



**SLOVENSKI STANDARD**  
**SIST EN 15194:2009+A1:2012**  
**01-februar-2012**

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**Kolesa - Kolesa z električnim pomožnim pogonom - Kolo KEPP**

Cycles - Electrically power assisted cycles - EPAC Bicycles

Fahrräder - Elektromotorisch unterstützte Räder - EPAC-Fahrräder

Cycles - Cycles à assistance électrique - Bicyclettes EPAC

**Ta slovenski standard je istoveten z: EN 15194:2009+A1:2011**

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**ICS:**

43.120	Električna cestna vozila	Electric road vehicles
43.150	Kolesa	Cycles

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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## Cycles - Electrically power assisted cycles - EPAC Bicycles

Cycles - Cycles à assistance électrique - Bicyclettes EPAC

Fahrräder - Elektromotorisch unterstützte Räder - EPAC-Fahrräder

This European Standard was approved by CEN on 22 November 2008 and includes Amendment 1 approved by CEN on 8 October 2011.

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**EN 15194:2009+A1:2011 (E)****Foreword**

This document (EN 15194:2009+A1:2011) has been prepared by Technical Committee CEN/TC 333 "Cycles", the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by May 2012, and conflicting national standards shall be withdrawn at the latest by May 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1 approved by CEN on 8 October 2011.

This document supersedes EN 15194:2009.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**.

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

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## Introduction

This European Standard gives requirements for electric power assisted cycles (EPAC).

This European Standard has been developed in response to demand throughout Europe. Its aim is to provide a standard for the assessment of electrically powered cycles of a type which are excluded from type approval by Directive 2002/24/EC.

Due to the limitation of the voltage to 48 VDC, there are no special requirements applicable to the EPAC in regard to protection against electrical hazards.

EPACs are vehicles which use the same traffic areas as cars, lorries and motorcycles, which is predominantly the street. For this reason the products concerning EMC-testing have the same basic conditions. Chapter 8 of the EC Directive 97/24 contains a very high value concerning the immunity test of electronic components with 30 V/m, nevertheless based on the application area it comes up of the implementation. Manipulation of the electronic system of EPAC by other source of interference in the scope of the public road traffic could signify considerable risks of safety regulations for the user of EPAC. The standards EN 61000-6-1 as well as EN 61000-6-3 are standards for appliances in residential, commercial and light-industrial environments which do not reach the values for the EMC immunity-test necessary in the road traffic area. In these standards the EMC immunity of the electric and electronic systems will be tested only with 3 V/m, which is the tenth part of the requirements in chapter 8 of the EC Directive 97/24. These standards are unsuitable to obtain the urgent and necessary security level.

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**EN 15194:2009+A1:2011 (E)****1 Scope**

This European Standard is intended to cover electrically power assisted cycles of a type which have a maximum continuous rated power of 0,25 kW, of which the output is progressively reduced and finally cut off as the vehicle reaches a speed of 25 km/h, or sooner, if the cyclist stops pedalling.

This European Standard specifies safety requirements and test methods for the assessment of the design and assembly of electrically power assisted bicycles and sub-assemblies for systems using battery voltage up to 48 VDC or integrated a battery charger with a 230 V input.

This European Standard specifies requirements and test methods for engine power management systems, electrical circuits including the charging system for the assessment of the design and assembly of electrically power assisted cycles and sub-assemblies for systems having a voltage up to and including 48 VDC or integrated a battery charger with a 230 V input.

