BRITISH STANDARD

BS EN
50171:2001

Central power supply systems

The European Standard EN 50171:2001 has the status of a British Standard

ICS 29.200; 91.160.10

National foreword

This British Standard is the official English language version of EN 50171:2001, including corrigendum August 2001.

For guidance in the application of this standard, attention is drawn to the following British Standards:

BS 5266-1:1999, *Emergency lighting — Part 1: Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment*;

BS 5266-7:1999, *Emergency lighting — Part 7: Lighting applications — Emergency lighting*.

Emergency lighting systems are normally used in conjunction with luminaires conforming to the following British Standard:

BS EN 60598-2-22:1999, *Luminaires — Part 2-22: Particular requirements — Luminaires for emergency lighting*.

The UK participation in its preparation was entrusted by Technical Committee CPL/34, Lamps and related equipment, to Subcommittee CPL/34/9, Emergency lighting, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

This British Standard, having been prepared under the direction of the Electrotechnical Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 23 August 2001

Summary of pages

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EUROPEAN STANDARD **EN 50171**

NORME EUROPÉENNE

EUROPÄISCHE NORM May 2001

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English version

Central power supply systems

Systèmes d'alimentation à source centrale Zentrale Stromversorgungssysteme

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 50171:2001 E

Foreword

This European Standard was prepared by the CENELEC BTTF 62-8, Emergency lighting systems.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50171 on 2000-08-01.

This European Standard is intended to replace, in part, national standards relating to central power supply systems. For emergency lighting systems it should be read in conjunction with the standards being produced by CENELEC BTTF 62-8 and EN 1838, Emergency lighting.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2001-12-01

- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-08-01

Contents

1 Scope

This European Standard specifies the general requirements for central power supply systems for an independent energy supply to essential safety equipment. This standard covers systems permanently connected to AC supply voltages not exceeding 1 000 V and that use batteries as the alternative power source.

The central power supplies are intended to energize emergency escape lighting in the case of failure of the normal supply, and may be suitable for energizing other essential safety equipment, for example:

- electrical circuits of automatic fire extinguishing installations;
- paging systems and signalling safety installations;
- smoke extraction equipment;
- carbon monoxide warning systems;
- specific safety installations related to specific buildings, e.g. high-risk areas.

Schematic representations of typical central power supply equipment are depicted in clause 4. When a UPS system is used to feed these essential safety systems, it must comply with EN 50091-1 and its relevant parts, and the additional requirements of this standard.

The power supply system for fire alarms covered by EN 54 are excluded.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 1838	*Lighting applications — Emergency lighting.*
EN 50091-1-1	*Uninterruptible power systems (UPS) — Part 1-1: General and safety requirements for UPS used in operator access areas.*
EN 50091-1-2	*Uninterruptible power systems (UPS) — Part 1-2: General and safety requirements for UPS used in restricted access locations.*
EN 50272-2	*Safety requirements for secondary batteries and battery installations — Part 2: Stationary batteries.*
EN 60051 (series)	*Direct acting indicating analogue electrical measuring instruments and their accessories.*
EN 60146-1-1	*Semiconductor convertors — General requirements and line commutated convertors — Part 1-1: Specifications of basic requirements.*
EN 60285	*Alkaline secondary cells and batteries — Sealed nickel-cadmium cylindrical rechargeable single cells.*
EN 60417 (series)	*Graphical symbols for use on equipment.*

EN 60598-1	*Luminaires — Part 1: General requirements and tests.* (IEC 60598-1, mod.)
EN 60598-2-22	*Luminaires — Part 2-22: Particular requirements — Luminaires for emergency lighting.* (IEC 60598-2-22, mod.)
EN 60622	*Sealed nickel-cadmium prismatic rechargeable cells.*
EN 60623	*Vented nickel-cadmium prismatic rechargeable single cells.*
EN 60896-1	*Stationary lead-acid batteries — General requirements and methods of test — Part 1: Vented types.*
EN 60896-2	*Stationary lead-acid batteries — General requirements and methods of test — Part 2: Valve regulated types.*
EN 60898	*Circuit breakers for overcurrent protection for household and similar protection.* (IEC 60898, mod.)
EN 60947-2	*Low-voltage switchgear and controlgear — Part 2: Circuit-breakers.*
EN 60947-4-1	*Low-voltage switchgear and controlgear — Part 4-1: Contactors and motor-starters — Electromechanical contactors and motor-starters.*
EN 61032:1998	*Protection of persons and equipment by enclosures — Probes for verification.*
EN 61558-2-6	*Safety of power transformers, power supply units and similar — Part 2-6: Particular requirements for safety isolating transformers for general use.*
HD 21 (series)	*Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V.*
HD 472 S1	*Nominal voltages for low-voltage public electricity supply systems.* (IEC 60238:1983, mod.)

