SLOVENSKI STANDARD
SIST EN 60298:2001

01-marec-2001

A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV

A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV

Metallgekapselte Wechselstrom-Schaltanlagen für Bemessungsspannungen über 1 kV bis einschließlich 52 kV

Appareillage sous enveloppe métallique pour courant alternatif de tensions assignées supérieures à 1 kV et inférieures ou égales à 52 kV

Ta slovenski standard je istoveten z: **EN 60298:1996**

ICS:

29.130.99	Druge stikalne in krmilne naprave	Other switchgear and controlgear

SIST EN 60298:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60298

January 1996

ICS 29.120.60

Supersedes HD 187 S5:1992

Descriptors: High-voltage switchgear and controlgear (1 kV < rated voltage ≤ 52 kV), switches, disconnectors, switch-disconnectors, fuse-combination units

English version

A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV (IEC 298:1990 + corrigendum 1995 + A1:1994)

Appareillage sous enveloppe métallique pour courant alternatif de tensions assignées supérieures à 1 kV et inférieures ou égales à 52 kV (CEI 298:1990 + corrigendum 1995 + A1:1994)

Metallgekapselte Wechselstrom-Schaltanlagen für Nennspannungen über 1 kV bis einschließlich 52 kV (IEC 298:1990 + corrigendum 1995 + A1:1994)

This European Standard was approved by CENELEC on 1995-11-28. 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 text of the International Standard IEC 298:1990 with its corrigendum April 1995 and its amendment 1:1994, prepared by SC 17C, High-voltage enclosed switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60298 on 1995-11-28 without any modification.

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) 1996-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-12-01

For products which have complied with HD 187 S5:1992 before 1996-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2001-12-01.

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes AA, BB, DD, EE, FF, ZA and ZB are normative and annex ZC is informative.
Annexes ZA, ZB and ZC have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 298:1990 with its corrigendum April 1995 and its amendment 1:1994 was approved by CENELEC as a European Standard without any modification.

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.

Publication	Year	Title	EN/HD	Year
IEC 50(151)	1978	International electrotechnical vocabulary Chapter 151: Electrical and magnetic devices	-	-
IEC 50(441)	1984	Chapter 441: Switchgear, controlgear and fuses	-	-
IEC 56 (mod)	1987	High-voltage alternating-current circuit-breakers	HD 348 S6[1)]	1995
IEC 129	1984	Alternating current disconnectors and earthing switches	EN 60129	1994
IEC 137	1984	Bushings for alternating voltages above 1 kV	-	-
IEC 243-1 (mod)	1988	Methods of test for electric strength of solid insulating materials - Part 1: Tests at power frequencies	HD 559.1 S1	1991
IEC 270	1981	Partial discharge measurements	-	-
IEC 466	1987	A.C. insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 38 kV	-	-
IEC 480	1974	Guide to the checking of sulphur hexafluoride (SF6) taken from electrical equipment	-	-
IEC 517	1990	Gas-insulated metal-enclosed switchgear for rated voltages of 72,5 kV and above	EN 60517[2)]	1996

1) HD 348 S6 includes A1:1992 + A2:1995 to IEC 56.

2) EN 60517 includes corrigendum April 1995 + A1:1994 to IEC 517.

Publication	Year	Title	EN/HD	Year
IEC 529	1976	Classification of degrees of protection provided by enclosures	HD 365 S3[3]	1985
IEC 694	1980	Common clauses for high-voltage switchgear and controlgear standards	HD 448 S3[4]	1995

3) HD 365 S3 is superseded by EN 60529:1991, which is based on IEC 529:1989, *Degrees of protection provided by enclosures (IP Code).*

4) HD 448 S3 includes A1:1985 + A2:1993 to IEC 694.

Annex ZB (normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions. If it affects harmonization, it forms part of the European Standard or Harmonization Document.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

Clause	Special national condition
4.1.1	**Belgium** (NBN C 64-701) Rated voltages of 41,5 kV and 82,5 kV are also in use.

Annex ZC (informative)

A-deviations

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN/CENELEC member.

This European Standard falls under Directive 93/38/EEC.

NOTE (from CEN/CENELEC IR Part 2, 3.1.9): Where standards fall under EC Directives, it is the view of the Commission of the European Communities (OJ No C 59, 1982-03-09) that the effect of the decision of the Court of Justice in case 815/79 Cremonini/Vrankovich (European Court Reports 1980, p. 3583) is that compliance with A-deviations is no longer mandatory and that the free movement of products complying with such a standard should not be restricted except under the safeguard procedure provided for in the relevant Directive.

A-deviations in an EFTA-country are **valid instead** of the relevant provisions of the European Standard in that country until they have been removed.

