SLOVENSKI STANDARD
SIST EN 60529:1997

01-oktober-1997

Stopnja zaščite, ki jo zagotavlja ohišje (koda IP) (IEC 60529:1989) (vsebuje popravek AC:1993)

Degrees of protection provided by enclosures (IP Code)

Schutzarten durch Gehäuse (IP-Code)

Degrés de protection procurés par les enveloppes (Code IP)

Ta slovenski standard je istoveten z: **EN 60529:1991**

ICS:

13.260	Varstvo pred električnim udarom. Delo pod napetostjo	Protection against electric shock. Live working
29.100.99	Drugi sestavni deli za električne naprave	Other components for electrical equipment

SIST EN 60529:1997 **sl**

EUROPEAN STANDARD EN 60529

NORME EUROPEENNE

EUROPÄISCHE NORM October 1991

UDC 621.3:62-78:620.1 Supersedes HD 365 S3:1985

Descriptors: Electric equipment, protection, enclosure, type test, marking

ENGLISH VERSION

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES (IP CODE)
(IEC 529:1989)

Degrés de protection procurés par les enveloppes (Code IP)
(CEI 529:1989)

Schutzarten durch Gehäuse (IP-Code)
(IEC 529:1989)

This European Standard was approved by CENELEC on 1991-06-25. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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 CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 529:1989 could be accepted without textual changes, has shown that no CENELEC common modifications were necessary for the acceptance as European Standard. The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as EN 60529 on 25 June 1991.

This European Standard supersedes HD 365 S3:1985.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1992-07-01
- latest date of withdrawal of conflicting national standards	(dow)	1992-07-01

Annexes designated "normative" are part of the body of the standard. In this standard, annex ZA is normative.

ENDORSEMENT NOTICE

The text of the International Standard IEC 529:1989 was approved by CENELEC as a European Standard without any modification.

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

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

IEC Publication	Date	Title	EN/HD	Date
50(826)	1982	International Electrotechnical Vocabulary (IEV) Chapter 826: Electrical installations of buildings	HD 384.2 S1	1986
68-1	1988	Environmental testing Part 1: General and guidance	HD 323.1 S2	1988
71-2	1976	Insulation co-ordination Part 2: Application guide	HD 540.2 S1	1991

C E N E L E C
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Central Secretariat

CORRIGENDUM to EN 60529:1991

English version

Page 2, Foreword

Add after the implementation dates:

For products **not covered by a specific product standard** which have complied with HD 365 S3:1985 before 1992-07-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1997-07-01.

May 1993

NORME INTERNATIONALE
INTERNATIONAL STANDARD

CEI
IEC
529

Deuxième édition
Second edition
1989-11

DEUXIÈME IMPRESSION 1992 SECOND IMPRESSION 1992

Degrés de protection procurés par les enveloppes (Code IP)

Degrees of protection provided by enclosures (IP Code)

Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembé Genève, Suisse

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE W

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

CEI 60529
(Edition consolidée 2.1 – 2001)

Degrés de protection procurés par les enveloppes (Code IP)

IEC 60529
(Consolidated edition 2.1– 2001)

Degrees of protection provided by enclosures (IP Code)

CORRIGENDUM 2

Page 83

Applies to French text only.

Figure 6 – Appareil pour la vérification de la protection contre les jets d'eau (buse)

Au lieu de:

D*'* = 15,5 pour l'essai de 14.2.6 (deuxiéme chiffre caractéristique 6)

lire:

D*'* = 12,5 pour l'essai de 14.2.6 (deuxiéme chiffre caractéristique 6)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES

(IP Code)

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by IEC Technical Committee No. 70: Degrees of protection by enclosures.

This second edition of IEC 529 replaces the first edition of 1976.

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

Six Months' Rule	Report on Voting	Two Months' Procedure	Report on Voting
70(CO)13	70(CO)15	70(CO)16	70(CO)17

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

The following IEC publications are quoted in this standard:

Publications Nos. 50(826) (1982): International Electrotechnical Vocabulary (IEV), Chapter 826: Electrical installations of buildings.
68-1 (1988): Environmental testing, Part 1: General and guidance.
71-2 (1976): Insulation co-ordination, Part 2: Application guide.

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES

(IP Code)

INTRODUCTION

This standard describes a system for classifying the degrees of protection provided by the enclosures of electrical equipment. 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, will promote uniformity in 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.