3 Definitions

For the purposes of this standard, the following definitions apply.

3.1
automatic transfer switching device (ATSD)
device arranged to connect the emergency supply automatically to the essential safety equipment circuit(s) on failure of the normal supply or to transfer the load from the normal supply to the battery

3.2
battery charger
part of the equipment that provides the charge to the battery from the normal supply

3.3
inverter
device for the conversion of direct current (DC) to alternating current (AC)

3.4
changeover mode
mode in which the emergency power supply source is kept on standby where in cases of failure of the normal supply the emergency power supply is automatically transferred to the essential safety equipment

3.5
converter
device for changing the voltage of a direct current supply

3.6
mode without interruption
mode in which the emergency power supply source operates in parallel to the normal supply, connected to the load and supplies power without interruption when the normal supply fails

3.7
control switch device (CSD)
device arranged to automatically supply one or several circuits from the emergency power source on failure of the normal supply

This device may be manually controlled as required by the application standard.

3.8
deep discharge protection device
device to protect the battery against deep discharge

3.9
rated supply voltage (mains input)
supply voltage or voltages assigned to the equipment by the manufacturer for the specified operating condition of the equipment

3.10
rated output current (of a system)
current, in amperes, of a system supplied at nominal voltage

3.11
normal supply
source of electrical energy used to provide normal power supply

3.12
rated duration of the system
designed period of time during which the load can be supplied whilst the system stays within specified voltage limits

3.13
nominal battery voltage
suitable approximate value of voltage used to designate or identify a system calculated on the basis of 2 V per cell for lead acid cells and 1,2 V per cell for nickel cadmium cells

3.14
nominal system voltage
declared output voltage of a centrally supplied emergency power system

3.15
minimum voltage
voltage of the supply at the end of rated duration

3.16
earth leakage indication
device to indicate a leakage to earth from either pole of the battery or load circuit only when connected to the battery

3.17
mains failure indication
device to indicate a failure of the normal supply

3.18
phase or final circuit failure detector
device which monitors the normal supply to separate circuits or phases providing normal power supply and which automatically initiates the emergency power supply on failure of the normal supply to any of the monitored circuits

3.19
central power supply system (CPS-System)
central power supply system which supplies the required emergency power to essential safety equipment without any restriction in power output

3.20
low power supply system (LPS-System)
central power supply system with a limitation of the power output of the system at 500 W for 3 h or 1 500 W for 1 h duration

3.21
equipment input power
power rating of the power supply equipment for connection to the mains

3.22
essential safety equipment
devices required by the relevant authority to protect people in the event of a hazard

4 Types of central power supply systems

In order to comply with the different operating requirements of the essential safety equipment, various types of central power supply systems are necessary.

This clause describes the basic types and their essential characteristics.

In general two different modes of power supply are defined, i.e. the changeover mode and the mode without interruption. The main difference is the response (changeover) time. In the changeover mode, the response time shall be no more than 0,5 s whilst in the mode without interruption the supply is permanent so, by its nature, there is no response time.

The load, the level of discharge and the capacity of the battery determine the rated duration in the case of a power failure. Where the load requires an AC supply an inverter is included in the circuit. Where a DC supply is required a converter circuit is included.

4.1 Changeover mode

In this case the essential safety equipment is supplied directly from the system (see Figure 1). Where the load voltage differs from the system voltage, an isolating transformer is used for supply matching.

In the event of power failure, the voltage monitor in the automatic transfer-switching device (ATSD) switches over the supply to the battery. Controlled battery chargers provide charging and float charging of the battery.

