



SLOVENSKI STANDARD
oSIST prEN 397:2022

01-december-2022

Industrijske zaščitne čelade

Industrial protective helmets

Industrieschutzhelme

Casques de protection pour l'industrie

*iTeh STANDARD PREVIEW
(standards.iteh.ai)*

Ta slovenski standard je istoveten z: prEN 397

<https://standards.iteh.ai/catalog/standards/sist/4820f7e0-d00c-4ade-a3ce-d4bacb14d6ab/osist-pren-397-2022>

ICS:

13.340.20 Varovalna oprema za glavo Head protective equipment

oSIST prEN 397:2022

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 397

October 2022

ICS 13.340.20

Will supersede EN 397:2012+A1:2012

English Version

Industrial protective helmets

Casques de protection pour l'industrie

Industrieschutzhelme

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 158.

If this draft becomes a European Standard, 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.

This draft European Standard 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.

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.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Requirements	8
4.1 Physical requirements	8
4.2 Performance requirements	10
5 Test methods	15
5.1 Samples	15
5.2 Conditioning for testing	19
5.3 Head forms	21
5.4 Penetration of the shell via ventilation holes	21
5.5 Sizing	22
5.6 Ergonomics	22
5.7 Shock absorption	23
5.8 Resistance to penetration	26
5.9 Retention system strength release	26
5.10 Retention system effectiveness	26
5.11 Resistance to ignition	28
5.12 Molten metal splash	29
5.13 Electrostatic properties	29
5.14 Enhanced visibility	31
5.15 Determination of resistance to off-crown penetration	31
6 Marking	32
6.1 General	32
6.2 General markings	32
7 Manufacturer's instructions and information	33
7.1 General	33
7.2 For electrostatic properties	34
7.3 For enhanced visibility properties	35
Annex A (informative) Recommendations on the materials and construction for industrial safety helmets	36
Annex B (informative) Test results, uncertainty of measurement	37
Annex C (informative) Significant technical changes between this document and EN 397:2012+A1:2012	39
Annex ZA (informative) Relationship between this European Standard and the essential Requirements of Regulation (EU) 2016/425 of the European Parliament and of the Council of 9 March 2016 on personal protective equipment aimed to be covered	40
Bibliography	42

European foreword

This document (prEN 397:2022) has been prepared by Technical Committee CEN/TC 158 “Head protection”, the secretariat of which is held by SIS.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 397:2012+A1:2012.

In comparison with the previous version EN 397:2012+A1:2012 of edition EN 397:2012, the following technical modifications have been made (see Annex C):

- Introduction revised and modernized;
- introducing two types of helmets, with protection against falling objects on-crown (type 1) or on-crown and off-crown (type 2);
- measuring of drop speed is defined for improved reproducibility;
- added electrostatic and enhanced visibility requirements;
- electrical properties are removed and reference to EN 50365 is made;
- editorial changes.

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.

Introduction

An industrial protective helmet is intended to be used in different work settings such as construction, mining, shipping, manufacturing etc. With this in mind the accidents that occur can therefore be different depending on the workplace. Accident statistics show there are typical hazards such as falling objects, slips, trips or falls of a person from the same level or one above, loss of control of machinery and electrical hazards. The intention with this document is to reduce the potential injury risk associated with the hazards but will not eliminate them completely.

Manufacturers complying with European Standards offer a suite of head protection devices for general industrial use:

- the industrial bump cap meeting the requirements of EN 812;
- the industrial protective helmet meeting the requirements of Type 1 and Type 2 in this document;
- the high performance industrial helmet meeting the requirements of EN 14052.

EN 812, *Industrial bump caps* is intended to provide protection to the wearer against the effects of striking their head against hard or stationary objects with sufficient severity to cause lacerations or other superficial injuries. They are not intended to provide protection against the effects of being struck by an object or moving or suspended loads. In addition to the mandatory requirements the bump cap can have shock absorption properties at low temperatures, be ignition resistant and have electrical insulation properties.

In this document Type 1 industrial protective helmets are intended to reduce the possible consequential effects of head injuries caused by being struck by an object in the crown area. In this document Type 2 industrial protective helmets are intended to offer some additional protection from impacts off crown, front, rear, sides of the helmet and includes a mandatory retention system. In addition to the requirements for the Type 1 and Type 2 helmets, this document also includes requirements for special applications, for example low temperature, high temperature, electrical insulation and enhanced visibility.

EN 14052 *high performance industrial helmet* offers even greater protection from falling objects, protection from off crown impacts and protection from penetration by a flat blade striker. It also includes a retention system that meets requirements for system release and system effectiveness properties.

