

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 16716

January 2025

ICS 13.340.99; 97.220.20; 97.220.40

Will supersede EN 16716:2017

English Version

Mountaineering equipment - Avalanche airbag systems - Safety requirements and test methods

Équipement d'alpinisme et d'escalade - Systèmes de
sac gonflable anti-ensevelissement lors d'une
avalanche - Exigences de sécurité et méthodes d'essai

Bergsteigerausrüstung - Lawinen-Airbag-Systeme -
Sicherheitstechnische Anforderungen und
Prüfverfahren

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 136.

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	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Safety requirements	9
4.1 Function	9
4.1.1 Activation system	9
4.1.2 Carrying system	12
4.2 Design requirements	12
4.2.1 Performance	12
4.2.2 Material requirements	13
4.2.3 Ergonomic requirements	14
4.2.4 Detachable avalanche airbag systems	14
4.2.5 Electric avalanche airbag systems	14
5 Test methods	15
5.1 General	15
5.2 Test of activation force	15
5.3 Test of activation distance	15
5.4 Test of airbag inflation	15
5.5 Test of airbag volume	16
5.6 Test of rated number of deployments	16
5.7 Test of condensation effects on the activation system	16
5.8 Test of working time span/low temperature test	16
5.9 Test of high temperature damage	17
5.10 Cold temperature deployment	17
5.11 Test of minimum battery reserve time	17
5.12 Test of airbag pressure	17
5.13 Test of airbag burst pressure	18
5.14 Impact test of the airbag	18
5.15 Test of influence of snow during deployment	18
5.16 Test of practical deployment	18
5.17 Test of deployment readiness indicator	18
5.18 Test of carrying system	18
5.19 Test of pull-off-strength	20
5.20 Practical tests	20
5.21 Integrated indication system	20
5.22 Corrosion resistance test	20
6 Marking	21
7 Manufacturer's instructions and information	21

Annex A (informative) Interference test electrical avalanche airbag systems with avalanche beacons	23
A.1 Introduction	23
A.2 Preparation	23
A.3 Tests	23
Annex B (informative) Test method to measure EMI of electrical avalanche airbag systems with avalanche beacons in laboratory	26
B.1 Introduction	26
B.2 Procedure	26
Annex C (informative) Standards on mountaineering equipment	29
Annex ZA (informative) Relationship between this European Standard and the essential requirements of Regulation (EU) 2016/425 aimed to be covered	31
Bibliography	32

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[oSIST prEN 16716:2025](https://standards.iteh.ai/catalog/standards/sist/50f310fe-46b7-4b41-ac55-5f547c2557e9/osist-pren-16716-2025)

<https://standards.iteh.ai/catalog/standards/sist/50f310fe-46b7-4b41-ac55-5f547c2557e9/osist-pren-16716-2025>

prEN 16716:2025 (E)**European foreword**

This document (prEN 16716:2025) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational facilities and equipment”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 16716:2017.

prEN 16716:2025 includes the following significant technical changes with respect to EN 16716:2017:

- a) new subclause 4.1.1.16, Airbag stability, where requirements for the connection of airbag(s) to the carrying system are defined;
- b) new subclause 4.1.1.17/5.17 Deployment readiness indicator, where requirements and tests are formulated for indication for user of airbag system, that it is ready for deployment or not ready for deployment;
- c) in 4.1.2.2, Connecting strength, the load for pulling airbag against carrying system has been raised from 3 kN to 4 kN. Buckle slippage requirement < 30 mm has been implemented;
- d) in 4.2.2, Material requirements, more requirements for leg loop have been implemented;
- e) in 4.2.5.2/5.21, Integrated indication system, has been improved with a required start-up self-test and a test method for it;
- f) in 5.16, Test of practical deployment test, parameters have been specified;
- g) Figures 3 a – 3 d have been improved to be conform to test;
- h) in Clause 6, Marking, small improvements have been made;
- i) in Clause 7, Manufacturer’s instructions and information, small improvements have been made and additional information for electrical airbag systems is required;
- j) new Annex A: Interference test electrical airbag System with avalanche beacons (informative);
- k) new Annex B: Test method to measure EMI of electrical airbag systems with avalanche beacons in laboratory (informative).