This second edition of IEC 529 takes account of experiences with the first edition, and clarifies the requirements. It provides for an optional extension of the IP Code by an additional letter A, B, C, or D if the actual protection of persons against access to hazardous parts is higher than that indicated by the first characteristic numeral.

In general, enclosures with an IP coding to the first edition would be eligible for the same code according to this edition.

1. Scope

This standard applies to the classification of degrees of protection provided by enclosures for electrical equipment with a rated voltage not exceeding 72,5 kV.

2. Object

The object of this standard is to give:

a) Definitions for degrees of protection provided by enclosures of electrical equipment as regards:

1) protection of persons against access to hazardous parts inside the enclosure;

2) protection of the equipment inside the enclosure against ingress of solid foreign objects;

3) protection of the equipment inside the enclosure against harmful effects due to the ingress of water.

b) Designations for these degrees of protection.

c) Requirements for each designation.

d) Tests to be performed to verify that the enclosure meets the requirements of this standard.

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 "enclosure" as it applies to their equipment. However, it is recommended that for a given classification the tests do not differ from those specified in this standard. If necessary, complementary requirements may be included in the relevant product standard. A guide for the details to be specified in relevant product standards is given in Annex B.

For a particular type of equipment, a Technical Committee may specify different requirements provided that at least the same level of safety is ensured.

This standard 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.

This standard is also applicable to empty enclosures provided that the general test requirements are met and that the selected degree of protection is suitable for the type of equipment.

Measures to protect both the enclosure and the equipment inside the enclosure against external influences or conditions such as

- mechanical impacts
- corrosion
- corrosive solvents (e. g. cutting liquids)
- fungus
- vermin
- solar radiation
- icing
- moisture (e. g. produced by condensation)
- explosive atmospheres

and the protection against contact with hazardous moving parts external to the enclosure (such as fans),

are matters for the relevant product standard.

Barriers external to the enclosure and not attached to it and obstacles which have been provided solely for the safety of personnel are not considered as a part of the enclosure and are not dealt with in this standard.

3. Definitions

For the purpose of this standard, the following definitions apply:

3.1 *Enclosure*

A part providing protection of equipment against certain external influences and, in any direction, protection against direct contact (IEV 826-03-12)*.

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* IEC 50(826).

Note. — This definition taken from the existing International Electrotechnical Vocabulary (IEV) needs the following explanations under the scope of this standard:
1) Enclosures provide protection of persons or livestock against access to hazardous parts.

2) 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.

3.2 *Direct contact*

Contact of persons or livestock with live parts (IEV 826-03-05).

Note. — This IEV definition is given for information. In this standard "Direct contact" is replaced by "Access to hazardous parts".

3.3 *Degree of protection*

The extent of protection provided by an enclosure against access to hazardous parts, against ingress of solid foreign objects and/or against ingress of water and verified by standardized test methods.

3.4 *IP Code*

A coding system to indicate the degrees of protection provided by an enclosure against access to hazardous parts, ingress of solid foreign objects, ingress of water and to give additional information in connection with such protection.

3.5 *Hazardous part*

A part that is hazardous to approach or touch.

3.5.1 *Hazardous live part*

A live part which, under certain conditions of external influences, can give an electric shock (see IEC 536, at present Document 64(CO)196).

3.5.2 *Hazardous mechanical part*

A moving part, other than a smooth rotating shaft, that is hazardous to touch.

3.6 *Protection provided by an enclosure against access to hazardous parts*

The protection of persons against

- contact with hazardous low-voltage live parts,
- contact with hazardous mechanical parts,
- approach to hazardous high-voltage live parts below adequate clearance inside an enclosure.

Note. — This protection may be provided
- by means of the enclosure itself,
- by means of barriers as part of the enclosure or distances inside the enclosure.

3.7 *Adequate clearance for protection against access to hazardous parts*

A distance to prevent contact or approach of an access probe to a hazardous part.

3.8 *Access probe*

A test probe simulating in a conventional manner a part of a person or a tool, or the like, held by a person to verify adequate clearance from hazardous parts.

3.9 *Object probe*

A test probe simulating a solid foreign object to verify the possibility of ingress into an enclosure.

