SLOVENSKI STANDARD
oSIST prEN 16716:2014

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Gorniška oprema - Sistem zračnih blazin za zaščito v snežnih plazovih - Varnostne zahteve in preskusne metode

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

Bergsteigerausrüstung - Lawinen-Airbag-Systeme - Sicherheitsanforderungen und Prüfverfahren

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

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13.340.99	Druga varovalna oprema	Other protective equipment
97.220.40	Oprema za športe na prostem in vodne športe	Outdoor and water sports equipment

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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

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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.

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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

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Foreword

This document (prEN 16716:2014) 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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

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

Introduction

The product is Category II of the PPE Directive 89/686/EEC. This Directive is on higher-level than the standard and includes additional requirements, which are not covered with the standard.

1 Scope

This European Standard specifies safety requirements and test methods for avalanche airbag systems to reduce the risk of being buried by a snow avalanche which can lead to suffocation, lack of oxygen, wounds, fractures, internal bleeding, organ damage, hypothermia, not being found in time, etc.

This European Standard does not consider the protection against impact or cold temperature.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ANSI/ASTM F 2153, *Test Method for Measurement of Backpack Capacity*

EN 12277, *Mountaineering equipment — Harnesses — Safety requirements and test methods*

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

prEN ISO 10297:2012, *Transportable gas cylinders — Cylinder valves — Specification and type testing (ISO/DIS 10297:2012)*

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

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

EN ISO 13937-4, *Textiles — Tear properties of fabrics — Part 4: Determination of tear force of tongue-shaped test specimens (Double tear test) (ISO 13937-4)*

ISO 11119-3, *Gas cylinders - Refillable composite gas cylinders and tubes — Design, construction and testing — Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450L with non-load-sharing metallic or non-metallic liners*

3 Terms and definitions

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

3.1
activation system
device to initiate the deployment of the avalanche airbag system

3.2
avalanche airbag system
inflating bag system which reduces the probability of being buried in a snow avalanche by increasing the volume and decreasing the specific weight of the user in combination with the device

3.3
carrying system
system attaching the airbag system to the user

3.4
fully inflated airbag
airbag inflated to a point that it achieves its intended shape and maintains that shape under its own weight

3.5
operating pressure
maximum pressure above atmospheric pressure in the airbag achieved during deployment of the airbag at room temperature

3.6
refillable cartridge
pressurized gas cartridge, where the manufacturer authorises to do the refill by qualified personnel

3.7
non-refillable cartridge
pressurized gas cartridge, where only the manufacturer or an authorized third party can do the refill or which are single use cartridges

3.8
Airbag volume
maximum amount of PE-balls between 15 mm and 20 mm which can be filled into the airbag at room temperature, in liters

3.9
Detachable airbag systems
Avalanche airbag systems which can be removed from the carrying system by the user and where the user is authorized to do this by the manufacturer

4 Safety requirements

4.1 Function of the airbag system

4.1.1 Activation of airbag system

4.1.1.1 General

All components shall be compatible with relevant or existing EU requirements, for examples the pressurized cylinders and their closure system shall comply with ISO 11119-3 and prEN ISO 10297:2012.

4.1.1.1.1 Operating force

When tested according to 5.2, the operating force for a mechanical activation system shall be between 50 N to 150 N where a maximum activation distance of the mechanical activation system of 100 mm has to be kept.

4.1.1.1.2 Minimum number of deployments

When tested according to 5.3, the device shall be able to withstand twice the minimum rated number of deployments stated by the manufacturer. The minimum rated number of deployments is 20, which is 40 successful test deployments.

NOTE The deployment number stated by the manufacturer should be in relation to the application and the expected lifetime of the airbag system.

In order to prevent accidental deployment the activation system shall be able to be deactivated by the user, e.g. for storage or transport reasons.

The activation system shall be able to be temporarily disabled and enabled by the user without removing the carrying system.

Adequate measures in the construction of the device shall be taken to protect components of the airbag system from damage, when used according to the manufacturer's recommendations.

4.1.1.1.3 Condensing effects on activation system

When tested according to 5.4, the avalanche airbag system shall meet the requirements in 4.1.2.1 and condensation effects shall not lead to malfunction or damage. The requirement of 4.1.1.1.1 has to be met.

4.1.1.1.4 Maximum temperature

When tested according to 5.5, the avalanche airbag system shall meet the requirements in 4.1.2.1 without malfunction or damage when tested at an ambient temperature of +50 °C, or higher, if specified by the manufacturer's instructions. The requirement of 4.1.1.1.1 has to be met.

4.1.1.1.5 Working time span

The avalanche airbag system has to work at least over a time period of 24 h at –30 °C without any external support (e.g. power supply, pressure support). When tested according to 5.6 the device shall meet the requirements in 4.1.2.1.

4.1.1.2 Electronic components of the airbag system

The device has to be equipped with an integrated indication system which indicates to the user if the energy supply of the device is outside of its normal operating capabilities. When tested according to 5.7 the device has fully to deploy within 5 s.

For electronic airbag activation systems the following Standards are relevant:

— Electronic: IEC 61508 / SIL

— Charger: IEC 61558-2-16; IEC 60335-2-29

— Battery: IEC 62133 (EC 2006/66)

— Motor: IEC 60335-1; IEC 60335-2-30; IEC 60335-2-80

— Controller: IEC 60035-1; IEC 60529:1989+A1:2000 (IP 65)

— EMC: EN 55014-1/-2 ; EN 61000-6-2/-3 E;

4.1.1.3 Gas cartridges

Airbag systems with gas cartridges shall achieve full inflation within the temperature range given by the manufacturer or between –30 °C and +50 °C, whichever is greater, without damage. Gas cartridges shall be tested according to 5.8.

4.1.2 Airbag requirements

4.1.2.1 Airbag inflation requirements

The full inflation (see 3.4) of the airbag shall be achieved within 5 s after activation. The deployed airbag shall remain fully inflated (see 3.4) for at least 3 min.

4.1.2.2 Airbag volume requirements

The fully inflated airbag has to achieve a minimum volume of 150 l. The volume test of the airbag is specified in 5.9.

4.1.2.3 Additional airbag requirements

The airbag shall be of a highly visible signal colour (not black or white).

Determine the operation pressure (see 3.5) of the airbag system by using a cartridge filled to the highest end of the fill range. For this purpose the test airbag may be modified with a pressure measurement adapter.

Valves and the airbags shall withstand at least a pressure of their operating pressure plus 0,1 bar as test pressure for 30 min. Leakage shall be compensated. After that the pressure is reduced to an absolute pressure of 0,1 bar and the pressure loss is measured for a time period of 1 min. A moderate pressure loss of ≤ 0,02 bar/min is acceptable. For this purpose the test airbag may be modified with a pressure measurement and filling adapter. This pressure test is specified in 5.10.

NOTE Because the nominal tube size of the device << 25 mm, it is possible to apply good engineering practice according to the guideline of pressure equipment. The guideline of pressure equipment apply up to a pressure of 0,5 bar.

The burst pressure of the airbags shall be at least a pressure of their operating pressure plus 0,25 bar as test pressure.

This pressure test is specified in 5.11.

An impact test shall not damage the airbag. The impact test of the airbag is specified in 5.12.

4.1.3 Carrying system

The carrying system shall keep the avalanche airbag system firmly connected to the user during the avalanche, including the potential where the human could slip out of the carrying system.