SLOVENSKI STANDARD
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Avalanche beacons - Transmitter/Receiver systems - Safety requirements and testing - Flamability

Avalanche beacons - Transmitter/Receiver systems - Safety requirements and testing

Lawinenverschütteten-Suchgeräte - Sender-Empfängersysteme - Sicherheitstechnische Anforderungen und Prüfung

Appareil de recherche de victimes d'avalanche (A.R.V.A.) - Exigences de sécurité et essais

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This European Standard was approved by CEN on 1991-09-16
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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists 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 Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

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Contents

Foreword

This European Standard was prepared by the Technical Committee CEN/TC 136 "Sports, Playground and other Recreational Equipment" the secretariat is held by DIN.

The text is based on DIN 32 924 which has been elaborated with European participation.

In accordance with the Common CEN/CENELEC Rules the following countries are bound to implement this European Standard:

Austria	Italy
Belgium	Luxembourg
Denmark	Netherlands
Finland	Norway
France	Portugal
Germany	Spain
Greece	Sweden
Iceland	Switzerland
Ireland	United Kingdom

Introduction

On international level it is intended after a transition period to standardize only mono-frequency beacons operating on a frequency f = 457 kHz.

Therefore double-frequency beacons according to this standard should only be used where it is absolutely necessary, for example within "organized rescue" where compatibility to older mono-frequency beacons still in use and operating on a frequency f= 2,275 kHz (and therefore not comply to this EN) is required.

It is recommended that only mono-frequency beacons type 1 (f = 457 kHz) shall be distributed.

1 Scope

This standard is applicable to systems used for searching for and/or finding of avalanche hidden persons, this means for direct rescue.

These systems are denominated as avalanche beacons and shall comprise a transmitter as well as a receiver part.

This standard distinguishes between two types of beacons:

- type 1 single frequency beacons (457 kHz)

- type 2 double frequency beacons (2,275 kHz and 457 kHz) temporary type, compatible to beacons with frequency 2,275 kHz

It is the purpose of this standard to ensure the practical interoperability of products from different manufacturers and their reliability.

2 Normative references

ISO 554	Standard Atmospheres for Conditioning and/or Testing Specifications
IEC 68 part 2-6	Electrical Engineering; Basic Environmental Testing Procedures, Part 2: Tests, Test Fc and Comments: vibration, Sinusoidal.
IEC 68 part 2-17	Basic Environmental Testing Procedures, Part 2: Tests, Test Group Q: Seal Test
CEPT	Recommendation T/R 24-02 (Cannes 1983) relative aux dispositifs de détection de victimes d'avalanches au moyen d'équipments radio a basse puissance.

3 Safety requirements

3.1 General requirements

The avalanche beacons shall not exhibit any sharp edges or corners.

3.2 Frequencies

The avalanche beacons shall operate on the following frequencies in the transmit as well as in the receive mode:

- type 1 f = 457 kHz ± 0,1 kHz

- type 2 f = 2,275 kHz ± 0,03 kHz and

  f = 457 kHz ± 0,1 kHz

3.3 Transmitted field strength

3.3.1 Minimum Transmitted Field Strength

The minimum transmitted field strengths at a distance of 1 metre shall be:

- type 1 f = 457 kHz 0,5 mA/m

- type 2 f = 2,275 kHz 10 mA/m

  f = 457 kHz 0,5 mA/m

3.3.2 Maximum transmitted field strength

The maximum transmitted field strengths at a distance of 1 metre shall be (in accordance with CEPT recommendation T/R 24-02):

- type 1 f = 457 kHz 2,16 mA/m

- type 2 f = 2,275 kHz 108 mA/m

  f = 457 kHz 2,16 mA/m

3.3.3 Receiver sensitivity

In the best coupling position, i. e. when the antenna rod is parallel to the lines of the magnetic field, the following field strengths shall produce a signal plus noise to noise ratio ((S + N)/N) of 6 dB, measured flat over a bandwith of 20 kHz at the terminals of the electroacoustic transducer:

- type 1 f = 457 kHz 80 nA/m

- type 2 f = 2,275 kHz 10 µA/m

f = 457 kHz 200 nA/m

3.4 Modulation and carrier keying

3.4.1 The modulation at the frequencies f_1 = 457 kHz and f_2 = 2,275 kHz shall be of type A1A.

3.4.2 The carrier keying shall be

- turn on time 70 ms minimum

- turn off time 200 ms minimum

- period 0,9 ± 0,4 s

(turn on time plus turn off time)

3.5 Temperatures

The avalanche beacons shall operate at temperatures ranging from - 20 °C to + 40 °C. This performance is checked with an external mains independent power source at 2/3 of the nominal battery voltage.

