



BSI Standards Publication

Helmets for S-EPAC riders

Currently in preview, click buy full version

National foreword

This Published Document is the UK implementation of CEN/TS 17946:2023.

The UK participation in its preparation was entrusted to Technical Committee PH/6, Head protection.

A list of organizations represented on this committee can be obtained on request to its committee manager.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

This publication is not to be regarded as a British Standard.

© The British Standards Institution 2023
Published by BSI Standards Limited 2023

ISBN 978 0 55 22165 7

ICS 13.240.20

Compliance with a Published Document cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 July 2023.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION

CEN/TS 17946

July 2023

ICS 13.340.20

English Version

Helmets for S-EPAC riders

Helme für S-EPAC-Berittzer

This Technical Specification (CEN/TS) was approved by CEN on 12 June 2023 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for a CEN standard to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



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

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

Contents		Page
European foreword		4
Introduction		6
1	Scope	7
2	Normative references	7
3	Terms and definitions	7
4	Requirements	9
4.1	Materials	9
4.2	Construction	9
4.3	Field of vision	9
4.4	Shock absorbing capacity	11
4.5	Durability	11
4.6	Retention system	11
4.6.1	General	11
4.6.2	Chin strap	11
4.6.3	Fastening device	11
4.6.4	Colour	11
4.6.5	Strength	11
4.6.6	Effectiveness	11
4.6.7	Ease of release	11
4.7	Integrated visors	12
5	Testing	12
5.1	Headforms	12
5.2	Inspection and determination of marks	12
5.3	Number of samples and sequence of tests	12
5.4	Determination of shock absorbing capacity	13
5.4.1	Test area	13
5.4.2	Conditioning	15
5.4.3	Apparatus	15
5.4.4	Procedure	18
5.5	Determination of retention system strength and ease of release	18
5.5.1	Apparatus	18
5.5.2	Procedure	19
5.6	Determination of retention system effectiveness	19
5.6.1	Apparatus	19
5.6.2	Procedure	21
5.7	Determination of field of vision	22
5.8	Test report	22
6	Marking	22
Information supplied by the manufacturer		23
Annex A (informative) Alternative procedure for artificial ageing		24
Annex B (informative) Mark of approval		25
Annex C (normative) Integrated visors for S-EPAC users		26

C.1	Scope	26
C.2	Normative references	26
C.3	Terms and definitions.....	26
C.4	Requirements.....	26
C.4.1	General	26
C.4.2	Design and manufacture	26
C.4.3	Materials	26
C.4.4	Sit and fit.....	27
C.4.5	Ventilation.....	27
C.4.6	Optical requirements	27
C.4.7	Non optical requirements.....	30
C.4.8	Optional requirements – Resistance to fogging.....	31
C.5	Testing.....	31
C.5.1	General	31
C.5.2	Conditioning and test conditions.....	32
C.5.3	Field of vision	32
C.5.4	Refractive powers.....	34
C.5.5	Transmittance.....	34
C.5.6	Reduced luminance coefficient.....	35
C.5.7	Resistance to ultraviolet radiation.....	35
C.5.8	Impact resistance	36
C.5.9	Resistance to surface damage by fine particles.....	37
C.5.10	Resistance to fogging.....	37
C.5.11	Visual inspection.....	37
C.5.12	Sit and fit.....	37
	Annex D (normative to Annex C) Photochromic sunglare oculars for use in twilight or at night ...	38
	Annex E (normative to Annex C) Spectral functions for the calculation of luminous transmittance and relative visual attenuation coefficients (quotients).....	39
	Annex F (normative to Annex C) Spectral functions for the calculation of solar UV transmittance values.....	41
	Annex G (normative to Annex C) Spectral function for the calculation of infrared transmittance.....	43
	Annex H (normative to Annex C) Cut-on filter for UV filtering.....	45
	Annex I (normative to Annex C) Uncertainty of measurement and results interpretation.....	47
	Bibliography	49

European foreword

This document (CEN/TS 17946:2023) has been prepared by Technical Committee CEN/TC 158 “Head protection”, the secretariat of which is held by SIS.

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

CEN/TS 17946 is largely based on NTA 8776:2016-12, a document issued and adopted by Dutch standard organization NEN that sets requirements for S-EPAC helmets. CEN/TS 17946 was originally proposed as a European standard, but as multiple EU member states oblige users of all types of L1e-B categorized vehicles to wear (only) a helmet that conforms to UNECE Regulation 22, the form of a CEN Technical Specification was chosen to allow member states the choice whether or not to adopt this document.

