INTERNATIONAL STANDARD

ISO 10813-1

Second edition
2023-08

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

Reference number
ISO 10813-1:2023(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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 108, *Mechanical vibration, shock and condition monitoring*, Subcommittee SC 6, *Vibration and shock generating systems*.

This second edition cancels and replaces the first edition (ISO 10813-1:2004), which has been technically revised. It also incorporates the Technical Corrigendum ISO 10813-1:2004/Cor.1:2006.

The main changes are as follows:

— tables and figures are updated to reflect advances in typical system capability;

— selection calculations are rearranged to use values which are more likely to be available;

— a non-mathematical treatment of armature size and infrastructure requirements is included.

A list of parts in the ISO 10813 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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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 acceptably 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 document 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 document, 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 document.

If the equipment is expected to be used for tests of different types, all possible applications should be considered when selecting. Other 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 document 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 document 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 document to assess the market environment.

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Vibration generating machines — Guidance for selection —

Part 1: Equipment for environmental testing

1 Scope

This document 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 1 Some examples are given in Annex A.

NOTE 2 This document is primarily focused on determining functional specifications for equipment based on the requirements of a specific environmental test. More practical aspects of the selection (including target test definition and fixturing considerations) are covered in IEST-RP-DTE009.1[1].

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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, *Mechanical vibration, shock and condition monitoring — Vocabulary*

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

ISO 8626, *Servo-hydraulic test equipment for generating vibration — Method 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.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

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