Angled and tangential (rotational) impacts are one of the causes of head injuries. At the time of developing this document, no rotational test method was available. Therefore, only linear impacts to a helmeted head in the shock absorption test have been addressed. CEN/TC 158 will in the near future present a new test method, which can be used in future revisions of this document.

The wearing of a helmet meeting the requirements in this document reduces, but not eliminates, the consequences of head injury. A proportion of the energy of an impact is absorbed by the helmet, thereby reducing the force of the blow sustained by the head.

There are limits to the amount of protection that can be provided and wearing a helmet cannot always prevent death or long term disability.

1 Scope

This document specifies requirements for design, performance, test methods and markings for industrial protective helmets. The requirements apply to helmets for general use in industry.

Additional performance requirements for special applications are included to apply only when specifically claimed by the helmet manufacturer.

Industrial protective helmets are intended to reduce the risk of head injuries by falling objects and reduce consequential effects.

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

EN 13087-1:2000,¹ *Protective helmets — Test methods — Part 1: Conditions and conditioning*

EN 13087-2:2012, *Protective helmets — Test methods — Part 2: Shock absorption*

EN 13087-3:2000,² *Protective helmets — Test methods — Part 3: Resistance to penetration*

EN 13087-5:2012, *Protective helmets — Test methods — Part 5: Retention system strength*

EN 50365,³ *Live working — Electrically insulating helmets for use on low and medium voltage installations*

EN 60079-32-2:2015, *Explosive atmospheres — Part 32-2: Electrostatic hazards — Tests (IEC 60079-32-2:2015)*

EN ISO 472:2013,⁴ *Plastics — Vocabulary (ISO 472:1999)*

EN ISO 9185:2007, *Protective clothing — Assessment of resistance of materials to molten metal splash (ISO 9185:2007)*

EN ISO 11664-2:2011, *Colorimetry — Part 2: CIE standard illuminants (ISO 11664-2:2007)*

IEC/TS 60079-32-1:2013+AMD 1:2017, *Explosive atmospheres — Part 32-1: Electrostatic hazards — guidance*

3 Terms and definitions

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

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

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

¹ As impacted by EN 13087-1:2000/A1:2001.

² As impacted by EN 13087-3:2000/A1:2001.

³ Under preparation. Stage at time of publication: FprEN 50365:2022.

⁴ As impacted by EN ISO 472:2013/A1:2018.

prEN 397:2022 (E)**3.1****industrial protective helmet**

head protector, hereinafter referred to as 'helmet', primarily intended to provide the wearer with protection against falling objects on-crown (type 1) or on-crown and off-crown (type 2)

Note 1 to entry: The helmet can incorporate additional protective functions.

3.2**shell**

rigid cover which gives the helmet its shape

3.3**retention system**

complete assembly by means of which the helmet is maintained in position on the head, including any devices for adjusting the system or enhancing the wearer's comfort

Note 1 to entry: The retention system can include a chin strap.

[SOURCE: EN 14052:2012+A1:2012, 3.2]

3.4**crown**

area on the upper outside surface of the helmet which lies within a 30° included solid angle from point G (as defined in EN 960:2006, 2.12) on the central vertical axis through the head form to which the helmet is fitted

[SOURCE: EN 14052:2012+A1:2012, 3.4]

3.5**integral additional protective function**

part(s) of the helmet, intended by the helmet manufacturer not to be removed by the user, except for maintenance purposes, and which provide protection to the wearer, other than as provided for by this European Standard

[SOURCE: EN 14052:2012+A1:2012, 3.5]

3.6**non-integral additional protective function**

additional protective device(s) attached to the helmet intended to be removable by the user, but are not specifically required in order for the helmet to satisfy this document

EXAMPLE Non-integral additional function can be a visor, face shield or hearing protectors.

3.7**helmet accessory**

additional device(s) attached to the helmet intended to be removable by the user, but which provide no protective function to the wearer

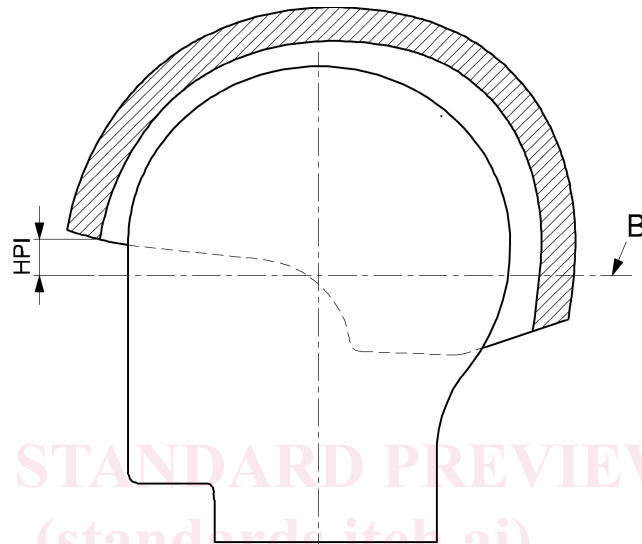
EXAMPLE Helmet accessory can be a head lamp or a video camera.

