
**Alpine touring ski-bindings —
Requirements and test methods**

*Fixations pour le ski alpin de randonnée — Exigences et méthodes
d'essai*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13992 was prepared by Technical Committee ISO/TC 83, *Sports and recreational equipment*, Subcommittee SC 3, *Ski bindings*.

This second edition cancels and replaces the first edition (ISO 13992:1997), Clauses 3 and 7/subclauses 3.6, 3.7, 5.1, 6.3.3, 6.3.4 and 6.6.2/Tables 1 and 3/Annexes A and B of which have been technically revised/deleted/added. It also incorporates the amendment ISO 13992:1997/Amd.1:2004.

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Alpine touring ski-bindings — Requirements and test methods

1 Scope

This International Standard specifies the main characteristics of touring ski-bindings and describes, as an example, the test methods A and B.

This International Standard applies, in principle, to touring ski-bindings for alpine skiing for children, juniors and adults.

NOTE As specific touring boots and bindings for children do not exist on the market at present, the scope of this International Standard is limited to bindings for juniors and adults.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 5355:2005, *Alpine ski-boots — Requirements and test methods*

ISO 8061:2004, *Alpine ski-bindings — Selection of release torque values*

ISO 9462:2006, *Alpine ski-bindings — Requirements and test methods*

ISO 9465:1991, *Alpine ski-bindings — Lateral release under impact loading — Test method*

ISO 9523:—¹⁾, *Touring ski-boots for adults — Interface with touring ski-bindings — Requirements and test methods*

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

3 Definitions

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

3.1

alpine touring ski-binding

device fixing the boot to the ski where the heel can be fixed for downhill skiing or allowed to move upwards relative to the ski for advancing on flat ground or uphill and where the device releases the boot from the ski when certain loads reach preset values

3.2

downhill position

position where the heel of the boot is fixed to the ski for downhill skiing

1) To be published. (Revision of ISO 9523:1990)

3.3 walking position

position where the heel of the boot is allowed to move upwards relative to the ski for walking on flat ground or uphill

3.4 maximum angular displacement

maximum angle between the bottom of the sole and the surface of the ski in the binding area, allowed by the binding in the advancing position

3.5 combined loading

loading of the sole or ski in several directions at the same time, where one of the loads is the torque M_z progressively applied to the sole until the binding releases

See Figure 1 and Table 1.

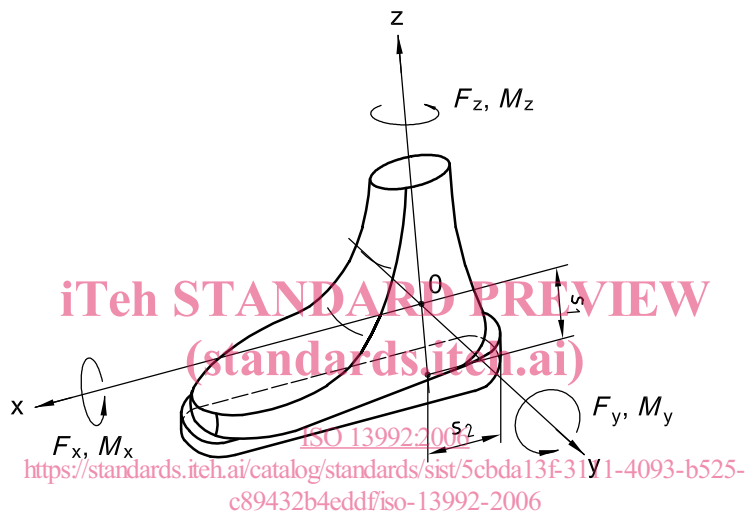


Figure 1 — Definition of the loads and torques

Table 1 — Coordinates of reference point 0

Dimensions in millimetres

	Type of binding		
	C	CA	A
s_1	85	100	100
s_2	70	80	80

NOTE Each of the load combinations simulates a given situation, chosen within an infinite field of possibilities and simplified for the purpose of the tests. The main simplification being that the loads applied additionally to the release torque M_z are held constant in value and direction during all the release process.

