

BS ISO 11087:2015



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Alpine ski-bindings — Retention devices — Requirements and test methods

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee SW/136, Sports, playground and other recreational equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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ISBN 978 0 580 85645 7

ICS 97.220.20

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2015.

Amendments issued since publication

Date	Text affected
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INTERNATIONAL
STANDARD

BS ISO 11087:2015

ISO
11087

Third edition
2015-07-01

**Alpine ski-bindings — Retention
devices — Requirements and test
methods**

*Fixations de skis alpins — Dispositifs de retenue — Exigences et
méthodes d'essai*



Reference number
ISO 11087:2015(E)

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 83, *Sports and other recreational facilities and equipment*, Subcommittee SC 4, *Snowsports equipment*.

This third edition cancels and replaces the second edition (ISO 11087:2004), which been technically revised.

Alpine ski-bindings — Retention devices — Requirements and test methods

1 Scope

This International Standard specifies the requirements for ski brakes and binding straps.

It applies to alpine retention devices, which are used to reduce the risk of injury, caused by the ski after the ski's release.

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

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 5355, *Alpine ski-boots — Safety requirements and test methods*

ISO 8364, *Alpine skis and bindings — Binding mounting area — Requirements and test methods*

ISO 9462, *Alpine ski-bindings — Safety requirements and test methods*

ISO 9838, *Alpine ski-bindings — Test soles for ski-binding tests*

3 Terms and definitions

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

3.1

ski brake

retention device for alpine skiing which is integrated into the ski binding and which is designed to slow down a ski which has come off after the release of a ski binding

Note 1 to entry: Integrated ski brakes represent the state of the art.

3.2

course of fall

area that can be passed over by a skier after a fall, defined by the length of which corresponds to the braking distance of the skier measured between the point of fall and the stoppage, and the width

4 Requirements

4.1 Compatibility with binding function

The ski brakes shall comply with the requirements in ISO 9462 and ISO 5355, which are relevant for ski brakes.

4.2 Interference with skiing

The ski brake shall not interfere with skiing. It shall be designed to prevent a catching of the ski or a skidding due to premature contact of the ski brake with the slope during skiing, even in steep terrain. During skiing, the ski brake shall not switch into the braking position without the need to do so.

4.3 Mechanical stability

The design of the ski brake shall be able to withstand, without damage, the loads occurring in practice.

4.4 Functional reliability

Cold, snow, and icing shall not interfere with the proper release of the ski brake.

4.5 Automatic function

The ski brake shall release independently, without handling by the skier. If the ski brake is provided with a locking mechanism, this locking mechanism shall be automatically released after having stepped into the binding. The operation of the ski brake can be set out of function by means of tools or inserts, if necessary, to facilitate the maintenance or care of the ski equipment. In this case, the device shall be designed in such a way as to prevent stepping into the binding without removing the inserts or tools. If this is not possible, a clear statement shall be provided with the insert or with the ski brake's information material.

4.6 External design

The external design of the ski brake shall be such that, during correct use, there is no greater risk for the skier to get injured by the ski brake than, for example, by the ski binding itself.

4.7 Braking effect

The ski brake shall slow down the ski from every possible position on the slope, independent of snow conditions and the nature of ground that can be found during skiing. The ski shall stop within the course of fall with a maximum width of 5 m.

5 Test methods

5.1 Sampling

Two complete binding/brake systems (including plates, if any) are required for the test.

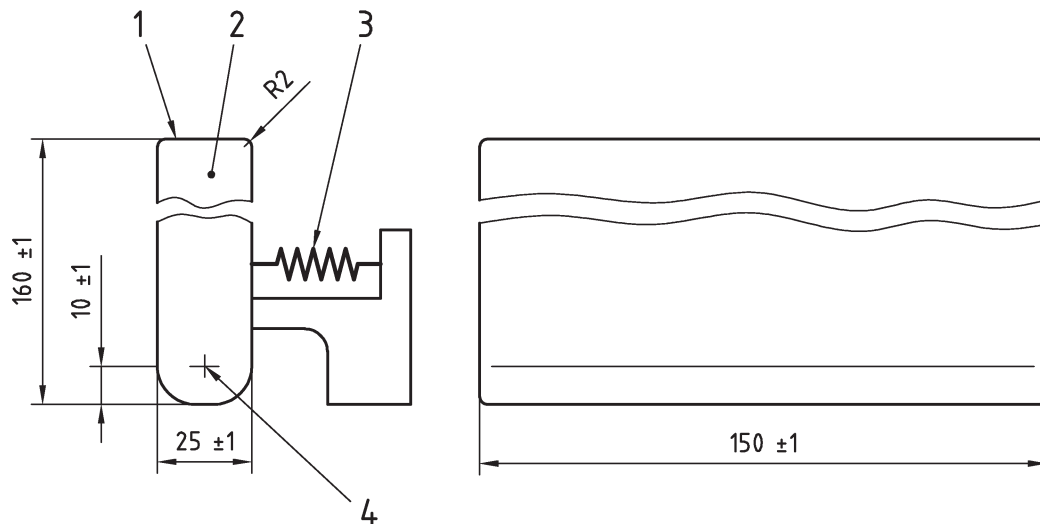
One test sample shall be selected for each laboratory test (one sample for the tests according to [5.4.6](#))

