

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**Power installations exceeding 1 kV a.c. –  
Part 1: Common rules**

**Installations électriques en courant alternatif de puissance supérieure à 1 kV –  
Partie 1: Règles communes**



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## CONTENTS

FOREWORD.....	7
INTRODUCTION.....	10
1 Scope.....	11
2 Normative references.....	12
3 Terms and definitions .....	14
3.1 General definitions.....	14
3.2 Definitions concerning installations .....	16
3.3 Definitions concerning types of installations .....	17
3.4 Definitions concerning safety measures against electric shock .....	17
3.5 Definitions concerning clearances.....	18
3.6 Definitions concerning control and protection .....	19
3.7 Definitions concerning earthing.....	19
4 Fundamental requirements .....	23
4.1 General.....	23
4.1.1 General requirements .....	23
4.1.2 Agreements between supplier (manufacturer) and user .....	24
4.2 Electrical requirements .....	25
4.2.1 Methods of neutral earthing.....	25
4.2.2 Voltage classification .....	25
4.2.3 Current in normal operation.....	25
4.2.4 Short-circuit current .....	25
4.2.5 Rated frequency.....	26
4.2.6 Corona .....	26
4.2.7 Electric and magnetic fields .....	26
4.2.8 Overvoltages .....	26
4.2.9 Harmonics .....	27
4.3 Mechanical requirements.....	27
4.3.1 Equipment and supporting structures .....	27
4.3.2 Tension load.....	27
4.3.3 Erection load .....	27
4.3.4 Ice load .....	28
4.3.5 Wind load .....	28
4.3.6 Switching forces .....	28
4.3.7 Short-circuit forces.....	28
4.3.8 Loss of conductor tension .....	28
4.3.9 Vibration .....	28
4.3.10 Dimensioning of supporting structures.....	28
4.4 Climatic and environmental conditions .....	28
4.4.1 General .....	28
4.4.2 Normal conditions .....	29
4.4.3 Special conditions .....	30
4.5 Special requirements .....	31
4.5.1 Effects of small animals and micro-organisms .....	31
4.5.2 Noise level.....	31
4.5.3 Transport.....	31
5 Insulation.....	32
5.1 General .....	32

5.2	Selection of insulation level.....	32
5.2.1	Consideration of methods of neutral earthing .....	32
5.2.2	Consideration of rated withstand voltages .....	32
5.3	Verification of withstand values.....	32
5.4	Minimum clearances of live parts .....	33
5.4.1	General .....	33
5.4.2	Minimum clearances in voltage range I.....	33
5.4.3	Minimum clearances in voltage range II.....	33
5.5	Minimum clearances between parts under special conditions .....	35
5.6	Tested connection zones .....	36
6	Equipment.....	36
6.1	General requirements .....	36
6.1.1	Selection .....	36
6.1.2	Compliance .....	36
6.1.3	Personnel safety .....	36
6.2	Specific requirements .....	36
6.2.1	Switching devices .....	36
6.2.2	Power transformers and reactors .....	37
6.2.3	Prefabricated type-tested switchgear.....	38
6.2.4	Instrument transformers.....	38
6.2.5	Surge arresters.....	39
6.2.6	Capacitors .....	39
6.2.7	Line traps .....	39
6.2.8	Insulators.....	39
6.2.9	Insulated cables.....	39
6.2.10	Conductors and accessories.....	42
6.2.11	Rotating electrical machines.....	42
6.2.12	Generating units .....	43
6.2.13	Generating unit main connections .....	43
6.2.14	Static converters.....	43
6.2.15	Fuses .....	44
6.2.16	Electrical and mechanical Interlocking.....	44
7	Installations.....	44
7.1	General requirements .....	44
7.1.1	Circuit arrangement .....	44
7.1.2	Documentation.....	45
7.1.3	Transport routes .....	45
7.1.4	Aisles and access areas .....	46
7.1.5	Lighting .....	46
7.1.6	Operational safety.....	46
7.1.7	Labelling.....	46
7.2	Outdoor installations of open design .....	46
7.2.1	Protective barrier clearances.....	47
7.2.2	Protective obstacle clearances.....	47
7.2.3	Boundary clearances .....	47
7.2.4	Minimum height over access area .....	47
7.2.5	Clearances to buildings.....	48
7.2.6	External fences or walls and access doors .....	48
7.3	Indoor installations of open design.....	48

