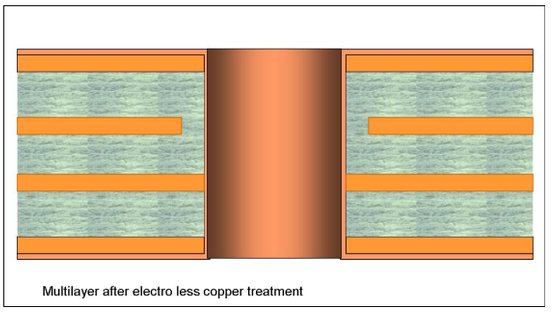


Deburring after drill

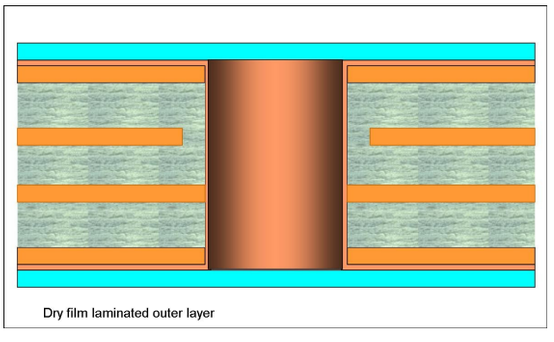


Electroless copper treament

This process is most important to provide a reliable through hole plating and it includes a large number of sub steps here left out.