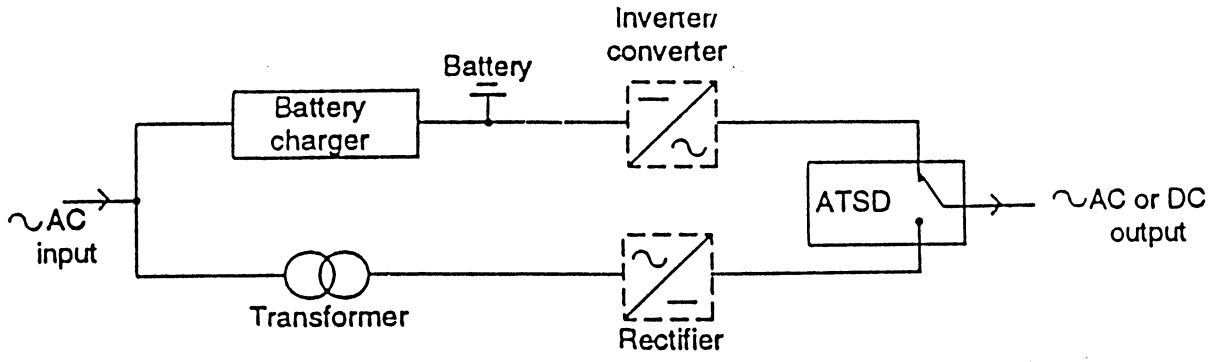

Figure 1

4.2 Mode without interruption

In this case the charger supplies the essential safety equipment and the controlled charging and/or float charging of the battery (see Figure 2).

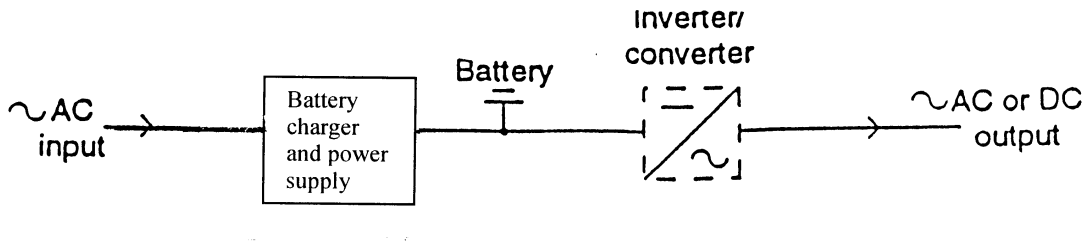

Figure 2

In the event of a power failure, the battery connected in parallel takes over the power supply to the load without interruption.

4.3 Changeover mode with additional control switching device for central switching of the load

In addition to the devices detailed in 4.1, the equipment includes a control switch device(s) (CSD) which is automatically or manually activated and is dependent upon normal supply being available. This device ensures the emergency power supply is not isolated at any material time (see Figure 3).

NOTE A number of control switch devices may by used to switch sections of the load.

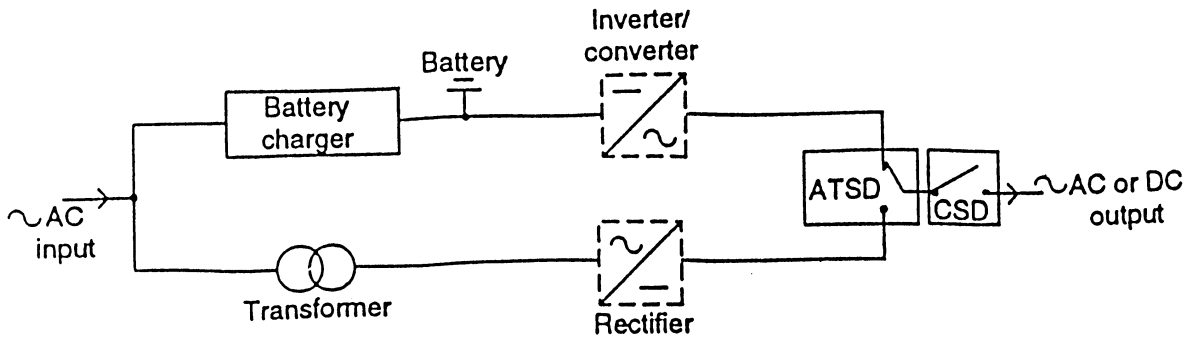

Figure 3

4.4 Changeover mode with additional control switching device for partial switching of the load

In addition to the devices details in 4.1, the equipment includes a control switching device for partial switching of the load activated by the normal supply (see 4.3).