7.4	Installation of prefabricated type-tested switchgear .....	49
7.4.1	General .....	49
7.4.2	Additional requirements for gas-insulated metal-enclosed switchgear .....	49
7.5	Requirements for buildings .....	51
7.5.1	Introduction .....	51
7.5.2	Structural provisions .....	51
7.5.3	Rooms for switchgear .....	52
7.5.4	Maintenance and operating areas .....	52
7.5.5	Doors .....	53
7.5.6	Draining of insulating liquids .....	53
7.5.7	Air conditioning and ventilation .....	53
7.5.8	Buildings which require special consideration .....	54
7.6	High voltage/low voltage prefabricated substations .....	54
7.7	Electrical installations on mast, pole and tower .....	54
8	Safety measures .....	60
8.1	General .....	60
8.2	Protection against direct contact .....	60
8.2.1	Measures for protection against direct contact .....	60
8.2.2	Protection requirements .....	61
8.3	Means to protect persons in case of indirect contact .....	62
8.4	Means to protect persons working on electrical installations .....	62
8.4.1	Equipment for isolating installations or apparatus .....	62
8.4.2	Devices to prevent reclosing of isolating devices .....	63
8.4.3	Devices for determining the de-energized state .....	63
8.4.4	Devices for earthing and short-circuiting .....	63
8.4.5	Equipment acting as protective barriers against adjacent live parts .....	64
8.4.6	Storage of personal protection equipment .....	65
8.5	Protection from danger resulting from arc fault .....	65
8.6	Protection against direct lightning strokes .....	65
8.7	Protection against fire .....	66
8.7.1	General .....	66
8.7.2	Transformers, reactors .....	67
8.7.3	Cables .....	70
8.7.4	Other equipment with flammable liquid .....	70
8.8	Protection against leakage of insulating liquid and SF <sub>6</sub> .....	70
8.8.1	Insulating liquid leakage and subsoil water protection .....	70
8.8.2	SF <sub>6</sub> leakage .....	72
8.8.3	Failure with loss of SF <sub>6</sub> and its decomposition products .....	72
8.9	Identification and marking .....	72
8.9.1	General .....	72
8.9.2	Information plates and warning plates .....	72
8.9.3	Electrical hazard warning .....	73
8.9.4	Installations with incorporated capacitors .....	73
8.9.5	Emergency signs for emergency exits .....	73
8.9.6	Cable identification marks .....	73
9	Protection, control and auxiliary systems .....	78
9.1	Monitoring and control systems .....	78
9.2	DC and AC supply circuits .....	79
9.2.1	General .....	79

9.2.2	AC supply .....	79
9.2.3	DC supply .....	80
9.3	Compressed air systems .....	80
9.4	SF <sub>6</sub> gas handling plants .....	81
9.5	Hydrogen handling plants .....	81
9.6	Basic rules for electromagnetic compatibility of control systems .....	82
9.6.1	General .....	82
9.6.2	Electrical noise sources in high voltage installations .....	82
9.6.3	Measures to be taken to reduce the effects of high frequency interference .....	82
9.6.4	Measures to be taken to reduce the effects of low frequency interference .....	83
9.6.5	Measures related to the selection of equipment .....	83
9.6.6	Other possible measures to reduce the effects of interference .....	84
10	Earthing systems .....	84
10.1	General .....	84
10.2	Fundamental requirements .....	84
10.2.1	Safety criteria .....	84
10.2.2	Functional requirements .....	85
10.2.3	High and low voltage earthing systems .....	85
10.3	Design of earthing systems .....	86
10.3.1	General .....	86
10.3.2	Power system faults .....	87
10.3.3	Lightning and transients .....	87
10.4	Construction of earthing systems .....	88
10.5	Measurements .....	88
10.6	Maintainability .....	88
10.6.1	Inspections .....	88
10.6.2	Measurements .....	88
11	Inspection and testing .....	89
11.1	General .....	89
11.2	Verification of specified performances .....	90
11.3	Tests during installation and commissioning .....	90
11.4	Trial running .....	90
12	Operation and maintenance manual .....	91
Annex A (normative)	Values of rated insulation levels and minimum clearances based on current practice in some countries .....	92
Annex B (normative)	Method of calculating permissible touch voltages .....	95
Annex C (normative)	Permissible touch voltage according IEEE 80 .....	96
Annex D (normative)	Earthing system design flow chart .....	97
Annex E (informative)	Protection measures against direct lightning strokes .....	97
Bibliography	.....	101
Figure 1	– Protection against direct contact by protective barriers/protective obstacles within closed electrical operating areas .....	55
Figure 2	– Boundary distances and minimum height at the external fence/wall .....	56
Figure 3	– Minimum heights and working clearances within closed electrical operating areas .....	57
Figure 4	– Approaches with buildings (within closed electrical operating areas) .....	58

