

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Environmental testing –

Part 2-65: Tests – Test Fg: Vibration – Acoustically induced method

Essais d'environnement –

Partie 2-65: Essais – Essai Fg: Vibrations – Méthode induite acoustiquement



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ENVIRONMENTAL TESTING –**Part 2-65: Tests –
Test Fg: Vibration –
Acoustically induced method****FOREWORD**

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International Standard IEC 60068-2-65 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This second edition cancels and replaces the second edition, published in 1993, and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- minor technical and editorial changes were made throughout the document as originally requested by the DE National Committee;
- following comments at the CD stage, particularly from the UK National Committee, significant technical and editorial additions were made to the standard for acoustic testing employing the progressive wave tube technique.

The text of this standard is based on the following documents:

FDIS	Report on voting
104/591/FDIS	104/597/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 60068 series, published under the general title *Environmental testing*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

Acoustic noise may produce significant vibration in components and equipment. In the acoustic noise field, sound pressure fluctuations impinge directly on the specimen and the response may be different to that produced by mechanical excitation.

Items particularly sensitive to acoustic noise include relatively lightweight items whose dimensions are comparable to an acoustic wavelength in the frequency range of interest and whose mass per unit area is low, such as dish antennas and solar panels, electronic devices, printed circuit boards, optical elements, etc.

Acoustic testing is applicable to components, equipment, functional units and other products, hereinafter referred to as “specimens”, which are liable to be exposed to and/or are required to function in conditions of high sound pressure levels. It should be noted that, under service conditions, the specimen may be subjected to simultaneous mechanical and acoustical excitation.

High sound pressure levels may be generated by jet engines and other aircraft propulsion systems, rocket motors, high-powered gas circulators, turbulent gas flow around aircraft or launchers, etc. This part of IEC 60068 deals with acoustic testing in compressible gases and can also be used to simulate the excitation response caused by turbulence resulting from high-velocity separated gas flows.

The intent of the test procedure contained in this standard is to produce a high intensity acoustic noise field by either reverberant methods (known as reverberant chamber testing) or by progressive wave methods (known as progressive wave tube testing).

Testing for the effects of vibration caused by acoustic noise demands a certain degree of engineering judgement and this should be recognized both by the manufacturer/supplier and the purchaser of the specimen. Based on the guidance provided in this standard, the writer of the relevant specification is expected to select the most appropriate method of test and values of severity, taking account of the nature of the specimen and its intended use.

Since the acoustic levels occurring during testing are high enough to be damaging to human hearing, appropriate protective measures need to be taken to reduce the noise exposure of operators performing the test to a level regarded as permissible from the standpoint of hearing conservation.

ENVIRONMENTAL TESTING –

Part 2-65: Tests – Test Fg: Vibration – Acoustically induced method

1 Scope

This part of IEC 60068 provides standard procedures and guidance for conducting acoustic tests in order to determine the ability of a specimen to withstand vibration caused by a specified sound-pressure level environment to which it is, or is liable to be, subjected.

For sound pressure level environments of less than 120 dB acoustic tests are not normally required.

This standard determines the mechanical weakness and/or degradation in the performance of specimens and to use this information, in conjunction with the relevant specification, to decide on their acceptability for use. The methods of test may also be used as a means of establishing the mechanical robustness or fatigue resistance of specimens.

Two procedures are described for conducting tests and for measurement of the sound pressure levels within the acoustic noise field and considers the need for measurement of the vibration responses at specified points on the specimen. It also gives guidance for the selection of the acoustic noise environment, spectrum, sound pressure level and duration of exposure.

The progressive wave tube method is relevant to material where aerodynamic turbulence will excite part, or all, of the total external surface. Such applications include aircraft panel assemblies where the excitation exists on one side only. The reverberant chamber method is relevant where it is preferable to induce vibration onto the entire external surface of equipment by distributed excitation rather than fixed points by means of electro-dynamic shakers.

2 Normative references

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

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

ISO/IEC 17025:2005, *General requirements for the competence of testing and calibration laboratories*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.