

# **SLOVENSKI STANDARD** SIST EN 1648-1:2005

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Leisure accommodation vehicles - 12 V direct current extra low voltage electrical installations - Part 1: Caravans

Bewohnbare Freizeitfahrzeuge - Elektrische Anlagen für DC 12 V - Teil 1: Caravans (standards.iteh.ai)

Véhicules habitables de loisirs - Installations électriques a tres basse tension de 12 V en courant continu - Partie 1: Caravanes standards/standards/sist/f8a25d9f-df3e-47a3-95c8-08539676a924/sist-en-1648-1-2005

Ta slovenski standard je istoveten z: EN 1648-1:2004

### ICS:

| 43.040.10 | Ò ^\dã}æ\$\$jÁ* ^\d[}∙\æ<br>[]¦^{æ                      | Electrical and electronic equipment       |
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| 43.100    | Osebni avtomobili. Bivalne prikolice in lahke prikolice | Passenger cars. Carava and light trailers |

SIST EN 1648-1:2005

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cars. Caravans

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#### SIST EN 1648-1:2005

# EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

### EN 1648-1

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Supersedes EN 1648-1:1997

English version

# Leisure accommodation vehicles - 12 V direct current extra low voltage electrical installations - Part 1: Caravans

Véhicules habitables de loisirs - Installations électriques à très basse tension de 12 V en courant continu - Partie 1: Caravanes

Bewohnbare Freizeitfahrzeuge - Elektrische Anlagen für DC 12 V - Teil 1: Caravans

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.

CEN members are the national standards **bodies of 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.

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### Foreword

This document (EN 1648-1:2004) has been prepared by 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 1648-1:1997.

This European Standard is based on ISO 8818 "Leisure accommodation vehicles — Caravans — 12 V direct current extra low voltage electrical installations" and takes into consideration specific aspects relating to electrical installations in caravans.

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 motor caravans are specified in EN 1648-2.

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.

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#### 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 caravans. It covers the design and integration of the caravan system with the towing vehicle system.

It does not apply to commercial trailers, nor does it include requirements for ELV road lighting and signalling lamps and their installations, except for safety requirements for the routing of cables in LPG storage compartments.

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 1645-1, Leisure accommodation vehicles — 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 60335-1, Household and similar electrical appliances - Safety - Part 1: General requirements (IEC 60335-1:2001, modified). <u>SIST EN 1648-1:2005</u>

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EN 60335-2-29, Safety of household and similar electrical appliances<sup>200</sup> Part 2: Particular requirements for battery chargers (IEC 60335-2-29:1994, modified).

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

EN 61558-1, Safety of power transformers, power supply units and similar — Part 1: General requirements and tests (IEC 61558-1:1997, modified).

EN 61558-2-1, Safety of power transformers, power supply units and similar — Part 2-1: Particular requirements for separating transformers for general use (IEC 61558-2-1:1997).

EN 61558-2-4, Safety of power transformers, power supply units and similar — Part 2-4: Particular requirements for isolating transformers for general use (IEC 61558-2-4:1997).

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 (IEC 61558-2-6:1997).

EN ISO 11446, Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 13-pole connectors for vehicles with 12 V nominal supply voltage (ISO 11446:2004).

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: Sheathed 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 1724, Road vehicles - Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 12 N (normal) for vehicles with 12 V nominal supply voltage.

ISO 3732, Road vehicles - Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 12 S (supplementary) for vehicles with 12 V nominal supply voltage.

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. **iTeh STANDARD PREVIEW** 

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#### Terms and definitions 3

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

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#### Power supply 4

#### 4.1 General

The power supply shall be a nominal DC 12 V (see also 4.4.1 and 7.1).

#### 4.2 Sources of supply

The supply shall be obtained from one or more of the following sources:

- the electrical installation of the towing vehicle; a)
- b) an auxiliary battery mounted on the caravan (see 4.3);
- LV supply via an on-board mounted transformer/rectifier unit that complies with the requirements of C) EN 60335-1, EN 61558-1, EN 61558-2-1, EN 61558-2-4 and EN 61558-2-6;
- DC generator that is driven by any form of energy (see 4.4); d)
- e) solar energy cells (see 4.4.2).

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

#### 4.3 Auxiliary batteries

#### 4.3.1 Type of battery

An auxiliary battery shall be of the rechargeable type. Non-rechargeable batteries are not auxiliary batteries according to 4.3. They may be used, provided that they are used in circuits separated from other sources of electrical supply.

#### 4.3.2 Capacity

An auxiliary battery shall have a minimum capacity of 36 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.

#### 4.3.3 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.

#### 4.3.4 Location

An auxiliary battery shall be placed in a compartment according to 4.3.5, which is designed to protect it from mechanical damage, with easy access for maintenance or removal and secured to prevent movement of the battery, e.g. when the caravan is in motion, TANDARD PREVIEW

### 4.3.5 Auxiliary battery compartment (standards.iteh.ai)

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 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 caravan by means of a suitable tube with a inside diameter of minimum 5 mm and maximum 8 mm at 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; or
- c) ventilating the compartment at low-level and high-level to the exterior of the caravan and constructing the interior of the compartment, which shall have gas tight joints and seams, 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<sup>2</sup> at low level and not less than 80 mm<sup>2</sup> at high level. If the compartment opens into the interior of the caravan, the lid shall provide an air seal.

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".

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

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 caravan has not been designed to accommodate an auxiliary battery. Do not fit one."

#### 4.3.6 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 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 caravan is to be sold.

#### 4.4 Other sources of supply

#### 4.4.1 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  $V_{pp}$ .

#### 4.4.2 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).

#### 4.5 Protective measures

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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. <u>SIST EN 1648-1:2005</u>

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

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

#### 5 Wiring

#### 5.1 Connection to electrical system of towing vehicle

#### 5.1.1 Connecting cables

The connection between the fixed wiring of a caravan and the electrical connector to the towing vehicle shall be by means of flexible connecting cable(s) with cores having minimum cross-sectional areas as shown in table 1. The length of the cables shall not exceed 5 m. To these cables shall be attached plugs with contact allocations in accordance with ISO 1724 and ISO 3732 or EN ISO 11446. A connecting cable shall be of sufficient length to allow the plug to extend 500 mm in front of the coupling head of the caravan.

#### 5.1.2 Protecting of disconnected plug

When the plug is disconnected it shall be protected against the ingress of water, foreign bodies and accidental damage.

#### 5.1.3 Contact allocation

The functional allocation of the single cores of the connecting cables shall be in accordance with table 1.