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A THIN ELECTROMAGNETIC SHIELD OF A COMPOSITE STRUCTURE MADE ON THE BASIS OF A MAGNETIC FLUID

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Abstract

A thin electromagnetic shield (0.25 – 0.50 mm thick) were developed, which has a composite structure and was made on a magnetic fluid deposited on a dielectric substrate. Experimental *researches of its shielding and electromagnetic properties were carried out. It is shown that the screening coefficient of a low-frequency magnetic field for such a screen is 2.4 – 7.8. The screening coefficient for an ultrahigh-frequency magnetic field is 3.0 – 9.3. The values of these coefficients depend on the thickness of the screen. The calculation-experimental method is proposed for the determine of the effective magnetic permeability of the composite screen material. This method is using the well-known analytical solution of the magnetostatic problem for a thin spherical shell and the results of measuring screening coefficients for a screen of spherical (or nearly spherical) shape. The obtained relative values of the magnetic permeability of the material for the case of a low-frequency magnetic field are 420 – 1050. These values depend little on the thickness of the screen.* References 10, figures 2, tables 2.

Key words: electromagnetic screen, composite material, magnetic fluid, screening coefficient, effective magnetic permeability.

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