SLOVENSKI STANDARD
SIST EN 15194:2017/oprA2:2022

01-april-2022

Kolesa - Kolesa z električnim pomožnim pogonom - Kolesa EPAC - Dopolnilo A2

Cycles - Electrically power assisted cycles - EPAC Bicycles

Fahrräder - Elektromotorisch unterstützte Räder - EPAC

Cycles - Cycles à assistance électrique - Bicyclettes EPAC

Ta slovenski standard je istoveten z: **EN 15194:2017/prA2**

ICS:

43.120	Električna cestna vozila	Electric road vehicles
43.150	Kolesa	Cycles

SIST EN 15194:2017/oprA2:2022 **en,fr,de**

EUROPEAN STANDARD

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EN 15194:2017

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ICS 43.120; 43.150

English Version

Cycles - Electrically power assisted cycles - EPAC Bicycles

Cycles - Cycles à assistance électrique - Bicyclettes EPAC

Fahrräder - Elektromotorisch unterstützte Räder - EPAC

This draft amendment is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 333.

This draft amendment A2, if approved, will modify the European Standard EN 15194:2017. If this draft becomes an amendment, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration.

This draft amendment was established by CEN 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 15194:2017/prA2:2022) has been prepared by Technical Committee CEN/TC 333 “Cycles”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

In comparison with the previous edition, the following technical modifications have been made:

— Clause 5 “Marking, labelling”: the reference to CE marking is removed;

— Addition of Annex K to give a method aiming at measuring the vibrations to which a cyclist is subjected.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

1 Modification to Clause 5, “Marking, labelling”

In 5.1, delete “(CE)” *in the third bullet to read:*

— appropriate marking required by legislation;

2 Addition of informative Annex K, “Vibration measurements on EPACs”

Add the following informative Annex K:

“

Annex K
(informative)

Vibration measurements on EPACs

K.1 General

In order to comply with the requirements of Directive 2006/42/EC (Machinery Directive), information is to be provided on the vibrations that can occur in machines where the operator may be exposed to vibrations due to the operation of the machine itself or due to the movement of the machine on uneven ground. The test method described below is limited to cycles for professional use.

For EPACs, vibration excitations result without exception from riding; therefore, the test of whole-body vibrations and hand-arm vibrations is based on the driving mode and thus complies with EN 1032.

An uncertainty is specified for the validity of the measurements, which is 0,4 times the vibration values specified in EN 12096. Further investigations should be carried out to reduce this uncertainty range as soon as vibration data obtained from different measuring facilities are available.

K.2 Basic standards

European Standards EN 1032 and EN 12096 are the basic standards relevant to the formulation of a vibration measurement standard for mobile machinery.

EN 1032 describes the determination of whole-body and hand-arm vibrations of the operator during the testing of mobile machinery; EN 12096 provides guidance on how to declare vibration emission values of machinery and specifies requirements for the verification of specified values.

K.3 Values to be measured

The following values are to be measured or determined:

— a_{wz}: root mean square (r.m.s.) value of the frequency-weighted acceleration of the vertical whole-body vibration according to EN 1032, measured on the saddle of the EPAC.

— a_{wzS}: mean value of N r.m.s. values of the weighted vertical whole-body vibration of a valid test series.

— a_{hwx} , a_{hwy} , a_{hwz}: r.m.s. values of the frequency-weighted acceleration of the hand-arm vibration in the x, y and z directions according to EN ISO 5349-1, measured on the handlebar grip of the EPAC.

— a_{hv}: total vibration value of the r.m.s. values of the frequency-weighted acceleration of the hand-arm vibrations according to EN ISO 5349-1. This results from the measurements of the r.m.s. values of the frequency-weighted acceleration in the x, y and z directions according to:

$$a_{hv} = \sqrt{a_{hwx}^2 + a_{hwy}^2 + a_{hwz}^2} \quad \text{(K.1)}$$

— a_{hvH}: mean value of N r.m.s. values of the total vibration value of the frequency-weighted acceleration of the hand-arm vibrations of a valid test series.

— Mean speed of the EPAC when moving along the test track. This velocity can be determined from the time spent running along the test track or by using the measuring equipment specified in K.3.5.

— The tire pressure shall be checked immediately before the measurement.

— Ambient air temperature.

