INTERNATIONAL STANDARD

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Alpine touring ski-bindings — Requirements and test methods

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

Reference number
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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 recreational equipment*, Subcommittee SC 4, *Ski-bindings*.

This third edition cancels and replaces the second edition (ISO 13992:2006) has been technically revised.

The main changed are:

— addition of 6.6.3.5;

— addition of the reference to ISO 11087 in 6.1.1.4.

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 in the market at present, the scope of this International Standard is limited for the moment to bindings for juniors and adults.

2 Normative references

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

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

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

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

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

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

ISO 11087, *Alpine ski-bindings — Retention devices — Requirements and test methods*

3 Terms and 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; 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

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

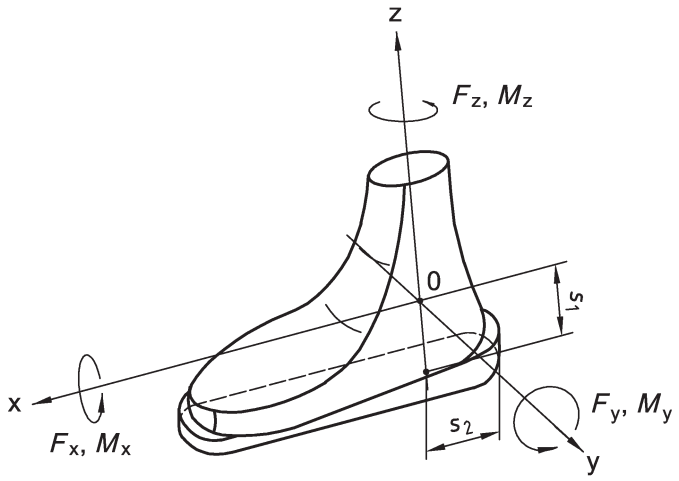


Figure 1 — Definition of the loads and torques

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 1 to entry: Each of the load combinations simulates a given situation, choiced 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.

[SOURCE: ISO 9462:2014, 3.5]

3.6
additional loads
loads applied additionally to release torque, M_z

[SOURCE: ISO 9462:2014, 3.6]

3.7
deflection of the ski
deflection of the ski perpendicular to its gliding surface

Note 1 to entry: In the 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.

[SOURCE: ISO 9462:2014, 3.7]

3.8
release
detachment of the boot from the ski by release of the mechanism that ensures the connection between boot and ski

Note 1 to entry: 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.

[SOURCE: ISO 9462:2014, 3.2]

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

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

[SOURCE: ISO 9462:2014, 3.3]

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)

[SOURCE: ISO 9462:2014, 3.4]

3.11
type C bindings
bindings which can be adjusted to at least the following release values:

a) M_z = 10 m

b) M_y = 37 Nm

Note 1 to entry: to entry: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 and with ISO 9523

Note 1 to entry: They may also require specific boot soles designed by the manufacturer. They can be adjusted to at least the following release values:

a) M_z = 20 Nm;

b) M_y = 75 Nm.

3.13
type A bindings
bindings generally suitable for boot soles complying with type A of ISO 5355 and with ISO 9523

Note 1 to entry: They may also require specific boot soles designed by the manufacturer.

3.14
limit
L_1
lowest possible position of the setting indicator

[SOURCE: ISO 9462:2014, 3.11]

3.15
limit
L_2
position of the indicator at the lowest mark on the setting scale

[SOURCE: ISO 9462:2014, 3.12]

3.16
limit
L_3
position of the indicator at the highest mark on the setting scale

[SOURCE: ISO 9462:2014, 3.13]

3.17
limit
L_4
highest possible position of the setting indicator

[SOURCE: ISO 9462:2014, 3.14]

4 Test conditions

4.1 Loading rate

The tests shall be performed quasi-statically, ensuring that the following indicative values of the torque gradient comply with the following.

a) Torsion release

The angular velocity of the test shall be for:

— M_Z (Moment in z-axis)

3,8°/s ± 0,1°/s;

— FAV (Moment in y-axis measured with force)

5 mm/s ± 2 mm/s.

b) Forward bending release

The angular velocity of the test shall be for:

— M_y (Moment in y-axis)

3,8°/s ± 0,1°/s;

— FSH [Energy absorption (recentering)]

5 mm/s ± 2 mm/s.

4.2 Accuracy of measurement

The measurement error of the release value in torsion shall be smaller than ±2 % for values above 50 N m inclusive and ±1 Nm for values below 50 Nm.

The measurement error of the release value in forward bending shall be smaller than ±2 % for values above 200 Nm inclusive and ±4 Nm for values below 200 Nm.