Figure 5 – Minimum approach distance for transport.....	59
Figure 6 – Separating walls between transformers.....	74
Figure 7 – Fire protection between transformer and building.....	75
Figure 8 – Sump with integrated catchment tank.....	76
Figure 9 – Sump with separate catchment tank.....	76
Figure 10 – Sump with integrated common catchment tank.....	77
Figure 11 – Example for small transformers without gravel layer and catchment tank.....	77
Figure 12 – Permissible touch voltage $U_{Tp}$ .....	89
Figure C.1 – Permissible touch voltage $U_{Tp}$ according IEEE 80.....	96
Figure E.1 – Single shield wire.....	99
Figure E.2 – Two shield wires.....	99
Figure E.3 – Single lightning rod.....	100
Figure E.4 – Two lightning rods.....	100
Table 1 – Minimum clearances in air – Voltage range I ( $1 \text{ kV} < U_m \leq 245 \text{ kV}$ ).....	34
Table 2 – Minimum clearances in air – Voltage range II ( $U_m > 245 \text{ kV}$ ).....	34
Table 3 – Guide values for outdoor transformer clearances.....	68
Table 4 – Minimum requirements for the installation of indoor transformers.....	69
Table 5 – Minimum requirements for interconnection of low-voltage and high-voltage earthing systems based on EPR limits.....	86
Table A.1 – Values of rated insulation levels and minimum clearances in air for $1 \text{ kV} < U_m \leq 245 \text{ kV}$ for highest voltage for installation $U_m$ not standardized by the IEC based on current practice in some countries.....	92
Table A.2 – Values of rated insulation levels and minimum clearances in air for $1 \text{ kV} < U_m \leq 245 \text{ kV}$ for highest voltage for installation $U_m$ not standardized by IEC based on current practice in some countries.....	93
Table A.3 – Values of rated insulation levels and minimum clearances in air for $U_m > 245 \text{ kV}$ for highest voltages for installation $U_m$ not standardized by IEC based on current practice in some countries.....	94

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## POWER INSTALLATIONS EXCEEDING 1 kV AC –

## Part 1: Common rules

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International Standard IEC 61936-1 has been prepared by IEC technical committee 99: System engineering and erection of electrical power installations in systems with nominal voltages above 1 kV a.c. and 1,5 kV d.c., particularly concerning safety aspects.

This second edition cancels and replaces the first edition, published in 2002. It constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- new table of references for additional agreements between manufacturer/contractor/planner and user/orderer/owner (4.1.2)
- addition of minimum clearances in air not standardized by IEC but based on current practice in some countries (Annex A)
- deletion of nominal voltages (Table 1, Table 2, Clause 5)
- addition of regulations for fuses (6.2.15)
- simplification of regulations for escape routes (7.5.4)

- deletion of special regulations for operating aisles (7.5.4)
- modification of clearances for fire protection (Table 3)
- modification of safety criteria for earthing systems (10.2.1)
- modified curves of permissibly touch voltages (Figure 12, Annex B)
- deletion of numbering of subclauses without headlines
- change of "should" to "shall" in many cases or change of subclauses with "should" to a note

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

FDIS	Report on voting
99/95/FDIS	99/96/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts<sup>1</sup> in the IEC 61936 series, under the general title *Power installations exceeding 1 kV a.c.*, can be found on the IEC website

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The following differences exist in the countries indicated below.

