
**Alpine ski-bindings — Retention devices —
Safety requirements and test methods**

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

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ISO 11087:1997

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@iso.ch
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11087 was prepared by Technical Committee ISO/TC 83, *Sports and recreational equipment*, Subcommittee SC 3, *Ski bindings*.

Annex A forms an integral part of this International Standard.

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Alpine ski-bindings — Retention devices — Safety requirements and test methods

1 Scope

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

It is applicable to alpine skiing retention devices which are used to reduce the risk of injury caused by the ski after its release.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 554:1976, *Standard atmospheres for conditioning and/or testing — Specifications.*

ISO 5355:1991, *Alpine ski-boots — Safety requirements and test methods.*

ISO 6289:1985, *Skis — Terms and definitions, and Amendment 1.*

ISO 8364:1991, *Alpine skis and bindings — Binding mounting area — Requirements and test methods.*

ISO 9462:1993, *Alpine ski-bindings — Safety requirements and test methods.*

ISO 9838:1991, *Alpine ski-bindings — Test soles for ski-binding tests.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 6289 and the following definitions apply.

3.1 ski brake: Retention device for alpine skiing which is integrated into the ski-binding and which is designed so as to slow down a ski which has come off after release of the ski-binding.

NOTE — 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. The length corresponds to the braking distance of the skier measured between the point of fall and the stoppage. The width of the area is assumed to be approximately 5 m.

4 Safety requirements

4.1 Compatibility with binding function

The ski brakes shall comply with those requirements in ISO 5355 and ISO 9462 that are relevant to ski brakes.

4.2 Interference with skiing

The ski brake shall not interfere with skiing. It shall be designed so as to prevent catching of the ski or 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 to the braking position without the need to do so.

4.3 Mechanical stability

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

4.4 Functional reliability

Low temperatures, 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 when the skier has stepped into the binding. The operation of the ski brake may 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 the skier stepping into the binding without removing the inserts or tools or, if this should not be possible, a clear statement shall be given with the insert or with the information material of the ski brake.

4.6 External design

The external design of the ski brake shall be such that during correct use there is no greater risk of the skier being 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 the ground that may be found during skiing. It is desirable that the ski stops within the course of fall of the skier.

5 Test methods

5.1 Sampling

Two pairs of ski brakes (four test samples) are required for the test.

One test sample shall be selected for each laboratory test (one sample for the tests given in 5.4.6).

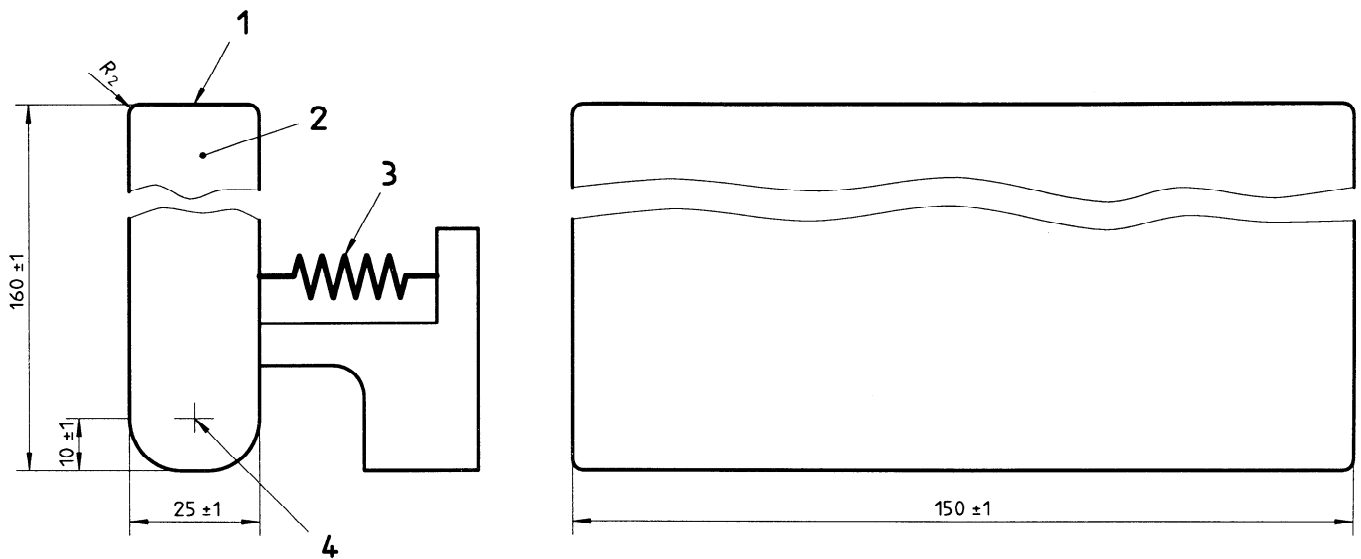
If one of the selected test samples should not meet the requirements, two substitute test samples shall be selected, which have to meet the requirements in order to pass the tests.

5.2 Apparatus

5.2.1 Impact block

See figure 1.

Dimensions in millimetres

**Key**

- 1 Top edge
- 2 Impact block
- 3 Spring
- 4 Centre of rotation

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 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 be as defined in table 1.

