*भारतीय मानक*

***Indian Standard***

**IS 17050 : 2023**
**IEC 62262 : 2001 +AMD1 : 2021**

# बाहरी यांत्रिक प्रभावों (आईके कोड) के खिलाफ विद्युत उपकरणों के लिए घेरो द्वारा प्रदान की जाने वाली सुरक्षा की डिग्री

*( पहला पुनरीक्षण )*

# Degrees of Protection Provided by Enclosures for Electrical Equipment Against External Mechanical Impacts (IK Code)

*( First Revision )*

ICS 29.020



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Basic Electrotechnical Standard and Power Quality Sectional Committee, ETD 01

NATIONAL FOREWORD

This Indian Standard (First Revision) which is identical with IEC 62262 : 2002 + Amd 1 : 2021 'Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)' issued by the International Electrotechnical Commission (IEC) was adopted by the Bureau of Indian Standards on the recommendation of the Basic Electrotechnical Standard and Power Quality Sectional Committee and approval of the Electrotechnical Division Council.

This standard was first published as IS 17050 : 2018 'Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK Code)' based on IEC 62262 : 2002. This revision has been undertaken to take into consideration the developments that have taken place subsequently and also to align with the latest version of IEC 62262 : 2002 + Amd 1 : 2021.

The text of IEC Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminologies and conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
b) Comma (,) has been used as a decimal marker, while in Indian Standards the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted, are listed below along with their degree of equivalence for the editions indicated:

| *International Standard* | *Corresponding Indian Standard* | *Degree of Equivalence* |
|---|---|---|
| IEC 60068-1 : 2013 Environmental testing — Part 1: General and guidance | IS/IEC 60068-1 : 2013 Environmental testing: Part 1 General and guidance | Identical |

The technical committee has reviewed the provisions of the following international standards referred in this adopted standard and decided that they are acceptable for use in conjunction with this standard.

| *International Standard* | *Title* |
|---|---|
| IEC 60050 (826) : 1982 | International electrotechnical vocabulary — Chapter 826: Electrical |
| IEC 60068-2-75 : 1997 | Environmental testing — Part 2: Tests — Test Eh: Hammer tests |

Only the English language text has been retained while adopting it in this Indian Standard, and as such, the page numbers given here are not the same as in the IEC Publication.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding of numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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# INTRODUCTION

This standard describes a system for classifying the degrees of protection provided by enclosures for electrical equipment against external mechanical impacts. Whilst this system is suitable for use with most types of electrical equipment, it should not be assumed that all the listed degrees of protection are applicable to a particular type of equipment. The manufacturer of the equipment should be consulted to determine the degrees of protection available and the parts of equipment to which the stated degree of protection applies.

The adoption of this classification system, wherever possible, should promote uniformity in the methods of describing the protection provided by the enclosure and in the tests to prove the various degrees of protection. It should also reduce the number of types of test devices necessary to test a wide range of products.

*Indian Standard*

# DEGREES OF PROTECTION PROVIDED BY ENCLOSURES FOR ELECTRICAL EQUIPMENT AGAINST EXTERNAL MECHANICAL IMPACTS (IK CODE)

*( First Revision )*

## 1 Scope

This document refers to the classification of the degrees of protection provided by enclosures against external mechanical impacts when the rated voltage of the protected equipment is not greater than 72,5 kV.

The object of this document is to give

a) the definitions for the degrees of protection provided by enclosures of electrical equipment as regards protection of the equipment inside the enclosure against harmful effects of mechanical impacts;
b) the designations for the degrees of protection;
c) the requirements for each designation;
d) the tests to be performed to verify that the enclosure meets the requirements of this document.

It will remain the responsibility of individual technical committees to decide on the extent and manner in which the classification is used in their standards and to define the "enclosure" as it applies to their equipment and to ensure that for a given classification, the tests do not differ from those specified in this document. If necessary, complementary requirements can be included in the relevant product standard.

For a particular type of equipment, a product committee can specify different requirements provided that at least the same level of safety is ensured.

This document deals only with enclosures that are in all other respects suitable for their intended use as specified in the relevant product standard and which, from the point of view of materials and workmanship, ensure that the claimed degrees of protection are maintained under the normal conditions of use.

## 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.

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

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

## 3 Terms and definitions

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

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

- IEC Electropedia: available at http://www.electropedia.org/

- ISO Online browsing platform: available at http://www.iso.org/obp

**3.1**
**enclosure**
part providing protection of equipment against certain external influences and, in any direction, protection against direct contact

Note 1 to entry: This definition needs the following explanations under the scope of this document:

a) Enclosures provide protection of equipment against harmful effects of mechanical impacts;

b) Barriers, shapes of openings or any other means – whether attached to the enclosure or formed by the enclosed equipment – suitable to prevent or limit the penetration of the specified test probes are considered as a part of the enclosure, except when they can be removed without the use of a key or tool.

[SOURCE: IEC 60529:1989, 3.1, modified – Reference to IEV 826-03-12 has been deleted and the note has been replaced with a new Note 1 to entry.]