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

Introduction

This document is one of a package of standards for mountaineering equipment; see Annex C, Table C.1.

iTeh Standards (<https://standards.iteh.ai>) Document Preview

[oSIST prEN 16716:2025](https://standards.iteh.ai/catalog/standards/sist/50f310fe-46b7-4b41-ac55-5f547c2557e9/osist-pren-16716-2025)

<https://standards.iteh.ai/catalog/standards/sist/50f310fe-46b7-4b41-ac55-5f547c2557e9/osist-pren-16716-2025>

prEN 16716:2025 (E)**1 Scope**

This document specifies safety requirements and test methods for avalanche airbag systems to reduce the risk of being buried by a snow avalanche.

This document does not consider personal protection against impact or cold temperature.

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 12277:2015+A1:2018, *Mountaineering equipment — Harnesses — Safety requirements and test methods*

EN IEC 55014-1:2021, *Electromagnetic compatibility — Requirements for household appliances, electric tools and similar apparatus — Part 1: Emission (CISPR 14-1:2020)*

EN IEC 55014-2:2021, *Electromagnetic compatibility — Requirements for household appliances, electric tools and similar apparatus — Part 2: Immunity — Product family standard (CISPR 14-2:2020)*

EN 60335-1:2012,¹ *Household and similar electrical appliances — Part 1: General requirements (IEC 60335-1:2010, modified)*

EN 60335-2-29:2021,² *Household and similar electrical appliances — Safety — Part 2-29: Particular requirements for battery chargers (IEC 60335-2-29:2016, modified)*

EN 60335-2-30:2009,³ *Household and similar electrical appliances — Safety — Part 2-30: Particular requirements for room heaters (IEC 60335-2-30:2009, modified)*

EN 60335-2-80:2003,⁴ *Household and similar electrical appliances — Safety — Part 2-80: Particular requirements for fans (IEC 60335-2-80:2002, modified)*

EN 60529:1991,⁵ *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989, modified)*

EN IEC 61000-6-2:2019, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2:2016)*

EN IEC 61000-6-3:2021, *Electromagnetic compatibility (EMC) — Part 6-3: Generic standards — Emission standard for equipment in residential environments (IEC 61000-6-3:2020)*

EN 61000-4-2:2009, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test (IEC 61000-4-2:2008)*

¹ As impacted by EN 60335-1:2012/AC:2014, EN 60335-1:2012/A11:2014, EN 60335-1:2012/A13:2017, EN 60335-1:2012/A1:2019, EN 60335-1:2012/A2:2019, EN 60335-1:2012/A14:2019, EN 60335-1:2012/A15:2021 and EN 60335-1:2012/A16:2023.

² As impacted by EN 60335-2-29:2021/A1:2021 and EN 60335-2-29:2021/A11:2024.

³ As impacted by EN 60335-2-30:2009/A11:2012, EN 60335-2-30:2009/AC:2014, EN 60335-2-30:2009/A1:2020, EN 60335-2-30:2009/A12:2020, EN 60335-2-30:2009/A2:2022, and EN 60335-2-30:2009/A13:2022.

⁴ As impacted by EN 60335-2-80:2003/A1:2004 and EN 60335-2-80:2003/A2:2009.

⁵ As impacted by EN 60529:1991/A1:2000, EN 60529:1991/A2:2013, EN 60529:1991/AC:2016-12 and EN 60529:1991/A2:2013/AC:2019-02.

EN 61558-2-16:2009,⁶ *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V — Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units (IEC 61558-2-16:2009, modified)*

EN 62133-1:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications — Part 1: Nickel systems (IEC 62133-1:2017)*

EN 62133-2:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications — Part 2: Lithium systems (IEC 62133-2:2017)*

EN IEC 62368-1:2024,⁷ *Audio/video, information and communication technology equipment — Part 1: Safety requirements (IEC 62368-1:2023)*

EN ISO 9227:2022,⁸ *Corrosion tests in artificial atmospheres — Salt spray tests (ISO 9227)*

