

Improved Technique for Manufacturing of the Elastic Air-Permeable Electromagnetic Radiation Absorbers Based on Foil

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2023

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Keywords: air permeability, aluminum, copper, flexibility, foil, electromagnetic radiation absorber.

Abstract: The improved technique for manufacturing of the elastic air-permeable electromagnetic radiation absorbers based on foil fragments is proposed. The results of the computational and experimental substantiation of the proposed technique are presented. In the course of this justification, the following has been performed: 1) numerical simulation of the process of interaction of electromagnetic radiation in the microwave range with aluminum and copper foil, depending on the thickness of the metal layer of such materials; 2) measuring of the electromagnetic radiation reflection and transmission coefficients values in the microwave range of the absorbers manufactured in accordance with the proposed technique; 3) calculation of the electromagnetic radiation absorption coefficient values in the microwave range of the absorbers manufactured in accordance with the proposed technique. Based on the justification results, it was found that for the manufacture of absorbers in accordance with the proposed technique, it is optimal to use foil with a metal layer thickness of 50.0 μm . Electromagnetic radiation reflection and transmission coefficients values in the frequency

range of 0.7–17.0 GHz of such absorbers vary accordingly within the following limits: 1) from –0.5 to –15.0 dB and from –5.0 to –25.0 dB, if the foil fragments cover 80.0 % of the absorbers surface area; 2) from –0.5 to –10.0 dB and from –5.0 to –30.0 dB, if the foil fragments cover 95.0% of the absorber surface area. Electromagnetic radiation absorption coefficient values in the frequency range of 0.7–17.0 GHz of the absorbers manufactured in accordance with the proposed technique reach 0.9. Such absorbers are recommended for use in order to reduce interference introduced into the operation of antenna systems or electronic devices.

Boiprav, O. Improved Technique for Manufacturing of the Elastic Air-Permeable Electromagnetic Radiation Absorbers Based on Foil / O. Boiprav, S. A. Abdaljlil, A. Zerek // 2023 IEEE 3rd International Maghreb Meeting of the Conference on Sciences and Techniques of Automatic Control and Computer Engineering (MI-STA) : conference materials, Benghazi, Libya, 21-23 May 2023 / Institute of Electrical and Electronics Engineers. – USA, 2023. – P. 504–509.