

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Environmental testing –  
Part 2-53: Tests and guidance – Combined climatic (temperature/humidity)  
and dynamic (vibration/shock) tests**

**Essais d'environnement –  
Partie 2-53: Essais et guide – Essais combinés climatiques  
(température/humidité) et dynamiques (vibrations/chocs)**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## ENVIRONMENTAL TESTING –

**Part 2-53: Tests and guidance – Combined climatic  
(temperature/humidity) and dynamic (vibration/shock) tests**

## FOREWORD

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International Standard IEC 60068-2-53 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This second edition cancels and replaces

- the first edition of IEC 60068-2-50, published in 1983,
- the first edition of IEC 60068-2-51, published in 1983 and
- the first edition of 60068-2-53, published in 1984

and constitutes a technical revision.

The main changes with respect to the previous editions of all three standards cited above is to update and group tests. In this way it allows for the possibility to use different kinds of vibration excitation – sine, random or mixed mode – or shocks, with different tests for climatic conditions – cold, dry heat, change of temperature or constant and cyclic damp heat.

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

FDIS	Report on voting
104/499/FDIS	104/514/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, 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- withdrawn,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

Equipment and components are required to function without significant reduction in performance when subjected to different environmental parameters.

The type and severity of the environmental parameters depend on the operational, transport and storage environments to which the equipment and components are subjected. The environmental effects on the performance of equipments in the tropics and subtropics are totally different from those in arctic regions. Individual parameters cause a variety of different and overlapping effects on the equipment and components.

The manufacturer attempts to ensure, and the user expects, that equipment and components will survive the environments to which they will be subjected throughout their useful life. This expectation can be assessed by exposure of the specimen to a range of simulated environmental parameters controlled in the laboratory. The severity of the environmental parameters is often increased to obtain meaningful results in a relatively short period of time. This allows assessment of the likely effects of applied environmental conditions.

The combination of temperature, humidity and vibration occurs especially in the domains of automotive, rail and aerospace environments.

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## ENVIRONMENTAL TESTING –

### Part 2-53: Tests and guidance – Combined climatic (temperature/humidity) and dynamic (vibration/shock) tests

#### 1 Scope

This part of IEC 60068 provides a description of test methods and guidance for testing equipment or components under combined climatic and dynamic conditions.

The purpose of combined testing is to investigate to what extent the equipment or components are affected by combined climatic and dynamic tests.

The method of combined tests detects electrical, mechanical or other physical variations.

#### 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.

IEC 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14, *Environmental testing – Part 2-14: Test – Test N: Change of temperature*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-30, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-64, *Environmental testing – Part 2-64: Tests – Test Fh: Vibration, broadband random (digital control) and guidance*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60068-2-80, *Environmental testing – Part 2-80: Tests – Test Fi: Vibration – Mixed mode*

#### 3 Testing

##### 3.1 General

All parameters such as temperatures, cold, dry heat, temperature change, type of vibration, exposure time to temperature, exposure time to vibration, number of shocks, repetition time of