

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**High-voltage switchgear and controlgear –  
Part 212: Compact Equipment Assembly for Distribution Substation (CEADS) for  
AC voltages up to 52 kV**

**Appareillage à haute tension –  
Partie 212: Ensemble compact d'équipement pour poste de distribution (ECEPD)  
pour les tensions alternatives inférieures ou égales à 52 kV**



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IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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## CONTENTS

FOREWORD .....	6
INTRODUCTION .....	8
1 Scope .....	9
2 Normative references .....	9
3 Terms and definitions .....	11
3.1 General terms and definitions .....	11
3.2 Assemblies of switchgear and controlgear .....	11
3.3 Parts of assemblies .....	12
3.4 Switching devices .....	13
3.5 Parts of switchgear and controlgear .....	13
3.6 Operational characteristics of switchgear and controlgear .....	13
3.7 Characteristic quantities .....	13
3.8 Index of definitions .....	13
4 Normal and special service conditions .....	13
4.1 Normal service conditions .....	13
4.2 Special service conditions .....	14
5 Ratings .....	15
5.1 General .....	15
5.2 Rated voltage .....	16
5.3 Rated insulation level .....	16
5.4 Rated frequency ( $f_r$ ) .....	16
5.5 Rated continuous current ( $I_r$ ) .....	16
5.6 Rated short-time withstand current ( $I_k$ ) .....	17
5.7 Rated peak withstand current ( $I_{pk}$ ) .....	17
5.9 Rated supply voltage of auxiliary and control circuits ( $U_a$ ) .....	18
5.10 Rated supply frequency of auxiliary and control circuits .....	18
5.11 Rated pressure of compressed gas supply for controlled pressure systems .....	18
5.101 Rated power and total losses of CEADS .....	19
5.102 Ratings of the internal arc classification (IAC) .....	19
6 Design and construction .....	20
6.1 Requirements for liquids in switchgear and controlgear .....	21
6.2 Requirements for gases in switchgear and controlgear .....	21
6.3 Earthing of switchgear and controlgear .....	21
6.4 Auxiliary and control equipment and circuits .....	22
6.5 Dependent power operation .....	22
6.6 Stored energy operation .....	22
6.7 Independent unlatched operation (independent manual or power operation) .....	22
6.8 Manually operated actuators .....	22
6.9 Operation of releases .....	22
6.10 Pressure/level indication .....	22
6.11 Nameplates .....	22
6.12 Locking devices .....	23
6.13 Position indication .....	23
6.14 Degrees of protection provided by enclosures .....	23
6.15 Creepage distances for outdoor insulators .....	24

6.16	Gas and vacuum tightness .....	24
6.17	Tightness for liquid systems .....	24
6.18	Fire hazard (flammability) .....	24
6.19	Electromagnetic compatibility (EMC) .....	24
6.20	X-ray emission .....	24
6.21	Corrosion .....	24
6.22	Filling levels for insulation, switching and/or operation .....	24
6.101	Protection against mechanical stresses .....	25
6.102	Protection of the environment due to internal defects .....	25
6.103	Internal arc fault .....	25
6.104	Enclosures .....	26
6.105	Sound emission .....	26
6.106	Electromagnetic fields .....	26
6.107	Solar radiation .....	26
7	Type tests .....	27
7.1	General .....	27
7.2	Dielectric tests .....	28
7.3	Radio interference voltage (RIV) test .....	32
7.4	Resistance measurement .....	32
7.5	Continuous current tests .....	32
7.6	Short-time withstand current and peak withstand current tests .....	32
7.7	Verification of the protection .....	33
7.8	Tightness tests .....	33
7.9	Electromagnetic compatibility tests (EMC) .....	33
7.10	Additional tests on auxiliary and control circuits .....	34
7.11	X-radiation test for vacuum interrupter .....	34
7.101	Temperature-rise tests .....	35
7.102	Internal arc test .....	42
7.103	Verification of making and breaking capacities of high-voltage functional unit .....	45
7.104	Mechanical operation tests .....	45
7.105	Mechanical stability test .....	45
7.106	Pressure withstand test for gas-filled compartments .....	45
7.107	Measurements of leakage currents of non-metallic enclosures .....	46
7.108	Weatherproofing test .....	46
7.109	Tightness and mechanical strength for liquid filled compartments .....	46
7.110	Measurement or calculation of electromagnetic fields .....	46
8	Routine tests .....	46
8.1	General .....	46
8.2	Dielectric tests on the main circuit .....	47
8.3	Tests on auxiliary and control circuits .....	48
8.4	Measurement of the resistance of the main circuit .....	48
8.5	Tightness test .....	48
8.6	Design and visual checks .....	48
8.101	Mechanical operation tests on high-voltage functional unit .....	48
8.102	Pressure tests of gas-filled compartments .....	48
8.103	Tests of auxiliary electrical, pneumatic and hydraulic devices .....	49
8.104	Measurement of the winding resistance .....	49
8.105	Measurement of the voltage ratio and check of phase displacement .....	49
8.106	Measurement of the short circuit impedance and load losses .....	49

