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Electrical installations of buildings –

Part 5-55: Selection and erection of electrical equipment – Other equipment

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL INSTALLATIONS OF BUILDINGS –
Part 5-55: Selection and erection of electrical equipment –
Other equipment**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60364-5-55 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

The IEC 60364 series (parts 1 to 6), is currently being restructured, without any technical changes, into a more simple form (see annex A).

According to a unanimous decision by the Committee of Action (CA/1720/RV (2000-03-21)), the restructured parts of IEC 60364 have not been submitted to National Committees for approval.

The text of this first edition of IEC 60364-5-55 is compiled from and replaces

- part 5-551, first edition (1994),
- part 5-559, first edition (1999),
- part 5-56, first edition (1980) and its amendment 1 (1998), and
- part 3, second edition (1993), its amendment 1 (1994) and its amendment 2 (1995).

This publication has been drafted, as close as possible, in accordance with the ISO/IEC Directives, Part 3.

This consolidated version of IEC 60364-5-55 consists of the first edition (2001) and its amendment 1 (2001) [documents 64/1190/FDIS and 64/1201/RVD].

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 1.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

Annex A is for information only.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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

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ELECTRICAL INSTALLATIONS OF BUILDINGS –

Part 5-55: Selection and erection of electrical equipment – Other equipment

550 Introduction

550.1 Scope

This part of IEC 60364 covers requirements for low-voltage generating sets. Particular requirements for supplies for safety services are given in clause 556 while clause 559 applies to the selection and erection of luminaires and lighting installations intended to be part of the fixed installation.

Electrical standby supply systems, other than for safety services, are outside the scope of this standard.

This part of IEC 60364 does not apply for installations in hazardous areas (BE3).

NOTE 1 Requirements of the public supply undertaking should be ascertained before a generating set is installed in an installation which is connected to the public supply.

NOTE 2 For additional requirements for hazardous areas, see the IEC 60079 and IEC 61241 series.

550.2 (551.1.2)(559.2) Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60364. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60364 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(195):1998, *International Electrotechnical Vocabulary – Part 195: Earthing and protection against electric shock*

IEC 60050(826):1982, *International Electrotechnical Vocabulary – Part 826: Electrical installations of buildings*

IEC 60079 (all parts), *Electrical apparatus for explosive gas atmospheres*

IEC 60245-3:1994, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 3: Heat resistant silicone insulated cables*

IEC 60331-11, *Tests for electric cables under fire conditions – Circuit integrity – Part 11: Apparatus – Fire alone at a flame temperature of at least 750 °C*

IEC 60311-21, *Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV*

IEC 60332-1, *Tests on electric cables under fire conditions – Part 1: Test on a single vertical insulated wire or cable*

IEC 60364-1, *Electrical installations of buildings – Part 1: Fundamental principles, assessment of general characteristics, definitions*

IEC 60364-4-41:2001, *Electrical installations of buildings – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-4-42:2001, *Electrical installations of buildings – Part 4-42: Protection for safety – Protection against thermal effects*

IEC 60364-4-43:2001, *Electrical installations of buildings – Part 4-43: Protection for safety – Protection against overcurrent*

IEC 60364-5-52:2001, *Electrical installations of buildings – Part 5-52: Selection and erection of electrical equipment – Wiring systems*

IEC 60364-5-53:2001, *Electrical installations of buildings – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control*

IEC 60364-5-54:1980, *Electrical installations of buildings – Part 5: Selection and erection of electrical equipment – Chapter 54: Earthing arrangements and protective conductors¹⁾*

IEC 60364-7-713:1996, *Electrical installations of buildings – Part 7: Requirements for special installations and locations – Furniture*

IEC 60364-7-714:1996, *Electrical installations of buildings – Part 7: Requirements for special installations and locations – External lighting installations*

IEC 60364-7-715:1999, *Electrical installations of buildings – Part 7-715: Requirements for special installations and locations – Extra-low voltage lighting installations*

IEC 60417 (all parts), *Graphical symbols for use on equipment*

IEC 60598 (all parts), *Luminaires*

IEC 60598-2-22, *Luminaires, Part 2-22: Particular requirements – Luminaires for emergency lighting*