In variation to the concept defined in 4.3, part of the load is continuously supplied (see Figure 4).

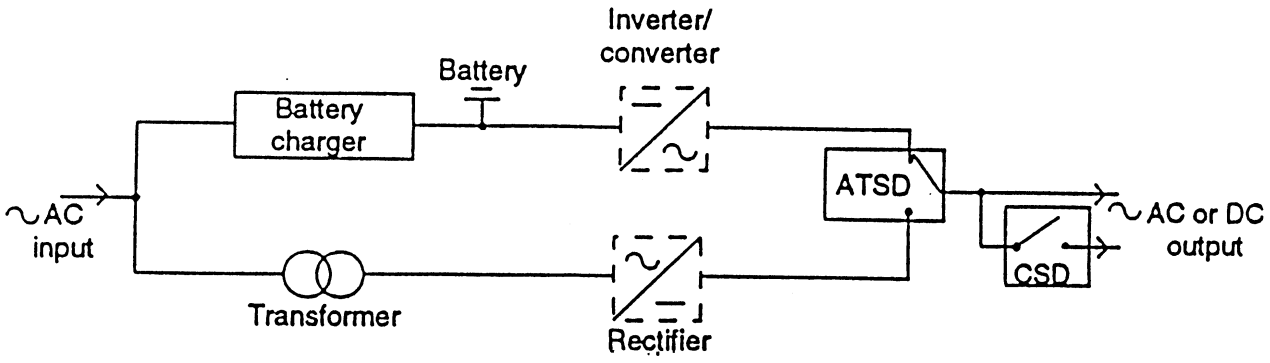

Figure 4

4.5 Non-maintained changeover mode

In this case the essential safety equipment is supplied only in the event of normal supply failure. The system differs from that defined in 4.2 by using control switch device(s) (see Figure 5).

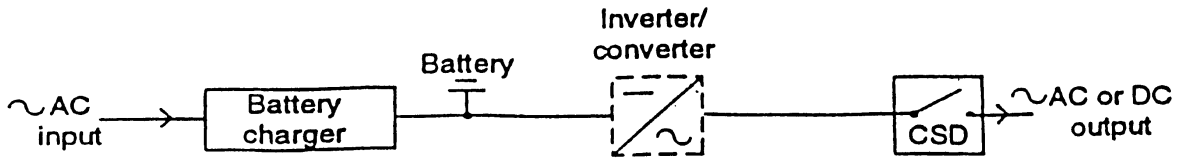

Figure 5

5 Operating conditions and requirements

5.1 Normal operating conditions and requirements for equipment

Devices shall be operated under the following conditions unless user and manufacturer agree specific variations:

a) the input voltage shall comply with HD 472 S1;

b) the frequency tolerance band of the alternating current input voltage shall be ±2 % of the rated value;

c) the temperature range in which the equipment will operate shall be declared and the equipment shall be capable of operating in a relative air humidity of 85 %, non-condensing;

d) the system shall be capable of operating at up to 1 000 m above sea level;

e) the battery shall be protected against deep discharge.

5.2 Information requirements for equipment operation

To ensure the correct equipment is supplied, the following information shall be provided to the manufacturer:

a) type and value of the input and output voltages;

b) load profile over the rated duration;

c) divisions of the load (maintained and non-maintained operation), as far as required;

d) permissible transfer time in case of failure of the mains supply;

e) the duration required;

f) the intended battery installation;

g) intended system configuration;

h) ambient temperature range and the relative humidity for correct operation of equipment.

6 Construction

6.1 Structure of enclosure

6.1.1 Enclosures shall have adequate mechanical strength.

Compliance is checked by inspection and by the following test.

A straight and unjointed test finger is used with the same dimensions as the standard test finger specified in EN 61032:1998, Figure 7 — Test probe 11. The finger is pressed against the surface with a force of 30 N. During the test, metal parts shall not touch live parts. After the test, covers shall not be excessively deformed and the enclosure shall continue to meet the requirements of Section 11 of EN 60598-1.

6.1.2 Enclosures of the system shall have degrees of protection of at least IP 20.

6.1.3 Enclosures shall be resistant to heat and fire.

The provisions of section 13 of EN 60598-1 shall apply together with the following requirements: the enclosure shall withstand the test given in 13.3.2 of EN 60598-1 but at a test temperature of 850 °C.

