

The influence of external magnetic fields on crack contrast in magnetic steel detected by induction thermography

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Abstract

Magnetic materials were investigated by induction thermography at induction frequencies of 80 - 300 kHz. The influence of an external magnetic field on the thermal crack contrast was studied. With proper orientation of the external field, the contrast increased by a factor more than three. Numerical simulations of the static and high-frequency magnetic fields and the temperature distribution were performed. Using a stationary induction field and a modulated external field in the frequency range of 0.28 to 36.5 Hz, lock-in thermography was realized, which shows cracks with good contrast. The technique was applied to crack detection in ferritic steel profiles.

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