IEC 60702-1, *Mineral insulated cables with a rated voltage not exceeding 750 V – Part 1: Cables*

IEC 60702-2, *Mineral insulated cables with a rated voltage not exceeding 750 V – Part 2: Terminations*

ISO 8528-12, *Reciprocating internal combustion engine driven alternating current generating sets – Part 12: Emergency power supply to safety services*

550.3 Definitions

For the purpose of this part of IEC 60364, the following definitions apply:

550.3.1

self-contained battery unit

unit comprising a battery and a charging and testing unit

¹⁾ Currently being revised under the modified title "Electrical installations of buildings – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors and equipotential bonding"

550.3.2**non-maintained mode**

operating mode of electrical equipment, essential for safety services, operating only when the normal supply fails

550.3.3**maintained mode**

operating mode of electrical equipment, essential for safety services, operating at all times

550.3.4**safety services**

those services in a building which are essential

- for the safety of persons,
- for avoiding damage to the environment or other material

NOTE Examples of safety services include

- emergency (escape) lighting,
- fire pumps,
- fire brigade lifts,
- alarm systems, such as fire alarms, smoke alarms, CO alarms and intruder alarms,
- evacuation systems,
- smoke extraction systems,
- essential medical equipment.

550.3.5**electrical safety source**

source intended to maintain the supply to electrical equipment essential for the safety services

550.3.6**electrical supply system for safety services**

see IEC 60050(826)

550.3.7**rated operating time of a safety source**

operating time for which a safety source is designed under normal operating conditions.

551 Low-voltage generating set**551.1 (551.1-1.1) Scope**

This part 5-55 of IEC 60364 applies to low-voltage and extra-low voltage installations which incorporate generating sets intended to supply, either continuously or occasionally, all or part of the installation. Requirements are included for installation with the following supply arrangements:

- supply to an installation which is not connected to the public supply;
- supply to an installation as an alternative to the public supply;
- supply to an installation in parallel with the public supply;
- appropriate combinations of the above.

This part does not apply to self-contained items of extra-low voltage electrical equipment which incorporate both the source of energy and the energy-using load and for which a specific product standard exists that includes the requirements for electrical safety.

551.1.1 (551.1.1.2) Generating sets with the following power sources are considered:

- combustion engines;
- turbines;
- electric motors;
- photovoltaic cells;
- electrochemical accumulators;
- other suitable sources.

551.1.2 (551.1.1.3) Generating sets with the following electrical characteristics are considered:

- mains-excited and separately excited synchronous generators;
- mains-excited and self-excited asynchronous generators;
- mains-commutated and self-commutated static inverters with or without by-pass facilities.

551.1.3 (551.1.1.4) The use of generating sets for the following purposes is considered:

- supply to permanent installations;
- supply to temporary installations;
- supply to portable equipment which is not connected to a permanent fixed installation.

551.2 General requirements

551.2.1 The means of excitation and commutation shall be appropriate for the intended use of the generating set and the safety and proper functioning of other sources of supply shall not be impaired by the generating set.

NOTE See 551.7 for particular requirements where the generating set may operate in parallel with a public supply.

551.2.2 The prospective short-circuit current and prospective earth fault current shall be assessed for each source of supply or combination of sources which can operate independently of other sources or combinations. The short-circuit rating of protective devices within the installation and, where appropriate, connected to the public supply network, shall not be exceeded for any of the intended methods of operation of the sources.

551.2.3 Where the generating set is intended to provide a supply to an installation which is not connected to the public supply or to provide a supply as a switched alternative to the public supply, the capacity and operating characteristics of the generating set shall be such that danger or damage to equipment does not arise after the connection or disconnection of any intended load as a result of the deviation of the voltage or frequency from the intended operating range. Means shall be provided to automatically disconnect such parts of the installation as may be necessary if the capacity of the generating set is exceeded.

NOTE 1 Attention should be given to the size of individual loads as a proportion of the capacity of the generating set and to motor starting currents.

NOTE 2 Attention should be given to the power factor specified for protective devices in the installation.

NOTE 3 The installation of a generating set within an existing building or installation may change the conditions of external influence for the installation (see IEC 60364-1), for example by the introduction of moving parts, parts at high temperature or by the presence of noxious gases, etc.