[ISO 9462:2006]

3.6 additional loads

loads applied additionally to the release torque M_z

[ISO 9462:2006]

3.7**deflection of the ski**

deflection of the ski perpendicular to its gliding surface

NOTE In practice, the deflection of the ski depends at the same time on the loading situation and the profile of the snow-surface ("geometrical" situation); in test simplification, only the "geometrical" situation is simulated.

[ISO 9462:2006]

3.8**release**

detachment of the boot from the ski by release of the mechanism that ensures the connection between boot and ski

NOTE This release is only considered effective when all the loads due to the boot/ski connection have dropped to values which present no danger to the skier.

[ISO 9462:2006]

3.9**release values**

maximum values of torques M_z and M_y (see Figure 1), caused at the boot/ski connection by the two movements of torsion and forward bending

NOTE 1 These values are generally adjustable on current bindings which have a scale and an indicator displaying the setting level.

NOTE 2 In the present state of the art, bindings are designed at least to release in torsion ($\pm M_z$) and in forward bending ($\pm M_y$).

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3.10**reference value**

value, adjusted after a series of tests, used as a basis of comparison to evaluate the behaviour of the binding during the tests (see 6.3.1)

[ISO 9462:2006]

3.11**type C bindings**

bindings that can be adjusted to at least the following release values:

- a) $M_z = 10 \text{ N}\cdot\text{m}$
- b) $M_y = 37 \text{ N}\cdot\text{m}$

NOTE At present, type C bindings for ski touring do not exist on the market.

3.12**type CA bindings**

bindings generally suitable for boot soles complying with type A of ISO 5355:2005 and with ISO 9523 and which can be adjusted to at least the following release values:

- a) $M_z = 20 \text{ N}\cdot\text{m}$
- b) $M_y = 75 \text{ N}\cdot\text{m}$

NOTE They may also require specific boot soles designed by the manufacturer.

3.13
type A bindings

bindings generally suitable for boot soles complying with type A of ISO 5355:2005 and with ISO 9523

NOTE They may also require specific boot soles designed by the manufacturer.

3.14
limit

L_1
lowest possible position of the setting indicator

[ISO 9462:2006]

3.15
limit

L_2
position of the indicator at the lowest mark on the setting scale

[ISO 9462:2006]

3.16
limit

L_3
position of the indicator at the highest mark on the setting scale

[ISO 9462:2006]

3.17
limit

L_4
highest possible position of the setting indicator

[ISO 9462:2006]

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4 Test conditions

4.1 Loading rate

The tests shall be performed quasi-statically, ensuring that the following indicative values of the torque gradient are respected:

a) torsion release:

$$\frac{dM_z}{dt} \leq 50 \text{ N} \cdot \text{m/s}$$

b) forward bending release:

$$\frac{dM_y}{dt} \leq 220 \text{ N} \cdot \text{m/s}$$

4.2 Accuracy of measurement

The measurement error of the release value in torsion shall be smaller than $\pm 2\%$ for values ≥ 50 N·m and ± 1 N·m for values < 50 N·m.

The measurement error of the release value in forward bending shall be smaller than $\pm 2\%$ for values ≥ 200 N·m and ± 4 N·m for values < 200 N·m.

The test equipment shall be designed to allow application of pure moments, without any extraneous forces, during the entire release process.

4.3 Test sole

The test sole shall be in accordance with ISO 9838.

If a specific boot-sole design is required, a test sole should be cut from a boot provided by the manufacturer and adapted for test needs.

Before testing, the sole shall be degreased, washed and dried.

4.4 Test ski

For the release tests in the laboratory, the bindings shall be mounted either on whole skis or on appropriate sections of skis. If the binding is pre-mounted (already mounted on the ski by the producer), use the ski with which the binding is delivered in its medium size. If not choose a ski which represents the market.

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5 Test methods A and B

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5.1 Principle

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The binding shall be mounted on a ski in accordance with the manufacturer's instructions. A test sole shall then be inserted in the binding.