NOTE Metal enclosures are deemed to comply with this requirement.

6.1.4 Doors and removable panels shall be so fastened that access to dangerous live parts is not possible without the use of a tool or key.

6.1.5 Devices within the enclosure shall be arranged to facilitate maintenance and functional tests.

6.1.6 The arrangement of interconnections between components and equipment shall be adequately and permanently identified.

6.1.7 Wireways shall be smooth and free from sharp edges, burrs, flashes, etc, which might cause damage to the insulation of the wiring parts. Metal screws shall not protrude into wireways.

6.1.8 Enclosures housing batteries shall also meet the requirements of EN 50272-2.

Compliance with the requirements of 6.1.4 to 6.1.8 is checked by inspection.

6.2 Battery chargers and rectifiers

Battery chargers and rectifiers shall comply with the following requirements.

6.2.1 Battery chargers and rectifiers shall comply with the relevant requirements of EN 60146-1-1 and EN 50272-2.

6.2.2 The charging characteristics of battery chargers and the compatibility with inverter circuits shall be designed with full regard to the battery manufacturer’s data and recommendations so as to optimize the battery service life.

6.2.3 Battery chargers shall be capable of automatically charging their batteries that have been discharged so that they can perform at least 80 % of their specified duration within 12 h of commencement of charge

In the case of mode without interruption where the load is supplied from the charger, the nominal output current of the charger shall be equivalent to at least 110 % of the sum of the rated current delivered to the load and the current delivered to the battery.

Compliance is checked by carrying out the test given in 6.2.5.

6.2.4 Where maintained loads are permanently connected in the mode without interruption, the design of the battery charger and its associated system shall be such that the voltage appearing at the output terminal shall not exceed the maximum rated voltage of the loads.

6.2.5 Battery chargers shall provide their rated performance over their designed ambient temperature range when operating on mains supply voltage. Automatic compensation of battery charge voltage dependent on temperature variations shall be provided if required by the battery manufacturer.

Compliance is checked by inspection and by the following test.

The battery shall be charged for 36 h by application of the minimum rated input voltage to the battery charger at nominal conditions. Immediately following the charge, the battery shall be discharged using the designed load or resistive equivalent to provide rated current at the nominal battery voltage. The discharge shall be continued for the specified duration of the equipment, ensuring at the end of discharge that the battery voltage provided is not less than the specified minimum voltage.

The battery shall be recharged at the minimum rated input voltage for 12 h at an ambient room temperature of (20 ± 5) °C. Immediately following the recharge, the battery shall be discharged at rated current to 80 % of rated duration period of the system at which time the battery voltage shall not be less than that specified.

Equipment that does not pass this test shall be retested. Equipment that does not pass the repeat test shall be deemed not to comply.

6.2.6 The battery charger shall be so designed that a short circuit on its output will not cause damage.

Compliance is checked by disconnecting the battery and applying a short circuit to the battery charger output. No damage other than the operation of protective devices shall occur.

6.3 Transformers

Transformers, if fitted, shall comply with EN 61558-2-6.

NOTE For equipment requiring transformers outside the scope of EN 61558-2-6 specific requirements should be agreed between supplier and user, but the same level of safety should be maintained.

6.4 Switching and protection devices

6.4.1 Automatic transfer switches and electronic devices of equivalent nature shall conform to EN 60947-4-1 and EN 50272-2 and shall be of the appropriate category for the load. For emergency lighting loads the switching thresholds shall conform to EN 60598-2-22. These limits shall apply to the automatic transfer switch and any final circuit monitors and control switch devices.

NOTE The transfer time of the changeover device is part of the start up requirements of EN 1838 and the system designer should ensure these times are met.

6.4.2 Input circuit breakers shall comply with EN 60898 or EN 60947-2.

6.4.3 Any switch or control used to change the performance of the battery charger to the boost or commissioning level shall be either of the lockable type or shall be fitted inside the enclosure and shall not be accessible without the use of a tool or key.

Compliance with the requirements of 6.4.1 to 6.4.3 is checked by inspection and by measurement.

6.5 Central inverters

Central inverters shall comply with the following requirements.