551.3 Protection against both direct and indirect contact

Additional requirements for extra-low voltage (ELV) systems which provide protection against both direct and indirect contact and where the installation is supplied from more than one source.

551.3.1 Where a SELV or PELV system may be supplied by more than one source, the requirements of 411.1.2 of IEC 60364-4-41 shall apply to each source. Where one or more of the sources is earthed, the requirements of 411.1.3 and 411.1.5 of IEC 60364-4-41 for PELV systems shall apply.

If one or more of the sources does not meet the requirements of 411.1.2, the system shall be treated as a FELV system and the requirements of 411.3 shall apply.

551.3.2 Where it is necessary to maintain the supply to an extra-low voltage system following the loss of one or more sources of supply, each source of supply or combination of sources of supply which can operate independently of other sources or combinations shall be capable of supplying the intended load of the extra-low voltage system. Provisions shall be made so that the loss of low-voltage supply to an extra-low voltage source does not lead to danger or damage for other extra-low voltage equipment.

NOTE Such precautions may be necessary in supplies for safety services (see clause 35 of IEC 60364-1).

551.4 Protection against indirect contact

Protection against indirect contact shall be provided for the installation in respect of each source of supply or combination of sources of supply which can operate independently of other sources or combinations of sources.

551.4.1 Protection by automatic disconnection of supply

Protection by automatic disconnection of supply shall be provided in accordance with 413.1 of IEC 60364-4-41, except as modified for particular cases by 551.4.2, 551.4.3 or 551.4.4.

551.4.2 Additional requirements for installations where the generating set provides a switched alternative to the public supply (stand-by systems)

Protection by automatic disconnection of supply shall not rely upon the connection to the earthed point of the public supply system when the generator is operating as a switched alternative to a TN system. A suitable earth electrode shall be provided.

551.4.3 Additional requirements for installations incorporating static inverters

551.4.3.1 Where protection against indirect contact for parts of the installation supplied by the static inverter relies upon the automatic closure of the by-pass switch and the operation of protective devices on the supply side of the by-pass switch is not within the time required by 413.1 of IEC 60364-4-41, supplementary equipotential bonding shall be provided between simultaneous accessible exposed conductive parts and extraneous conductive parts on the load side of the static inverter in accordance with 413.1.6 of IEC 60364-4-41.

The resistance of supplementary equipotential bonding conductors required between simultaneously accessible conductive parts shall fulfil the following condition:

$$R \leq \frac{50}{I_a}$$

where

I_a is the maximum earth fault current which can be supplied by the static inverter alone for a period of up to 5 s.

NOTE Where such equipment is intended to operate in parallel with a public supply system, the requirements of 551.7 also apply.

551.4.3.2 Precautions shall be taken or equipment shall be selected so that the correct operation of protective devices is not impaired by d.c. currents generated by a static inverter or by the presence of filters.

551.4.4 Additional requirements for protection by automatic disconnection where the installation and generating set are not permanently fixed

This subclause applies to portable generating sets and to generating sets which are intended to be moved to unspecified locations for temporary or short-term use. Such generating sets may be part of an installation which is subject to similar use. This subclause does not apply to permanent fixed installations.

NOTE For suitable connection arrangements see IEC 60309.

551.4.4.1 Between separate items of equipment protective conductors shall be provided which are part of a suitable cord or cable and which comply with table 54F of IEC 60364-5-54. All protective conductors shall comply with IEC 60364-5-54.

551.4.4.2 In TN, TT and IT systems a residual current protective device with a rated residual operating current of not more than 30 mA shall be installed in accordance with 413.1 of IEC 60364-4-41 to provide automatic disconnection.

NOTE In IT systems, a residual current device may not operate unless one of the earth faults is on a part of the system on the supply side of the device.

551.5 Protection against overcurrent

551.5.1 Where means of detecting overcurrent of the generating set is provided, this shall be located as near as practicable to the generator terminals.

NOTE The contribution to the prospective short-circuit current by a generating set may be time-dependent and may be much less than the contribution made by a public supply.

551.5.2 Where a generating set is intended to operate in parallel with a public supply, or where two or more generating sets may operate in parallel, circulating harmonic currents shall be limited so that the thermal rating of conductors is not exceeded.