In method A, the ski is rigidly connected to the test frame and the torque M_z or M_y is progressively applied to the sole until the binding releases. The peak value of M_z or M_y is recorded.

In method B, the sole is rigidly connected to the test frame through a sensor which measures the torques M_z and M_y . Forces are progressively applied to the ski until the binding releases. The peak value of M_z or M_y is recorded.

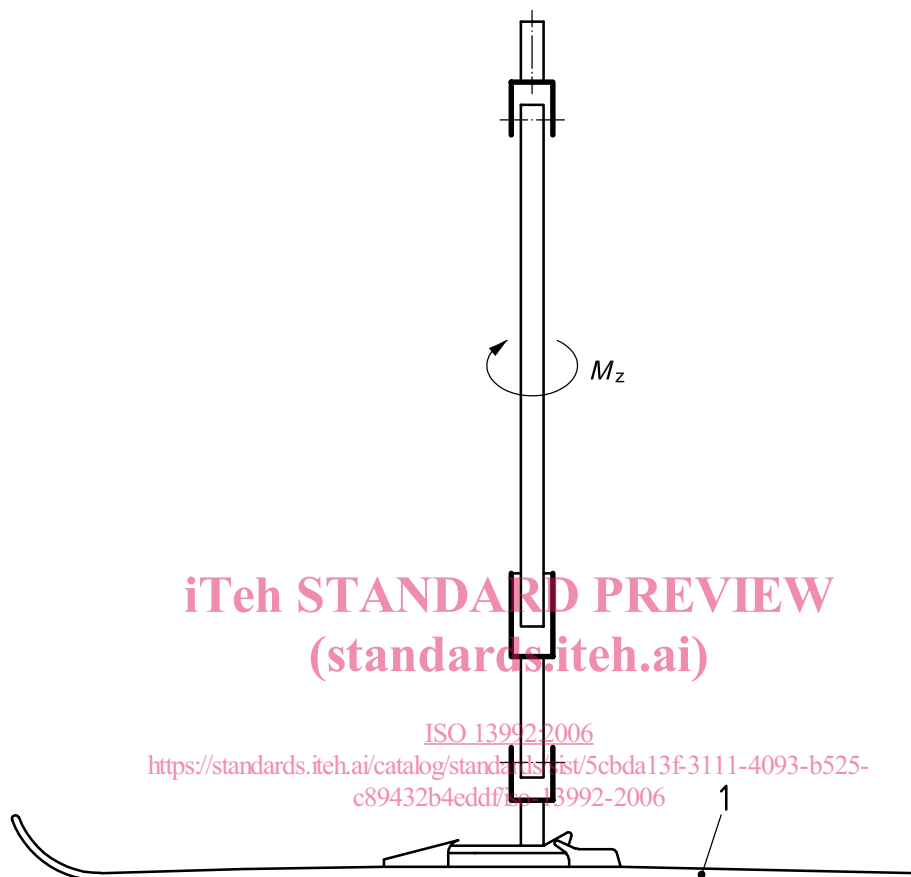
Annexes A and B give examples of how to realise method A or method B.

Passing by either method shall be deemed satisfactory.

5.2 Simple torsion test

5.2.1 Method A

See Figure 2.