8.107	Measurement of no-load loss and current .....	49
8.108	Inspection of the low-voltage functional unit, including inspection of wiring, operational performance and function .....	49
8.109	Checking of protective measures and of the electrical continuity of the protective circuits of the low-voltage functional unit.....	49
8.110	Tests after CEADS assembly on site.....	49
9	Guide to the selection of CEADS (informative).....	49
9.1	General.....	49
9.2	Selection of rated values.....	50
9.3	Cable-interface considerations.....	50
9.4	Continuous or temporary overload due to changed service conditions.....	50
9.5	Environmental aspects.....	50
9.101	Selection of internal arc classification .....	50
9.102	Summary of technical requirements and ratings for CEADS.....	52
10	Information to be given with enquiries, tenders and orders (informative).....	56
10.1	General.....	56
10.2	Information with enquiries and orders .....	56
10.3	Information with tenders.....	57
11	Transport, storage, installation, operating instructions and maintenance.....	58
11.1	General.....	58
11.2	Conditions during transport, storage and installation.....	58
11.3	Installation .....	58
11.4	Operating instructions.....	59
11.5	Maintenance .....	60
11.101	Dismantling, recycling and disposal at the end of service life .....	60
12	Safety.....	60
12.1	General.....	60
12.101	Electrical aspects.....	61
12.102	Mechanical aspects .....	61
12.103	Thermal aspects .....	61
12.104	Internal arc aspects.....	61
13	Influence of the product on the environment .....	61
Annex A (normative)	Method for testing CEADS under conditions of arcing due to an internal arc fault.....	62
A.1	General.....	62
A.2	Room simulation .....	62
A.3	Indicators (for assessing the thermal effects of the gases).....	62
A.4	Tolerances for geometrical dimensions of test arrangements .....	64
A.5	Test parameters.....	64
A.6	Test procedure.....	64
A.7	Designation of the internal arc classification .....	66
Annex B (normative)	Test to verify the sound level of a CEADS.....	75
B.1	Purpose .....	75
B.2	Test object.....	75
B.3	Test method.....	75
B.4	Measurements .....	75
B.5	Presentation and calculation of the results .....	75
Annex C (informative)	Types and application of CEADS.....	76

C.1	Type of CEADS.....	76
C.2	Application of CEADS .....	76
	Bibliography.....	79
	Figure 1 – Test diagram in case of type-tested high-voltage functional unit.....	37
	Figure 2 – Test diagram in case of non-type-tested high-voltage functional unit.....	38
	Figure 3 – Diagram of the temperature-rise test alternative method .....	39
	Figure 4 – Diagram for the open-circuit test .....	40
	Figure A.1 – Mounting frame for vertical indicators .....	67
	Figure A.2 – Horizontal indicators .....	67
	Figure A.3 – Protection of operators in front of classified side(s) of CEADS .....	68
	Figure A.4 – Protection of general public around the CEADS .....	68
	Figure A.5 – Protection of operators in front of classified side(s) of CEADS having a pressure relief volume below the floor.....	69
	Figure A.6 – Protection of the general public around the CEADS having a pressure relief volume below the floor .....	70
	Figure A.7 – Selection of tests on high-voltage functional unit for class I, C-A .....	71
	Figure A.8 – Selection of tests on high-voltage functional unit for class IAC-B .....	72
	Figure A.9 – Selection of tests on high-voltage interconnection for class IAC-A .....	73
	Figure A.10 – Selection of tests on high-voltage interconnection for class IAC-B .....	74
	Figure C.1 – Application of CEADS .....	77
	Figure C.2 – CEADS Type G.....	77
	Figure C.3 – CEADS Type A.....	78
	Figure C.4 – CEADS Type I .....	78
	Table 1 – Locations, causes and examples of measures decreasing the probability of internal arc faults.....	51
	Table 2 – Examples of measures limiting the consequences of internal arc faults .....	51
	Table 3 – Summary of technical requirements, ratings for CEADS – Service conditions .....	53
	Table 4 – Summary of technical requirements, ratings for CEADS – Ratings of the CEADS .....	53
	Table 5 – Summary of technical requirements, ratings for CEADS – Design and construction of the CEADS .....	55

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

**Part 212: Compact Equipment Assembly  
for Distribution Substation (CEADS) for AC voltages up to 52 kV**

## FOREWORD

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IEC 62271-212 has been prepared by subcommittee 17C: Assemblies, of IEC technical committee 17: High-voltage switchgear and controlgear. It is an International Standard.