The avalanche beacons shall be fully operable after storage at - 30 °C to + 40 °C for avalanche beacons type 1 and - 30 °C to + 40 °C for avalanche beacons type 2 (see 4.1).

3.6 Performance after shock

The avalanche beacon (without carrying case) shall be operable after the test as described in 4.2

3.7 Performance during immersion in water

The avalanche beacon (without carrying case) shall be operable during the immersion test as described in 4.5

3.8 Performance after vibration

The avalanche beacon shall be operable after the vibration test as described in 4.3

3.9 Prevention of loss of essential components

All components essential to the use of the avalanche beacons (e. g. earphones, loudspeakers) shall be tied together such that they cannot be lost.

Avalanche beacons using an earphone shall be operable after the tensile stress test as described in 4.6

The transmitter and the receiver shall be inseparable.

3.10 Switching over from transmit to receive

The avalanche beacons shall permit reliable and fast switchover from the transmit to the receive mode, without danger of unintentionally turning off the device.

The transmit mode shall include a safety feature against involuntary turn-off.

3.11 Changes in the received signal

Reducing the distance between transmitter and receiver by 25 % shall produce a perceivable change in the received signal over the whole receiving range down to a distance of 1 m. In the receive mode, there shall be means to modify the received signal manually. The test shall be carried out according to 4.7

3.12 User aspects

3.12.1 Battery type

The avalanche beacons shall use a widely obtainable battery type, e. g. IEC LR6 (size AA) 1,5 Volt cells.

3.12.2 Operating time

An avalanche beacon equipped with a new set of batteries recommended by the manufacturer of the avalanche beacon shall be capable to operate for a minimum of 200 hrs of continuous transmission at a temperature of + 10 °C followed by 1 h of reception at - 10 °C environmental temperature while meeting the requirements of 3.3

3.12.3 Battery check

The avalanche beacons shall include a battery check feature. A positive response shall be given if at least 24 h of operation at + 10 °C in the transmit mode under the conditions as stated under 3.3 and 3.4 are possible.

3.12.4 Transmitter self test

The avalanche beacons shall include at least an acoustic or optical self test feature for the transmitter. For type 2 devices, this test feature shall cover both frequencies.

3.12.5 Carrying straps

The avalance beacon shall include adjustable carrying straps with a joint tensile strength of at least 50 N.

4 Tests

Note: If no particular test is specified, the requirements shall be checked visually and/or with suitable auxiliary equipment.

4.1 Storage temperature

To test for effect of storage temperature, the device shall be stored for a minimum of 4 h at - 30 °C, then for 1 h in a standard climate according to ISO 554, then for a minimum of 4 h at + 50 °C for avalanche beacous type 1 and + 40 °C for avalanche beacous type 2 and then for another hour in the standard climate according to ISO 554.

4.2 Free fall

The avalanche beacon with batteries inserted shall be dropped six times in a horizontal position from a height of 4 m onto a sand floor (grains about 0,1 mm to 1 mm, a minimum layer of 20 cm, not packed and dry)

4.3 Vibration

The avalanche beacon shall be vibrated along the 3 main axes in the following way:

frequency 10 Hz to 150 Hz

acceleration 3 g

duration 4 cycles, one octave per minute

(see also IEC 68 part 1-6/02.84, test Fc).

4.4 Correct performance

After every one of the following tests, the avalanche beacons are checked against the requirements as per 3.2 to 3.4

4.4.1 Storage at (- 20 ± 2) °C for 1 h (the receiver and transmitter in its operating state shall be checked, starting from the standard climate according to ISO 554).

4.4.2 Storage for 1 h after reaching the equilibrium operating temperature of (40 ± 2) °C (both the transmitter and the receiver shall be checked).

4.5 Immersion in water

The avalanche beacon (without its carrying case) shall be immersed into water for one hour in a horizontal position at a depth of 15 cm and at + 10 °C and shall remain capable of transmitting during the whole duration of the test. (see also IEC 68 part 2-17, March 1981, section 5 test Qf: Immersion into Liquids).

4.6 Joints between essential components

All joints between essential parts of the avalanche beacon shall be submitted to a tensile stress of at least 10 N by suitable means and then checked.

4.7 Changes in the received signal

The fullfillment of the requirement of 3.11 shall be checked and judged by five independent persons.