

Mechanical structures for electronic equipment — Tests for IEC 60917 and IEC 60297 —

**Part 1: Climatic, mechanical tests and
safety aspects for cabinets, racks,
subracks and chassis**

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National foreword

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**Mechanical structures for electronic equipment -
Tests for IEC 60917 and IEC 60297 -
Part 1: Climatic, mechanical tests and safety aspects
for cabinets, racks, subracks and chassis
(IEC 61587-1:2007)**

Structures mécaniques
pour équipement électronique -
Essais pour la CEI 60917
et la CEI 60297 -
Partie 1: Essais climatiques, mécaniques
et aspects de la sécurité des baies, bâtis,
bacs à cartes et châssis
(CEI 61587-1:2007)

Mechanische Bauweisen
für elektronische Einrichtungen -
Prüfungen für IEC 60917
und IEC 60297 -
Teil 1: Klimatische, mechanische
Prüfungen und Sicherheitsaspekte
für Schränke, Gestelle,
Baugruppenträger und Einschübe
(IEC 61587-1:2007)

This European Standard was approved by CENELEC on 2007-04-01. 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.

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CENELEC

European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 48D/352/FDIS, future edition 2 of IEC 61587-1, prepared by SC 48D, Mechanical structures for electronic equipment, of IEC TC 48, Electromechanical components and mechanical structures for electronic equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61587-1 on 2007-04-01.

This European Standard supersedes EN 61587-1:1999.

This European Standard includes the following significant technical changes with respect to EN 61587-1:1999:

- Table 3: Performance levels for industrial atmosphere. In addition to the existing performance levels extended values (E) are implemented.
- Table 8: Vibration and shock performance levels for cabinets. Change of values in accordance to EN 60721-3-3 was necessary to meet the more practical test levels.
- Table 11: Vibration and shock performance levels for subracks. Change of values in accordance to EN 60721-3-3 was necessary to meet the more practical test levels.

The following dates were fixed:

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|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2008-01-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2010-04-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61587-1:2007 was approved by CENELEC as a European Standard without any modification.

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MECHANICAL STRUCTURES FOR ELECTRONIC EQUIPMENT – TESTS FOR IEC 60917 AND IEC 60297 –

Part 1: Climatic, mechanical tests and safety aspects for cabinets, racks, subracks and chassis

1 Scope and object

This part of IEC 61587 specifies mechanical tests, climatic tests and safety aspects for cabinets, racks, subracks and chassis as defined in the standards of the IEC 60917 series and the IEC 60297 series for indoor applications. It applies in whole or part only to the mechanical structures of cabinets, racks, subracks and chassis, but it does not apply to electronic equipment or systems. Tests dedicated to outdoor enclosures are standardized in IEC 61969-3. Some suitable parts of IEC 61587-1 apply to IEC 61969-3.

The object of this standard is to ensure physical integrity and environmental performance in cabinets, racks, subracks and chassis, taking into account the need for different levels of performance in different applications. It is intended to give the user a level of confidence in the selection of performance levels to meet as close as possible the individual application requirements.

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: Tests – Tests A: Cold*

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

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

IEC 60068-2-11, *Environmental testing – Part 2: Tests – Test Ka: Salt mist*

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

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

IEC 60068-2-42, *Environmental testing – Part 2-42: Tests – Test Kc: Sulphur dioxide test for contacts and connections*

IEC 60068-2-43, *Environmental testing – Part 2-43: Tests – Test Kd: Hydrogen sulphide test for contacts and connections*

IEC 60068-2-49, *Environmental testing – Part 2: Tests – Guidance to test Kc: Sulphur dioxide test for contacts and connections*

IEC 60068-2-52, *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution)*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60297 (all parts), *Dimensions of mechanical structures of the 482,6 mm (19 in) series*

IEC 60512-1-1, *Connectors for electronic equipment – Tests and measurements – Part 1-1: General examination – Test 1a: Visual examination*

IEC 60529, *Degrees of protection provided by enclosures (IP code)*

IEC 60603-2, *Connectors for frequencies below 3 MHz for use with printed boards – Part 2: Detail specification for two – part connectors with assessed quality, for printed boards, for basic grid of 2,54 mm (0,1 in) with common mounting features*

IEC 60654-4, *Operating conditions for industrial-process measurement and control equipment – Part 4: Corrosive and erosive influences*

IEC 60721-3-3, *Classification of environmental conditions – Part 3-3: Classification of groups of environmental parameters and their severities – Stationary use at weatherprotected locations*

IEC 60917, (all parts), *Modular order for the development of mechanical structures for electronic equipment practices*

IEC 60950-1, *Information technology equipment – Safety – Part 1: General requirements*

IEC 61010-1, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements*

IEC 61076-4-100, *Connectors for electronic equipment – Part 4-100: Printed board connectors with assessed quality – Detail specification for two-part connector modules having a grid of 2,5 mm for printed boards and backplanes*

IEC 61969-3, *Mechanical structures for electronic equipment – Outdoor enclosures – Part 3: Sectional specification – Climatic, mechanical tests and safety aspects for cabinets and cases*

3 General

The specified levels of performance and kinds of tests of this standard can be combined as required. Compliance to individual subclauses and levels is permissible. Individual tests and severities are referred to by letters and numbers (see Table 1 for examples which show a selection of representative and well-known values from each subclause and relevant table).

The various tests should be performed using the same specimen wherever it is possible. Experience has shown that the sequence of tests listed in this standard (see also IEC 60068-1) enables the test sequence to be performed using the same test specimen except where the individual test results preclude further testing of the same specimen, i.e. the test damages (destroys) the specimen.

Table 1 – Examples showing references to tests

Test	Subrack IEC 60297 series	Subrack IEC 60917 series	Cabinet
Climatic	C1 C2 C3		
Industrial atmosphere	A1 A2 A3		
Static load	SL1	SL2 SL3 SL4	SL5 SL6 SL7
Dynamic load (shock and vibration)	DL1 DL2 DL3		DL4 DL5 DL6
Impact	–	–	K1 K2 K3
Protection (IP)	IP20	IP20	IP20 IP30 IP42 IP54
Seismic performance			
Shielding performance			

Application example:

A subrack in accordance with IEC 60917-2-2 complies with the following test requirements:

- climatic: C2 (see Table 2);
- industrial atmosphere: A1 (see Table 3);
- static load: SL2 (see Table 6);
- shock and vibration: DL1 (see Table 11);
- safety aspects: 6.1;
- protection to: IP30 (see Table 13).

4 Climatic tests

4.1 General

It is the objective of the climatic tests to ensure that cabinets, racks and subracks will survive the particular environment in which they will normally operate without degradation or creating a hazard.

Climatic tests shall be selected by reference to the application examples given in Table 2 for cabinets, racks and subracks.

In order to claim compliance at a given level, all test criteria for that requirement level shall be met.