

EFFECT OF MICROSTRUCTURE ON EDDY CURRENT RESPONSE OF METALS

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Eddy current testing (ECT) is a versatile non-destructive testing (NDT) technique which is being used for various types of quality assurance applications and as a metal characterization technique, specially to detect coating thicknesses, corrosion depth, crack detection of turbine blades, metallic piping systems, boilers etc. The responses of eddy current up on surface and near surface macro defects are dominant and widely used. But eddy current responses on microscopic features of metals are not considered most. Grain boundaries are considered one of main types of microscopic discontinuities of metals and this research was done to identify the effect of these grain boundaries of Copper and Stainless Steel on eddy current testing which are being used for industrial purposes. Different test samples of Copper and Stainless Steel with different sizes of grain boundaries which were modified by using thermal treatments (Annealing Process) were tested for eddy current response using the eddy current probes with model numbers 47P001(60-500 kHz) and 106P4 (2 MHz) which are widely used for industrial purposes. The undergone series of tests indicated that the above mentioned effect of grain boundaries of Copper and Stainless Steel on eddy current response is not significant for the used eddy current probes and no effect of the size of the grain boundaries on results obtain by eddy current testing.

Keywords: Copper, Eddy current testing, Grain boundaries, Micro structure, Stainless Steel