EFFECTIVE SCREEN BASED ON COPPER – MAGNETIC COMPOSITION OF FLUOROSILOXANE RUBBER

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Abstract – Currently, the issues of creating effective screens for the laboratory of electromagnetic compatibility, protection of electronic equipment and people from external electromagnetic radiation in the entire frequency range are becoming more and more urgent. It is well known that according to the skin effect, the depth of penetration of the alternating current δ in the conductive materials is determined by the relation [1] :

$$\delta = 503\sqrt{\rho/\mu_r f},$$

where: ρ is the resistivity of the conductive material, in $\Omega \cdot m$;

μ_r – relative magnetic permeability of the material; f – frequency of the current, in Hertz.

We have developed and manufactured a composite screen based on fluorosiloxane rubber (35%) [2] with the addition of copper powder (26%) ($\rho = 0.0172 \cdot 10^{-6}\Omega \cdot m$; $\mu_r = 1$) [3] and Mu Metal powder (39%) ($\rho = 0.55 \cdot 10^{-6}\Omega \cdot m$; $\mu_r = 80000 - 100000$) [4], which at a thickness of 0.25 mm proved to be effective in the spectrum of frequencies from 50 Hz to 28 GHz. This composite screen is flexible and represents an analogue of textile fabric, which can be rolled up, and also has a wide operating temperature range (from -90 to + 250 ℃).

Keywords: Screen, fluorosiloxane rubber, copper, Mu Metal.

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