

Book Review

Nondestructive Testing

Handbook. In 8 Volumes

Edited by V. Klyuev

Volume 3. Ultrasonic Testing

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Ultrasonic oscillations and waves are the main type of acoustic oscillations and waves used in nondestructive testing. In the book application of acoustic oscillations and waves is discussed as a means for testing of materials. Testing types which are adopted widely in practice are disclosed in detail. The book includes many original developments of Russian scientists as well as of scientists from other countries. Handbook deals with physical principles of high and low frequency acoustic methods, their classification, fields of their application, their operational capabilities and features. It contains data on methods and hardware for testing of typical objects. Recommendations on selection of a method to resolve specific problems are provided. Not only widely known methods are described in the handbook, but also a number of specific ones. Requirements to technical knowledge of the nondestructive testing personnel and European Standards on ultrasonic testing are presented. The content of the handbook is extremely useful for practical workers and hardware developers. Formulas which are necessary for practical calculations are presented. Complex formulas and graphical relationships are accompanied by application examples.

Considerable space in the handbook is devoted to new acoustic methods and fields of their application intended for solving a wide range of practical tasks. Authors present material in logical sequence paying special attention to the physical nature of considered phenomena. Structural schemes of the main types of instruments are provided. Designs of specific instruments, as a rule, are not presented, because this data quickly becomes obsolete.

Physical principles of acoustic testing are described including elastic oscillations and waves, various wave types, acoustic properties of media, wave reflection and refraction on media interfaces, diffraction on obstacles, generation and reception of elastic oscillations and waves, piezoelectric effect, various types of electro – acoustic transducers, longitudinal and transverse oscillations of rods and plates, various nonlinear methods and spatial distributions of nonlinearity.

Acoustic testing techniques are described including reflection as well as transmission methods, methods based on natural oscillations (including methods of forced oscillations and of

free oscillations), impedance methods, also the methods of calculation of echo – signals, analysis of accuracy and sensitivity of measurements.

Ultrasonic testing of metals, testing of multi – layered structures and articles of non – metal materials, testing of joints, measurements of dimensions of objects, testing of physical and mechanical properties of materials are comprehensively described in the handbook.

Handbook is the complete manual reflecting not only the modern state of ultrasonic testing, but the newest trends of its development as well. It is intended for engineers, research workers, technical personnel and employees of the plant testing services. It may also be used by specialists preparing for passing exams for ultrasonic testing qualifications.

The handbook is unique and most comprehensive one in this field in the world.