SLOVENSKI STANDARD
SIST EN 1648-2:2005

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Bivalna poļ itniġka vozila ï 12 V enosmerna elektriļ na napeljava male napetosti - 2. del: Avtodomi

Leisure accommodation vehicles - 12 V direct current extra low voltage electrical installations - Part 2: Motor caravans

Bewohnbare Freizeitfahrzeuge - Elektrische Anlagen für DC 12 V - Teil 2: Motorcaravans

Véhicules habitables de loisirs - Installations électriques a tres basse tension de 12 V en courant continu - Partie 2: Autocaravanes

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EUROPEAN STANDARD

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Leisure accommodation vehicles - 12 V direct current extra low voltage electrical installations - Part 2: Motor caravans

Véhicules habitables de loisirs - Installations électriques à très basse tension de 12 V en courant continu - Partie 2: Autocaravanes

Bewohnbare Freizeitfahrzeuge - Elektrische Anlagen für DC 12 V - Teil 2: Motorcaravans

This European Standard was approved by CEN on 14 October 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Contents

Foreword

This document (EN 1648-2:2004) has been prepared by the Technical Committee CEN /TC 245, “Leisure accommodation vehicles”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2005, and conflicting national standards shall be withdrawn at the latest by June 2005.

This European Standard supersedes EN 1648-2:1997.

The requirements of relative ISO/IEC and CENELEC publications were taken into consideration during the preparation of this European Standard.

This European Standard is one of a series covering the habitation aspects of leisure accommodation vehicles.

Requirements for 12 V direct current extra low voltage electrical installations for caravans are specified in EN 1648-1.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This document specifies safety, health and functional requirements for 12 V direct current (DC) extra low voltage (ELV) electrical installations for habitation aspects of motor caravans.

It applies only to installations which are electrically connected with the electrical installation of the base vehicle or which can be electrically connected with it by means of change-over devices.

This document also specifies the ELV output requirements of low voltage (LV) equipment that may be used to provide an ELV supply but it does not specify safety, technical and functional requirements for LV appliances and installations. Requirements for LV installations are specified in HD 384-7-708 S1.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 1646-1, *Leisure accommodation vehicles — Motor caravans — Part 1: Habitation requirements relating to health and safety.*

EN 13878:2003, *Leisure accommodation vehicles — Terms and definitions.*

EN 50102, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code).*

EN 60335-2-29, *Safety of household and similar electrical appliances — Part 2: Particular requirements for battery chargers (IEC 60335-2-29:1994, modified).*

EN 60529, *Degrees of protection provided by enclosures (IP code) (IEC 6052:1989).*

HD 21.1 S4, *Cables of rated voltages up to and including 450/750 V and having thermoplastic insulation— Part 1: General requirements.*

HD 21.3 S3, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V — Part 3: Non-sheathed cables for fixed wiring (IEC 60227-3:1993, modified).*

HD 21.4 S2, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V — Part 4: Sheated cables for fixed wiring.*

HD 21.5 S3, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 5: Flexible cables (cords) (IEC 60227-5:1979, modified).*

HD 22.1 S4, *Cables of rated voltages up to and including 450/750 V and having cross-linked insulation – Part 1: General requirements.*

HD 22.4 S3, *Rubber insulated cables of rated voltages up to and including 450/750 V— Part 4: Cords and flexible cables (IEC 60245-4:1994, modified).*

ISO 6309, *Fire protection — Safety signs.*

ISO 6722, *Road vehicles — 60 V and 600 V single-core cables — Dimensions, test methods and requirements.*

ISO 8820-1, *Road vehicles — Fuse-links — Part 1: Definitions and general test requirements.*

ISO 8820-3, *Road vehicles — Fuse-links — Part 3: Fuse-links with tabs (blade type).*

ISO 8820-4, *Road vehicles — Fuse-links — Part 4: Fuse-links with female contacts (type A) and bolt-in contacts (type B) and their test fixtures.*

3 Terms and definitions

For the purposes of this document the terms and definitions given in EN 13878:2003 apply.

4 Power supply

4.1 General

The power supply shall be a nominal DC 12 V obtained from an auxiliary battery, except in the case of a motor caravan where the overall length multiplied by the overall width does not exceed 8,5 m^2 plan area. In this case it is permissible to use only the base vehicle battery.

The supply of the auxiliary battery shall be obtained from the electrical installation of the base vehicle or one or more of the following sources:

a) Battery charger (see 7.4);

   Where the charger is combined with a transformer/rectifier unit fixed within the motor caravan, then individual items of current using equipment can also be supplied with electricity directly from this rectifier unit.

b) Generator that is driven by any form of energy (see 4.3);

c) solar energy cells (see 4.3).

It shall be ensured that the auxiliary battery will be automatically disconnected from the 12 V power supply of the base vehicle when the engine of the base vehicle is turned off.

If several sources of supply are used it shall be ensured that there is no unfavourable interaction.

4.2 Auxiliary batteries

4.2.1 General

An auxiliary battery shall only be intended for the electric power supply of the living area.

4.2.2 Type of battery

An auxiliary battery shall be of the rechargeable type.

Non-rechargeable batteries are not auxiliary batteries according to 4.2. They may be used, provided that they are used in circuits separated from other sources of electrical supply.

4.2.3 Capacity

An auxiliary battery shall have a minimum capacity of at least 60 Ampere-hours (Ah) at 20 h discharge rate.