This second edition cancels and replaces the first edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) clause numbering aligned with IEC 62271-1:2017,
- b) rewording of title and scope of the document,
- c) implement changes on internal arc definition and testing following the evolution of prefabricated substation concept according to IEC 62271-202,
- d) general review of main test procedures such as temperature rise or dielectric test on interconnections, considering control equipment, communication, smart grid devices and integration of components,

e) general review of installation, operation, safety and maintenance requirements.

The text of this International Standard is based on the following documents:

Draft	Report on voting
17C/845/FDIS	17C/850/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

This International Standard should be read in conjunction with IEC 62271-1:2017, to which it refers and which is applicable unless otherwise specified. In order to simplify the indication of corresponding requirements, the same numbering of clauses and subclauses is used as in IEC 62271-1:2017. Amendments to these clauses and subclauses are given under the same numbering, whilst additional subclauses, are numbered from 10.

A list of all parts of the IEC 62271 series can be found, under the general title *High-voltage switchgear and controlgear*, on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under [store.iec.ch](http://store.iec.ch) in the data related to the specific document. At this date, the document will be

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## INTRODUCTION

Traditionally a high-voltage/low-voltage distribution substation has been constructed by installing the main electrical components –high-voltage switchgear and controlgear, power transformer and the corresponding low-voltage switchgear and controlgear- within a closed electrical operating area. It can be a room within a building intended for other usages (non electrical uses) or a separated housing (prefabricated or not) designed specifically to contain the electrical equipment of the substation or an open area limited by fences.

Some years ago in the search for a more standardized and compact substation, the concept of prefabricated substation was developed. IEC 62271-202 covers this type of substation. According to this document, the main electrical components (high-voltage switchgear and controlgear, power transformer and low-voltage switchgear and controlgear) are fully in compliance with their respective product standard, and the whole substation, including interconnections and enclosure is designed and type tested and later manufactured and routine tested in the factory. Correspondingly the quality of the substation is assured by the manufacturer.

Moreover, also other types of assemblies have been introduced in the market. These are assemblies comprising the main electrical active components of the substation and their interconnections, delivered as a single product. The product can therefore be type tested, manufactured, routine tested in the factory, transported and then installed in a closed electrical operating area.

This type of factory assembled and type-tested product is covered by this document receiving the generic name CEADS from Compact Equipment Assembly for Distribution Substation. Numerous arrangements are possible and this document provides guidance on basic types of assemblies, which might be envisaged.

A CEADS is not covered by IEC 61936-1. However, CEADS is intended to become part of a distribution substation.

Taking into account the closer proximity of the main electrical components that even can share some parts (enclosure, solid or fluid insulation...), it is very relevant to take notice of the potential interaction between them. Therefore, to cover CEADS is neither sufficient nor always applicable to refer to the relevant product standards. This document covers any additional design and construction requirements and test methods applicable to the different types of CEADS. In addition to the specified characteristics, particular attention has been paid to the specification concerning the protection of persons, both operators and general public.

The CEADS is also of interest to committee TC 14: Power transformers, and committee TC 121: Switchgear and controlgear and their assemblies for low voltage.

# HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

## Part 212: Compact Equipment Assembly for Distribution Substation (CEADS) for AC voltages up to 52 kV

### 1 Scope

This part of IEC 62271 specifies the service conditions, rated characteristics, general structural requirements and test methods of the assemblies of the main electrical functional units of a high-voltage transformer substation, duly interconnected, for AC voltages up to and including 52 kV on the high-voltage side and service frequency 50 Hz or 60 Hz. The CEADS is cable-connected to the high-voltage network for indoor and outdoor applications of restricted access.

A CEADS as defined in this document is designed and tested to be a single product with a single serial number and one set of documentation.

The functions of a CEADS are:

- high-voltage/high-voltage or high-voltage/low-voltage transformation;

and some or all the following:

- switching and control for the operation of the high-voltage circuit(s);
- switching and control for the operation of the low-voltage circuit(s);
- protection of the power transformer functional unit.

The main functions are integrated in the following functional units:

- high-voltage functional unit;
- power transformer functional unit;
- low-voltage functional unit.

NOTE For the purpose of this document a self-protected transformer is not considered as a CEADS, but as a functional unit, designed and type tested to its own product standard IEC 60076-13:2006.

### 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 60050-441, *International Electrotechnical Vocabulary (IEV) – Part 441: Switchgear, controlgear and fuses* (available at [www.electropedia.org](http://www.electropedia.org))

IEC 60050-461, *International Electrotechnical Vocabulary (IEV) – Part 461: Electric cables* (available at [www.electropedia.org](http://www.electropedia.org))

IEC 60076 (all parts), *Power transformers*

IEC 60076-1:2011, *Power transformers – Part 1: General*