**3.2**
**degree of protection against mechanical impacts**
the extent (level) of protection of the equipment provided by an enclosure against harmful mechanical impacts and verified by standardised test methods

**3.3**
**IK code**
coding system to indicate the degree of protection provided by an enclosure against harmful external mechanical impacts

## 4 Designations

### 4.1 Arrangement of the IK code

The degree of protection provided by an enclosure against mechanical impacts is indicated by the IK code in the following way:

IK 05

Codes letters (international mechanical protection)

Characteristic group numeral (00 to 11)

### 4.2 Characteristic group numerals of the IK code and their meanings

Each characteristic group numeral represents an impact energy value as shown in table 1.

**Table 1 – Relation between IK code and impact energy**

| IK code | IK00 | IK01 | IK02 | IK03 | IK04 | IK05 | IK06 | IK07 | IK08 | IK09 | IK10 | IK11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Impact energy, J | [a] | 0,14 | 0,2 | 0,35 | 0,5 | 0,7 | 1 | 2 | 5 | 10 | 20 | 50 |
| [a] Not protected according to this document. | | | | | | | | | | | | |

NOTE IK11 can be specified on special enclosures or protection grids for extremely harsh outdoor applications. It does not substitute the sandbag test when specified in the relevant product standard.

### 4.3 Application of the IK code

In general, the degree of protection applies to the complete enclosure. If parts of the enclosure have differing degrees of protection, the latter shall be indicated separately.

### 4.4 Marking

In cases where the relevant product committee decides that the marking of the IK-code shall be required, the marking requirements shall be detailed in the relevant product standard.

Where appropriate, such a standard should also specify the method of marking which is to be used when

– one part of an enclosure has a different degree of protection to that of another part of the same enclosure,
– the mounting position has an influence on the degree of protection.

## 5 General requirements for tests

### 5.1 Atmospheric conditions for tests

Unless otherwise specified in the relevant product standard, the test shall be carried out under the standard atmospheric conditions for tests described in IEC 60068-1:

– temperature range: 15 °C to 35 °C,
– air pressure: 86 kPa to 106 kPa (860 mbar to 1 060 mbar).

When the altitude at which the test is performed is higher than 2 000 m, the height of fall shall be adjusted where necessary to result in the specified impact energy.

### 5.2 Enclosures under test

Each enclosure under test shall be in a clean and new condition, complete with all its parts in place unless otherwise specified in the relevant product standard.

### 5.3 Specifications to be given in the relevant product standard

The relevant product standard shall specify

– the definition of "enclosure" as it applies to the particular type of equipment;
– the test equipment (e.g. pendulum hammer, spring hammer or vertical hammer, see clause 7);
– the number of samples to be tested;
– the conditions for mounting, assembling and positioning the samples, e.g. by the use of an artificial surface (ceiling, floor or wall), in order to simulate intended service conditions as far as possible;
– the pre-conditioning, if any, which is to be used;
– whether to be tested energised;
– whether to be tested with any moving parts in motion;
– the number of impacts and their points of application (see 6.4).

In the absence of such specifications in the relevant product standard, the conditions of this standard shall apply.

## 6 Test to verify the protection against mechanical impacts

**6.1** The test specified in this standard is a type test.

**6.2** In order to verify the protection against mechanical impacts, blows shall be applied to the enclosure to be tested. The devices to be used for this test are described in clause 7.

**6.3** During the test the enclosure shall be mounted on a rigid support, according to the manufacturer's instructions for use. A support is considered to be sufficiently rigid if its displacement is less than or equal to 0,1 mm under the effect of an impact directly applied and whose energy corresponds to the degree of protection. Alternative mounting and support, suitable for the product, may be specified in the relevant product standard.

**6.4** The number of impacts shall be five on each exposed face unless otherwise specified in the relevant product standard. The impacts shall be evenly distributed on the faces of the enclosure(s) under test. In no case shall more than three impacts be applied in the surroundings of the same point of the enclosure. The relevant product standard shall specify the points of application of impacts.

### 6.5 Test evaluation

The relevant product standard shall specify the criteria upon which the acceptance or rejection of the enclosure is to be based, particularly

– admissible damages,
– verification criteria relative to the continuity of the safety and reliability of the equipment.

In the absence of these criteria, at least the following acceptance criterion shall apply:

– No damage is accepted that impairs the specified IP code.

## 7 Test apparatus

The test shall be done by using one of the test apparatus described in IEC 60068-2-75.

The relevant product standard shall specify which types of test apparatus are appropriate.

# Bibliography

IEC 60050-826, *International Electrotechnical Vocabulary (IEV) – Part 826: Electrical installations* (available at http://www.electropedia.org)

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

**Bureau of Indian Standards**

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**Review of Indian Standards**

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.

This Indian Standard has been developed from Doc No.: ETD 01 (20085).

## Amendments Issued Since Publication

| Amend No. | Date of Issue | Text Affected |
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