The effects of circulating harmonic currents may be limited as follows:

- the selection of generating sets with compensated windings;
- the provision of a suitable impedance in the connection to generator star points;

- the provision of switches which interrupt the circulatory circuit but which are interlocked so that at all times protection against indirect contact is not impaired;
- the provision of filtering equipment;
- other suitable means.

NOTE Consideration should be given to the maximum voltage which may be produced across an impedance connected to limit circulating harmonics.

551.6 Additional requirements for installations where the generating set provides a supply as a switched alternative to the public supply (stand-by systems)

551.6.1 Precautions complying with the relevant requirements of IEC 60364-5-53 for isolation shall be taken, so that the generator cannot operate in parallel with the public supply system. Suitable precautions may include:

- an electrical, mechanical or electro-mechanical interlock between the operating mechanisms or control circuits of the change-over switching devices;
- a system of locks with a single transferable key;
- a three-position break-before-make change-over switch;
- an automatic change-over switching device with a suitable interlock;
- other means providing equivalent security of operation.

551.6.2 For TN-S systems where the neutral is not isolated, any residual current device shall be positioned to avoid incorrect operation due to the existence of any parallel neutral-earth path.

NOTE It may be desirable in TN systems to disconnect the neutral of the installation from the public supply system neutral to avoid disturbances such as induced voltage surges caused by lightning.

551.7 Additional requirements for installations where the generating set may operate in parallel with the public supply system

551.7.1 In selecting and using a generating set to run in parallel with a public supply, care shall be taken to avoid adverse effects to the supply network and to other installations in respect of power factor, voltage changes, harmonic distortion, unbalance, starting, synchronizing or voltage fluctuation effects. The public supply undertaking shall be consulted in respect of particular requirements. Where synchronization is necessary, the use of automatic synchronizing systems which consider frequency, phase and voltage is to be preferred.

551.7.2 Protection shall be provided to disconnect the generating set from the public supply in the event of loss of that supply or deviation of the voltage or frequency at the supply terminals from values declared for normal supply.

The type of protection and the sensitivity and operating times depend upon the protection of the public supply system and shall be agreed by the public supply undertaking.

551.7.3 Means shall be provided to prevent the connection of a generating set to the public supply system if the voltage and frequency of the public supply are outside the limits of operation of the protection required in 551.7.2.

551.7.4 Means shall be provided to enable the generating set to be isolated from the public supply. The means of isolation shall be accessible to the public supply undertaking at all times.

551.7.5 Where a generating set may also operate as switched alternative to the public supply, the installation shall also comply with 551.6.

556 Safety services

556.1 General requirements

556.1.1 Safety services required to operate in fire conditions shall meet the following requirements:

- a safety source shall maintain an electrical supply of adequate duration;
- equipment shall have a fire resistance of adequate duration either by suitable selection or erection.

NOTE 1 Safety services may also be required to comply with additional national or local regulations.

NOTE 2 Two types of electrical supply source may exist: the safety source and the normal source.

NOTE 3 The normal source is, for example, the public supply network.

556.1.2 For protection against indirect contact, protective measures without automatic disconnection at the first fault are preferred.

In IT systems continuous insulation monitoring devices shall be provided to give an audible and visible indication of a first fault to earth.

556.2 Supplies to current-using equipment

Where electrical equipment is supplied by two different sources, a failure occurring in the circuit from one source shall not impair the protection against electric shock or the correct operation of the other source. Where such equipment requires a protective conductor, it shall be connected to the protective conductors of both circuits.

556.3 Special requirements

556.3.1 Protection against short-circuit and against electric shock, under normal conditions and in case of a fault, shall be ensured under any configuration of the normal and safety sources of supply.

556.3.2 Protection against overload may be omitted where the loss of supply may cause a greater hazard. Where protection against overload is omitted, the occurrence of an overload shall be monitored.

556.3.3 Depending on whether the safety source is to operate in parallel with or independently of the normal supply, the appropriate subclauses of clause 551 shall be taken into account.

556.4 Switchgear and controlgear

556.4.1 Switchgear and controlgear shall be provided, either by construction, location or erection, with protection ensuring fire resistance of adequate duration.

