

APPLICATION NOTE

Application of FISCHER products

AN034en

Measuring the copper thickness in plated through-holes on PCBs

As electronic devices get smaller and smaller, ever more conducting paths must be positioned ever more closely together on printed circuit boards (PCBs). This is why, today, most PCBs are multi-layered. In order to transfer electronic signals through to all the layers, these are connected by plated through-holes, also called *vias* (vertical interconnect access), which are electroplated with an electrically conductive material such as copper. To ensure proper function, the hole lining must be uniform.

For quality control purposes, the thickness of the copper coating lining the through-hole is measured using the eddy current method: A specially designed probe tip, housing a tiny eddy current coil, is simply inserted into the through-hole.

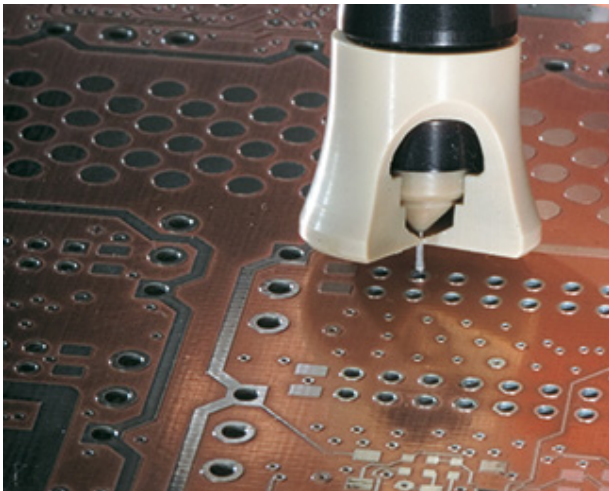


Fig 1: Needle-like measurement probe with a tiny, integrated eddy current coil. The cut out helps to easily position the probe in through-holes to be measured.

The coil's special layout causes all of the eddy currents to flow longitudinally along the centre line of the through-hole (Fig. 2), such that intervening copper layers exert no influence on the measurement result. Reliable measurements can even be taken despite thin layers of Sn (galvanisation) on top of the plating.

Besides its ease of use, another advantage of this probe is that its range of optimum accuracy – that is, without taking any influence from the sample geometry – is for holes from 0.8 to 1.2 mm in diameter, or the typical range of PCB vias; this means that measurements can be made on multiple through-holes of different sizes without having to recalibrate in between.

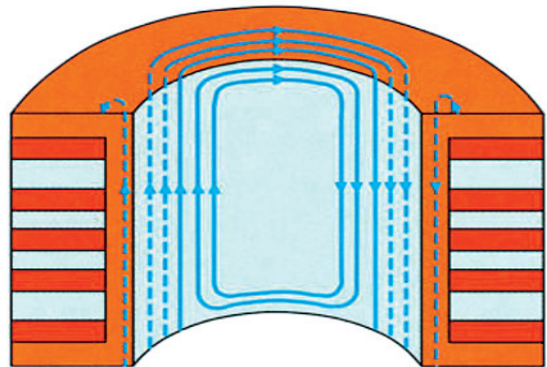


Fig. 2: Eddy current characteristics in the through-hole centre line. The eddy currents flow longitudinally along the centre line, not influenced by intervening copper layers.

FISCHER's needle-like eddy current probe tips are made in different lengths corresponding to typical PCB thicknesses: With the ESL080B and ESL080V probes, a range of board thicknesses from 0.5 to 8 mm is covered. These probes work perfectly with FISCHER eddy-current instruments: e.g. the convenient handheld unit PHASCOPE® PMP10, or the versatile table-top device FISCHERSCOPE® MMS® PC2.

The precise measurement of copper thickness in plated PCB through-holes is made easy with specialised probes (ESL080B / ESL080V) used in conjunction with FISCHER eddy current instruments, such as the PHASCOPE® PMP10 or the FISCHERSCOPE® MMS® PC2. For additional information, please contact your local FISCHER representative.