

1.5.8. THE PHOTOTHERMAL CAMERA METHOD – TECHNOLOGY UPDATE AND RECENT RESULTS

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The Photothermal Camera, developed by AREVA NP in collaboration with ON-ERA, is an inspection instrument that can be used to replace more conventional surface inspection techniques such as ET or PT.

Photothermal testing is a contactless NDT technique that detects infrared emission following a transient thermal excitation of the inspection target. An infrared sensor is combined with a scanning laser excitation source to comprise the Photothermal Camera. The focused laser scanning beam almost instantly heats a line on the target surface to be inspected. The infrared detector measures the IR emission of the surface adjacent to the heated area as the thermal wave propagates away from the line of initiation. On-line analysis of the image enables the cracks, acting as a thermal barrier, to be clearly shown by their characteristic flaw footprint.

The Photothermal Camera avoids direct contact with inspection areas by the operator. No chemicals are required for the process. Photothermal inspections generate no environmental waste in contrast to alternative surface inspection like Liquid Penetrant or Magnetoscopy Testing. The method is also relatively quick and therefore the operator exposure to hazards of the general inspection area may be minimized. Thus the method is ideal for situations where surface contact can be hazardous to the operators (like contaminated nuclear components) or materials and environments that may be sensitive to chemical exposures (like the ITER reactor).

This paper will present the principle of this technique coupled with example results from recent applications. Most notable will be results for depth sizing of open cracks in the range of 0 – 3 mm where the ultrasonic methods are limited.