In order to be allowed to be used on S-EPACs on public roads and to place on the market in the Netherlands, manufacturers are obliged by Dutch law to affix a mark of approval to the S-EPAC helmet. The terms of use of the mark of approval are to be found in the certification scheme NCS 8776 see Annex B.

Working Group 15 of CEN/TC 158 has reviewed NTA 8776:2016-12 and decided to fully adopt its requirements into CEN/TS 17946. The only addition to NTA 8776:2016-12 is that in CEN/TS 17946 requirements for integrated visors into S-EPAC-helmets are adopted. An integrated visor is optional for a S-EPAC-helmet as specified in this document. The requirements for integrated visors are largely based on EN 1938 *Personal eye protection — Goggles for motorcycle and moped users*.

CEN/TS 17946 contains requirements for helmets for use by speed electrically power assisted bicycles (S-EPACs). The S-EPAC is a product for which the European bicycle industry and consumers have identified the need to provide users with a suitable helmet. In the new European regulation No 168/2013 on the approval and market surveillance of two- or three-wheel vehicles and quadricycles the S-EPAC is classified as an L1e-B two-wheel moped. Although the electric power assistance will support the S-EPAC user up to the speed of 45 km/h, the S-EPAC will require a considerable pedaling effort from the user.

The challenge for the bicycle and helmet industry therefore was to come up with a set of requirements for an S-EPAC helmet that would provide an enhanced safety level compared to the EN 1078:2012+A1:2012 bicycle helmet as a result of the higher speeds, but would likewise provide the same comfort level for use in physical effort.

The bicycle and helmet industry together with other relevant stakeholders (government, test institutes) made use of existing knowledge on head protection (a whole range of existing helmet standards, literature and testing results) and defined requirements that are at the limits of the current technical possibilities in the context of developing a ventilated, lightweight helmet with an increased safety level.

The result was NTA 8776:2016-12, a modified version of EN 1078:2012+A1:2012 *Helmets for pedal cyclists and for users of skateboards and roller skates*. Significant modifications compared to EN 1078:2012+A1:2012 are related to the shock absorbing capacity and test area. The test area is enlarged in order to provide more protection of the temporal and occipital area of the head. For the impact test the fall velocities are increased.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

The protection given by a helmet depends on the circumstances of the accident and wearing a helmet cannot always prevent death or long-term disability.

A proportion of the energy of an impact is absorbed by the helmet, thereby reducing the force of the blow sustained by the head. The structure of the helmet may be damaged in absorbing this energy and any helmet that sustains a severe blow needs to be replaced even if damage is not apparent.

At the time this document was prepared, no standardized method for measuring the ventilating capacity of a helmet was recognized. For that reason no requirements concerning ventilation or heat transmission have been introduced. Manufacturers of helmets are urged to design their helmets to encourage a flow of air over the wearer's head.

Licensed copy: Techstreet Content, ISO Exchange - Michigan, Version correct as of 22/08/2023.

Currently in preview, click buy full version.

1 Scope

This document specifies requirements and test methods for helmets worn by users of speed electrically power assisted bicycles (S-EPACs). This document also specifies requirements and test methods for integrated visors in helmets worn by users of S-EPACs.

Requirements and the corresponding methods of test are given for the following:

- construction, including field of vision;
- shock absorbing properties;
- retention system properties, including chin strap and fastening devices;
- marking and information.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 167:2001, *Personal eye-protection — Optical test methods*

EN 168:2001, *Personal eye-protection — Non-optical test methods*

EN 960:2006, *Headforms for use in the testing of protective helmets*

EN 1811, *Reference test method for release of nickel from products intended to come into direct and prolonged contact with the skin*

EN 1836:2005+A1:2007, *Personal eye-equipment — Sunglasses and sunglare filters for general use and filters for direct observation of the sun*

EN ISO 4007:2018, *Personal protective equipment — Eye and face protection — Vocabulary (ISO 4007:2018)*

EN ISO 13688:2013,¹ *Protective clothing — General requirements*

ISO 11664-1:2007, *Colorimetry — Part 1: CIE standard colorimetric observers*

ISO 11664-2:2007, *Colorimetry — Part 2: CIE standard illuminants*

ISO 6487, *Road vehicles — Measurement techniques in impact tests — Instrumentation*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

¹ As impacted by EN ISO 13688:2013/A1:2021.