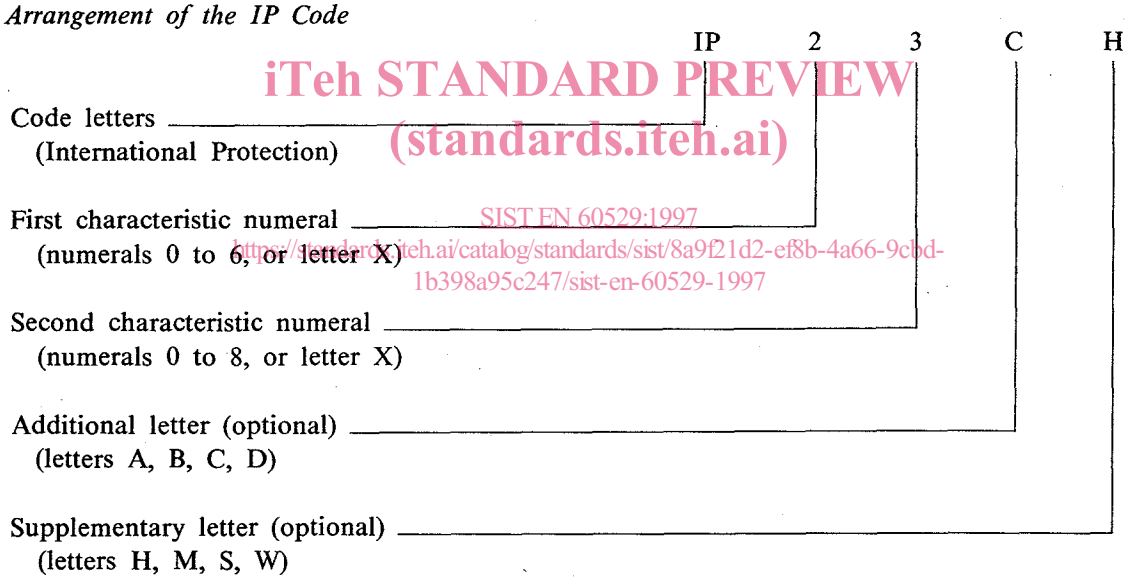
3.10 *Opening*

A gap or aperture in an enclosure which exists or may be formed by the application of a test probe at the specified force.

4. Designations

The degree of protection provided by an enclosure is indicated by the IP Code in the following way:

4.1 *Arrangement of the IP Code*



Where a characteristic numeral is not required to be specified, it shall be replaced by the letter "X" ("XX" if both numerals are omitted).

Additional letters and/or supplementary letters may be omitted without replacement.

Where more than one supplementary letter is used, the alphabetic sequence shall apply.

If an enclosure provides different degrees of protection for different intended mounting arrangements, the relevant degrees of protection shall be indicated by the manufacturer in the instructions related to the respective mounting arrangements.

Details for the marking of an enclosure are given in Clause 10.

4.2 *Elements of the IP Code and their meanings*

A brief description of the IP Code elements is given in the following chart. Full details are specified in the clauses indicated in the last column.

Element	Numerals or letters	Meaning for the protection of *equipment*	Meaning for the protection of *persons*	Ref.
Code letters	IP	–	–	–
First characteristic numeral	0 1 2 3 4 5 6	Against ingress of solid foreign objects (non-protected) ⩾ 50 mm diameter ⩾ 12,5 mm diameter ⩾ 2,5 mm diameter ⩾ 1,0 mm diameter dust-protected dust-tight	Against access to hazardous parts with (non-protected) back of hand finger tool wire wire wire	Cl. 5
Second characteristic numeral	0 1 2 3 4 5 6 7 8	Against ingress of water with harmful effects (non-protected) vertically dripping dripping (15° tilted) spraying splashing jetting powerful jetting temporary immersion continuous immersion	–	Cl. 6
Additional letter (optional)	A B C D	–	Against access to hazardous parts with: back of hand finger tool wire	Cl. 7
Supplementary letter (optional)	H M S W	Supplementary information specific to: High-voltage apparatus Motion during water test Stationary during water test Weather conditions	–	Cl. 8

4.3 *Examples for the use of letters in the IP Code*

The following examples are to explain the use and arrangement of letters in the IP Code.

For more comprehensive examples see Clause 9.

IP44 – no letters, no options;

IPX5 – omitting first characteristic numeral;