Clause	Deviation
5.3.2	**Finland** (Resolution of the Ministry of Trade and Industry on Electrical Safety Regulations 205/74) The current density in the earthing conductor of copper shall not exceed $165/\sqrt{t/s}$ A/mm²; of aluminium $100/\sqrt{t/s}$ A/mm² and of iron $70/\sqrt{t/s}$ A/mm² under specified earth fault conditions, where t means the maximum time (in s) of earth fault current.
5.104	**Italy** (DPR N° 547/55 clauses 293 and 345) To know if the operating position of the disconnector or earthing switch has met the condition "the position of the disconnector or earthing switch is indicated by a reliable indication device" is not applicable.

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
298

Troisième édition
Third edition
1990-12

Appareillage sous enveloppe métallique pour courant alternatif de tensions assignées supérieures à 1 kV et inférieures ou égales à 52 kV

A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV

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 XA

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

CONTENTS

SECTION SEVEN — RULES FOR ROUTINE TESTS

SECTION EIGHT — GENERAL INFORMATION

INTERNATIONAL ELECTROTECHNICAL COMMISSION

A.C. METAL-ENCLOSED SWITCHGEAR AND CONTROLGEAR FOR RATED VOLTAGES ABOVE 1 kV AND UP TO AND INCLUDING 52 kV

FOREWORD

1) The formal decisions or agreements of the I E C 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 I E C expresses the wish that all National Committees should adopt the text of the I E C recommendation for their national rules in so far as national conditions will permit. Any divergence between the I E C recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.
4) The I E C has not laid down any procedure concerning marking as an indication of approval and has no responsibility when an item of equipment is declared to comply with one of its recommendations.

PREFACE

This standard has been prepared by Sub-Committee 17C: High-voltage enclosed switchgear and controlgear, of I E C Technical Committee No. 17: Switchgear and controlgear.

It forms the third edition of I E C 298 and replaces the second edition issued in 1981 and Amendment No. 1 (1987).

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

Six Months' Rule	Reports on Voting
17C(CO)34 17C(CO)58 17C(CO)65	17C(CO)39, 39A and 39B 17C(CO)59 17C(CO)68

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

Annexes AA to GG are normative.

The following I E C publications are quoted in this standard:

Publications Nos.:
- 50(151) (1978): International Electrotechnical Vocabulary (IEV), Chapter 151: Electrical and magnetic devices.
- 50(441) (1984): Chapter 441: Switchgear, controlgear and fuses.
- 56 1987): High-voltage alternating-current circuit-breakers.
- 129 (1984): Alternating current disconnectors (isolators) and earthing switches.
- 137 (1984): Bushings for alternating voltages above 1000 V.
- 243-1 (1988): Methods of test for electric strength of solid insulating materials, Part 1: Tests at power frequencies.
- 270 (1981): Partial discharge measurements.
- 466 (1987): A.C. insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 38 kV.
- 480 (1974): Guide to the checking of sulphur hexafluoride (SF_6) taken from electrical equipment.
- 517 (1990): Gas-insulated metal-enclosed switchgear for rated voltages of 72.5 kV and above.
- 529 (1976): Classification of degrees of protection provided by enclosures.
- 694 (1980): Common clauses for high-voltage switchgear and controlgear standards.

A.C. METAL-ENCLOSED SWITCHGEAR AND CONTROLGEAR FOR RATED VOLTAGES ABOVE 1 kV AND UP TO AND INCLUDING 52 kV

SECTION ONE — GENERAL

1. Scope

This standard specifies requirements for factory-assembled metal-enclosed switchgear and controlgear for alternating current of rated voltages above 1 kV and up to and including 52 kV for indoor and outdoor installation, and for service frequencies up to and including 60 Hz.

For metal-enclosed switchgear and controlgear containing gas-filled compartments, the design pressure is limited to a maximum of 3 bar (gauge). Gas-filled compartments having a design pressure exceeding 3 bar (gauge) shall be designed and tested in accordance with I E C 517.

Metal-enclosed switchgear and controlgear for special use, for example in flammable atmospheres, in mines or on board ships, may be subject to additional requirements.

This standard does not deal with components contained in metal-enclosed switchgear and controlgear for which individual specifications exist.

NOTES

1 Switchgear and controlgear assemblies having an insulation enclosure are covered by I E C 466.

2 Metal-enclosed switchgear and controlgear for rated voltages above 52 kV insulated by air at atmospheric pressure may be covered by this standard taking into account the insulation levels of I E C 694.

3 Liquid-insulated hermetically sealed compartments are equal to gas-filled compartments with respect to independence from ambient atmosphere.

SECTION TWO — SERVICE CONDITIONS

2. Normal and special service conditions

Unless otherwise specified in this standard, the metal-enclosed switchgear and controlgear is designed to be used under normal service conditions.