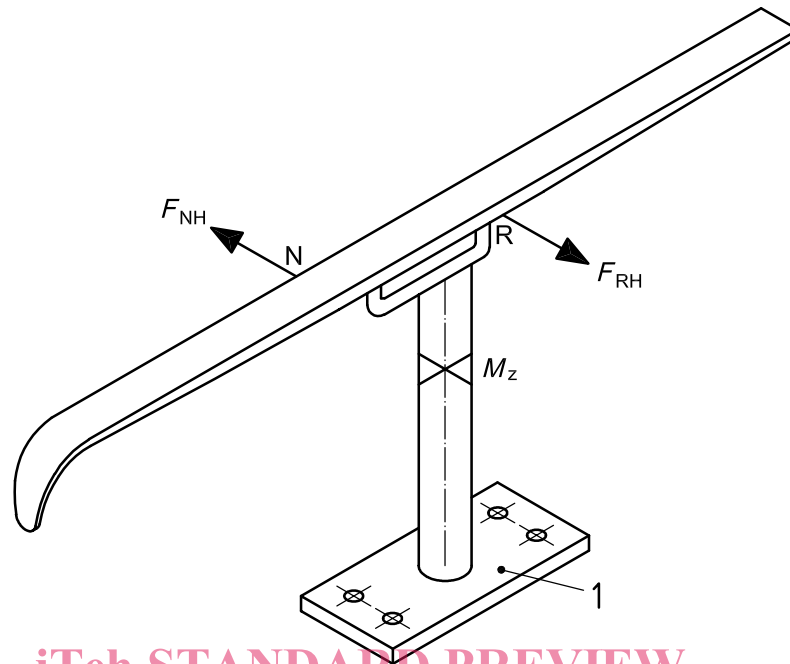
Key

1 fixed ski

Figure 2 — Application of M_z torque and measurement of $M_{z, \max}$

5.2.2 Method B

See Figure 3.



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Key

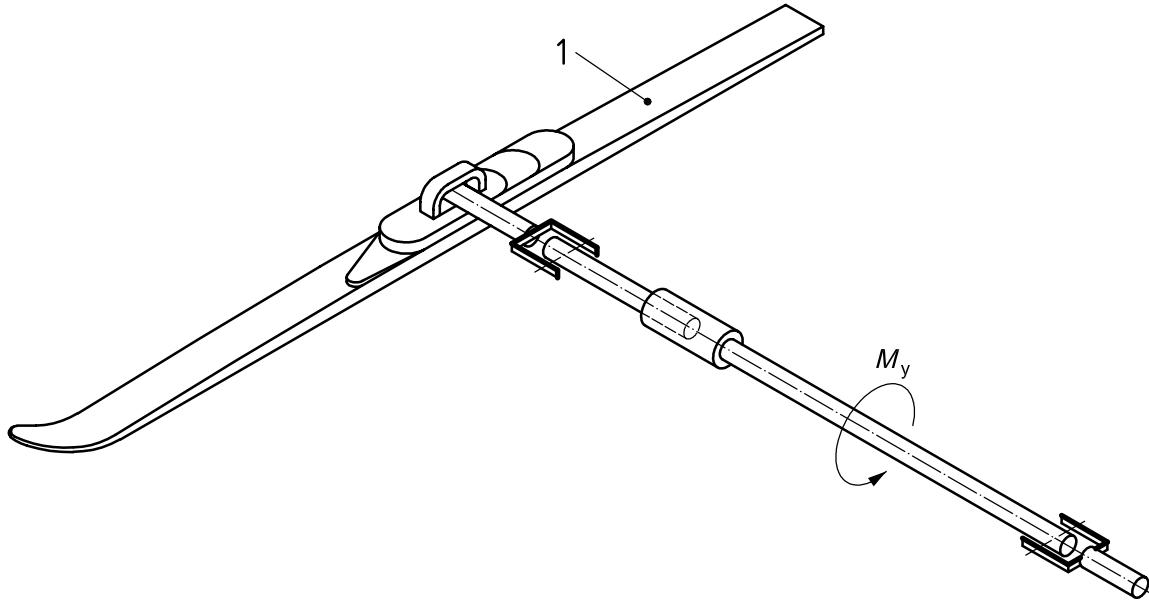
1 fixed base

ISO 13992:2006
Figure 3 — Application of two equal forces F_{NH} and F_{RH} and measurement of $M_{z, \max}$ torque
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5.3 Forward bending test

5.3.1 Method A

See Figure 4.