3.8**HPI****Helmet Positioning Index**

vertical distance measured on the longitudinal vertical plane, between the brow of the helmet front part and the reference plane (B), when the helmet is placed on the appropriate reference head form

Note 1 to entry: The longitudinal vertical plane and the reference plane are defined in EN 960:2006.

Note 2 to entry: See Figure 1.

**Key**

B reference plane

HPI helmet positioning index

Figure 1 — Helmet positioning index

[SOURCE: EN 960:2006]

3.9**test plaque**

sample of the shell or representative shell material

[SOURCE: ANSI Z89.1-2014]

4 Requirements

4.1 Physical requirements

4.1.1 Requirements overview

Table 1 — Overview for the requirements of Type 1 and Type 2 industrial protective helmets

		Type 1	Type 2
Physical requirements	4.1.2 General	X	X
	4.1.3 Materials and design	X	X
	4.1.4 Penetration of the shell via ventilation holes	X	X
	4.1.5 Sizing	X	X
	4.1.6 Ergonomics	X	X
Performance requirements	4.2.1 Shock absorption on crown impacts for type 1 and 2	X	X
	4.2.2 Shock absorption for high energy on crown impact for type 2	-	X
	4.2.3 Shock absorption for off-crown impacts for type 2	-	X
	4.2.4 Resistance to penetration	X	X
	4.2.5 Retention system	X (4.2.5.1)	X (4.2.5.2)
	4.2.6 Resistance to ignition	X	X
	4.2.7 Special application requirements	O	O
X Applicable for the specified type O Applicable for special application - Not applicable for the helmet type			

4.1.2 General

Unless otherwise specified, the values stated in this document are expressed as nominal values. Except for temperature limits, values that are not stated as maxima or minima shall be subject to a tolerance of $\pm 5\%$. Unless otherwise specified, the temperature values shall be in accordance with EN 13087-1:2000¹.

Helmets shall be tested with all integral additional protective functions (3.5) fitted. When non-integral additional protective functions (3.6) or helmet accessories (3.7) are submitted with the helmet for test, the helmet shall satisfy the requirements of this document with and without these items fitted.

If helmet accessories and/or non-integral additional protective functions are attached to a helmet, the manufacturer shall provide a list of possible accessories that do not affect the conformity of the helmet with this document. See Table 1 for the identification of required tests, when helmet accessories are attached to the helmet.

NOTE Accessories can be fixed on the helmet using fixing devices provided by the helmet manufacturer.

4.1.3 Material and design

4.1.3.1 Innocuousness

For those parts of the helmet that come into contact with the skin, materials shall not be used which are known to be likely to cause skin irritation or any adverse effect on health.

Substances recommended for cleaning, maintenance or disinfection shall have no adverse effect on the helmet and shall be known not to be likely to have any adverse effect upon the wearer, when applied in accordance with the helmet manufacturer's instructions.

Information claiming that the product is innocuous shall be checked.

See also Annex A.

4.1.3.2 Visual and tactile inspection

When tested according to 5.6.3.1, there shall be no sharp edges or projection on any parts of the helmet which are in contact, or potential contact, with the wearer, when the helmet is worn, such as is likely to cause injury to the wearer.

Any part of the helmet that can be adjusted, or removed by the wearer for the purpose of replacement (in accordance with the helmet manufacturer's instructions, see 5.6.3.2), shall be so designed and manufactured as to facilitate adjustment, removal and attachment without the use of tools.

4.1.4 Penetration of the shell via ventilation holes

If the helmet has ventilation holes, either adjustable or fixed, each ventilation hole shall be tested by pins in accordance with 5.4. The test is considered as passed if both pins do not get in contact with the testing head form during the tests.

NOTE 1 Requirements regarding ventilation design are not given because they depend on the use of the helmet and the resulting risks as determined by a risk analysis.

NOTE 2 Holes intended for accessories (e.g. visor, ear muff) are not considered as ventilation holes.

4.1.5 Sizing

The helmet shall be adjusted to fit to the head form as described in 5.5, when tested.

The size of the helmet shall be adjustable continuously or in steps of maximum 5 mm.

4.1.6 Ergonomics

Any adjustment system incorporated within the helmet shall be so designed and manufactured so that it remains adjusted, when tested in accordance with 5.6.

When the helmet is assessed in accordance with 5.6.3 the following requirements shall be met:

a) it shall be possible for the helmet to be adjusted to give a snug secure fit to the head of the test subject;

prEN 397:2022 (E)

- b) the helmet shall always remain in place during the activities listed under 5.6.3.3;
- c) there shall not be any “NO” answers from the test subject(s).

