

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Particular requirements for load-shedding equipment (LSE)

Exigences spécifiques pour les délesteurs (LSE)



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Particular requirements for load-shedding equipment (LSE)

Exigences spécifiques pour les délesteurs (LSE)

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ELECTROTECHNICAL
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CONTENTS

FOREWORD.....	9
INTRODUCTION.....	11
1 Scope.....	12
2 Normative references	13
3 Terms and definitions	14
4 General requirements	22
4.1 General.....	22
4.2 Architecture	23
4.3 Standard conditions for operation in service.....	24
5 General remarks on tests	25
5.1 Environmental conditions	25
5.1.1 General	25
5.1.2 Ambient temperature range in normal use.....	25
5.1.3 Relative humidity	25
5.1.4 Altitude	25
5.2 General testing procedure and samples	26
6 Ratings.....	27
6.1 Rated values.....	27
6.1.1 Rated operational voltages	27
6.1.2 Rated insulation voltage	27
6.1.3 Rated impulse voltage	27
6.1.4 Maximum value of rated current.....	27
6.1.5 Preferred rated current values (I_N).....	27
6.1.6 Minimum value of rated making and breaking capacity (I_{RMS})	28
6.1.7 Rated frequency	28
6.1.8 Rated conditional short-circuit current.....	28
6.1.9 Preferred rated load-shedding current (power) values ($I_N L_S$, $P_N L_S$).....	28
6.2 Time-current characteristic for LSEs monitoring the current	28
6.2.1 LSE operating principle.....	28
6.2.2 Current limits ($I_N L_S$).....	30
6.2.3 Minimum switch OFF-time	30
6.2.4 Reclosing conditions.....	31
6.3 Time-power characteristic	32
6.4 LSE shedding sequence	32
7 Classification.....	33
7.1 General.....	33
7.2 According to the LSE functional category	33
7.3 According to the switching means	34
7.4 According to the possibility of adjusting the rated load-shedding current(s) (or power)	34
7.5 According to the shedding sequence.....	34
7.6 According to the design	34
7.6.1 Stand-alone LSE with internal or external sensors or measuring units	34
7.6.2 LSE with external sensor	34
7.6.3 Combined LSE (or assembled LSE).....	34
7.7 According to the method of mounting	34

7.8	According to the type of terminals	34
7.9	According to the contact openings	34
7.10	According to the protection against external influences	35
7.11	According to the number of poles	35
7.12	According to the type of monitored parameters	35
8	Markings and information	35
8.1	General	35
8.2	Test of markings	36
9	Protection against electric shock	36
9.1	General	36
9.2	Test for protection against electric shock	37
10	Terminals for external copper conductors	40
10.1	General	40
10.2	Terminals with screw clamping for external copper conductors	40
10.2.1	General	40
10.2.2	Conductor fitting	46
10.2.3	Mechanical strength of terminals	46
10.2.4	Resistance to corrosion of terminals	46
10.2.5	Clamping effects on conductors	46
10.2.6	Clamping reliability of terminals	47
10.2.7	Clamping length of terminals	48
10.2.8	Reliability of terminals	49
10.2.9	Accidental loosening of earthing terminals	49
10.2.10	Resistance to corrosion of earthing terminals	49
10.2.11	Additional requirements for the design of pillar terminals	50
10.2.12	Additional requirements for the design of lug terminals	50
10.2.13	Additional requirements for terminals for the connection of external conductors	50
10.3	Screwless terminals for external copper conductors	50
10.3.1	General	50
10.3.2	Conductor fittings	50
10.3.3	Connection of conductors	51
10.3.4	Type of material	51
10.3.5	Conductors clamping	51
10.3.6	Operation of terminals	51
10.3.7	Multi conductor terminals	52
10.3.8	Introduction of conductors	52
10.3.9	Fixing of terminals	52
10.3.10	Mechanical strength	52
10.3.11	Electrical and thermal stress resistance	54
10.3.12	Mechanical reliability	56
11	Constructional requirements	59
11.1	General	59
11.2	Mechanical requirements for insulating means	59
11.3	Installation requirements	59
11.4	Fixing of covers, cover plates and actuating members	62
11.4.1	General	62
11.4.2	Fixings based on screws or rivets	63

