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Environmental testing - Part 2-81: Tests - Test Ei: Shock - Shock response  
spectrum synthesis (IEC 60068-2-81:2003)

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EUROPEAN STANDARD

**EN 60068-2-81**

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2003

ICS 19.040

English version

**Environmental testing**  
**Part 2-81: Tests –**  
**Test Ei: Shock –**  
**Shock response spectrum synthesis**  
(IEC 60068-2-81:2003)

Essais d'environnement

Partie 2-81: Essais –

Essai Ei: Chocs –

Synthèse du spectre de réponse au choc

(CEI 60068-2-81:2003)

Umweltprüfungen

Teil 2-81: Prüfungen –

Prüfung Ei: Schocken –

Synthese des Schockantwortspektrums

(IEC 60068-2-81:2003)

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**SIST EN 60068-2-81:2004**

This European Standard was approved by CENELEC on 2003-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

The text of document 104/306/FDIS, future edition 1 of IEC 60068-2-81, prepared by IEC TC 104, Environmental conditions, classification and methods of test, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60068-2-81 on 2003-10-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2004-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2006-10-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex ZA is normative and annexes A, B, C and D are informative.

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60068-2-81:2003 was approved by CENELEC as a European Standard without any modification.

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**Annex ZA**  
(normative)

**Normative references to international publications  
with their corresponding European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-1	1988	Environmental testing Part 1: General and guidance	EN 60068-1 <sup>1)</sup>	1994
IEC 60068-2-6 + corr. March	1995 1995	Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	1995
IEC 60068-2-27	1987	Part 2: Tests - Test Ea and guidance. Shock	EN 60068-2-27	1993
IEC 60068-2-47	1999	Part 2-47: Test methods - Mounting of components, equipment and other articles for vibration, impact and similar dynamic tests	EN 60068-2-47 + corr. June	1999 2000
IEC 60068-2-57	1999	Part 2-57: Tests - Test Ff: Vibration - Time-history method	EN 60068-2-57	2000
IEC 60068-2-64 + corr. October	1993 1993	Part 2: Test methods - Test Fh: Vibration, broad-band random (digital control) and guidance	EN 60068-2-64	1994
ISO 266	1997	Acoustics - Preferred frequencies	-	-
ISO 2041	1990	Vibration and shock - Vocabulary	-	-

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<sup>1)</sup> EN 60068-1 includes corrigendum October 1988 + A1:1992 to IEC 60068-1.

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INTERNATIONALE  
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BASIC SAFETY PUBLICATION  
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**Essais d'environnement –**

**Partie 2-81:**

**Essais – Essai Ei: Chocs –**

**Synthèse du spectre de réponse au choc**

**iTeh STANDARD PREVIEW**

**Environmental testing –**

**Part 2-81:**

**Tests – Test Ei: Shock –**

**Shock response spectrum synthesis**



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International Electrotechnical Commission  
Международная Электротехническая Комиссия

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For price, see current catalogue  
Pour prix, voir catalogue en vigueur

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ENVIRONMENTAL TESTING –****Part 2-81: Tests – Test Ei: Shock –  
Shock response spectrum synthesis**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60068-2-81 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

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

FDIS	Report on voting
104/306/FDIS	104/310/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.

It has the status of a basic safety publication in accordance with IEC Guide 104.

The committee has decided that the contents of this publication will remain unchanged until 2010. At this date, the publication will be

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

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## INTRODUCTION

This part of IEC 60068, designed for testing with a synthesized shock response spectrum (SRS) is intended for general application for components, equipment and other products, hereinafter referred to as “specimens”, when simulation of transient responses of a complex nature is required. The test method centres on the use of SRS and techniques associated with SRS.

The purpose of the test is to demonstrate the adequacy of the test specimen to resist the specified transient excitation, without unacceptable degradation of its functional and/or structural performance. It is particularly useful for tailoring shock responses where measured data are available from the operational environment. However, the test is applicable to any transient excitation within the limits of the testing apparatus.

The test method is based primarily on the use of an electrodynamic or a servo-hydraulic vibration generator with an associated computer-based control system used as a shock testing system.

Other shock testing machines may be used, provided they fulfil the requirements of this standard.

It is emphasized that SRS synthesis testing always demands a certain degree of engineering judgement. Both supplier and purchaser should be fully aware of this fact. The writer of the relevant specification is expected to select the testing procedure and the values of severity appropriate to the specimen and its use.

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## ENVIRONMENTAL TESTING –

### Part 2-81: Tests – Test Ei: Shock – Shock response spectrum synthesis

#### 1 Scope

This part of IEC 60068 specifies tests using a synthesized shock response spectrum (SRS). It is intended for general application to specimens when simulation of transient excitation of a complex nature is required.

#### 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 60068-1:1988, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27:1987, *Basic environmental testing procedures – Part 2: Tests – Test Ea and guidance: Shock*

[SIST EN 60068-2-81:2004](https://standards.iteh.ai/catalog/standards/sist/9a15f91a-25fb-48fd-91dd-64003a2e3ca3/iec-60068-2-81-2004)

IEC 60068-2-47:1999, *Environmental testing – Part 2-47: Test methods – Mounting of components, equipment and other articles for vibration, impact and similar dynamic tests*

IEC 60068-2-57:1999, *Environmental testing – Part 2-57: Tests – Test Ff: Vibration – Time-history method*

IEC 60068-2-64:1993, *Environmental testing – Part 2: Test methods – Test Fh: Vibration, broad-band random (digital control) and guidance*

ISO 266:1997, *Acoustics – Preferred frequencies*

ISO 2041:1990, *Vibration and shock – Vocabulary*

#### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2041, IEC 60068-1, IEC 60068-2-6, IEC 60068-2-27, IEC 60068-2-57 and IEC 60068-2-64, together with the following definitions, apply.

##### 3.1

##### –3 dB bandwidth

frequency bandwidth between two points in a frequency response function which is 0,707 of the maximum response when associated with a single resonance peak