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Vibration generating machines — Guidance for selection —

Part 1
Equipment for environmental testing

Générateurs de vibrations — Lignes directrices pour la sélection —

Partie 1: Moyens pour les essais environnementaux

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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 10813-1 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*, Subcommittee SC 6, *Vibration and shock generating systems*.

ISO 10813 consists of the following parts, under the general title *Vibration generating machines — Guidance for selection*:

— *Part 1: Equipment for environmental testing*

Further parts are under preparation.

Introduction

To select a suitable vibration generating system is an urgent problem if it is necessary for a certain test to purchase new test equipment or to update the equipment already available, or to choose between equipment proposed by a test laboratory or even a laboratory itself which offers its service to carry out such a test. A problem like this can be resolved quite easily if a number of factors are considered simultaneously, as follows:

— the type of the test to be carried out (environmental testing, normal and/or accelerated, dynamic structural testing, diagnosis, calibration, etc.);

— the requirements to be followed;

— the test conditions (one mode of vibration or combined vibration, single vibration test or combined test, for example, dynamic plus climatic);

— the objects to be tested.

This part of ISO 10813 deals only with equipment to be used during environmental testing, and those selection procedures that are predominantly to meet the requirements of this test. However, the user should keep in mind that a specific test condition and a specific object to be tested can significantly influence the selection. Thus, to excite a specimen inside a climatic chamber imposes limitations on the vibration generator interface, and a specimen of a large size and/or of a complex shape, having numerous resonances in all directions, demands larger equipment than that specified for the procedures of this part of ISO 10813, assuming that excitation is to be applied to the rigid body of the same mass. Unfortunately, such aspects cannot easily be formalized and, thus, are not covered by this part of ISO 10813.

If the equipment is expected to be used for tests of different types, all possible applications should be considered when selecting. Later parts of ISO 10813 will address the problem of the case where the vibration generator is acquired to be applied during both environmental and dynamic structural testing. It is presumed in this part of ISO 10813 that the system selected will be able to drive the object under test up to a specified level. In order to generate an excitation without undesired motion, a suitable control system should be used. The selection of a control system will be considered in a further International Standard.

It should be emphasized that vibration generating systems are complex machines, so the correct selection always demands a certain degree of engineering judgement. As a consequence, the purchaser, when selecting the vibration test equipment, can resort to the help of a third party. In such a case, this part of ISO 10813 can help the purchaser to ascertain if the solution proposed by the third party is acceptable or not. Designers and manufacturers can also use this part of ISO 10813 to assess the market environment.

Vibration generating machines — Guidance for selection —

Part 1: Equipment for environmental testing

1 Scope

This part of ISO 10813 gives guidance for the selection of vibration generating equipment used for vibration environmental testing, depending on the test requirements.

This guidance covers such aspects of selection as

— the equipment type,

— the model, and

— some main components, excluding the control system.

NOTE Some examples are given in Annex A.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2041, *Vibration and shock — Vocabulary*

ISO 5344, *Electrodynamic vibration generating systems — Performance characteristics*

ISO 8626, *Servo-hydraulic test equipment for generating vibration — Methods of describing characteristics*

ISO 15261, *Vibration and shock generating systems — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2041, ISO 5344, ISO 8626 and ISO 15261 apply.

4 Requirements for vibration tests

4.1 Vibration test purposes

The purpose of vibration tests is to estimate the capability of an object to maintain its operational characteristics and to stay intact under vibration loading of defined severity. The tests are subdivided, in accordance with their tasks, into functional, strength and endurance tests.

Strength tests are carried out to estimate the capability of an object to withstand vibration of defined severity and to stay in working order when the excitation is removed. In these tests, vibration might cause mechanical damage (fatigue) and may be used to predict the lifetime of the object under vibration.