

1.4.25. AUTOMATIC MEASUREMENTS WITH FLEXIBLE PROGRAMMABLE X-RAY IMAGE EVALUATION ROUTINES (Xe²)

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The diversity of applications in industrial X-Ray inspection requires for automatic measurements a flexible image processing tool. This tool is realized by Xe² ("X-Ray image Evaluation Environment"), a graphical development system for measurement scenarios in the X-Ray image. Xe² is a part of quality|assurance, the phoenix|X-Ray inspection software of GE Sensing & Inspection Technologies.

Within this development environment the user can choose between a lot of different image processing algorithms, which can be combined with almost no limitation. The algorithms in use are for example edge detection, greyscale analysis, pattern matching or void detection. After using the image processing algorithms it is possible to run geometrical or statistical functions on the extracted features like the fit of geometric principles, data rows, Boolean operators, etc. There are also tasks for visualisation and machine operation available. Every single task can be used for an automated error detection by using free variable thresholds. Depending on the result of a measurement, following tasks can be activated or deactivated. The basics for an automated inspection must be a high quality and high resolved X-Ray image.

Due to the modular structure of Xe² the user can react fast and easy on new inspection tasks. He can create a new inspection module or he can modify or develop an existing module. In the paper we will show typical applications of Xe² inspection modules used for evaluation of solder joints on assembled printed circuit board like BGA, QFN or PTH solder joints. In addition, Xe² is a suitable tool for automatic measurements of internal geometries and distances of any kind of synthetic or metallic samples or assembled components which are detectable in the X-Ray image.

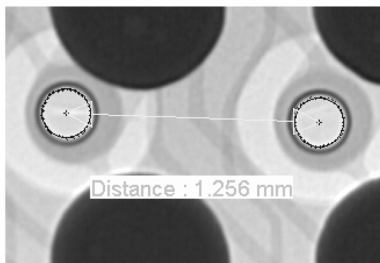


Fig. 1. Distance measurement between two through holes below a BGA

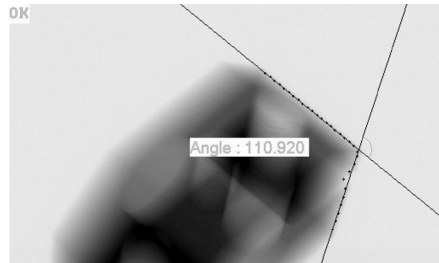


Fig. 2. Angle measurement between two fitted lines along two edges of an aluminium sample