

ANALYSIS OF THE ACOUSTIC FIELD STRUCTURE OF THE SMALL APERTURE ULTRASONIC TRANSDUCER DURING CONTROL OF HEAT ENGINEERING EQUIPMENT OBJECTS

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Introduction. Today the ultrasonic methods of non-destructive testing are widely used for defectoscopy of various kinds of materials, both in the process of their manufacture and during operation. One of the most important characteristics influencing the information capabilities and reliability of control is the acoustic field of the converters used. A characteristic feature of the acoustic field of the small aperture magnetostrictive converter is that such converters equally well excite different types of waves in the control object. Exploring this helps determine the speed of propagation of the wave from the converter to the receiver, since different types of waves move at different speeds.

Objective. To analyze the structure of the acoustic field of the small-aperture magnetostrictive converter (MSC) during the control of objects of heat engineering equipment. Determine the distribution of the energy emitted between different types of ultrasonic waves.

Results. The types of waves propagating in the control of metal objects of heat engineering equipment are determined. For each type of wave, the corresponding MSC parameters are selected, with which the converters will work more efficiently. Directional diagrams for the vertical and longitudinal waves are determined. The analysis shows that the acoustic field has a circularly symmetric character, with an axis of symmetry that coincides with the symmetry axis of the waveguide converter.

Conclusions. After analyzing the structure of the acoustic field of the small-aperture ultrasonic transducer during the control of the objects of the heat engineering equipment, patterns of wave propagation and the formation of acoustic fields were revealed. That allows the use of research as a basis for the development of effective methods and tools for ultrasound control with MSCs.