K.3 Instrumentation

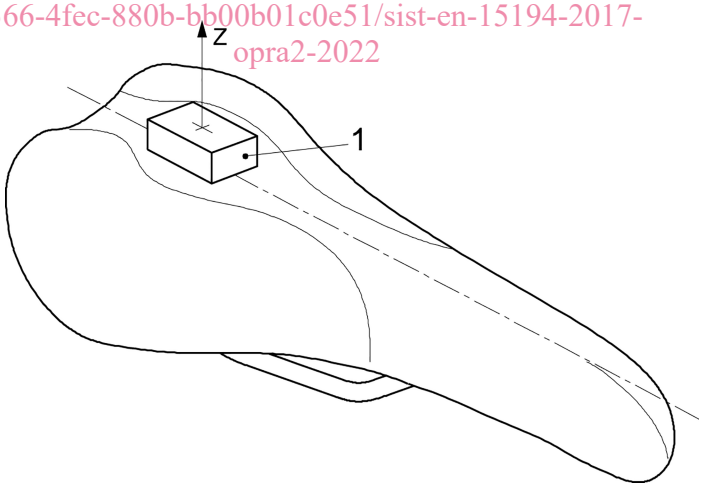
K.3.1 General

Accelerometers shall be used for the measurement of vibrations. Accelerometers shall be attached in accordance with ISO 5348 and in accordance with the instructions of the accelerometer manufacturer.

K.3.2 Vibration transducers for whole-body vibrations

The general requirements for mounting the vibration transducer are given in EN 1032:2003+A1:2008, 7.2. For measurement on the saddle, the use of a vibration transducer in a semi-elastic seat pad is not practical; therefore, the vibration transducer shall be placed directly on the saddle surface in such a way that the transducer is located centrally between the ischial tuberosities of the seated person (see Figure K.1). For reasons of comfort or due to the design of the saddle, it is permissible to position the transducer slightly (up to 50 mm) in front of or behind the ischial tuberosities. A transducer that is as flat as possible should be used; preferably, the transducer should be adhered to the saddle surface, e.g. with double-sided adhesive tape.

The measurement shall be taken in the vertical (z) direction.



Key

1 position of the accelerometer

Figure K.1 — Saddle with position of the accelerometer

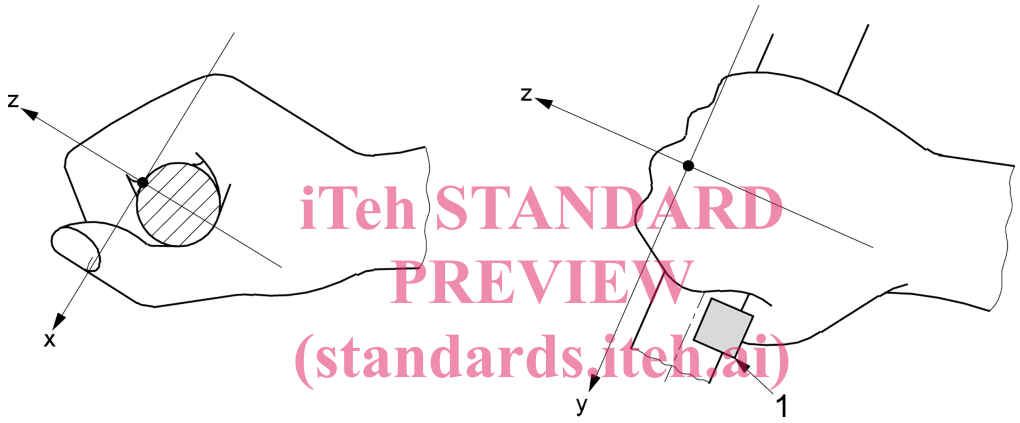
K.3.3 Vibration transducers for hand-arm vibrations

General requirements for the measurement and evaluation of human exposure to hand-transmitted vibration can be found in EN ISO 5349-1, and guidance on the mounting of vibration transducers is given in EN ISO 5349-2:2001[1], Annex D.

For measurements on the handlebar grip of the EPAC, it is possible to mount the vibration transducer both on the handlebar tube and on the handlebar grip, with the transducer preferably positioned as close as possible to the hand between the thumb and index finger, as given in EN ISO 20643:2008[2], 6.1, Figure 1 a) (see Figure K.2).

The vibration transducer shall not interfere with the operator's usual method of holding the handlebar, as this would influence the vibration behaviour at the handlebar and thus the measurement results.

The measurements shall be carried out in all three measuring directions. It is sufficient to record the hand-arm vibration with one sensor (on the right or left of the handlebar grip).



Key

1 position of the accelerometer

Figure K.2 — Coordinate system for the hand with position of the accelerometer

K.3.4 Frequency weighting and integration time

The frequency weighting and the characteristic values of the bandpass filters shall comply with EN 1032:2003+A1:2008, 7.3.

For each test, the r.m.s. value of acceleration shall be the linearly integrated average (interval r.m.s. value) for a complete test run on the test track (see K.4.2).

Preferably, the recording of all measured values (whole-body vibrations in vertical (z-) direction and hand-arm vibrations by means of a multi-axis transducer in x-, y- and z-direction) should be made simultaneously on the test track.

K.3.5 Speed of the EPAC

The speed of the EPAC on the test track shall be measured with measuring devices that measure the average speed with an uncertainty of ±5 %.