Refer to Clause 2 of I E C 694.

For outdoor installation it is assumed that inside the enclosure, normal indoor conditions prevail. If necessary, appropriate measures shall be taken, such as air conditioning, so that common indoor components may be used. This does not apply to gas-filled compartments.

SECTION THREE — TERMS AND DEFINITIONS

3. Definitions

For the definitions of general terms used in this standard, reference is made to the International Electrotechnical Vocabulary (IEV), namely I E C 50 (441) and I E C 50 (151).

The following definitions apply for the purpose of this standard:

3.101 *Switchgear and controlgear*

A general term covering switching devices and their combination with associated control, measuring, protective and regulating equipment, also assemblies of such devices and equipment with associated interconnections, accessories, enclosures and supporting structures (IEV 441-11-01).

3.102 *Metal-enclosed switchgear and controlgear*

Switchgear and controlgear assemblies with an external metal enclosure intended to be earthed and complete except for external connections (IEV 441-12-04).

NOTE — The metal-enclosed switchgear and controlgear is subdivided into three types:

— metal-clad switchgear and controlgear;
— compartmented switchgear and controlgear (with one or more non-metallic partitions);
— cubicle switchgear and controlgear.

3.102.1 *Metal-clad switchgear and controlgear*

Metal-enclosed switchgear and controlgear in which components are arranged in separate compartments with metal partitions intended to be earthed.

NOTES

1 This term applies to metal-enclosed switchgear and controlgear with metal partitions providing the degree of protection included in table 1 (or higher) and having separate compartments at least for the following components:

a) each main switching device;

b) components connected to one side of a main switching device, for example feeder circuit;

c) components connected to the other side of the main switching device, for example busbars; where more than one set of busbars is provided, each set being in a separate compartment.

2 Metal-enclosed switchgear and controlgear having metal partitions and meeting all the requirements of note 1, may utilize an insulating shutter barrier as a part of the shutter arrangement, the combination of which provides the degree of protection included in table 1 (or higher) and satisfies the requirements of Sub-clause 5.103.1 for partitions and shutters made of insulating material.

3.102.2 *Compartmented switchgear and controlgear* (with non-metallic partitions)

Metal-enclosed switchgear and controlgear in which components are arranged in separate compartments as for metal-clad switchgear and controlgear, but with one or more non-metallic partitions providing the degree of protection included in table 1 (or higher).

NOTE — Metal-enclosed switchgear and controlgear in which the main circuit components are individually embedded in solid insulating material can be considered as an alternative, provided that the conditions specified in I E C 466 are met.

3.102.3 *Cubicle switchgear and controlgear*

Metal-enclosed switchgear and controlgear, other than metal-clad and compartmented switchgear and controlgear.

NOTE — This term applies to switchgear and controlgear having a metal enclosure and having either:

a) a number of compartments less than that required for metal-clad or compartmented switchgear and controlgear;

b) partitions having a degree of protection lower than those included in table 1;

c) no partitions.

3.103 *Transport unit*

A part of metal-enclosed switchgear and controlgear suitable for shipment without being dismantled.

3.104 *Functional unit*

A part of metal-enclosed switchgear and controlgear comprising all the components of the main circuits and auxiliary circuits that contribute to the fulfilment of a single function (IEV 441-13-04).

NOTE — Functional units may be distinguished according to the function for which they are intended, for example: incoming unit, outgoing unit, etc.

3.105 *Enclosure*

A part of metal-enclosed switchgear and controlgear providing a specified degree of protection of equipment against external influences and a specified degree of protection against approach to or contact with live parts and against contact with moving parts (IEV 441-13-01).

3.106 *Compartment*

A part of metal-enclosed switchgear and controlgear enclosed except for openings necessary for interconnection, control or ventilation (IEV 441-13-05).

NOTES

1 A compartment may be designated by the main component contained therein, e.g. circuit-breaker compartment, busbar compartment, etc.

2 Openings necessary for interconnection between compartments are closed with bushings or other equivalent means.

3 Busbar compartments may extend through several functional units without the need for bushings or other equivalent means.

3.107 *Gas-filled compartment*

A compartment of metal-enclosed switchgear and controlgear in which the gas pressure is maintained by one of the following systems:

a) controlled pressure system;

b) closed pressure system;

c) sealed pressure system.

(Refer to annex GG.)

NOTE — Several gas-filled compartments may be interconnected to a common gas-system (gas-tight assembly).

3.108 *Component*

An essential part of the main or earthing circuits of metal-enclosed switchgear and controlgear which serves a specific function (for example circuit-breaker, disconnector, switch, fuse, instrument transformer, bushing, busbar, etc.).

3.109 *Partition*

A part of metal-enclosed switchgear and controlgear separating one compartment from other compartments (IEV 441-13-06).