Computed Tomography

Small and Concealed, but not Invisible – Microfocus Computed Tomography from Viscom

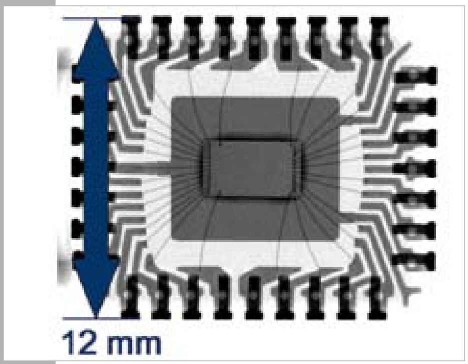
Complete volume reconstruction

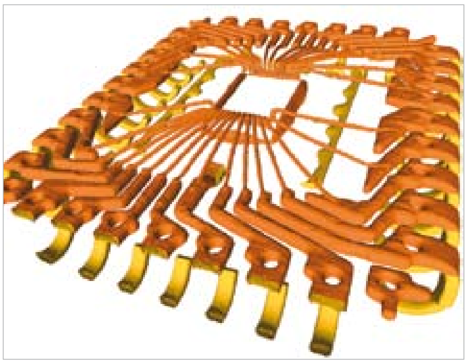
Non-destructive slices

Application area: Prototype qualification, reverse engineering, inspection alongside serial production

Combination of CT and microfocus X-ray tube

As demands for quality and safety verification rise, the significance of non-destructive inspection processes such as microfocus computed tomography (µCT) also increases. This is a combination of CT and a microfocus X-ray tube, which provides resolutions in the micrometer range. In many industrial sectors, this trend-setting, three dimensional inspection technique opens completely novel glimpses into the inner structure of an object that until now were not possible without destroying it. It can be applied to, for example, prototype qualification, reverse engineering, or inspection alongside serial production. Material defects are imaged and characterized according to their type, geometry, and position within the inspection sample. In this way, cast pieces, electronic components, ceramic parts etc. can be inspected for freedom from defects and dimensional accuracy, quickly and with certainty.





The inspection of a **PLCC** displays the sharp resolution which can be realized with µCT (upper right). **The 25 µm thick bond wires are just as recognizable as the excess die-attach adhesive along the edge of the chip**. In this image, two iso-gray value surfaces were extracted from the volumetric data and separated from each other by color. A µCT investigation, then, always makes sense when it delivers information that is not available in a 2-D image (top left).

µCT

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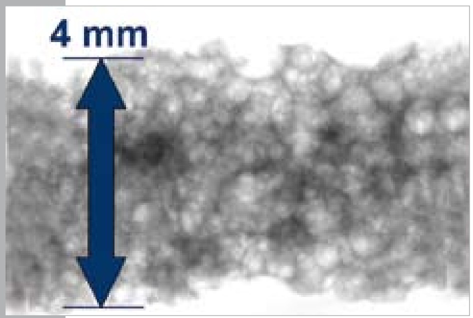
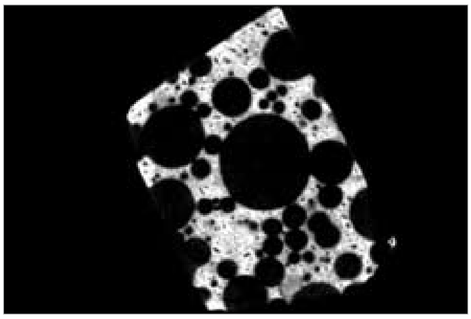
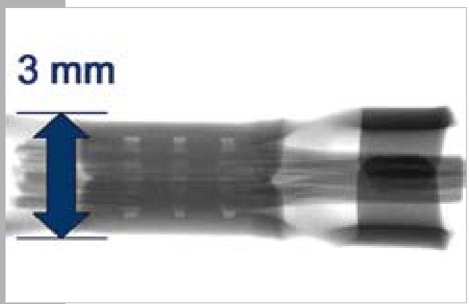
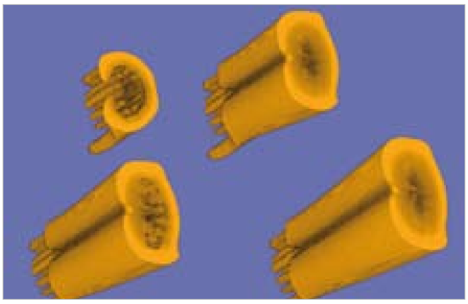




A very convincing example in favor of µCT is that of a 4 mm thick rod from **plaster foam**. In a reconstructed section image (top right), the pores are visible in brilliant clarity, while in a 2-D image (top left), nothing regarding the pores or their position can be determined.





Resolution in micrometer range

Image recording and evaluation in shorter time possible

Inspection of accuracy

Direct structure measurement in real units

A further example is the examination of a **crimp connection**. In a 2-D microfocus X-ray image (middle left), the wires are very sharply displayed, but it cannot be recognized if the cold welding with the surrounding metal sheath at the four contact points is adequate. For the human eye, sufficient depth information perpendicular to the image is lacking. It is, however, definitely present, lying concealed in the slightly varying gray values of the image. The µCT reveals this concealed information and makes possible perpendicular slices, as shown in the 3-D visualization (middle right). In both of the right slices, the **cold welds are well-impressed**. Only with the help of these views can it be appraised, whether the bonding quality between the wires and the sheathing of the crimp connector is sufficient to guarantee a reliable electric contact, even under tensile load conditions.

Due to the rapid advancement of computer performance, µCT has already distinguished itself as tested and proven in many places in industry. Image **recording and evaluation in shorter times are possible**. Results are already available in less than an hour – depending on the quality requirements. Thus, µCT can deliver many users information in a very short time, that previously could often be obtained only after tedious and destructive measures.

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