556.4.2 Controlgear shall not influence the operation of safety services, at any time when called upon to operate. The position of switching devices, whose operation could cause a hazard, shall be clearly and visibly indicated.

556.4.3 Switchgear and controlgear for the supply of safety service installations shall be physically separated from components of the normal supply installation.

556.4.4 Switchgear and controlgear, including safety lighting controls, shall be clearly identified and accessible only to skilled or instructed persons.

556.5 Electrical supply system

556.5.1 Electrical safety sources

NOTE See IEC 60364-1, clause 35 for general requirements of permissible sources.

556.5.1.1 Safety sources for supplying safety equipment shall be selected according to the required response time and rated operating time. Where a separate power supply is used, the required operating time of any batteries may be reduced if the safety equipment requiring power is supplied from the generating set for the required operating time.

NOTE A battery charger in itself is not a safety source.

556.5.1.2 Electrical safety sources shall be installed as fixed equipment. Failure of the normal supply shall not adversely affect the performance of the safety sources.

556.5.1.3 Electrical safety sources shall be accessible only to skilled or instructed persons.

556.5.1.4 The location of every electrical safety source shall be properly and adequately ventilated so that any exhaust gases, smoke or fumes from the source are prevented from penetrating areas occupied by persons.

556.5.1.5 Separate independent feeders shall not serve as the normal and electrical safety sources unless the suppliers give written assurance that the two supplies are unlikely to fail concurrently.

556.5.1.6 An electrical safety source may be used for purposes other than safety services, if the availability for safety services is thereby not impaired. In addition to the requirements of 556.2, a fault occurring in a circuit used for purposes other than safety services shall not lead to the interruption of any circuit for safety services.

NOTE In an emergency, where safety services are needed, it may be necessary to off-load equipment not providing safety services.

556.5.1.7 The operational status of the safety source (whether normal or fault condition) shall be indicated at a central point that is constantly monitored at all required times. This does not apply to self-contained battery units.

556.5.1.8 A dual supply system with two independent feeders may be used. This applies, for example, in the case of

- supply from a public distribution network and an independent power source,
- two independent public distribution networks (unlikely to fail concurrently).

The two separate feeders for a dual system shall meet the following requirement:

- a fault in the power supply system of one supply shall not cause faults in the power supply system of the other one.

If there is a fault in the normal source feed from one of the supplies the other supply shall at least ensure that the essential safety equipment is supplied.

556.5.1.9 Generating sets with reciprocating internal combustion engines, used as the prime mover, shall comply with ISO 8528-12.

NOTE These generally consist of a diesel engine as the prime mover and a synchronous machine as the generator. Other prime movers and generators may be used when they meet the requirements of ISO 8528-12 for fuel feed and cooling, operational performance, consistent voltage and frequency and adequate continuous short-circuiting power.

556.5.1.10 The safety source shall have sufficient capacity for the safety services.

556.5.1.11 Where the safety services of several buildings or locations are supplied from a single safety source, failure in the safety services of one building or location shall not endanger the normal operation of the safety source.

The following shall be indicated at a central, continuously monitored point throughout the period required for operation:

- a) supply failure at switchgear and controlgear to which safety services are connected;
- b) operational status of all switching devices in the system if they are critical as regards the safety services;
- c) first fault to earth.

556.6 Wiring systems

556.6.1 Circuits for electrical safety services shall be independent of the supply to other circuits.

NOTE 1 This means that an electrical fault or any intervention or modification in one system will not affect the correct functioning of the other. This may necessitate separation by fire-resistant materials or different routes or enclosures.

NOTE 2 The charging supply to self-contained battery units may be dependent on the supply to other circuits.

556.6.2 Circuits for safety services shall not pass through locations exposed to fire risk (BE2), unless they possess inherently high resistance against fire and physical damage or are suitably protected. The circuit shall not in any case pass through zones exposed to explosion risk (BE3).

556.6.3 The following wiring systems shall be provided for safety services required to operate in fire conditions:

- a) mineral-insulated cable complying with IEC 60702-1 and IEC 60702-2;
- b) fire-resistant cables complying with IEC 60331-11, IEC 60331-21 and IEC 60332-1;
- c) a wiring system maintaining the necessary fire and mechanical protection.