6.5.1 Central inverters, their batteries, chargers and associated controlgear, shall be designed so as to ensure they are a compatible system, with particular regard to frequency, voltage waveform, load capacity and power factors.

6.5.2 The output voltage of central inverters shall match the load requirement and be regulated within ±6 % of the system nominal voltage from 20 % to 100 % of load conditions throughout the rated discharge period. For instantaneous load changes the output voltage may be allowed to vary within ±10 % for up to 5 s.

6.5.3 Inverters shall be capable of permanently handling 120 % of the load requirement for the rated duration. Inverters shall also be able to start the full load of a previously unpowered system, within the response time of EN 1838 in the mains failed mode.

6.5.4 Sinusoidal inverters shall have a maximum total harmonic distortion of 5 % measured into a linear load. Low power systems using non-sinusoidal outputs are acceptable up to 6 A-output current provided they are compatible with the load.

6.5.5 Central inverters shall have a frequency matching the load with a maximum frequency of 500 Hz and a tolerance of ±2 % on the nominal frequency over the full battery voltage and load range.

6.5.6 The inverter shall be protected against damage to components, other than fuse links or other protective device, caused by reversal of battery polarity.

6.5.7 The inverter shall be protected by fuse links or other protective device against component damage from short circuits applied directly to the AC output terminations.

Compliance with the requirements of 6.5.1 to 6.5.7 is checked by inspection, measurement and the relevant tests.

6.5.8 The inverter shall be capable of clearing any associated final circuit or distribution circuit fused without shutting down or rupturing its output fuse. Inverters shall recover to normal output automatically within 5 s of the fuse being cleared. The size and type of fuse or protective device fitted in the distribution system shall be specified by the manufacturer.

Compliance is checked by the following test.

A fuse or protective device of the maximum declared value shall be connected across the output terminals. The inverter shall then be switched on and the fuse or protective device shall operate without damage to the inverter, which shall resume its full output voltage within 5 s.

6.6 Deep discharge protection

A deep discharge protective device shall be provided for the protection of the battery and the automatic switching device and shall comply with the following requirements:

a) the minimum operating voltage of the deep discharge protection shall be as defined by the battery manufacturers;

NOTE 1 Typical values are 0,9 V/cell for nickel cadmium and 1,6 V/cell for lead acid batteries.

b) the response time shall be less than 5 s. The consumption value of the deep discharge protective device shall not be more than 0,2 A per 100 Ah rated capacity of the battery;

c) the operation of the deep discharge protective devices shall be indicated on the control panel of the safety power supply;

NOTE 2 To prevent over-discharge the indication may be the switching off of a device.

d) restoration of the normal supply shall automatically reinstate charging;

e) the deep discharge monitor operation shall only be reset manually after restoration of the normal supply;

f) no additional manual switchgear shall be used in the battery circuit in order to separate the essential safety equipment from the battery.

Compliance is checked by operation, measurement and inspection.

6.7 Monitoring and supervision devices

6.7.1 The central power supply system shall include facilities for monitoring the system function. The following shall be measured:

- battery voltage;
- battery/charger/discharge current;
- load current (in mode without interruption operation);
- output current of the charger (in mode without interruption operation).

6.7.2 The following test and monitoring equipment shall be provided:

a) devices with automatic reset, e.g. push button, to simulate a normal supply failure;
b) isolating devices to isolate the AC supply for checking the duration of the system;
c) indication of the actual power supply source (normal supply or battery);
d) indication of the following faults and system condition:
    - float charge voltage (trickle charge current for Nickel/cadmium battery) out of the permissible range;
    - interruption of the battery charging circuit;
    - failure in charge equipment; no charge current, although normal supply is available;
    - supply from the battery, although normal supply is available;
    - warning to be given at least 10 min before deep discharge protection is initiated (CPS systems only);
    - deep discharge protection initiated.

When fitted, the following devices shall also provide indication of their operation:

- operation of the insulation monitoring device (earth leakage indication);
- failure of a powered ventilation system for battery cabinet or battery option.

e) facilities for a remote display of the following indicators via a potential-free contact shall be provided for:
   - systems in operation;
   - supply from the battery;
   - system disturbance combined fault indication as specified in item d).

NOTE An audible alarm may also be provided.

6.7.3 Failure of the alarm indicator facility shall not prejudice the operation of the power supply.

Compliance with the requirements of 6.7.1 to 6.7.3 is checked by disconnecting the battery charger from the battery and by inspection and measurement.