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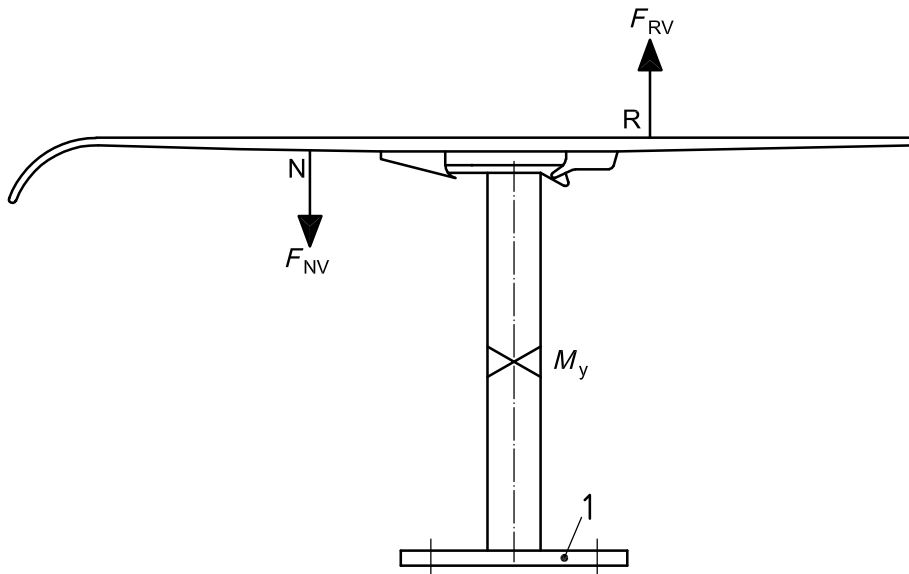
Key

1 fixed ski

Figure 4 — Application of M_y torque and measurement of $M_{y, \max}$
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5.3.2 Method B

See Figure 5.



Key

1 fixed base

Figure 5 — Application of two equal forces F_{NV} and F_{RV} and measurement of $M_{y, \max}$

6 Requirements and testing

6.1 General requirements

NOTE This subclause deals with general requirements covering topics where the evaluation is carried out visually.

6.1.1 Function and form

6.1.1.1 In the downhill position, the binding shall release at least in two cases:

- when applying a torque M_z about an axis perpendicular to the ski gliding surface;
- when applying a torque M_y about an axis parallel to the ski surface and perpendicular to the longitudinal axis of the ski.

The binding is said to release when the above mentioned torque reaches a maximum value (release value) and then drops to a value that is harmless for the skier. After release, all the loads applied by the ski and the boot on the leg shall remain under the dangerous level for all possible movements, and until all the risks associated with the coupling boot-ski are no longer apparent.

In the advancing position, the binding shall release in the same cases as before if its maximum angular displacement is less than 45°. For bindings allowing a greater angular displacement, the requirement for release is optional.

6.1.1.2 The release level shall be clearly indicated by a scale covering all of the setting range anticipated by the manufacturer. The release shall still be possible at the upper limit (maximum setting). Settings above $Z = 10$ shall be clearly differentiated from settings below $Z = 10$ on the indicator scale.

6.1.1.3 Each procedure of adjustment to the boot having an influence on the binding functioning shall be verifiable by the use of a clear indicator or by any other means considered suitable by the operator for showing the correct adjustment.

6.1.1.4 The binding shall be equipped with a ski-brake or allow for an easy and secure attachment of a leash.

6.1.1.5 The design of the ski-brake or the leash shall be such that, after release, no unnecessary danger will occur to the skier.

6.1.1.6 The binding shall have an external design which does not have a negative influence on skiing or cause unnecessary risk of injuries when used normally.

6.1.2 Handling

6.1.2.1 Mounting instructions

The manufacturer or the importer shall deliver mounting instructions that are easily understood, to the sports shop. These instructions shall include at least:

- a) the mechanical procedure for adjusting the release values of the binding;
- b) recommendations for determining the appropriate release values for the skier;
- c) the sole characteristics required for good functioning of the binding;
- d) the boot-sole requirements and preparation for mounting of additional elements if necessary;
- e) preparation and mounting of the binding, e.g. use of jig, compatibility with ski, etc.;