ICS 13.340.20 SLOVENSKÁ TECHNICKÁ NORMA November 2024

STN	**Ochranné prilby Skúšobné metódy Absorpcia nárazov vrátane merania rotačnej kinematiky**	**STN EN 17950** 83 2186

Protective helmets - Test methods - Shock absorption including measuring rotational kinematics

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 10/24

Obsahuje: EN 17950:2024

139133

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 17950

July 2024

ICS 13.340.20

English Version

Protective helmets - Test methods - Shock absorption including measuring rotational kinematics

Casques de protection - Méthodes d'essai - Absorption des chocs avec mesure de la cinématique de rotation

Schutzhelme - Prüfverfahren - Stoßdämpfung einschließlich Messung der Rotationskinematik

This European Standard was approved by CEN on 10 June 2024.

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

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

Ref. No. EN 17950:2024 E

Contents

Page

European foreword

This document (EN 17950:2024) has been prepared by Technical Committee CEN/TC 158 “Head protection”, the secretariat of which is held by SIS.

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of an identical text or by endorsement, at the latest by January 2025, and conflicting national standards shall be withdrawn at the latest by January 2025.

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.

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 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

0.1 Purpose and background

The test method described in this document is designed to measure translational and rotational kinematics from any helmeted dynamic event such as an impact to an object. Statistics from bike, ski, equestrian, and other accidents show that oblique impacts, resulting in a combination of translational and rotational kinematics of the head, are more frequent than pure translational impacts. EN 13087-2, *Protective helmets — Test methods — Part 2: Shock absorption* measures only the translational motion in impacts against flat, hemispherical or curb stone anvils. A test method that measures the translational and rotational kinematics is therefore important and much needed.

As this document specifies the measuring the translational and rotational kinematics, it is possible to use this document as a complementary test method to EN 13087-2 when performing tests to measure shock absorption of helmets.

This document does not replace EN 13087-2.

0.2 Background to the design of the test method

Preliminary discussions to start work on the test method specified in this document started in 2006. In 2013, the responsible working group within CEN/TC 158 Head protection, *Headforms and test methods*, accelerated the work on the design of the test method.

Extensive efforts to ensure the soundest state-of-art test method have been made by:

— gathering data and scientific evidence from the widest range of scientific sources possible;

— performing multiple round robin tests;

— organizing numerous physical and online working group meetings in which a multitude of alternatives were analysed and discussed exhaustively before finally opting for the final design specified in this document;

— ensuring that experts within the field of biomechanics and brain understanding are members of the working group.

As part of the CEN standardization process, the content of this document has been further scrutinized and refined by other stakeholders and experts in the member countries of CEN.

0.3 Headform

A new headform without a neck for rotational impact tests has been developed for the test method specified in this document. The main reasons for developing a new type of headform are described below:

a) analysis of the inertial properties (mass, moment of inertia and centre of gravity) of the existing EN 960 and Hybrid III headforms showed values that were very different from the values found in literature from measurements of the human head. This is not surprising as the EN 960 headform includes parts of a rigid neck, and the Hybrid III headform was developed for frontal car collisions and not for helmet testing;

b) the new test method requires that the outer surface of the headform that comes in contact with the helmet has more humanlike properties. Specifically, the coefficient of friction between the headform and the inner surface in a helmet needs to be specified. Neither the EN 960 headform nor the Hybrid III headform has the coefficient of friction specified for the headform specification in this document.

0.4 Performance requirements and prerequisites

Performance requirements for pass/fail criteria when using the test method in this document will be specified in the relevant helmet product standards. The writers of those documents will also specify test prerequisites, see Clause 4 for details.

1 Scope

This document specifies a test method for helmets that measures the translational and rotational kinematics in impacts of a helmeted headform against an anvil.

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 12195-2, *Load restraint assemblies on road vehicles — Safety — Part 2: Web lashing made from man-made fibres*

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

ISO 6344-2, *Coated abrasives — Determination and designation of grain size distribution — Part 2: Macrogrit sizes P12 to P220*