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 9523 and ISO 9838.

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

Before the tests, 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.

5 Test methods A and B

5.1 Principle

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 (for simple torsion test, see Figure 2 and for forward bending test, see Figure 4), 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.

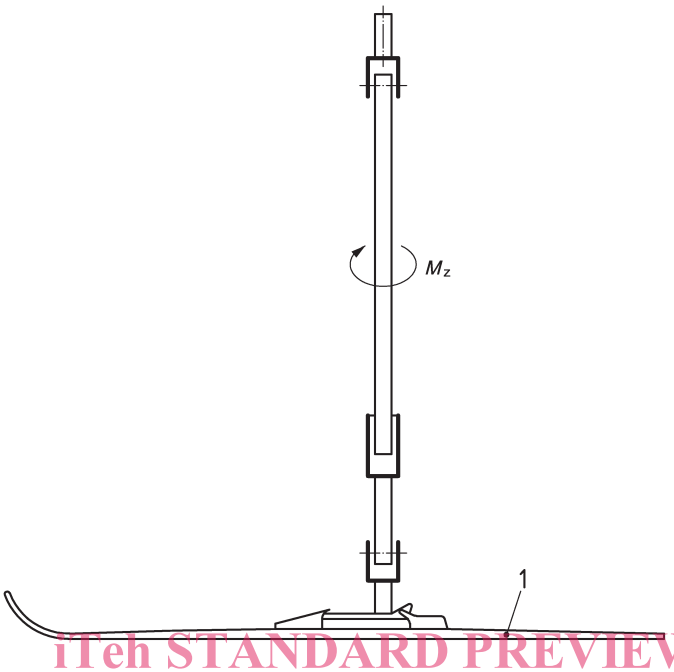
In method B (for simple torsion test, see Figure 3 and for forward bending test, see Figure 5), the sole is rigidly connected to the test frame through a sensor which measures the torques M_z and M_y. Forces are progressively applied to the ski until the binding releases. The peak value of M_z or M_y is recorded.

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

Passing by either method shall be deemed satisfactory.

5.2 Simple torsion test

For method A, see Figure 2.

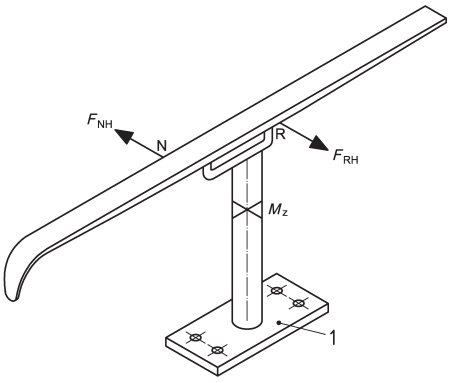


Key

1 fixed ski

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

For method B, see Figure 3.



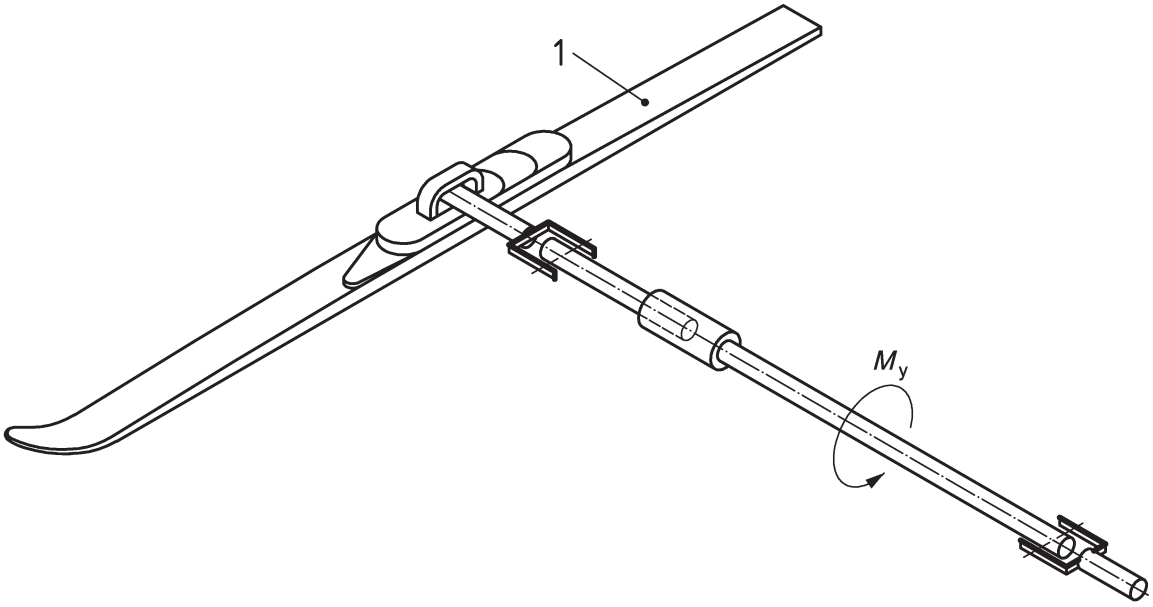
Key

1 fixed base

Figure 3 — Application of two equal forces F_{NH} and F_{RH} and measurement of $M_{z,\,max}$ torque

5.3 Forward bending test

For method A, see Figure 4.