556.6.4 Wiring systems and cables for safety services, other than those mentioned in 556.6.3, shall be adequately and reliably separated from other cables, including cables of other safety services by distance or barriers.

NOTE For battery cables, special requirements may apply.

556.6.5 Supplies for safety services, with the exception of wiring for fire-brigade lifts, shall not be installed in lift shafts or other flue- like openings.

556.6.6 Safety circuits shall be installed and identified so as to avoid unintentional disconnection.

556.6.7 In rooms and escape routes with several emergency lighting luminaires, these shall be wired alternately from at least two separate circuits such that a level of illuminance is maintained along the escape route in the event of the loss of one circuit.

556.6.8 Wiring to battery chargers, including self-contained battery units, is not considered to be part of the safety circuit.

556.6.9 If the voltage of the safety power supply differs from that of the general power supply and transformers are required, they shall have separate windings.

556.7 Safety lighting circuits

556.7.1 Non-maintained emergency lighting luminaires shall be activated by failure of the supply to the normal lighting luminaires in the area in which they are located.

556.7.2 In the maintained mode, the normal source shall be monitored at the main distribution board. This does not apply to self-contained battery units.

556.7.3 The values for minimum illuminance may be given by national and/or local regulations.

556.7.4 Luminaires shall comply with the requirements set out in IEC 60598-2-22.

559 Luminaires and lighting installations

559.1 Scope

This clause applies to the selection and erection of luminaires and lighting installations intended to be part of the fixed installation.

Requirements for specific types of lighting installations are covered in various parts 7 (e.g. 7-713, 7-714 and 7-715).

The requirements of this clause do not apply to temporary festoon lighting.

NOTE Safety requirements for luminaires are covered by IEC 60598.

559.3 Definitions

For the purpose of this clause, the general definitions of IEC 60364-1, IEC 60598, IEC 60050(195) and IEC 60050(826) apply.

559.3.1 Display stands for luminaires denote permanent stands in sales rooms or parts of sales rooms, which are used to display luminaires.

The following items are not regarded as display stands:

- trade fair stands, in which luminaires remain connected for the duration of the fair;
- temporary exhibition panels with permanently connected luminaires;
- exhibition panels with a range of luminaires which can be connected with a plug-in device.

559.4 General requirements for installations

Luminaires shall be selected and installed in accordance with the manufacturer's instructions and IEC 60598.

559.5 Protection against thermal effects

559.5.1 For the selection of luminaires with regard to their thermal effect on the surroundings, the following features shall be taken into account:

- a) the maximum permissible power dissipated by the lamps;
- b) fire resistance of adjacent material
 - at the point of installation,
 - in the thermally affected areas;
- c) minimum distance to combustible materials, including those in the path of a spotlight beam.

559.5.2 Depending on the fire resistance of the material at the point of installation and in thermally affected areas, the manufacturer's installation instructions shall be followed. Marked luminaires shall be selected and installed according to the marking as specified in IEC 60598.

NOTE For special installations or locations, additional requirements may apply, e.g. those in IEC 60364-4-42 in the case of locations with fire risk or those in IEC 60364-7-713 in the case of furniture.

559.6 Wiring systems

559.6.1 Where a pendant luminaire is installed, the fixing accessories shall be capable of carrying five times the mass of the connected luminaire, but not less than 25 kg. The cable or cord between the suspension device and the luminaire shall be installed so that excessive tensile and torsional stresses in the conductors and terminations are avoided.

NOTE See also 522.8 of IEC 60364-5-52.

559.6.2 Where cables and/or insulated conductors are drawn through the luminaires by the installer (through-wiring), suitable cables and/or insulated conductors, as specified in 559.6.3, shall be selected and only luminaires suitable for through-wiring shall be used.

559.6.3 Cables shall be selected in accordance with the temperature marking on the luminaire, if any, as follows:

- for luminaires complying with IEC 60598 but with no temperature marking, heat resistant cables are not required;
- for luminaires complying with IEC 60598 with temperature marking, cables suitable for the marked temperature shall be used;

- for luminaires not marked as complying with IEC 60598, the manufacturer's instructions shall be followed;
- in the absence of information, heat-resistant cables and/or insulated conductors in accordance with IEC 60245-3 or those of an equivalent type shall be used.