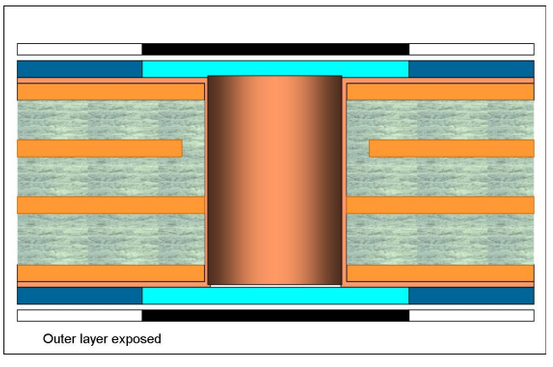


Lamination of dry film

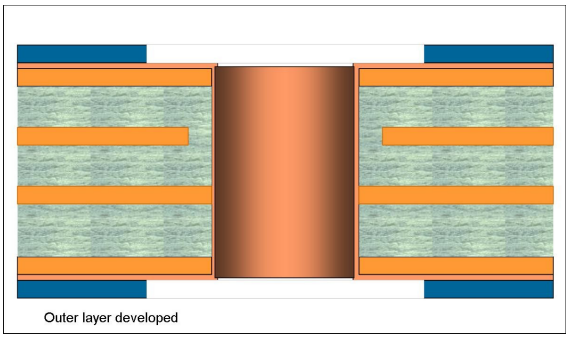


Exposure outer layer

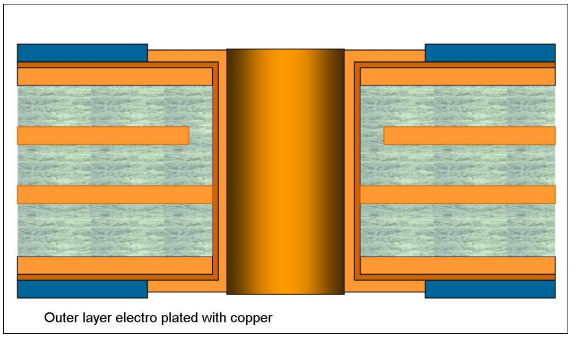
Contact copies or LDI



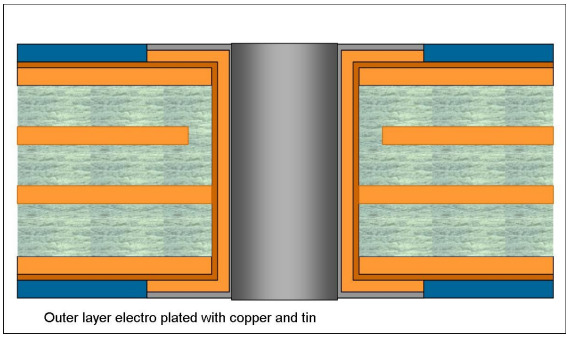
Develop dry film



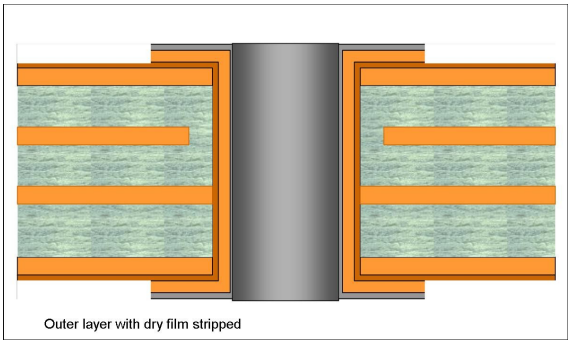
Electro plate copper



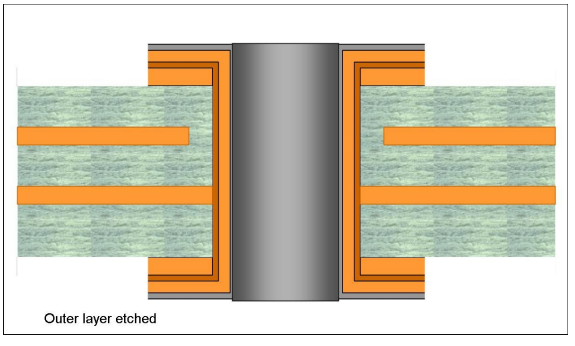
Electro plate tin



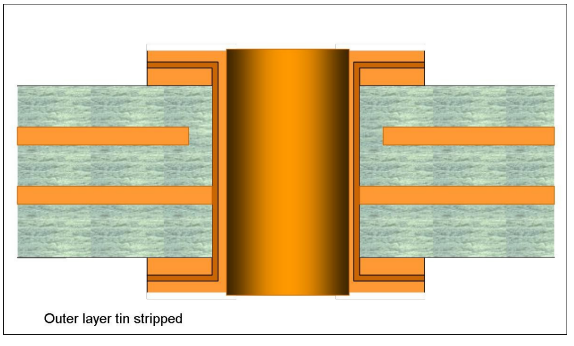
Strip dry film

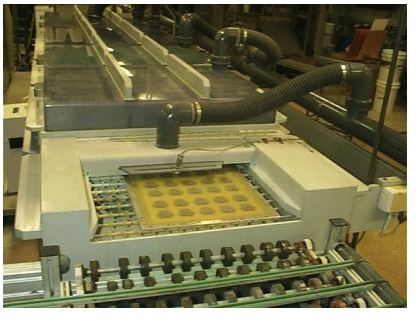


Etch copper

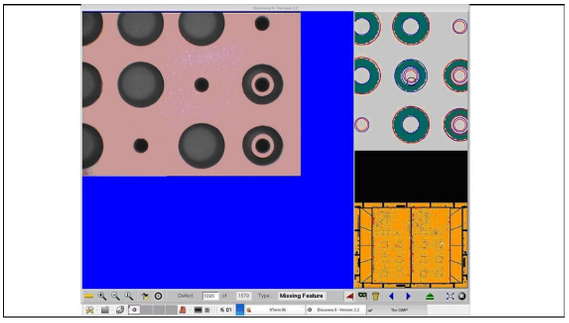


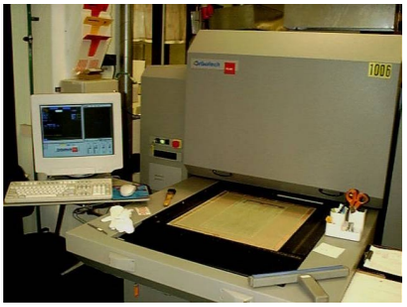