11.4.3	Fixings which may be removed by applying a force perpendicular to the surfaces	63
11.4.4	Fixings which may be removed using a tool	63
11.5	Attachment of knobs	64
11.6	Mounting means	64
11.7	Accessories	64
12	Mechanism and operating means	64
12.1	General.....	64
12.2	Indication of the position	65
12.3	Rest position.....	65
12.4	Making and breaking.....	65
12.5	Action of the mechanism without cover or cover plate	65
12.6	Fixings and removal of operating means	65
12.7	Locking.....	66
12.8	Status indicators	66
13	Resistance to ageing and humidity	66
13.1	Resistance to ageing	66
13.2	Resistance to humidity.....	67
14	Insulation resistance and dielectric strength	67
14.1	General.....	67
14.2	Insulation resistance of the main circuit	67
14.3	Dielectric strength of main circuits	68
14.4	Insulation resistance and dielectric strength of other circuits.....	70
14.5	Verification of impulse withstand voltages (across clearances and through solid insulations).....	71
14.5.1	General testing procedure	71
14.5.2	Verification of clearances with the impulse withstand voltage tests	72
15	Temperature rise	72
15.1	General.....	72
15.2	Test setup.....	73
15.3	Test procedure.....	74
16	Making and breaking capacity.....	76
17	Normal operation	76
17.1	Functional tests: disconnection and reclosing	76
17.1.1	General	76
17.1.2	Disconnection tests	77
17.1.3	Reclosing tests	78
17.1.4	Load-shedding sequence(s) tests	79
17.1.5	Remotely controlled LSE and LSE with connection to other external equipment.....	79
17.2	Endurance test.....	79
18	Mechanical strength	80
18.1	General.....	80
18.2	Pendulum hammer test	81
18.3	Covers, cover plates or actuating members – Accessibility to live parts	89
18.3.1	General	89
18.3.2	Verification of the non-removal of covers, cover plates or actuating members	89
18.3.3	Verification of the removal of covers, cover plates or actuating members.....	89

18.4	Covers, cover plates or actuating members – Accessibility to non-earthed metal parts separated from live parts	90
18.5	Covers, cover plates or actuating members – Accessibility to insulating parts, earthed metal parts, the live parts of SELV ≤ 25 V AC or metal parts separated from live parts	90
18.6	Covers, cover plates or actuating members – Application of gauges	90
18.7	Grooves, holes and reverse tapers	92
18.8	Rail mounted LSEs	93
19	Resistance to heat	94
19.1	General	94
19.2	Basic heating test	94
19.3	Ball-pressure test on parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position	95
19.4	Ball-pressure test on parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position	95
20	Screws, current carrying capacity and connections	95
20.1	General	95
20.2	Correct insertion of screws	96
20.3	Contact pressure of electrical connections	97
20.4	Screws and rivets used both as electrical and mechanical connections	97
20.5	Material of current-carrying parts	97
20.6	Thread-forming and thread-cutting screws	98
21	Creepage distances, clearances and distances through sealing compound	98
21.1	General	98
21.2	Measurements	98
21.3	Insulating compound	99
22	Resistance of insulating material to abnormal heat and fire	101
22.1	General	101
22.2	Glow-wire test	101
23	Resistance to rusting	103
24	EMC requirements	104
24.1	General	104
24.2	Immunity	104
24.2.1	General	104
24.2.2	Voltage dips and short interruptions	105
24.2.3	Surge immunity test for 1,2/50 wave impulses	105
24.2.4	Electrical fast transient/burst test	106
24.2.5	Electrostatic discharge test	106
24.2.6	Radiated electromagnetic field test	107
24.2.7	Radio-frequency voltage test	107
24.2.8	Power-frequency magnetic field test	108
24.3	Emission	108
24.3.1	General	108
24.3.2	Low-frequency emission	108
24.3.3	Radio-frequency emission	108
25	Coordination with short-circuit devices	108
25.1	General requirements for coordination	108
25.2	Testing conditions	108
25.2.1	Test circuit	108