6.8 Fuses, circuit protective devices and instruments

Fuses shall comply with the relevant standard.

Double pole protective devices shall comply with EN 60947-2.

Protective devices used in DC circuits and shall be DC rated for the required duty.

When analogue meters are used, they shall comply with the following minimum requirements:

- DC voltmeters shall comply with EN 60051: Class index 1,5;
- DC ammeters and ammeter shunts shall comply with EN 60051: Class index 1,5;
- AC voltmeters shall comply with EN 60051: Class index 2,5;
- AC ammeters and ammeter shunts shall comply with EN 60051: Class index 2,5. For CPS, the minimum scale length for meters shall be 50 mm; for LPS, the minimum scale length for meters shall be 20 mm.

Alternatively, when digital meters are used, their precision shall be equivalent in accuracy to the analogue meters.

Compliance is checked by inspection.

6.9 Internal wiring

6.9.1 Internal wiring used to carry AC supply and safety equipment circuits shall be separated from each other either by running through separate compartments or by double insulation.

6.9.2 For internal power circuits, wiring shall be of 300/500 V grade insulation according to HD 21.7. For controls circuits, wiring of a minimum 0,5 mm^2 cross section and 0,6 mm insulation thickness shall be used. Low power circuits to circuit boards and wiring interconnecting circuit boards may be of a lower cross-sectional area and insulation if adequate account of the current and voltage are made.

Compliance is checked by inspection and by measurement.

6.10 Electric strength

At normal operating temperature, the equipment shall be able to withstand a test voltage between all live terminals and the protective earth terminal or earthing contact.

Compliance is checked by the following test.

Following battery recharge, the maintained circuit shall be operated at rated load for a minimum period of 1 h after which the supply mains shall be disconnected. The equipment, with battery disconnected, shall withstand the electrical strength test at 2 U + 1 000 V for 1 min (where U = nominal supply voltage).

6.11 Automatic testing device (optional)

If the building is always occupied and there is a risk to the occupants during a test or whilst the battery is being recharged then a method of reducing the risk should be used. Examples of suitable alternative systems are shown in 6.11.1, 6.11.2 and 6.11.3.

6.11.1 The system shall be equipped with dual parallel batteries or addition of another power supply to enable the system to be checked in two halves, each capable of providing illumination while the other is discharged.

NOTE This system also enables some luminaires to operate while the battery is being serviced or replaced.

6.11.2 Manual initiation of a test is acceptable providing there is a visible warning if the test has not been carried out in a 12-month period.

6.11.3 The test shall be conducted for two-thirds of the rated duration. The system shall then be automatically checked that it has not been discharged to a lower voltage than is appropriate for a discharge of two-thirds of the rated capacity, as determined by the battery manufacturer.

6.11.4 Where an automatic test unit with a recording facility is used to monitor the system status instead of the manual test, the test unit shall have the following characteristics:

a) constant monitoring of the charge; where monitoring is periodic, the intervals shall be < 5 min;

b) cyclical monitoring of switching and functional capacity of the connected load (e.g. luminaires) for the emergency power supply:

   - test cycle: at least once every week;
   - test duration: shall be between 10 s and 5 min, the total being less than 10 min per week;

c) recording of any faults in the central battery power supply system and any fault in the test equipment or central monitoring point;

d) fault notification when there is a fault in the transmission route to the central monitoring point;

e) a facility for manual initiation of the test on the central battery power supply or on the central monitoring unit.

Compliance is checked by inspection and by test.

6.12 Batteries

6.12.1 Batteries shall comply with the appropriate one of the following publications.

EN 60285 *Sealed nickel-cadmium cylindrical rechargeable single cells.*

EN 60622 *Sealed nickel-cadmium prismatic rechargeable cells — Part 1: General requirements and test methods.*

EN 60623 *Vented nickel-cadmium cells.*

EN 60896-1 *Stationary lead-acid batteries — General requirements and method of tests — Part 1: Vented types.*

EN 60896-2 *Stationary lead-acid batteries — General requirements and methods of tests — Part 2: Valve-regulated types.*

NOTE Other battery types may be acceptable providing they meet the relevant applicable safety and performance standards.