Strip tin





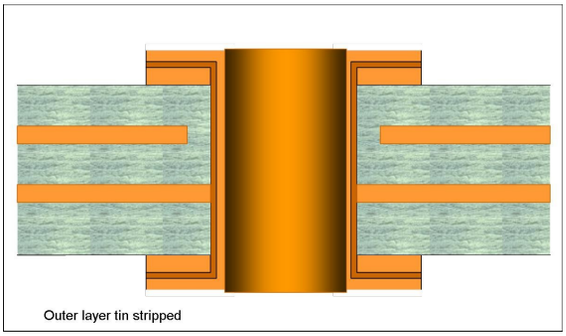
AOI check outer layers





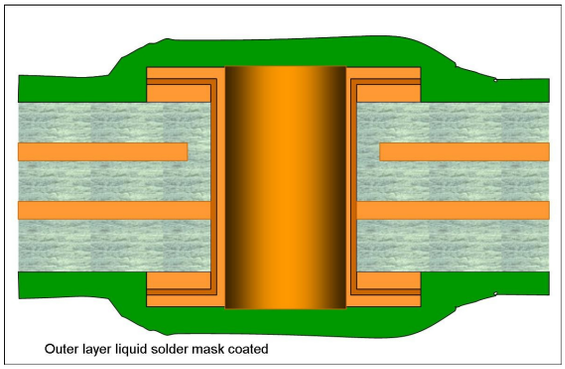
Pretreatment before solder mask

Chemical or mechanical treatment used to clean and roughen the surface copper.

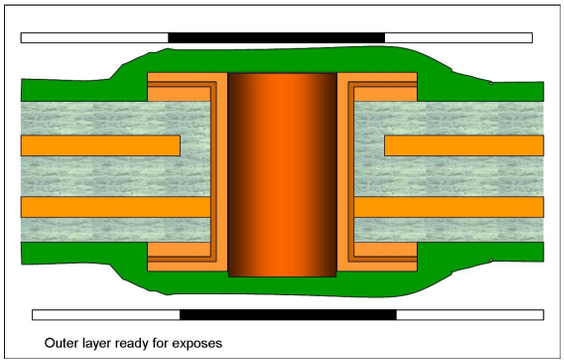


Curtain coating of solder mask

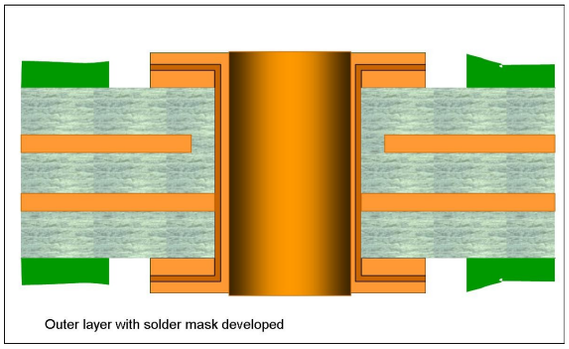
There are several ways to apply solder mask, the most common today are screen print and curtain coater. Another way is electrostatic spray. "Ink jet printer" is a direct way that skips the following two steps!