- 4.3.2: The combinations are for example: –40 °C without ice and without wind; –0 °C with ice and without wind; –20 °C with wind. For special projects even value –50 °C without ice and without wind could be needed (Finland)
- 4.4.2.2a: Even class –50 °C could be needed (Finland)
- 6.2.4.1: It shall not be fuses in conductors from current transformers (Norway)
- 7.2.1: Barriers for outdoor installations shall have a minimum height of 2,0 m. They shall fulfil the same requirements as the external fence. The minimum height of live parts behind a barrier shall be  $N + 300$  mm with a minimum of 800 mm (Finland)
- 7.2.2: The use of protective method obstacles is not allowed in electrical installations outside of buildings (Finland)
- 7.2.2: Rails, chains and ropes are not allowed as obstacles (Sweden)
- 7.2.2: The height  $H$  for outdoor installations shall be at least  $H = N + 2\ 500$  mm, with a minimum of 3 000 mm (Sweden)
- 7.2.4: The height  $H$  for outdoor installations shall be at least  $H = N + 2\ 500$  mm, with a minimum of 3 000 mm (Sweden)
- 7.2.4: The height  $H$  for outdoor installations shall be at least  $H = N + 2\ 600$  mm, with a minimum of 2 800 mm (Finland)
- 7.2.6: The height of the external fence shall be at least 2 000 mm. The local conditions of snow shall be taken into account (Finland)
- 7.2.6: The height of the external fence shall be at least 2 500 mm (Australia)
- 7.3: The use of indoor installations of open design is not allowed (Finland)
- 7.3: A rail shall be of not conductive material in the colours yellow/black behind (cell) doors and openings wider than 0,5 m (Norway)

<sup>1</sup> At the time of writing, future parts are still under consideration.

- 7.3: Rails, chains and ropes are not allowed as obstacle (Sweden)
- 7.4.1: Outside closed electrical operation areas equipment and cables shall either be constructed with an earthed intermediate shield or be protected against unintentional contact by placing out of reach. With an earthed intermediate shield, a metal enclosure for equipment or a screen for cables are understood (Sweden)
- 7.5.4: Gangways longer than 10 m shall be accessible from both ends. Indoor closed restricted access areas with length exceeding 20 m shall be accessible by doors from both ends (See IEC 60364-7-729) (Sweden)
- 7.5.8: Installations that are difficult to evacuate like Installations in underground, in mountains, wind-power stations e.g. special conditions shall be imposed to secure safe evacuation in case of fire or accident (Norway)
- 7.7: The minimum height  $H'$  of live parts above surfaces accessible to the general public shall be:
  - $H' = 5\,500$  mm for rated voltages  $U_m$  up to 24 kV
  - $H' = N + 5\,300$  mm for rated voltages  $U_m$  above 24 kV (Finland)
- 8.2: Exposed conductive parts shall be earthed. Also extraneous conductive parts which by faults, induction, or influence could become live and be a hazard to persons or damage to property shall be earthed (Sweden)
- 8.2.1.2: The minimum height of protective barriers is 2 300 mm (Finland)
- 8.2.1.2: Rails, chains and ropes are not allowed as obstacles (Sweden)
- 8.2.2.1: Outside closed electrical operation areas equipment and cables shall either be constructed with an earthed intermediate shield or be protected against unintentional contact by placing out of reach. With an earthed intermediate shield, a metal enclosure for equipment or a screen for cables are understood (Sweden)
- 8.2.2.2: Rails, chains and ropes are not allowed as obstacles (Sweden)
- 8.2.2.2: The use of protective method obstacles is not allowed in electrical installations of buildings. The use of protective method placing out of reach is restricted only to situations where the use of insulation or enclosures or barriers is not practicable (Finland)
- 8.7.2.1: For transformers with below 1000 l special conditions are listed in FEF 2006 §4-9 (Norway)
- 8.9.1: Warning signs, markings and identifications shall be in Norwegian and special cases additional marking in other language (Norway)
- 10.2.1 and Annex B: Health & Safety Executive (HSE) has advised that HV earthing systems should be designed according to tolerable voltages based on body impedances not exceeded by 5% of the population, as given in Table 1 of IEC60479-1:2005 (UK)
- 10.2.1: Permissible touch and step voltages in power installations shall be in accordance with the Federal law concerning electrical installations (High and low voltage) (SR 734.0) and the Regulations for electrical power installations (SR 743.2 StV) (Switzerland)
- Figure 1: Rails, chains and ropes are not allowed as obstacles (Sweden)

The contents of the corrigendum of March 2011 have been included in this copy.

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## INTRODUCTION

There are many national laws, standards and internal rules dealing with the matter coming within the scope of this standard and these practices have been taken as a basis for this work.

This part of IEC 61936 contains the minimum requirements valid for IEC countries and some additional information which ensures an acceptable reliability of an installation and its safe operation.

The publication of this standard is believed to be a decisive step towards the gradual alignment all over the world of the practices concerning the design and erection of high voltage power installations.

Particular requirements for transmission and distribution installations as well as particular requirements for power generation and industrial installations are included in this standard.

The relevant laws or regulations of an authority having jurisdiction takes precedence.

Withdrawn