If one of the selected test samples does not meet the requirements, two substitute test samples shall be selected, which have to meet the requirements in order to pass the tests.

5.2 Apparatus

5.2.1 Impact block

Dimensions in millimetres



Key

- 1 top edge
- 2 impact block
- 3 spring
- 4 centre of rotation

Figure 1 — Impact block

The impact block is made of aluminium.

An initial tension of 60 N is produced by means of a tension spring, the top edge of the impact block being the reference surface. The spring constant is 4 N/mm.

5.2.2 Test ski

The test ski, on which the ski brake to be tested is mounted, shall have the characteristics shown in [Table 1](#).

Table 1 — Test ski

	Adults' ski	Children's ski
Length	(2 000 ± 50) mm	(1 500 ± 50) mm
Mass without binding and brake	(2,0 ± 0,1) kg	(1,3 ± 0,1) kg
Mass of the ski-binding + reference brake	(1,3 ± 0,1) kg	(1,3 ± 0,1) kg
Bottom camber ^a	(12 ± 2) mm	(10 ± 2) mm
Thickness at binding mounting	(20 ± 2) mm	(18 ± 2) mm

^a Maximum camber height measured at the highest point of the running surface, see ISO 6289.

The mass of the ski shall be compensated, without the binding mounted, so that the difference is not greater than 0,1 kg with regard to the reference ski.

5.2.3 Test sole

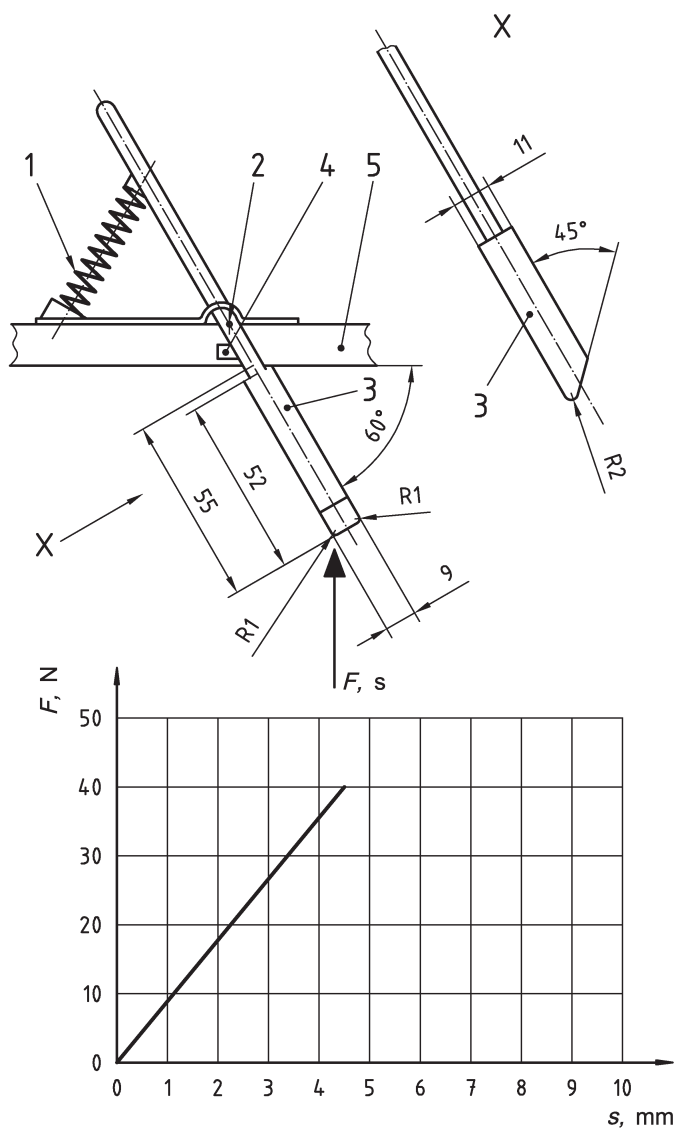
A sole as described in ISO 9838 shall be used as the test sole.