25.2.2	Tolerances on test quantities	112
25.2.3	Power factor of the test circuit	112
25.2.4	Power frequency recovery voltage	113
25.2.5	Calibration of the test circuit	113
25.2.6	Sequence of operations	113
25.3	Tests of coordination between the LSE and the SCPD	113
25.3.1	General	113
25.3.2	Verification of the coordination at the rated conditional short-circuit current (I_{nc})	114
25.3.3	Verification at the instantaneous tripping of the SCPD	114
25.3.4	Condition of the LSE during and after tests	114
26	Tests under abnormal conditions	114
26.1	General	114
26.2	Tests under fault conditions	115
26.3	Overload tests	116
27	Components	116
27.1	Fuses	117
27.2	Capacitors	117
27.3	Resistors	118
27.4	Automatic protective devices (other than fuses)	118
27.4.1	General	118
27.4.2	Cut-outs	118
27.4.3	Automatic protective devices	120
27.5	Transformers	120
Annex A (normative)	Test sequences and number of specimens	121
Annex B (informative)	Correspondence between ISO and AWG copper conductors	123
Annex C (normative)	Determination of clearances and creepage distances	124
C.1	General	124
C.2	Orientation and location of a creepage distance	124
C.3	Creepage distances where more than one material is used	124
C.4	Creepage distances split by floating conductive part	124
C.5	Measurement of creepage distances and clearances	124
Annex D (normative)	Arrangement for the detection of the emission of ionized gases during short-circuit tests	128
Bibliography		131
Figure 1	– Energy efficiency management system	11
Figure 2	– LSE general architecture	24
Figure 3	– Time-current characteristic of a Class A LSE	29
Figure 4	– Joined test finger (test probe B according to IEC 61032:1997)	38
Figure 5	– Test pin for checking the protection against electric shock	40
Figure 6	– Terminals with stirrup	41
Figure 7	– Pillar terminals	41
Figure 8	– Screw terminals and stud terminals	43
Figure 9	– Saddle terminals	44
Figure 10	– Lug terminals	45
Figure 11	– Test apparatus for checking damage to conductors	54

Figure 12 – Information for deflection test	57
Figure 13 – Determination of the direction of the forces to be applied	61
Figure 14 – Direction for the conductor pull of 30 N for 1 min	62
Figure 15 – Pendulum impact test apparatus	82
Figure 16 – Pendulum impact test apparatus (striking element)	83
Figure 17 – Mounting support of specimens	84
Figure 18 – Mounting block for a flush type LSE	85
Figure 19 – Example of mounting support of a panel board type LSE	86
Figure 20 – Example of mounting support for a rear fixed LSE	87
Figure 21 – Gauge (thickness: about 2 mm) for the verification of the outline of covers, cover-plates or actuating members	90
Figure 22 – Example of application of the gauge of Figure 21 on covers fixed without screws on a mounting surface or supporting surface	91
Figure 23 – Examples of applications of the gauge of Figure 21	92
Figure 24 – Gauge for verification of grooves, holes and reverse tapers	93
Figure 25 – Sketch showing the direction of application of the gauge of Figure 24	93
Figure 26 – Application of forces on a rail-mounted LSE	94
Figure 27 – Ball-pressure test apparatus	95
Figure 28 – Thread-cutting screw	96
Figure 29 – Thread-forming screw	96
Figure 30 – Diagrammatic representation	102
Figure 31 – Typical diagram for all coordination tests	110
Figure 32 – Detail of impedances Z and Z_1	110
Figure C.1 – Example 1	125
Figure C.2 – Example 2	125
Figure C.3 – Example 3	125
Figure C.4 – Example 4	126
Figure C.5 – Example 5	126
Figure C.6 – Example 6	126
Figure C.7 – Example 7	127
Figure D.1 – Test arrangement	129
Figure D.2 – Grid	130
Figure D.3 – Grid circuit	130
Table 1 – Cross-sectional areas (S) of test copper conductors corresponding to the rated currents	26
Table 2 – Rated impulse voltage as a function of the nominal voltage of the installation	27
Table 3 – Load-shedding classes	30
Table 4 – Disconnecting time	31
Table 5 – Load-shedding classes	32
Table 6 – Disconnecting time	32
Table 7 – Load-shedding functional categories	33
Table 8 – Marking and position of marking	35

Table 9 – Relationship between rated currents and connectable cross-sectional areas of copper conductors	39
Table 10 – Dimensions and tightening torque of pillar terminals	42
Table 11 – Dimensions and tightening torque for screw and stud terminals	44
Table 12 – Dimensions and tightening torque for saddle terminals	45
Table 13 – Dimensions and tightening torque for lug terminals	45
Table 14 – Tightening torque for the verification of the mechanical strength of screw-type terminals	47
Table 15 – Test values for pulling out test	48
Table 16 – Relationship between rated currents and connectable cross-sectional areas of copper conductors for screwless terminals	51
Table 17 – Test values for flexion and pull out for copper conductors	53
Table 18 – Test current for the verification of electrical and thermal stresses in normal use of screwless terminals	55
Table 19 – Cross-sectional areas of rigid copper conductors for deflection test of screwless terminals	58
Table 20 – Deflection test forces	58
Table 21 – Forces to be applied to covers, cover-plates or actuating members whose fixing is not dependent on screws	63
Table 22 – Test voltage, points of application and minimum values of insulating resistance for the verification of dielectric strength	69
Table 23 – Test voltages of auxiliary circuits	71
Table 24 – Test voltage for verification of impulse withstand voltage	72
Table 25 – Temperature-rise test currents and cross-sectional areas of copper conductors	73
Table 26 – Permissible temperature rise values (based on Table 3 of IEC 60065:2001)	75
Table 27 – Number of operations for normal operation test	80
Table 28 – Height of fall for impact test	88
Table 29 – Minimum clearances and creepage distances	100
Table 30 – Immunity tests (overview)	104
Table 31 – Voltage dip and short-interruption test values	105
Table 32 – Surge immunity test voltages	106
Table 33 – Fast transient test values	106
Table 34 – Minimum values of I^2t and I_p	111
Table 35 – Power factors for short-circuit tests	112
Table 36 – Capacitors	118
Table A.1 – Specimen for tests	122
Table B.1 – Correspondence between ISO and AWG copper conductors	123