Table 1 — Test ski

Parameter	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
Bottom camber ¹⁾	(12 ± 2) mm	(10 ± 2) mm
Thickness at binding mounting	(20 ± 2) mm	(18 ± 2) mm

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

The mass of the test 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

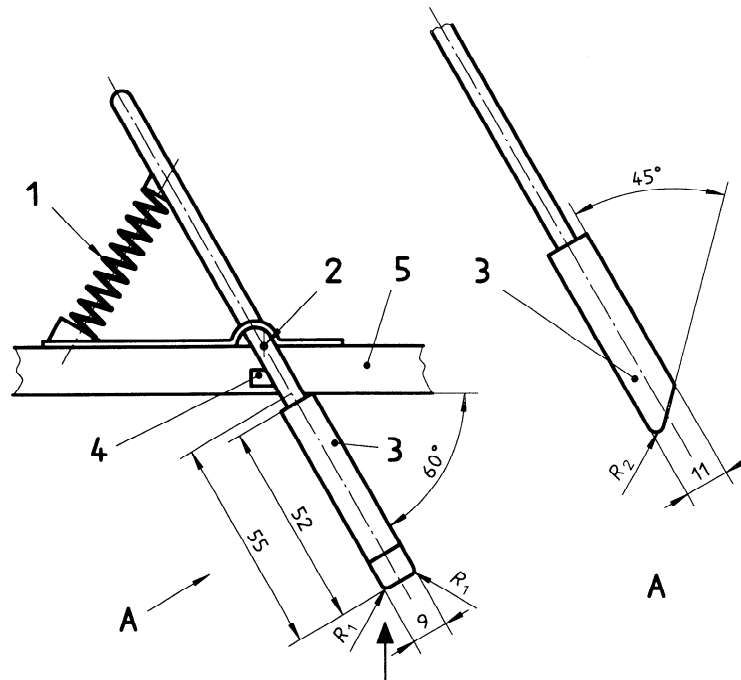
A sole in accordance with ISO 9838 shall be used as the test sole.

5.2.4 Reference brake

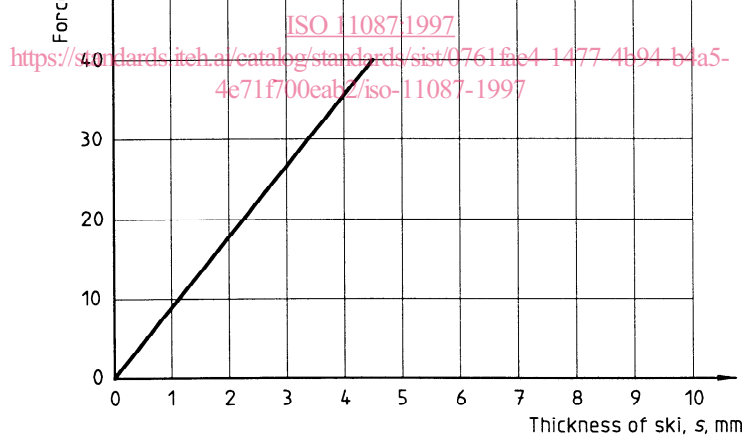
The reference brake is the comparative basis for testing the braking effect of ski brakes.

The design of the reference brake is specified in figure 2.

Dimensions in millimetres



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Key

- 1 Compression spring
- 2 Mounting point (in accordance with ISO 8364)
- 3 Two spades (arranged symmetrically along the longitudinal axis of the ski)
- 4 Stop
- 5 Ski

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 ski-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 for 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-stepping.

5.3 Conditions

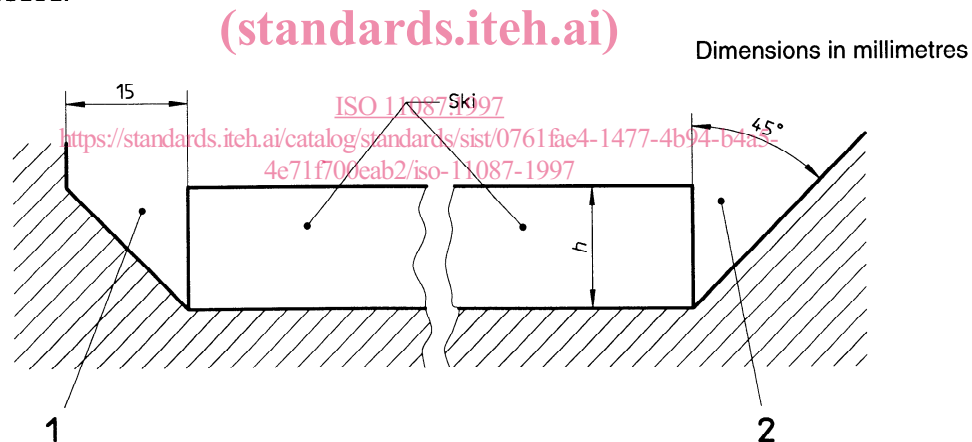
Unless otherwise specified, carry out the laboratory tests at standard atmosphere 23/50 in accordance with ISO 554.

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

5.4 Procedure

5.4.1 Test for interference with skiing

Examine the potential interference with skiing caused by the ski brake in a laboratory test. Verify with the smallest ski (or ski section) recommended by the retention-device manufacturer that the "non-interference" areas shown in figure 3 are not exceeded.



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 with covering or other designs).

$h = 20$ mm for adults' skis

$h = 18$ mm for children's skis

Figure 3 — "Non-interference" areas on skis for ski brakes

5.4.2 Test for mechanical stability

Carry out the test for mechanical stability at -20°C .