5.2.4 Reference brake

The reference brake is the comparative basis for testing the braking effect of ski brakes.

The design of the reference brake is specified in [Figure 2](#).

Dimensions in millimetres



Key

- | | | | |
|---|---|-----|------------------|
| 1 | compression spring | 5 | ski |
| 2 | mounting point in accordance with ISO 8364 | F | force |
| 3 | two spades arranged symmetrically to the longitudinal axis of the ski | s | thickness of ski |
| 4 | stop | | |

Figure 2 — Reference brake

5.2.5 Reference ski

The reference ski shall comply with the requirements for the test ski. The braking system shall be mounted within the requirements given by the brake manufacturer.

5.2.6 Remote control device

A suitable device shall be used to initiate the braking action of the ski brake to be tested as well as the reference brake when the ski has attained a speed of 8 ± 1 (m/s).

5.2.7 Course

Carry out the dynamic tests of the braking efficiency by using the test ski specified in 5.2.2 and the reference ski specified in 5.2.5 on a course having a slope of $28^\circ \pm 3^\circ$.

Roll and tread down loose snow by means of side-steps.

5.3 Conditions

Unless otherwise specified, carry out the laboratory tests at standard atmosphere 23/50 in accordance with ISO 554.

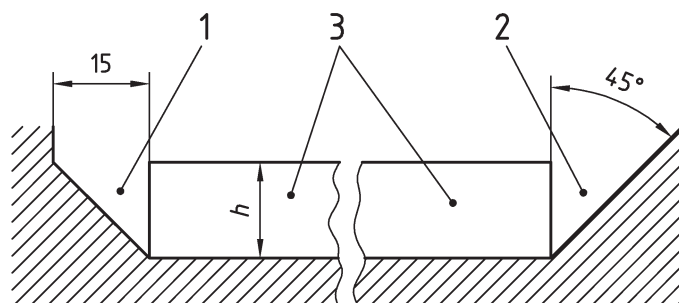
Wax the test ski and the reference ski in such a manner as to ensure minimum sliding friction between the running surface and the course.

5.4 Procedure

5.4.1 Test for interference with skiing

Examine potential interference with skiing caused by the ski brake by a laboratory test. Verify, with the smallest ski (or ski-section) recommended by the retention-device manufacturer, that the “Non interference” areas according to Figure 3 are not exceeded.

Dimensions in millimetres



Key

- 1 “Non interference” area for ski brakes with brake unit (trail spades) in the direction of the ski tip
- 2 “Non interference” area for ski brakes with brake unit (trail spades) in the direction of the ski tail (or in the direction of the ski tip covering or other designs)
- 3 ski
- h 20 mm for adults’ ski
- h 18 mm for children’s ski

Figure 3 — “Non interference” areas at the ski for the ski brake

5.4.2 Testing of the mechanical stability

Test the mechanical stability at $-20\text{ }^{\circ}\text{C}$.

Suspend the ski according to [Figures 4](#) and [5](#) in such a manner that the top edge of the impact block lies at half the distance between the running surface of the ski and the end of the brake out.

Lift the ski to a height of $850\text{ mm} \pm 50\text{ mm}$ and release it against the impact block.

For testing the stability of the brake unit's bearing, release the same ski against the impact block three times in the direction of the ski tip and three times in the direction of the ski tail as indicated in [Figure 4](#).

For testing the stability of the brake unit, release the ski against the impact block three times on the left side and three times on the right side as indicated in [Figure 5](#).

5.4.3 Testing of the functional reliability

Conduct tests with regard to the influence of icing in accordance with ISO 9462.

5.4.4 Testing of the enforced reaction

The function of the ski brake shall be tested by repeatedly stepping in and out with the test sole at room temperature and in accordance with the icing test in ISO 9462.

5.4.5 Testing of the external design

Subject the external design to a visual inspection.