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**PARTICULAR REQUIREMENTS FOR
LOAD-SHEDDING EQUIPMENT (LSE)****FOREWORD**

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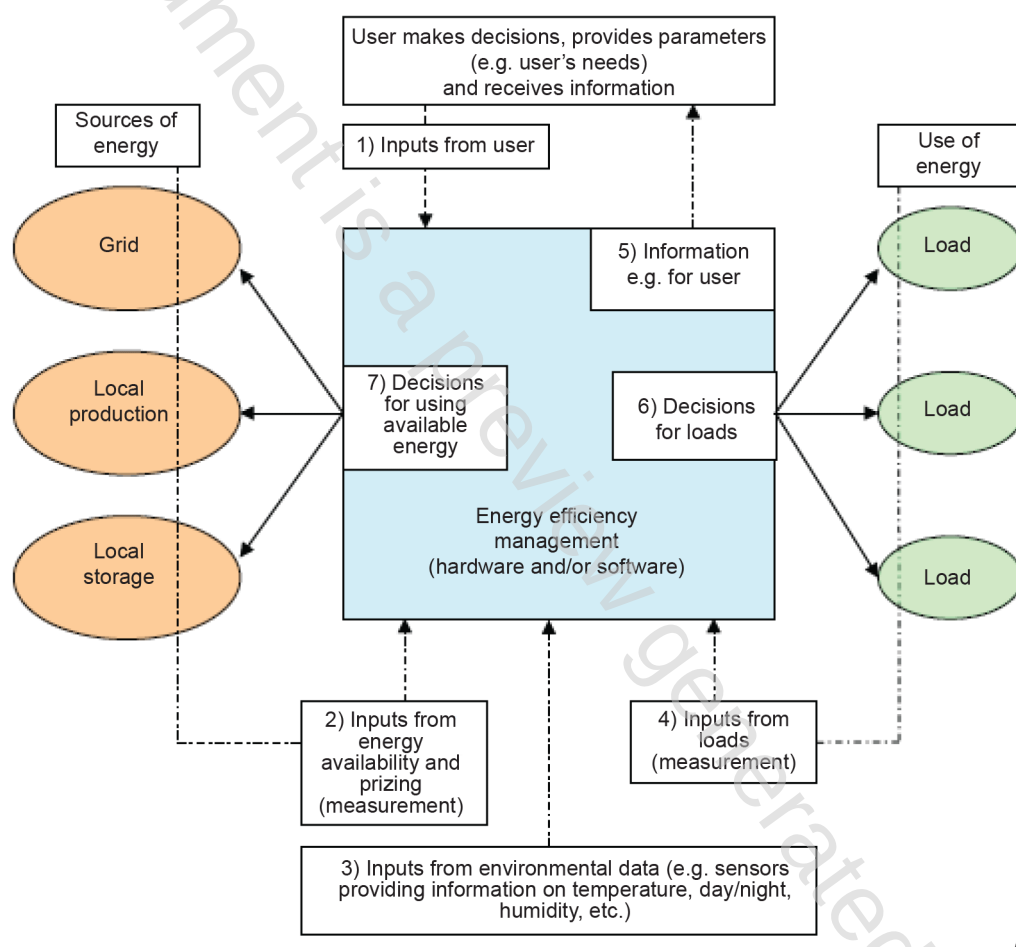
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INTRODUCTION

The optimization of electrical energy usage can be facilitated by appropriate design and installation considerations. An electrical installation can provide the required level of service and safety for the lowest electrical consumption.

This is considered by designers as a general requirement of their design procedures to establish the best use of electrical energy.

The optimization of the use of electricity is based on energy efficiency management which is based on the price of electricity, electrical consumption and real-time adaptation, as described in Figure 1 according to IEC 60364-8-1:2019.