6.12.2 Batteries for central power systems (CPS) shall be of a type having declared life expectancy of at least 10 years at 20 °C ambient temperature.

Batteries for low power systems (LPS) shall be of a type having a declared life expectancy of at least 5 years at 20 °C ambient temperature.

NOTE To achieve full performance at the end of life the battery capacity should be sized in accordance with the battery manufacturer's data.

6.12.3 Lead acid automotive batteries shall not be used.

6.12.4 The battery and system design shall be capable of meeting the declared performance initially, during and at the end of the stated life.

NOTE 1 Usually batteries are rated to meet the specified performance and declared life expectancy at 20 °C.

Where a battery rated temperature different from 20 °C is agreed between the supplier and user, this shall be stated.

Where batteries are subjected to boost charge, the surface temperature of the batteries within any cubicle shall not exceed 35 °C when operated in an ambient temperature of 25 °C.

NOTE 2 When equipment is operated continuously in an ambient temperature outside the range declared, the equipment manufacturer or supplier should be consulted.

6.12.5 At the end of the specified duration of the system, the output voltage shall be not less than 90 % of the nominal voltage at the nominal load.

Compliance is checked by inspection.

6.13 Battery installation and provision for maintenance

Batteries shall be installed and provision for maintenance made in accordance with EN 50272-2 and manufacturer's recommendations.

6.14 Equipment marking

6.14.1 Equipment shall be clearly and durably marked and be readily visible after installation.

Compliance is checked by the test specified in EN 60598-1.

6.14.2 Internal and external parts, such as meters, pilot lights, switches, fuses and terminals shall have their function identified by durable marking.

6.14.3 The following information shall appear on the rating level of the complete equipment and shall be visible after installation:

a) manufacturer's or supplier's name or trademark;

b) type and serial number;

c) mains supply input:
   - rated voltage (V);
   - rated frequency (Hz);
   - number of phases;

d) supply fuse or circuit-breaker rating;

e) output:
   - rated system voltage (V);
   - rated current (A);
   - rated power (W or VA);
   - minimum voltage.....(V) after duration .....(h);
   - time at rated load (h);
   - rated temperature of battery (°C);

f) battery type and number of cells.

6.14.4 The earth terminal shall be durably identified by the protective earth (ground) symbol complying with the requirements of EN 60417.

Where this symbol appears on a label, the label shall be permanently attached to the main body of the equipment adjacent to the earth terminal.

6.14.5 Central inverters shall be clearly and durably marked with the following information:

a) manufacturer's or supplier's name or trademark;

b) type and serial number;

c) mains supply input;
   - rated voltage (V);
   - rated frequency (Hz);
   - rated current;
   - number of phases;

d) output:

- rated voltage (r.m.s. V);
- maximum load (VA);
- minimum load (VA);
- rated power (W) for duration (h);
- rated frequency (Hz);
- power factor range;
- waveform description (non-sinusoidal shall be identified);
- harmonic distortion;

e) maximum battery input ripple current (if applicable).

Compliance with 6.14.2 to 6.14.5 is checked by inspection and by test.

6.15 Warning labels

6.15.1 A warning level acceptable to national requirements shall be fixed externally to every panel or door giving access to live parts.

6.15.2 Where vented cells are used:

- a label indicating whether a battery of the alkaline or the acid type is fitted and the treatment required after contact with the electrolyte shall be fixed in a visual position within the battery enclosure;

- a label warning of explosion risks caused by naked flames shall be fixed in a visible position on the exterior of the battery enclosure.

6.15.3 An external warning label shall state “Isolation of the normal supply to the equipment may not make it safe for maintenance purposes”.

NOTE Such warnings are necessary because, for example, non-illumination of an indicator lamp does not always indicate that a circuit is dead, and a circuit still alive could present a hazard to maintenance personnel.

Compliance is checked by inspection.

6.15.4 Equipment sited in a secure area

When equipment is sited in a secure area, a warning sign showing an electrical equipment hazard shall be displayed as required by the local authority.

Compliance is checked by inspection.

7 Information for installation and operation of power supply systems

The systems shall be provided with installation safety and operating instructions as specified in EN 50272-2.

Annex A
(informative)

System testing

Small low-powered systems may be produced in large numbers and be suitable for type testing, but for larger systems, witnessed tests are more likely to be appropriate.

blank

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