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First edition
2012-08-15

Mechanical vibration and shock — Characterization of the dynamic mechanical properties of visco-elastic materials —

Part 1: Principles and guidelines

*Vibrations et chocs mécaniques — Caractérisation des propriétés
mécaniques dynamiques des matériaux visco-élastiques —*

Partie 1: Principes et lignes directrices



Reference number
ISO 18437-1:2012(E)

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18437-1 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration, shock and condition monitoring*.

ISO 18437 consists of the following parts, under the general title *Mechanical vibration and shock — Characterization of the dynamic mechanical properties of visco-elastic materials*:

- *Part 1: Principles and guidelines*
- *Part 2: Resonance method*
- *Part 3: Cantilever shear beam method*
- *Part 4: Dynamic stiffness method*
- *Part 5: Poisson ratio based on comparison between measurements and finite element analysis*

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Introduction

Visco-elastic materials are used extensively to reduce vibration amplitudes in structural systems through dissipation of energy (damping) or isolation of components, and in acoustical applications that require a modification of the reflection, transmission or absorption of energy. Such systems often require specific dynamic mechanical properties in order to function in an optimum manner. Energy dissipation is due to interactions on the molecular scale and can be measured in terms of the lag between stress and strain in the material. The visco-elastic properties, modulus, and loss factor of most materials depend on frequency, temperature, strain amplitude, and pre-strain. In addition to modulus and loss factor, sometimes Poisson ratio is an important property required for predictions. The choice of a specific material for a given application determines the system performance. The goal of this International Standard is to provide brief descriptions of the three methods for elastic modulus and loss factor and two methods for Poisson ratio, the details of construction of each apparatus, measurement range, and the limitations of each apparatus. This International Standard applies to the linear behaviour observed at small strain amplitudes.