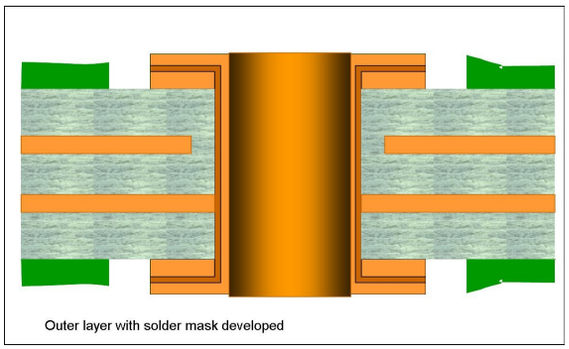
Expose of solder masks



Develop solder mask

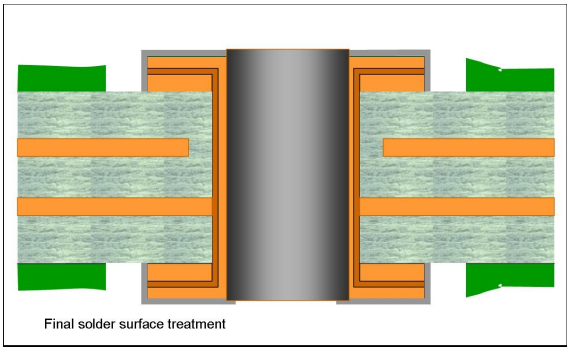


Final curing of solder mask



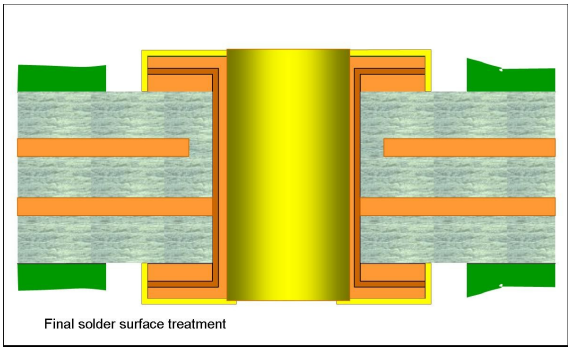
Copper Surface treatments (HASL)

HASL- was used for more than 80% of PC boards in the past.
LFHASL - With lead banned through the European RoHS directive it comes with tin copper instead of tin lead and 20 C higher temperature is more difficult to use.



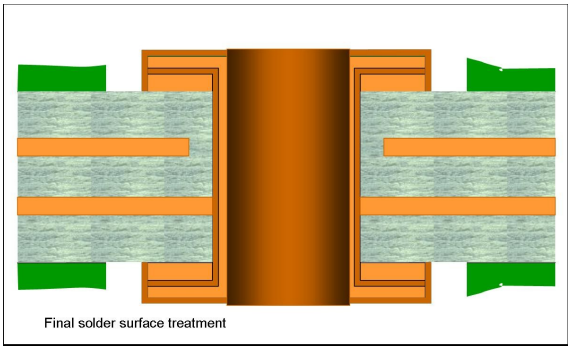
Copper Surface treatments (ENIG)

Electro less Ni/Au and HASL is the most common surface treatment used today



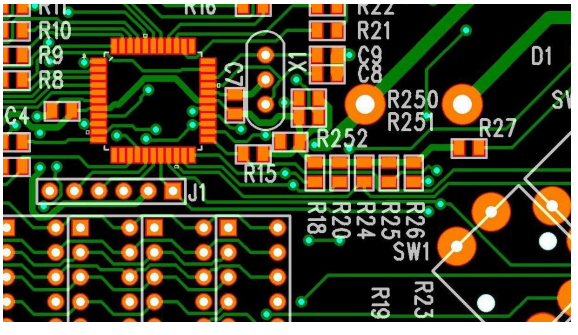
Copper Surface treatments (OSP)

OSP - Organic Solderbility Preservative looks like copper but is coated with a thin layer to protect from oxidation that is removed by heat and flux



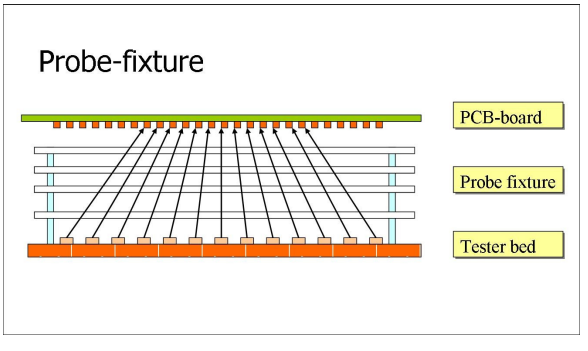
Screen printing of legend

It can be done either by hand or machine. Standard colors are white, yellow, blue and black.



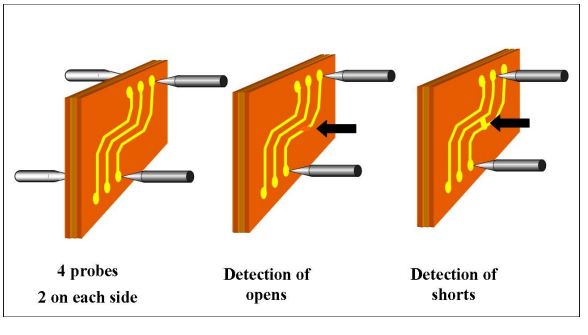
Electrical test Fixture

Fixture testing is very fast and the only way to test large volume of board. But the building of fixture is complex and very time consuming.