NOTE It is recommended to use a battery designed to be discharged over long periods at a relatively low current.

4.2.4 Terminals

Auxiliary battery terminals shall be clearly and durably marked “+” and “–“. Connections to auxiliary battery terminals shall be securely clamped or bolted to ensure continuous contact and shall be insulated unless the auxiliary battery is provided with an insulating cover.

4.2.5 Location

If an auxiliary battery is not installed in the engine compartment, it shall be placed in a compartment according to 4.2.6, which is designed to protect it from mechanical damage, with easy access for maintenance and/or removal and secured to prevent movement of the battery, e.g. when the motor caravan is in motion.

4.2.6 Auxiliary battery compartment

An acid resistant liquid tight tray shall be installed under an auxiliary battery whose electrolyte is liquid capable of holding at least 20 % of the electrolyte capacity of the recommended battery, when in place.

The interior of an auxiliary battery compartment shall be ventilated and protected against the corrosive effect of acid-laden gases, either by

a) installing a sealed auxiliary battery that incorporates an external ventilating kit that is taken to the exterior of the motor caravan; or

b) installing an auxiliary battery in an enclosed battery compartment that is protected internally against corrosion and is ventilated to the exterior of the motor caravan by means of a suitable tube with a inside diameter of minimum 5 mm at and maximum 8 mm the top of the auxiliary battery compartment in accordance with the battery manufacturer's instructions or as supplied by the manufacturer of the auxiliary battery;

c) ventilating the compartment at low-level and high-level to the exterior of the motor caravan and constructing the interior of the compartment, including the sides of the ventilator openings, of acid-resistant material or providing it with an anti-corrosive finish. The minimum size of ventilation shall be not less than 80 mm^2 at low level and not less than 80 mm^2 at high level. If the compartment opens into the interior of the motor caravan, the lid shall provide an air seal.

The requirements concerning the protection against corrosion and ventilation are not applicable if batteries with bound electrolytes are used.

If an auxiliary battery is not provided, then the position and instructions for the installation of the battery and compartment, in accordance with a), b) or c), shall be included in the User's Handbook according to clause 8 and a notice shall be fixed in or near the proposed location stating:

“For instructions on auxiliary battery installation, see User's Handbook”.

When the manufacturer makes no provision for the installation of an auxiliary battery, the following statement shall be made in the User's Handbook:

“This motor caravan has not been designed to accommodate an auxiliary battery. Do not fit one.”

4.2.7 Warning notice

A warning notice shall be fixed in a prominent position near the auxiliary battery or displayed on the lid of the auxiliary battery compartment. This warning shall be in the official language(s) of the country in which the motor caravan is to be sold and shall state:

“Switch off all appliances and lamps before connecting or disconnecting the auxiliary battery.”

The auxiliary battery compartment shall be additionally marked “smoking prohibited” in accordance with ISO 6309 and in the language(s) of the country in which the motor caravan is to be sold.

4.3 Other sources of supply

4.3.1 Generators and transformer/rectifiers unit

If a supply is obtained from a generator or from a low voltage supply via a transformer/rectifier unit without a battery in the circuit, the extra low voltage at the output terminals of the supply unit shall be maintained between 11 V minimum and 15 V maximum The alternating voltage ripple shall not exceed 1,2 V_{pp}.

4.3.2 Regenerative sources

Regenerative energy sources, such as wind energy, solar energy etc., shall be applied only for charging batteries.

They shall only be fitted with a device which prevents overcharging of the battery(ies).

4.4 Protective measures

The ELV installation shall be so installed that the protective measures of the LV installation against direct contact, or against indirect contact are not impaired.

It shall be ensured that the protective conductors of the LV installation are not loaded by operating currents of the ELV installation.

The negative pole of the appropriate circuit for the supply of the ELV consumers in the motor caravan shall be included in the equipotential bonding.

5 Wiring

5.1 Cable and fixed wiring cross-sectional areas

The cross-sectional areas of the fixed wiring shall be in accordance with annex A. Annex A does not apply to sensor and data lines.

5.2 Fixed wiring

5.2.1 Cables

All circuits from the auxiliary battery shall consist of a feed and a return cable (two-core line). The return (negative) cable shall be connected to battery negative. The feed (positive) cable shall be connected to battery positive.

Providing that voltage drop is not increased, the return path of a circuit may be by means of the chassis/body-work of the base vehicle rather than by cable.

5.2.2 Type of cable

Cables shall be of solid construction and shall conform to HD 21.1 S4, HD 21.3 S3, HD 21.4 S2 and HD 21.5 S3 or HD 22.1 S4 and HD 22.4 S3 or ISO 6722.

5.2.3 Cable installation

Cables may be run either visibly or concealed. Cables shall be protected by suitable means against mechanical damage, thermal overload and chemical reaction.

Cables of ELV circuits and cables of other circuits (cables for LV current) may be run together, if the insulations of the cables or the individual circuits are designed for the highest value of voltage which is likely to be present.

5.2.4 Supporting of cables

Cables shall be supported at maximum intervals of 400 mm for vertical runs. Horizontal runs, unless run in conduits or ducts shall be secured at maximum intervals of 250 mm. In the case of horizontal runs of a cable on a fixed substructure, cables shall be supported at maximum intervals of 400 mm.