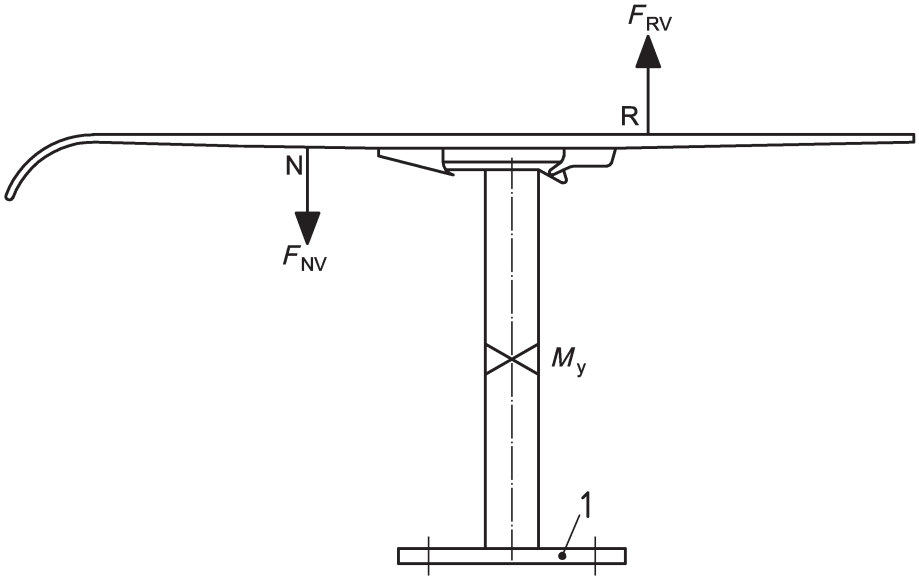


Key

1 fixed ski

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

For 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 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 have disappeared.

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. The ski-brake and the attachment for the leash shall be according to ISO 11087.

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.,

f) the adjustment instructions necessary for accommodating different boot-sole lengths and heights, the centering of the sole and ways of controlling the length adjustment,

g) ways of performing the basic functional tests after mounting,

h) recommendation for the inspection of the ski/boot/binding system with a testing device, and

i) troubleshooting procedures for non-symmetric release and readjustment.

6.1.2.2 Instructions for use

An easily understood set of instructions for the skier shall be included with all bindings. These instructions shall contain at least

a) warnings against important modifications of the recommended setting,

b) instructions on how to step in and out of the binding, how to restore the binding to its initial position after release and how to open the binding after a fall in an awkward position; how to get from the downhill to advancing position or the reverse,

c) recommendations for avoiding problems, for example increase of the release level with time,

d) instructions for maintenance, storage, and control of the binding,

e) recommendations for setting the binding by a specialist with a setting device and for controlling this setting each year,

f) warning that, when skiing in deep snow, the brake alone is not sufficient to avoid losing the ski,

g) information on the appropriate ski-boots the binding is designed to function with,

h) advice that in ski touring severe environmental conditions can occur (presence of ice, snow packs, or dirt) requiring special control and maintenance procedures,

i) warning about the risk linked to the cancellation of the release function (concerns binding with the possibility of manual cancellation of this function),

j) information on the appropriate ski-boots, the binding is designed to function with, and

k) warning about the locked out release function in uphill mode (if applicable).

6.2 Release tests — Setting, reproducibility, and symmetry of release values

6.2.1 Requirements

6.2.1.1 Scattering of values

The difference between each of the five values and their mean value shall not exceed ±10 % of that mean value.

6.2.1.2 Symmetry in torsion

The difference between the mean of the five values of M_z in one direction and the mean of the 10 values of $|M_z|$ shall not exceed ±10 % of the latter.

6.2.1.3 Accuracy of setting scale

The release value that corresponds to the indicator position of the setting scale is given in Table 2.

For M_z, the tolerance is ±5 Nm for $Z = 1$ and then increases linearly to ±10 Nm for $Z = 10$.