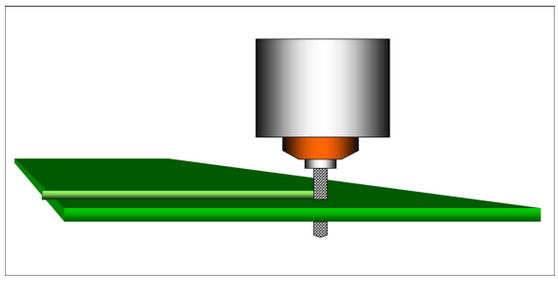
Electrical test Probe

A probe test machine has mainly 2 or more probes on each side. They are very accurate but slow compare to fixture test. They can test directly with data from CAM station and need no fixture.



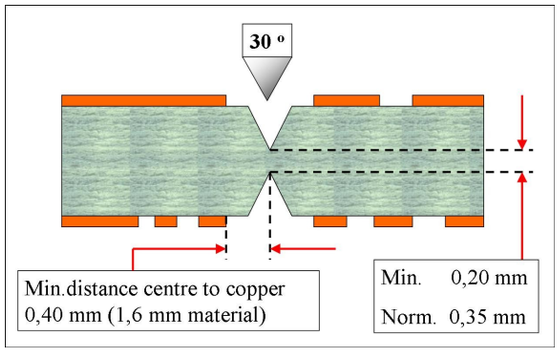
Routing

2.4 mm is an often used standard size. Smallest economical router size is 0.8 mm but 0.5 mm is possible.



Scoring

There are two good reasons to use scoring. It maximize the use of the panel surface and make boards cheaper, secondly the panel becomes stiffer enabling larger panels that can be assembled safely and easily broken apart after (testing).
Combinations of routing, scoring and panel bars are often used.

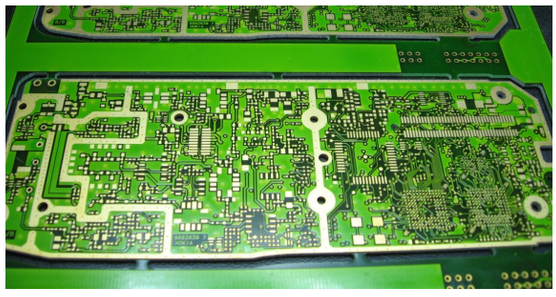


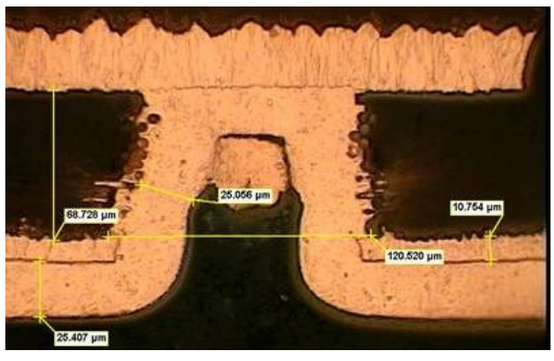
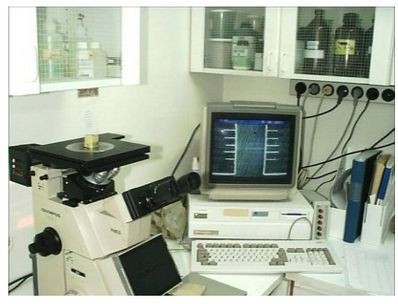
Final cleaning

Hot water high pressure or chemical cleaning for board with ENIG as solder finish

Final inspection and packing

Checking adherence to listed and genereal specifications in all areas including dimensions, finish, bow and twist, cosmetics.



Quality

The laboratory is the most important part to be able to produce a good quality at all step in production. Here the check all chemical bath so they are inside specifications. By making several chocks, heat and cool cycles they can test the final board's limits and also see that all process are in good shape. By making micro-section they can measure all material thickness and see that all are within limits.