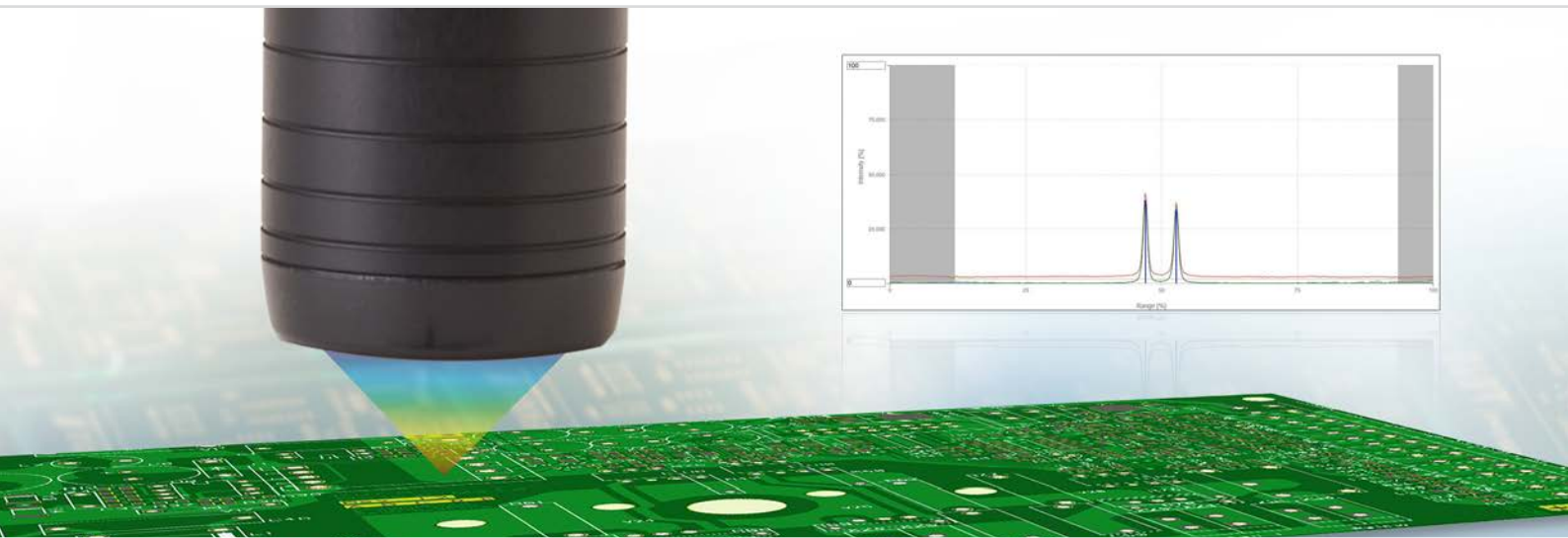




Thickness measurement of varnish on PCBs

In order to protect PCBs from environmental influences such as humidity, they are coated with a protective clear varnish. This ensures error-free operation. The automotive industry in particular demands a minimum thickness for this protective coating. Up to now, it was not possible to perform a measurement without destroying the target. Confocal sensors from Micro-Epsilon solve this measurement task without making contact with the target and therefore in a non-destructive manner. They provide the thickness values in real time.

confocalDT IFS 2405 confocal sensors with a measuring range of 1 mm are used. These sensors are characterized by their extremely small measuring spot size of only 8 μm and excellent precision for measuring thin layers. The measurement is performed immediately and quickly at a measuring rate of 1 kHz using the confocalDT IFC2461 confocal controller. Differences in thickness, e.g., due to the flow behavior during hardening, can be made visible by scanning larger areas. Changing substrates consisting of CU conductor paths, passivation layers and the PCB surface do not influence the measurement result. The actual measurement is carried out in defined zones, from which a generally valid statement on the thickness can be drawn. The measuring point is freely selected within the zones. Stored limit values support the user in evaluating the measurement result via the configurable switching outputs. The refractive properties of the varnish depend on the hardening and the solvent content, therefore the refractive indices are initially determined once via a micrograph. The current measurements are then carried out on a non-contact basis. With the help of the measurement result, it is possible to influence the process parameters of the automated varnishing line. In addition, the cost of previous micrographs is saved, rejects are reduced and at the same time the requirements of the final customer are met. All data can be stored in a protocol.

Requirements for the measurement system

- Thickness measurement between 30 and 200 μm
- Resolution 1 μm
- Measuring rate 1 kHz
- Sufficient offset distance when measuring fitted PCBs

Ambient conditions

- Electronics production, proper environment
- Solvent vapors after the varnish has hardened

System design

- Controller: IFC2461
- Sensor: IFS2405-1 with 1 mm measuring range
- Cable: C2401-3 with 3 m length

Advantages

- Precise and non-contact thickness measurements
- Automated inline measurement
- Improved responsiveness increases the PCB quality
- Rejects can be reduced