**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 14764:2005, *City and trekking bicycles — Safety requirements and test methods*

EN 55014-1, *Electromagnetic compatibility — Requirements for household appliances, electric tools and similar apparatus — Part 1: Emission*

EN 55014-2, *Electromagnetic compatibility — Requirements for household appliances, electric tools and similar apparatus — Part 2: Immunity product family standard*

EN 60034-1, *Rotating electrical machines — Part 1: Rating and performance*

EN 61000-3-2, *Electromagnetic compatibility (EMC) — Part 3-2: Limits — Limits for harmonic current emissions (equipment input current  $\leq$  16A per phase)*

EN 61000-3-3, *Electromagnetic compatibility (EMC) — Part 3-3: Limits — Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current  $\leq$  16 A*

ISO 2575, *Road vehicles — Symbols for controls, indicators and tell tales*

ISO 11451-1, *Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 1: General principles and terminology*

ISO 11452-1, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 1: General principles and terminology*

ISO 11452-2, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 2: Absorber-lined shielded enclosure*

ISO 11452-3, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 3: Transverse electromagnetic mode (TEM) cell*

ISO 11452-4, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 4: Bulk current injection (BCI)*

ISO 11452-5, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 5: Stripline*



IEC 60068-2-75:1998, *Environmental testing — Part 2: Tests — Test Eh: Hammer tests*

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

IEC 60529:1991, *Degrees of protection provided by enclosures (IP Code)*

CISPR 12, *Vehicles, boats and internal combustion engines — Radio disturbance characteristics — Limits and methods of measurement for the protection of off-board receivers*

CISPR 25:2008, *Vehicles, boats and internal combustion engines — Radio disturbance characteristics — Limits and methods of measurement for the protection of on-board receivers*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

##### **cycle**

vehicle that has at least two wheels and is propelled solely or mainly by the muscular energy of the person in that vehicle, in particular by means of pedals

#### 3.2

##### **bicycle**

two-wheeled cycle

#### 3.3

##### **fully assembled bicycle**

bicycle fitted with all the components necessary for its intended use

#### 3.4

##### **electrically power assisted cycle**

##### **EPAC**

cycle, equipped with pedals and an auxiliary electric motor, which cannot be propelled exclusively by means of this auxiliary electric motor

#### 3.5

##### **no load current point**

current for which there is no torque on the driving wheel

#### 3.6

##### **full discharge of the battery**

point at which the battery does not deliver any power/energy to the motor, according to the manufacturer's specifications

#### 3.7

##### **cut off speed**

speed reached, by the EPAC, at the moment the current has dropped to zero or to the no load current value

#### 3.8

##### **maximum assisted speed by design**

maximum design speed up to which assistance is provided

#### 3.9

##### **electromagnetic compatibility**

ability of a vehicle or one of its electrical/electronic systems to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbance to anything in that environment

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**EN 15194:2009+A1:2011 (E)****3.10****electromagnetic disturbance**

electromagnetic phenomenon which may degrade the performance of a vehicle or one of its electronic/electrical systems

NOTE An electromagnetic disturbance may be electromagnetic noise, an unwanted signal or a change in the propagation medium itself.

**3.11****electromagnetic immunity**

ability of a vehicle or one of its electronic/electrical systems to perform without degradation of its performance in the presence of specific electromagnetic disturbance

**3.12****electromagnetic environment**

all electromagnetic phenomena present in a given situation

**3.13****reference limit**

nominal level to which both the component type-approval of the vehicle and the conformity-of-production limit value refer

**3.14****reference antenna**

balanced half-wave dipole tuned to the measured frequency

**3.15****wide-band emission**

emission which has a bandwidth exceeding that of a specific receiver or measuring instrument

**3.16****narrow-band emission**

emission which has a bandwidth less than that of a specific receiver or measuring instrument

**3.17****electronic/electrical subassembly (ESA)**

electronic and/or electrical component, or an assembly of components provided for installation into a vehicle, together with all electrical connections and associated wiring for the execution of several specific functions

**3.18****ESA test**

test carried out on one or more specific ESAs

**3.19****vehicle type with regard to electromagnetic compatibility**

vehicles that do not differ essentially in design and construction from the following aspect:

- general layout of the electronic and/or electrical components;
- overall size, layout and shape of the engine mounting and the disposition of the high-voltage wiring (where present);
- raw material from which both the vehicle chassis and bodywork are constructed (e.g., a chassis or body made of glass fibre, aluminium or steel)

**3.20****ESA type in relation to electromagnetic compatibility**

separate technical ESA unit that does not differ from other units in its essential design and construction aspects

NOTE For example:

- the function performed by the ESA;
- the general layout of the electronic and/or electrical components;
- direct vehicle control performed by the rider acting on the steering, the brakes and the accelerator control.

