

1.2.29. EDDY-CURRENT METHOD OF SELECTIVE NON-DESTRUCTIVE TESTING OF GEOMETRICAL, ELECTRO- PHYSICAL AND THERMAL PARAMETERS OF MULTI-LAYER, THIN-SHEET ARTICLES OF “METAL-DIELECTRIC” TYPE

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For selective non-destructive testing of geometrical, electro-physical and thermal parameters of thin-sheet articles and coatings on dielectric substrate, special eddy-current thermal probe is used. This probe consists of multi-coil transformer eddy-current thermal transducer (ECTT) and thermal transducer (TT) with common electromagnetic inductor for excitation of eddy-currents in an article. Excitation current generator operates in two modes – “small signal” and “large signal”. In the “small signal” mode, when excitation current is continuous and harmonic and does not causes article heating, measurement is performed by means of ECTT at high frequency of gap between probe and article surface, while generalized parameter depending on the thickness of metal sheet (coating) and its specific conductivity is determined at reduced frequency under known algorithm. In the “large signal” mode, pulse excitation current heats an article with thermal transit process occurring in it. In this case, chronological thermogram parameters are measured by means of TT. By this thermogram, thermophysical parameters of article material (temperature conductivity coefficient, for example) are determined. Paper presents structural scheme, algorithms and flow-chart of program to determine values of metal sheets thickness, temperature conductivity and specific electric conductivity of tested article. As it is shown by verification of this method operation, measurement error of above said parameters amounts to not more than 3%.