4.2 Performance requirements**4.2.1 Shock absorption on crown impacts for type 1 and 2**

When a helmet is tested in accordance with 5.7.1, the force transmitted to the head form shall not exceed 5,0 kN. This requirement shall be satisfied by helmets treated in accordance with the appropriate conditioning processes given in 5.2 as specified by the list of mandatory tests given in Table 1.

4.2.2 Shock absorption for high energy on crown impact for type 2

When a helmet is tested in accordance with 5.7.2, the force transmitted to the head form shall not exceed 10,0 kN. This requirement shall be satisfied by helmets treated in accordance with the appropriate conditioning processes given in 5.2 as specified by the list of mandatory tests given in Table 1.

4.2.3 Shock absorption for off-crown impacts for type 2

When a type 2 helmet is tested in accordance with 5.7.2, the force transmitted to the head form shall not exceed 10,0 kN.

4.2.4 Resistance to penetration

When a helmet is tested in accordance with 5.8, the striker shall not contact the head form. This requirement shall be satisfied by helmets treated in accordance with the appropriate conditioning processes given in 5.2, as specified by the list of mandatory tests given in Table 1.

4.2.5 Retention system**4.2.5.1 Chin strap strength release – Type 1**

If a chin strap is supplied with the helmet, it shall be no less than 10 mm wide when un-tensioned. When a helmet is tested by the method described in 5.9, the chinstrap shall not release at less than 150 N.

4.2.5.2 Chin strap strength release – Type 2

The chinstrap shall be no less than 10 mm wide when un-tensioned. When a helmet is tested by the method described in 5.9, the chinstrap shall not release at less than 500 N.

When a helmet is tested by the method described in 5.10, for the front way and rear way tests, the helmet shall not come off the head form.

4.2.6 Resistance to ignition

When tested in accordance with 5.11, no part of the helmet shell shall ignite upon application of the heated rod nor continue to glow after removal of the heated rod.

4.2.7 Special application requirements**4.2.7.1 Performance at lower temperatures**

When tested for shock absorption in accordance with 5.7, the requirement given in 4.2 shall be satisfied by one additional helmet which has been conditioned in accordance with 5.2.3.

When tested for penetration in accordance with 5.15, the requirement given in 4.2 shall be satisfied by one additional helmet, which has been conditioned in accordance with 5.2.3.

Helmets claimed to meet this requirement shall state this fact on the marking of the helmet, in accordance with 6.2.

4.2.7.2 Performance at higher temperatures

When tested for shock absorption by the method given in 5.7, the requirement of 4.2 shall be satisfied by one helmet, which has been conditioned in accordance with 5.2.4.

When tested for resistance to penetration by the method given in 5.8, the requirement of 4.2 shall be satisfied by a second helmet, which has been conditioned in accordance with 5.2.4.

Helmets claimed to meet this requirement shall state this fact on the marking of the helmet, in accordance with 6.2.

4.2.7.3 Electrically insulating helmets for use on low and medium voltage installations

If the helmet also is designed to give Electrically insulating protection it shall meet the requirements of FprEN 50365:2022.

4.2.7.4 Molten metal splash

When tested in accordance with 5.12, the shell shall not:

- a) be penetrated by the molten metal through the shell;
- b) burn with the emission of flame after a period of 5 s has elapsed after the pouring of molten metal has ceased. Only the direct contact area shall be assessed.

NOTE A helmet fitted with a grooved rim can comply with this requirement.

4.2.7.5 Electrostatic properties

4.2.7.5.1 General

To avoid the buildup of harmful electrostatic charges, helmets shall be protected by one of the following means:

- use of dissipative materials which are safely earthed e.g. via contact to the wearer;
- use of insulating materials and surfaces that do not tend to be highly charged by rubbing with clothes potentially in contact with these in normal operation. If insulating materials are used in the helmet, charging shall then be completed using cloths made of materials from the positive and negative end of a triboelectric series. If results on corona charging and whipping with a leather glove have been discarded, it shall be stated in the information for use that the test sample may not be used in the presence of charge generating processes stronger than manual rubbing;
- in case insulating materials are used in positions inside the equipment that are not accessible, these do not need to be tested as charging by rubbing is impossible.

If there are isolated metallic parts that are accessible in the helmet these are considered as isolated capacitances and shall meet the requirements of IEC TS 60079-32-1:2013+AMD1:2017.

4.2.7.5.2 Conditioning

Conditioning shall be in accordance with EN 60079-32-2:2015, 24 h at $(23 \pm 2)^\circ\text{C}$ and $30\% \pm 5\%$ r.h.