NOTE Local reinforcement or substitution of insulating material may be used, see 522.2 of IEC 60364-5-52.

559.6.4 Groups of luminaires, which are divided between the three phase conductors of a three-phase system with only one common neutral conductor, shall be treated as three-phase current-using equipment.

NOTE See also 536.2.1.1 of IEC 60364-5-53.

559.7 Independent lamp controlgear, e.g. ballasts

Only independent lamp controlgear marked as suitable for independent use, according to the relevant standard, shall be used outside luminaires.

NOTE The generally recognized symbol is:  independent ballast 5138 of IEC 60417.

559.8 Compensation capacitors

Compensation capacitors having a total capacitance exceeding 0,5 μF shall only be used in conjunction with discharge resistors.

NOTE 1 See also 536.2.1.4 of IEC 60364-5-53.

NOTE 2 Capacitors and their marking should be in accordance with IEC 61048.

559.9 Protection against electric shock for display stands for luminaires

Protection against electric shock shall be provided by either:

- SELV supply, or
- automatic disconnection of supply using a residual current operated protective device having a rated residual operating current not exceeding 30 mA.

559.10 Stroboscopic effect

In the case of lighting for premises where machines with moving parts are in operation, consideration shall be given to stroboscopic effects which can give a misleading impression of moving parts being stationary. Such effects may be avoided by selecting suitable lamp controlgear.

Annex A (informative)

IEC 60364 – Parts 1 to 6: Restructuring

Table A.1 – Relationship between restructured and original parts

Publication number according to the restructuring	Old publications contained in the new part	Title	Published	Amendment (date)
PART 1 Fundamental principles	IEC 60364-1 Ed.3	<i>Electrical installations of buildings – Part 1: Scope, object and fundamental principles</i>	1992	
	IEC 60364-2-21 TR3 Ed.1	<i>Electrical installations of buildings – Part 2: Definitions – Chapter 21: Guide to general terms</i>	1993	
	IEC 60364-3 Ed.2	<i>Electrical installations of buildings – Part 3: Assessment of general characteristics</i>	1993	A1 (1994) A2 (1995)
PART 4-41 Protection for safety – Protection against electric shock	IEC 60364-4-41 Ed.3	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 41: Protection against electric shock</i>	1992	A1 (1996) A2 (1999)
	IEC 60364-4-46 Ed.1	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 46: Isolation and switching</i>	1981	
	IEC 60364-4-47 Ed.1	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 47: Application of protective measures for safety – Section 470: General – Section 471: Measures of protection against electric shock</i>	1981	A1 (1993)
	IEC 60364-4-481 Ed.1	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 48: Choice of protective measures as a function of external influences – Section 481: Selection of measures for protection against electric shock in relation to external influences</i>	1993	
PART 4-42 Protection for safety – Protection against thermal effects	IEC 60364-4-42 Ed.1	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 42: Protection against thermal effects</i>	1980	
	IEC 60364-4-482 Ed.1	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 48: Choice of protective measures as a function of external influences – Section 482: Protection against fire</i>	1982	
PART 4-43 Protection for safety – Protection against overcurrent	IEC 60364-4-43 Ed.1	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 43: Protection against overcurrent</i>	1977	A1 (1997)
	IEC 60364-4-473 Ed.1	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 47: Application of protective measures for safety – Section 473: Measures of protection against overcurrent</i>	1977	A1 (1998)
PART 4-44 Protection for safety – Protection against electromagnetic and voltage disturbance	IEC 60364-4-442 Ed.1	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 44: Protection against overvoltages – Section 442: Protection of low-voltage installations against faults between high-voltage systems and earth</i>	1993	A1 (1995) A2 (1999)
	IEC 60364-4-443 Ed.2	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 44: Protection against overvoltages – Section 443: Protection against overvoltages of atmospheric origin or due to switching</i>	1995	A1 (1998)
	IEC 60364-4-444 Ed.1	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 44: Protection against overvoltages – Section 444: Protection against electromagnetic interferences (EMI) in installations of buildings</i>	1996	
	IEC 60364-4-45 Ed.1	<i>Electrical installations of buildings – Part 4: Protection for safety – Chapter 45: Protection against undervoltage</i>	1984	