

INFLUENCE OF STRUCTURING METHODS ON THE HEAT RESISTANCE OF PCM

Cherkashina G.M., Lebedev V.V., Derius D.V., Klimchuk S.O.

National Technical University

"Kharkiv Polytechnic Institute", Kharkiv

Temperature is one of the most active and practically important environmental factors. During storage and operation, thermal effects on equipment and materials can be stationary, periodic and aperiodic. Each such impact will correspond to its possible specific damage to the equipment or changes in the properties of materials.

The established mode of heat exchange inside the apparatus and the apparatus with the external environment creates a stationary thermal effect. This mode of operation is set in equipment operating in a room with a constant temperature. Damage to products in this mode of operation occurs mainly due to aging of materials when the maximum allowable temperature of the materials of the elements does not correspond to the actual operating temperature. As a result of such temperature rises, both gradual and sudden changes in the physical parameters of materials occur.

The operation of radio electronic equipment (REA) in conditions of high ambient temperature in some areas makes it necessary to resort to a decrease in the power of the equipment while maintaining an optimal service life compared to its operation in areas with a normal climate. Accelerated thermal aging of a number of materials under such conditions is also possible in the absence of heat release in the equipment (cracking of materials, fractures of conductor insulation, etc.).

In a homogeneous material, stresses leading to its damage arise in the presence of a temperature gradient over the volume of the material, in an inhomogeneous material and at the same temperatures in different materials due to different physical properties of these materials (temperature expansion coefficients, elastic moduli, thermal conductivity coefficients, etc.).

It follows from the foregoing that in order to ensure operation (REA) at elevated temperatures, it is necessary to know the change in the heat resistance of polymer composite materials (PCM) over time.

The conducted experimental studies have shown that the absolute indicators of Vika heat-resistant are higher for PCMs structured in the field of high-frequency currents (HFC) in comparison with the heat resistance of PCMs structured by the convection method. Stabilization of heat resistance indicators occurs on the 80th day and remains constant during the test period of - 360 days.