5.4.6 Testing of the breaking effect

Carry out the following ski-brake tests on the course at a speed of $(8 \pm 1)\text{ m/s}$:

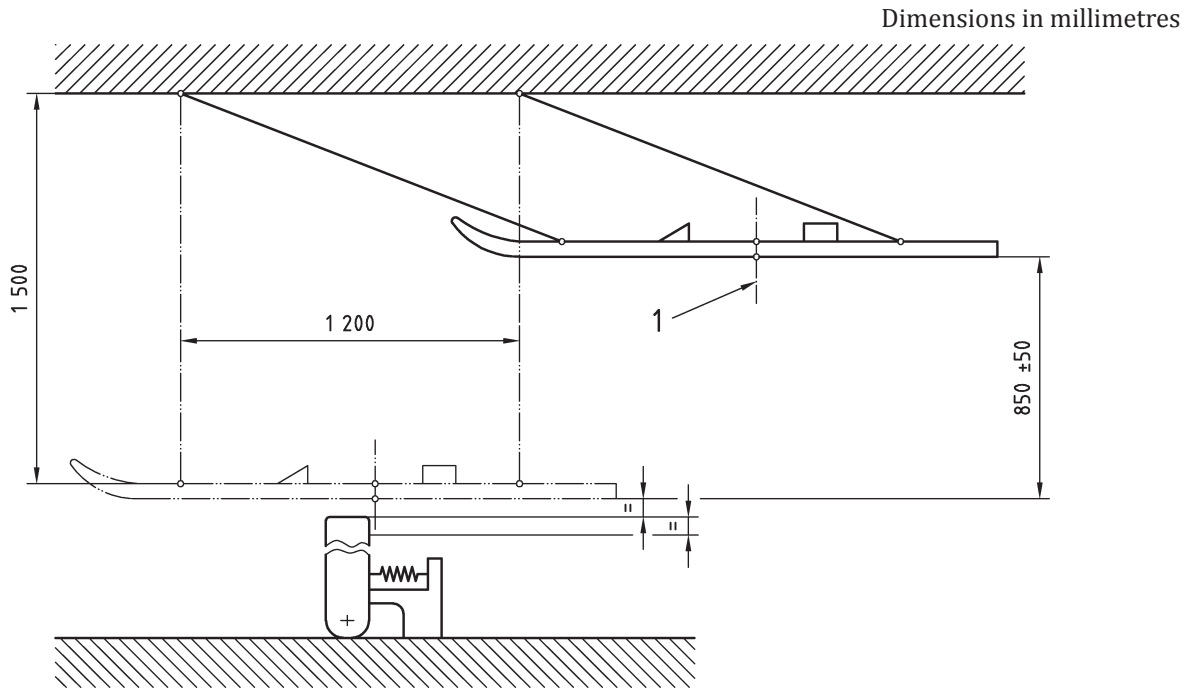
- a) five tests with the test ski with its tip running forward;
- b) five tests with the test ski with its tip running backwards;
- c) five tests with the reference ski with its tip running forward.

The mean value of the stopping distance of a) and b) shall not exceed the mean value of c) by more than 20 %.

5.4.7 Test report

With reference to this International Standard, the test report shall include at least the following information:

- a) brand;
- b) model designation;
- c) serial number (if given);
- d) suitability of the ski brake for adults' ski or children's ski;
- e) widths of the ski for which the ski brake is suitable;
- f) with regard to the test equipment used: type, measuring range, measuring accuracy, speed of loading;
- g) maximum height from the running surface of the ski;
- h) maximum weight of the total sliding equipment.