### 3.21

#### rated voltage

voltage declared by the manufacturer of the bicycle

### 3.22

#### continuous rated power

continuous (or constant) output power specified by manufacturer, at which the motor reaches its thermal equilibrium at given ambient conditions

NOTE Thermal equilibrium: temperatures of motor parts do not vary more than 2K per hour.

### 3.23

#### brake lever cut-off switch

device that cuts off the motor assistance while using the brake lever

### 3.24

#### integrated charger

charger which is a part of the bicycle and needs tools to be disassembled from it

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## 4 Requirements

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### 4.1 General

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Electrically power-assisted bicycles shall comply with Clause 4, 5 and 6 of the European Standard EN 14764:2005 in addition to the specific requirements in Clause 4.2 of this standard.

### 4.2 EPAC specific additional requirements

#### 4.2.1 Electric circuit

The electrical control system shall be designed so that, should it malfunction in a hazardous manner, it shall switch off power to the electric motor.

**[A1]** If a symbol shows a function that is described by a symbol included in ISO 2575, the symbol shall be in accordance with that standard. **[A1]**

#### 4.2.2 Batteries

##### 4.2.2.1 Requirements

EPAC and pack of batteries shall be designed in order to avoid risk of fire, mechanical deterioration resulting from abnormal use. Compliance is checked by the test described in 4.2.2.2.

During the test the EPAC and the batteries shall not emit flames, molten metal or poisonous ignitable gas in hazardous amounts and any enclosure shall show no damage that could impair compliance with this European Standard.

Safety and compatibility of the combination battery/charger combination shall be ensured, according to the manufacturer's specifications.

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The battery terminals shall be protected against creating an accidental short circuit. Care shall be taken to ensure that the batteries are protected against overcharging. An appropriate overheating and short circuit protection device shall be fitted.

NOTE Indication and example of solutions are given in Annex A.

Batteries and the charger unit shall be labelled in order to be able to check their compatibility.

**4.2.2.2 Test method**

- 1) Battery terminals are short-circuited with the batteries in a fully charged condition.
- 2) Motor terminals are short-circuited; all commands are in ON position, whilst the batteries are fully charged.
- 3) The EPAC is operated with the electric motor or drive system locked up so as to fully discharge the battery or until the system stops.
- 4) The battery is charged for double the recommended charging period or for 24 hours depending upon which is the longest period.

**4.2.3 Electric cables and connections****4.2.3.1 Requirements**

Cable and plug temperature shall be lower than that specified by the manufacturer of the cables and plugs. There shall be no corrosion on plug pins and no damage to cable and plug insulation.

**4.2.3.2 Test method**

Discharge the fully charged EPAC battery to the discharging limit specified by the EPAC or ESA manufacturer at the maximum current allowable by the system and record it, giving consideration to the electric motor and/or the controller and/or the battery controller. Measure the cable and plug temperatures and ensure, by examination, that there is no deterioration of the insulation on either assembly.

**4.2.3.3 Wiring**

- a) Wire ways shall be smooth and free from sharp edges.
- b) Wires shall be protected so that they do not come into contact with burrs, cooling fins or similar sharp edges that may cause damage to their insulation. Holes in metal through which insulated wires pass shall have smooth well-rounded surfaces or be provided with bushings.
- c) Wiring shall be effectively prevented from coming into contact with moving parts.

Separate parts of the EPAC that can move in normal use or during user maintenance relative to each other, shall not cause undue stress to electrical connections and internal conductors, including those providing earthing continuity.

Compliance with a), b), c) shall be checked by inspection.

- d) If an open coil spring is used, it shall be correctly installed and insulated. Flexible metallic tubes shall not cause damage to the insulation of the conductors contained within them.

Compliance with d) shall be checked by inspection and by the following test method.

If flexing occurs in normal use, the appliance is placed in its normal operational position and is supplied at rated voltage under normal operation.