EN ISO 13849-1:2023, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2023)*

EN ISO 13934-1:2013, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1:20113)*

EN ISO 13937-2:2000, *Textiles — Tear properties of fabrics — Part 2: Determination of tear force of trouser-shaped test specimens (Single tear method) (ISO 13937-2:2000)*

ISO 7000, *Graphical symbols for use on equipment — Registered symbols*

3 Terms and definitions

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

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/>

3.1

activation system

device to initiate the deployment of the avalanche airbag system (e.g. deployment handle)

3.2

airbag

part of the avalanche airbag system which changes the shape for increasing the volume of the avalanche airbag system

3.3

airbag volume

volume of the fully inflated airbag which changes shape during deployment

⁶ As impacted by EN 61558-2-16:2009/A1:2013.

⁷ As impacted by EN IEC 62368-1:2024/A11.

⁸ As impacted by EN ISO 9227:2022/A1:2024.

prEN 16716:2025 (E)

3.4

avalanche airbag system

personal protective equipment worn by the user, which reduces the probability of being buried in a snow avalanche by rapidly increasing the volume of the user in combination with the device

3.5

carrying system

part of the avalanche airbag system attaching the activation system, inflating system and airbag to the user

EXAMPLE back pack, vest

3.6

detachable airbag system

avalanche airbag system where the inflation system, activation system and airbag can be removed as a unit from the carrying system by the user by design

3.7

fully inflated airbag

airbag inflated to a point that it achieves its intended shape and maintains that shape under its own weight

3.8

inflation system

part of the avalanche airbag system which deploys the airbag after the activation system has been activated

EXAMPLE gas cylinder with venturi valve

3.9

inflation time

time between initiation of deployment and fully inflated airbag

3.10

non-refillable cartridge

pressurized gas cartridge for single use or refillable only by the manufacturer or someone authorized and trained by the manufacturer to do these refills

3.11

operating pressure

maximum pressure above atmospheric pressure in the airbag achieved during deployment of the airbag at $(23 \pm 5) ^\circ\text{C}$

3.12

refillable cartridge

pressurized gas cartridge with a technical application for making a refill by qualified personnel

4 Safety requirements

4.1 Function

4.1.1 Activation system

4.1.1.1 General

Appropriate documentation shall be provided.

NOTE It is important to show that components of the avalanche airbag system comply with applicable EU Directives/Regulations (e.g. Transportable pressure equipment (TPED) – Directive 2010/35/EU).

4.1.1.2 Activation force

4.1.1.2.1 Mechanical activation

When tested in accordance with 5.2, the activation force for a mechanical activation system shall be between 50 N and 150 N.

4.1.1.2.2 Activation other than by handle

Electronic means for deployment shall have a safeguard to prevent accidental deployment.

Electronic activation shall have specific electronical safety testing and shall have a functional safety level according to EN ISO 13849-1:2023: Performance Level PLc, in accordance with 4.2.5.1.

4.1.1.3 Activation distance

When the mechanical activation system is tested in accordance with 5.3, the maximum activation distance of 100 mm shall be met.

4.1.1.4 Airbag inflation

When tested in accordance with 5.4, full inflation of the airbag (see 3.7) shall be achieved within 5 s after activation and the airbag shall remain fully inflated for at least 3 min.

4.1.1.5 Airbag volume

When tested in accordance with 5.5, the fully inflated airbag shall achieve a minimum volume of 150 l.

4.1.1.6 Rated number of deployments

When tested in accordance with 5.6, the device shall be able to withstand twice the rated number of deployments stated by the manufacturer. The rated number of deployments shall at least be 20. All deployments of the avalanche airbag system shall meet the requirements in 4.1.1.2 and 4.1.1.4.

4.1.1.7 Condensation effects

When tested in accordance with 5.7, the avalanche airbag system shall meet the requirements of 4.1.1.2 and 4.1.1.4 and condensation effects shall not lead to malfunction or damage.

4.1.1.8 Working time span

When tested in accordance with 5.8, the avalanche airbag system shall work during at least 24 h at -30 °C without any external support (e.g. power supply, pressure support). The requirements of 4.1.1.2 and 4.1.1.4 shall be met.