Key

- 1 ski brake in braked position

Figure 4 — Testing of strength of the brake unit's bearing

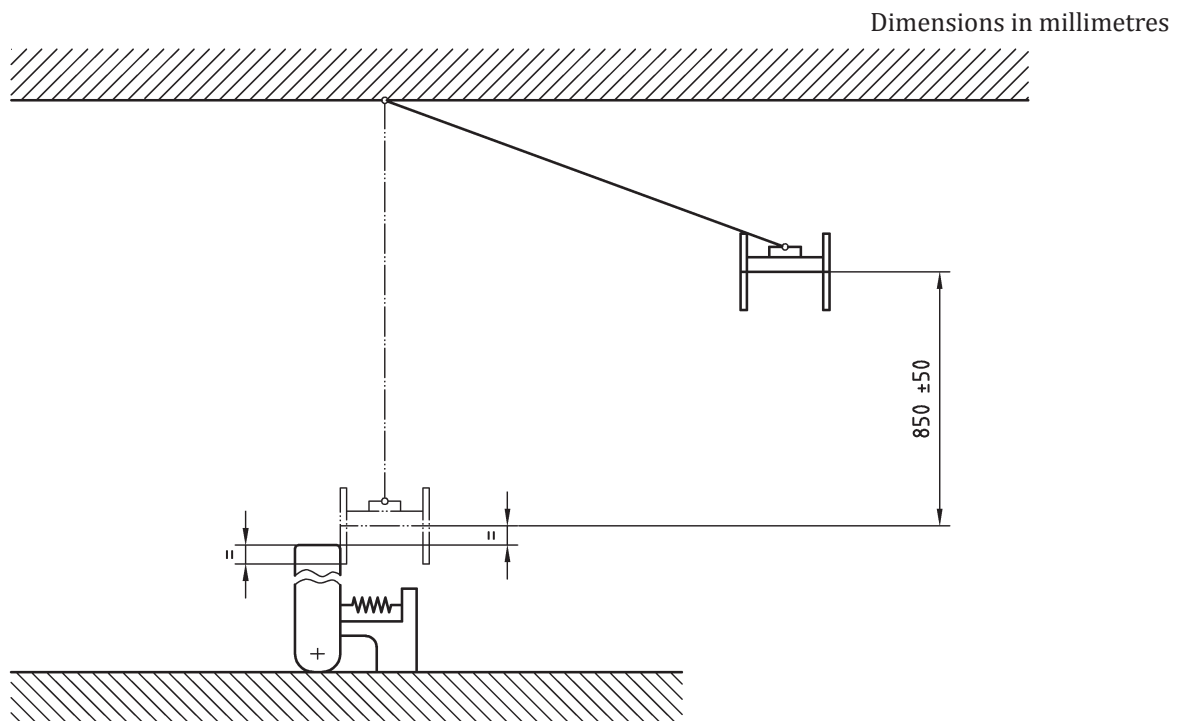


Figure 5 — Testing of the strength of the brake unit

6 Instructions

6.1 Instruction for use

Each ski brake shall be accompanied by instructions for use including at least the following information:

- a) how to use the retention device;
- b) maintenance and care;
- c) a warning that problems can arise when skiing in deep snow.

6.2 Instruction for mounting

The manufacturer of the ski brake shall provide at least the following instructions for mounting:

- a) application and limitations of the brake with respect to the weight of the ski plate binding unit, the width of the ski and height of the ski plate unit;
- b) how to connect the ski brake with the binding.

Annex A (normative)

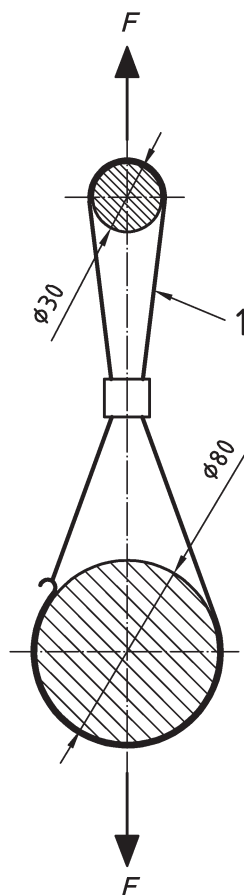
Binding straps

Retention devices such as binding straps can nevertheless be desirable for special purposes, such as off-piste-skiing or in deep powder conditions, since they are suitable for holding the ski to the skier after the release of a ski binding.

Binding straps shall be designed such that

- closing and opening is possible under all environmental conditions occurring during skiing, even with ski gloves,
- there is no interference with the functioning of the ski-binding nor with skiing, and
- the tensile force (tested according to [Figure A.1](#)) and the tensile energy exceed the limits given below.

Dimensions in millimetres



Key

- 1 binding strap

Figure A.1 — Test arrangement for binding straps

- a) Binding straps for adults' bindings:
 - minimum tensile strength 1 500 N;
 - minimum tensile energy 75 Nm.
- b) Binding straps for children's bindings:
 - minimum tensile strength 1 000 N;
 - minimum tensile energy 50 Nm.

In order to prevent any catapult effect, the reversable energy shall be less than 50 %.

Bibliography

- [1] ISO 6289:2003, *Skis — Vocabulary*
- [2] ISO 9523, *Touring ski-boots for adults — Interface with touring ski-bindings — Requirements and test methods*

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