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Figure 1 – Energy efficiency management system

This document applies to load-shedding equipment (LSE), for household and similar uses.

The LSE is an equipment able to respond to the monitored current or power, or alternative monitored parameters to switch ON and OFF selected loads when certain conditions are met.

The load-shedding function is used in energy management systems to optimize the overall use of electrical energy including production and storage, and can be used for example for energy efficiency purposes as per IEC 60364-8-1:2019.

PARTICULAR REQUIREMENTS FOR LOAD-SHEDDING EQUIPMENT (LSE)

1 Scope

The purpose of this document is to provide requirements for equipment to be used in energy efficiency systems. This document covers load-shedding equipment (LSE).

Guidelines relating to safety for LSE as given in IEC Guide 110 have been followed.

This document applies to load-shedding equipment for household and similar uses. The load-shedding function is used in energy management systems to optimize the overall use of electrical energy including production and storage. Load-shedding can be used for example for energy efficiency purposes as per IEC 60364-8-1:2019.

This document applies to LSE for operation under normal conditions:

- AC circuits with a rated frequency of 50 Hz, 60 Hz or both, with a rated voltage not exceeding 440 V (between phases), a rated current not exceeding 125 A and a rated short-circuit capacity not exceeding 25 000 A; or
- DC circuits¹.

LSEs are intended to control the energy supplied to one or more load, circuit or mesh when:

- defined conditions of time and current are reached;
- a command or information from an external system is received.

An LSE is intended to serve as:

- a single equipment having all the necessary means able to control the loads (e.g. the electrical energy management function is embedded in such an equipment); or
- a unit integrated into a more complex equipment or an independent equipment being part of an electrical energy management system (EEMS); or
- an assembly of independent equipment forming an LSE (e.g. an LSE with external current sensors); or
- as a combination of the above points.

LSE can have a wireless interface.

LSE is part of the fixed installation.

NOTE 1 This document covers load shedding equipment in the fixed installations including portable appliances connected thereto.

LSE are intended for use in circuits with protection against electrical shock and over-current according to IEC 60364 (all parts).

NOTE 2 For example, fault protection (indirect contact protection) can be covered as follows:

- in TT systems, by an upstream RCBOs or RCCBs according to IEC 61008-1 and IEC 61009-1;

¹ LSE for DC circuits are under consideration.

– in a TN system, by an upstream over-current protective device.

LSEs do not, by their nature, provide an isolation function nor the over-current protection.

LSEs are normally installed by instructed persons (IEC 60050-195:1998, 195-04-02) or skilled persons (IEC 60050-195:1998, 195-04-01) and normally used by ordinary persons (IEC 60050-195:1998, 195-04-03).

This document contains all requirements necessary to ensure compliance with the operational characteristics required by type tests for LSEs based on single equipment or based on an assembly of independent equipment.

These requirements apply for standard conditions of temperature and environment as given in 5.1. They are applicable to LSEs with a degree of protection of IP 20 intended for use in an environment with pollution degree 2. For LSE having a degree of protection higher than IP 20 according to IEC 60529, for use in locations where arduous environmental conditions prevail (e.g. excessive humidity, heat or cold or deposition of dust) and in hazardous locations (e.g. where explosions are liable to occur), special construction can be required.

If other functions are included in LSE, these functions are covered by the relevant standards.

This document does not address communication aspects such as protocols, interoperability, data security and any other related aspects.

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 60065:2001, *Audio, video and similar electronic apparatus – Safety requirements*²

IEC 60085, *Electrical insulation – Thermal evaluation and designation*

IEC 60127 (all parts), *Miniature fuses*

IEC 60212, *Standard conditions for use prior to and during the testing of solid electrical insulating materials*

IEC 60317-0-1:1997, *Specifications for particular types of winding wires – Part 0: General requirements – Section 1: Enamelled round copper wire*²

IEC 60364 (all parts), *Low-voltage electrical installations*

IEC 60384-14:1993, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*²

IEC 60417, *Graphical symbols for use on equipment* (available at <http://www.graphical-symbols.info/equipment>)

² A more recent edition exists for this standard.

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60695-2-10:2000, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*²

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*²

IEC 60730 (all parts), *Automatic electrical controls*

IEC 61000-2-2, *Electromagnetic compatibility (EMC) – Part 2-2: Environment – Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61558-2-6, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers*

CISPR 15, *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment*

ISO 306, *Plastics – Thermoplastic materials – Determination of Vicat softening temperature (VST)*

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: