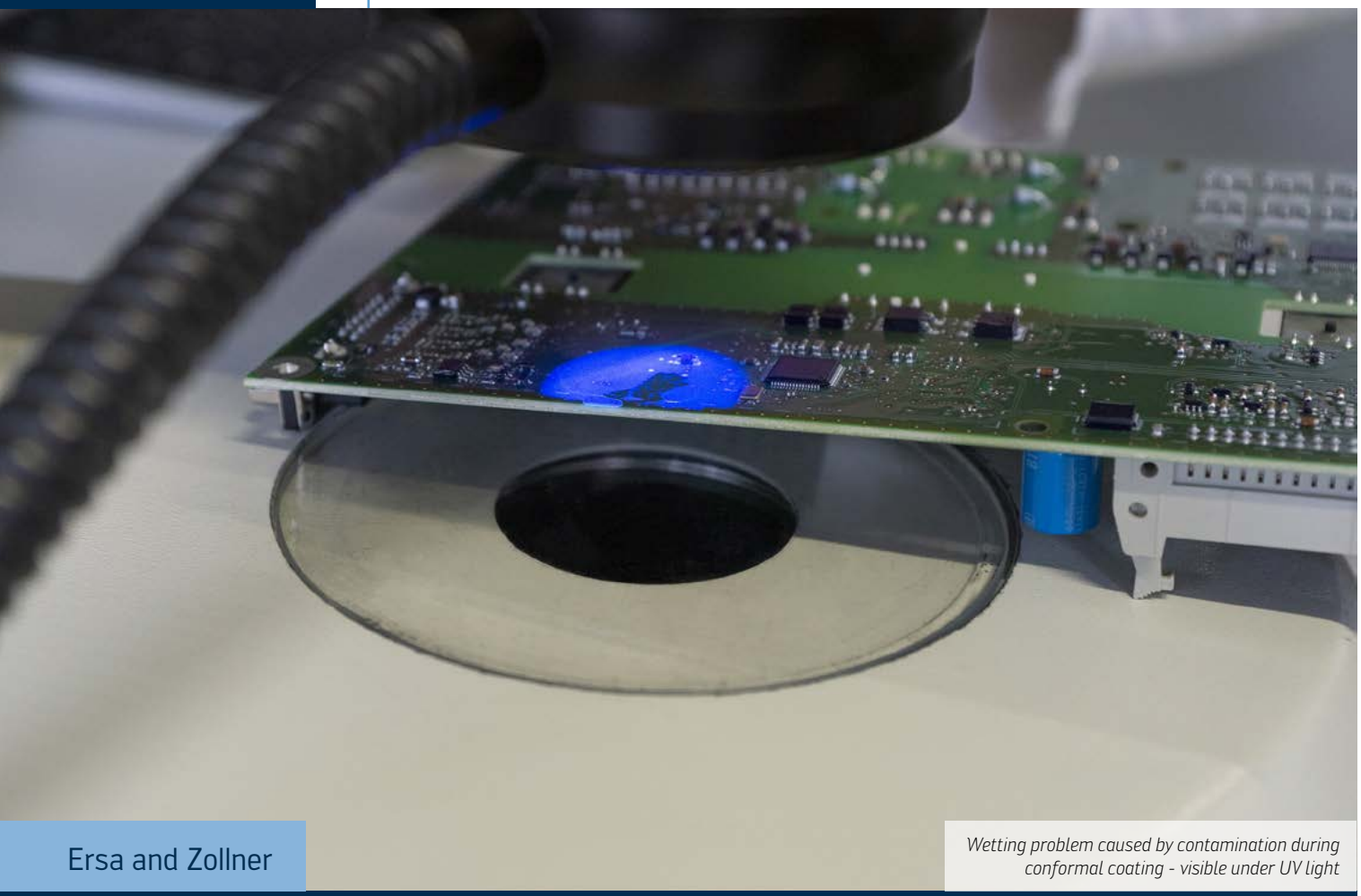
User report



Wetting problem caused by contamination during conformal coating - visible under UV light

Ersa and Zollner

Ersascope 2 helps with tests in electronics manufacturing

Processing coatings, adhesives or other substances is an inherent part of modern electronics manufacturing. Coatings for protecting the assembly are just as much state-of-the-art as jointing processes with adhesives or the potting of components or assemblies. As with all manufacturing processes, there are parameters crucial to the quality of coating or adhesion. Contamination on the base material can lead to dewetting, for example. It is also possible that the base material cannot be wetted with a specific substance on account of its surface chemistry.

Author
Jörg Nolte
Product Manager
Ersa GmbH

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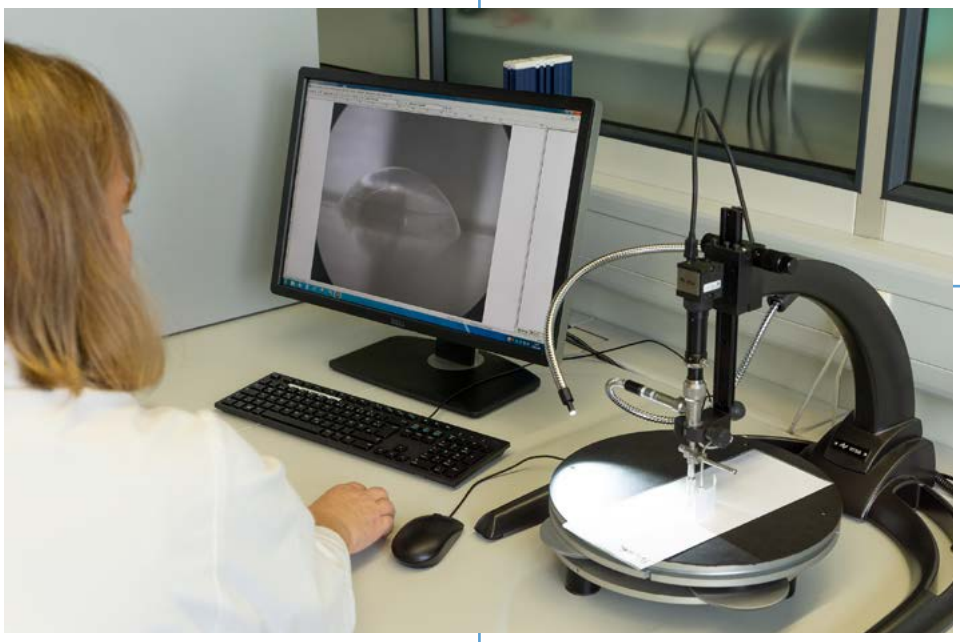
kurtz ersa



Images of the solvent drops are recorded with the Ersascope 2

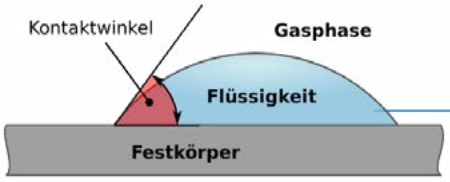
At Zollner Elektronik AG in Zandt, one of the leading global EMS service providers, they are striving to work out down to the last detail how wetting mechanisms work, particularly in the context of conformal coating for PCBs. Special analysis methods are being applied for this and continually developed.

Established techniques to assess whether a surface can be wetted with a certain coating often reveal weaknesses in practice: it is quite possible that a test ink used indicates that wetting will work without any problems, and yet dewetting effects still occur during series production.

For this reason, various manufacturers have developed more precise analysis techniques in accordance with DIN EN 828 (Adhesives - Wettability - Determination by measurement of contact angle and surface free energy of solid surface). Such measuring methods are also used by Zollner AG. Frau Dr. Anette Lätsch, who works in the Analysis and Material Technology Research division, is familiar with the methods and goes into more detail: "The surface tensions of the wetting partners are assessed according to their polar and their dispersive share. This makes a more precise statement possible as to whether a coating or adhesive will stick permanently to a surface."

The methods measure the so-called contact angles (wetting angles) after wetting a surface with fine drops of different media. A polar solvent (water) and a dispersive solvent (diiodomethane) are used for this. The free surface energy of the substrate can be calculated from the measured contact angles of both the drops. Specifications for the chemical properties of solder resist or protective coating (conformal coating) can then be derived and wetting problems excluded from the outset. This way, a database which lists the compatibility or incompatibility of coating partners is gradually being built up at Zollner Elektronik AG.

In addition, knowledge such as the extent to which plasma-treated surfaces can be wetted better than non-treated ones is also being gained. This much can be said already: the time between treatment and adhesion process is an extremely relevant factor.



The contact angle of a liquid on a solid provides information about its wettability (Source: Wikipedia) https://de.wikipedia.org/wiki/Kontaktwinkel

What role does the Ersascope 2 play in this context? During work in the analysis laboratory it was quickly noticed that there are applications where the usual test system cannot be used despite its extremely compact design. "The surfaces to be analysed for adhesive processes in grooves or for potting processes may be very small indeed. For this reason, we looked for an alternative to enable us to carry out measurements reliably even under such conditions," Dr. Lätsch explains.

Application of solvent drops on a sample in the analysis laboratory at Zollner AG

During discussions, someone recalled that the Ersascope 2 is used for the optical analysis of concealed solder spots. Zollner now uses the Ersa system as follows: first, the solvent drops are applied by manual pipette. Using the Ersascope optics, these can be photographed from the side on the surface to be examined even in very cramped spaces. Assuming good and homogeneous lighting, the contact angle can be measured on the image and a statement about wettability can be made thanks to the high level of precision. The suitability of the Ersascope for this application is based on the fact that the optical pupil of the 90° optics is very close to the sample surface. This allows the drop to be photographed at an optimum angle, similar to the BGA inspection.

The Ersascope 2 is thus the ideal supplement for the fine-tuning of an already established process and allows this to be used under geometrically critical conditions. The high correlation between measured results of the automatic test system and the manual measurements on images recorded with the Ersascope had Zollner convinced. And an additional area of application opens up for the Ersa measuring device. This shows that the reliable use of the video endoscope is not limited just to the analysis of concealed solder spots. ■

Ersascope 2 photographs drops from the side in order to be able to measure the contact angle

Ersa GmbH
Leonhard-Karl-Str. 24
97877 Wertheim
Phone: +49 9342 800-0
info@ersa.de
www.ersa.com

Ersa North America
usa@kurtzersa.com

Ersa Shanghai
info-esh@kurtzersa.com

Ersa Asia Pacific
asia@kurtzersa.com

Kurtz Ersa Mexico
info-kmx@kurtzersa.com