NOTE An alternative method is to measure the time to pass the entire length of the test track. Knowing the length of the track and the time required to pass through it, the mean speed of the EPAC can be calculated.

K.4 Test setup and test equipment

K.4.1 General

If an EPAC is available in different frame sizes, it is sufficient to perform the measurements on a size suitable for the rider. The EPAC is to be adjusted according to this person, see also K.4.3.

K.4.2 Test track

The test track consists of a straight, plain and smooth surface of length l = 100 m with 12 rigid obstacles of a defined cross-section (e.g. made of hardwood, metal, etc.) which shall be driven over. The distance between the obstacles is b = 8 m, and at the beginning and end of the test track there is a run-in and run-out section of a = 6 m, respectively.

The total length of the test track further includes a sufficient area at each end to accelerate the EPAC to the required speed at the actual beginning of the measurement section and after the end of the measurement section for braking and turning.

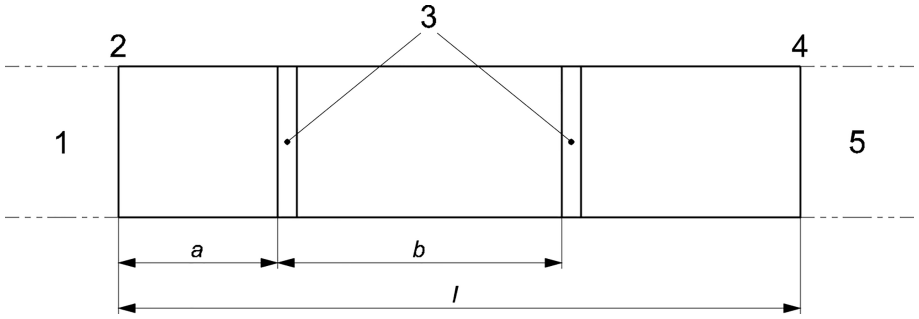
The surface of the test track shall be made of a hard material, such as asphalt or concrete. The surface shall be smooth enough that the r.m.s. value of the frequency-weighted acceleration of the vertical vibration ($a_{w,z}$) measured for the whole-body vibrations on the saddle when the EPAC passes through the test track without obstacles is less than 50 % of the measured value at the same measurement location when the EPAC passes through the test track equipped with obstacles.

Care shall be taken to ensure that the obstacles do not slip on the surface of the test track. Figure K.3 shows the setup for the test track; the geometry of the obstacles is shown in Figure K.4. The obstacles have a width of (50 ±2,5) mm and a thickness of (10 ±0,25) mm.

NOTE The ratio between the whole-body vibration measurements taken on the saddle, with and without obstacles, is generally smaller than for the hand-arm vibration measurements taken on the handlebar grip.

If, when crossing the obstacles, the vibrations measured on the saddle are less than 0,5 m/s², then the 50 % criterion may be neglected.

For the obstacles, instead of the slots according to EN ISO 4210-3:2014, Annex A with a width of (50 ±2,5) mm and a thickness of (10 ±0,25) mm and edges chamfered at 45° of half their thickness, obstacles with a rectangular cross-section with a width of (40 ±2,0) mm and a thickness of (10 ±0,25) mm may also be used, provided that the wheel diameter is greater than or equal to 20" (406 mm), since the contact of the wheel to the obstacle is made on the upper edge.



Key

1	acceleration area	*a*	run-in section
2	starting line	*b*	obstacle spacing
3	obstacles	*l*	total length of the test track
4	finish line		
5	area for braking and turning		

Figure K.3 — Characteristic values of the test track

Dimensions in millimetres

a) Obstacle with 45° chamfered edges b) Rectangular obstacle

Figure K.4 — Obstacle geometry

K.4.3 Equipment and condition of the EPAC

K.4.3.1 EPAC

The measurements shall be performed on a new, fully assembled EPAC.

The measurements are performed on an EPAC in an unloaded state, i.e. without luggage.

It is sufficient to perform the measurements on a single EPAC if this is available in different frame heights, but the remaining equipment is otherwise identical, in particular with regard to tires, suspension elements, handlebar and saddle.

K.4.3.2 Tires and suspension systems

The EPAC shall be equipped with new tires. If pneumatic tires are used, they shall be properly inflated according to the EPAC manufacturer's instructions. The tire inflation pressure shall be checked immediately before the vibration measurement.

The tire pressure shall be set according to the manufacturer's instructions (according to the operating instructions or as indicated on the product) (±5 %). If there are no specifications, the tire pressure as indicated on the tire sidewall shall be used. If a maximum value or a range for the tire pressure (min./max.) is specified, the tire shall be inflated with 80 % of the maximum inflation pressure.

If the EPAC is equipped with suspension systems, the adjustment of the spring-damper elements is carried out according to the manufacturer's instructions in the operating manual or the specifications on the product. If there are no specifications for the adjustment, the adjustment should be made so that a