

ABSTRACT OF SCIENTIFIC SPECIALTY

1.3.7 ACOUSTICS

The scientific specialty provides for the study of the physical foundations and special issues of acoustics in areas related to the design and development of acoustic systems and means of control and measurement for the purposes of research of solid media and the World Ocean, and issues of quality management of industrial products and operated products of mechanical engineering, transport, etc. etc. and so on. It also describes how to build and use devices for processing and generating measuring acoustic signals.

Includes the following areas of research:

Study of elastic vibrations and waves, the processes of their generation, radiation and propagation in various media and structures.

Study of the interaction of elastic vibrations and waves with matter and waves of other physical nature.

Investigation of scattering and diffraction phenomena during the propagation of elastic oscillations and waves in various media and structures.

Study of acoustic phenomena of natural environments (atmosphere, earth's crust, ocean).

Study of the effects of sound, vibration, ultra- and infrasound on humans and the biosphere, psychoacoustics.

Study of the processes of generation and propagation of sound, vibration, ultra- and infrasound in various media. Creation of methods for their calculation and the basics of design, vibroacoustic control and diagnostics.

Development and research of features, elements, devices and systems for generating, amplifying, converting and synthesizing sound and vibration, including for solving problems of aero-, geo- and hydroacoustics, musical, architectural and building acoustics, electroacoustics, opto- and photoacoustics, acoustoelectronics and other applications.

Development and research of methods, devices and instruments for identification and measurement of sound, vibration, ultra- and infrasound, including quantitative assessment of sound and vibration sources, assessment of the quality of generated, transmitted and received information, including in the presence of masking interference from other sources, as well as technical implementation of the relevant methods, devices and devices.

Development and research of new methods and means of reducing noise, vibration, ultra- and infrasound, which improve the efficiency of reduction, as well as the technical implementation of the relevant methods and means.

Development and research of algorithms, including digital ones, for processing vibroacoustic signals with different characteristics, including synthesis and optimization of processing algorithms.

Development and research of methods for modeling and calculating the propagation of sound and vibration in various environments, mapping sound and vibration.

Development and research of new software tools, methods and algorithms of methods for ensuring the electromagnetic compatibility of radio engineering systems and devices, including radio television and communication systems,

Development of promising information technologies, new software tools, methods and algorithms that allow the study and calculation of the vibroacoustic characteristics of various sources of sound and vibration, the propagation of sound and vibration in various environments, the calculation and quantitative assessment of the effectiveness of various sound and vibration reduction devices.

As well as the development of the technical foundations of devices, tools, systems and methods of measurement in the following areas:

Acoustic processing of materials and products, acoustic technologies in industry;

Acoustic diagnostics and non-destructive testing in transport and construction; acoustic monitoring of buildings and structures;

Medical acoustics and acoustics of living systems;
acoustic electronics;

Aquatic acoustics environments; radiation, reception And treatment
hydroacoustic signals, acoustic monitoring of reservoirs;

Acoustics of gas media, aeroacoustics, reception and processing of sound signals in the air, monitoring of sources of acoustic noise in the atmosphere, acoustic ecology;

Acoustics of structurally inhomogeneous media, geological acoustics;
Room acoustics, musical acoustics, speech acoustics; Acoustic metrology and calibration of sources and receivers of acoustic waves.

