INTERNATIONAL STANDARD

ISO 9462

Third edition
2006-02-15

Alpine ski-bindings — Requirements and test methods

Fixations de skis alpins — Exigences et méthodes d'essai

Reference number
ISO 9462:2006(E)

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Published in Switzerland

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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 9462 was prepared by Technical Committee ISO/TC 83, *Sports and recreational equipment*, Subcommittee SC 3, *Ski bindings*.

This third edition cancels and replaces the second edition (ISO 9462:1993), Clauses 3 and 7/subclauses 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 9462:1993/Amd.1:2002 and the Technical Corrigendum ISO 9462:1993/Cor.1:1993.

Alpine ski-bindings — Requirements and test methods

1 Scope

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

This International Standard applies to ski-bindings for alpine skiing for children, 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 9465:1991, *Alpine ski-bindings — Lateral release under impact loading — Test method*

ISO 9838:1991, *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
alpine ski-binding
system to ensure firm connection between boot and ski, fixing the heel low for downhill skiing

NOTE The system releases the boot from the ski when certain loads reach preset values.

3.2
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.

3.3
release values
maximum values of torques M_z and M_y caused at the boot/ski connection by the two movements of torsion and forward bending

See Figure 1.

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 ($\pm M_y$)

3.4
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)

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.

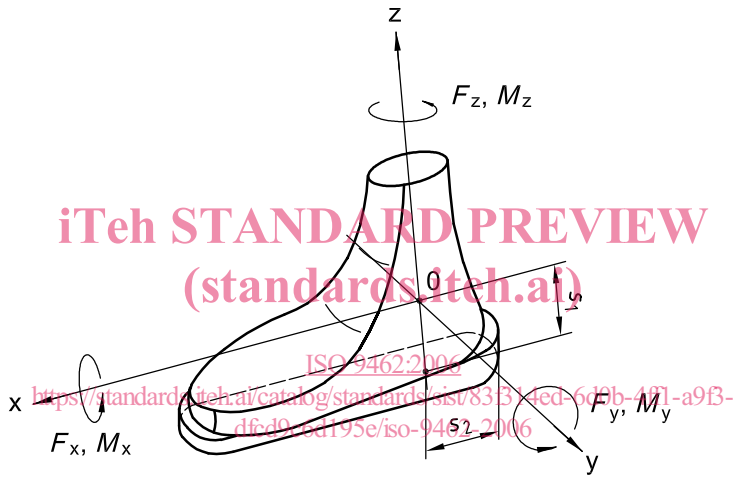


Figure 1 — Definition of the loads and torques

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.

3.6
additional loads
loads applied additionally to the release torque M_z

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.

3.8
type C bindings
bindings suitable for boot soles complying with type C of ISO 5355:2005, which can be adjusted to at least the following release values:

a) M_z = 10 N·m

b) M_y = 37 N·m

3.9
type CA bindings
bindings suitable for boot soles complying with types C and A of ISO 5355:2005, which can be adjusted to at least the following release values:

a) M_z = 20 N·m

b) M_y = 75 N·m

3.10
type A bindings
bindings suitable for boot soles complying with type A of ISO 5355:2005

3.11
limit
L_1
lowest possible position of the setting indicator

3.12
limit
L_2
position of the indicator at the lowest mark on the setting scale

3.13
limit
L_3
position of the indicator at the highest mark on the setting scale

3.14
limit
L_4
highest possible position of the setting indicator

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:

$$\frac{dM_z}{dt} \leqslant 50 \cdot m/s$$

b) forward bending release:

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

4.2 Accuracy of measurement

The measurement error of the release value in torsion shall be smaller than ± 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 ± 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.

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.

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, 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.

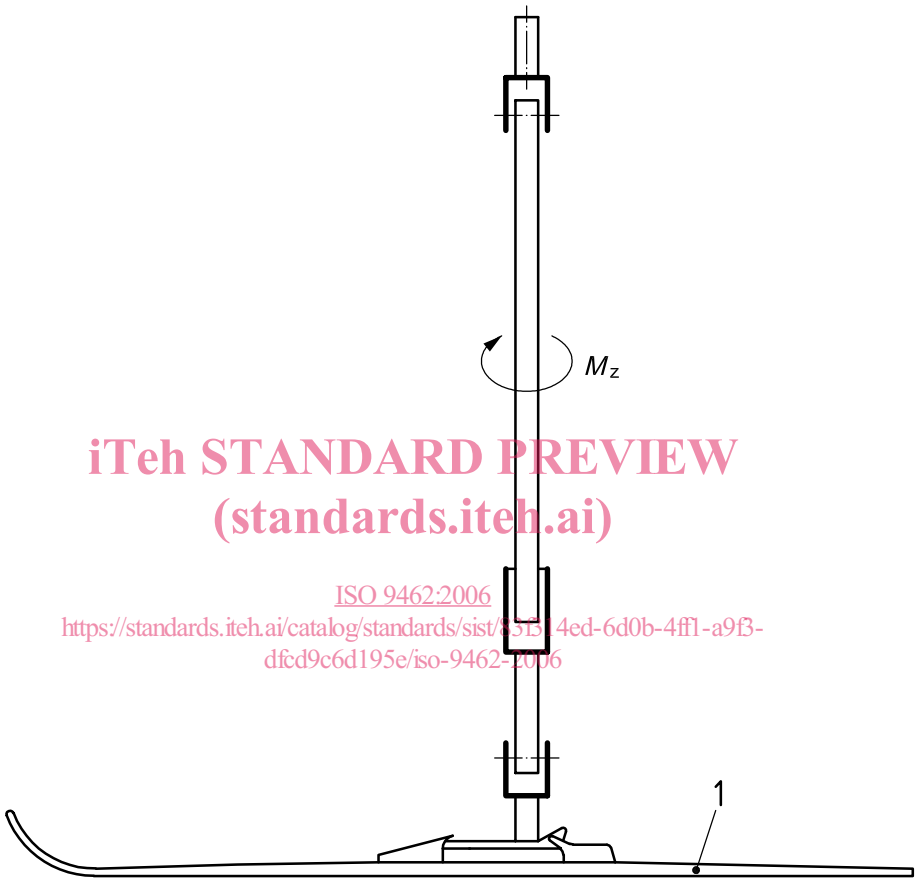
Annexes A and B give examples of how to realise method A or method B.

Passing by either method shall be deemed satisfactory.

5.2 Simple torsion test

5.2.1 Method A

See Figure 2.



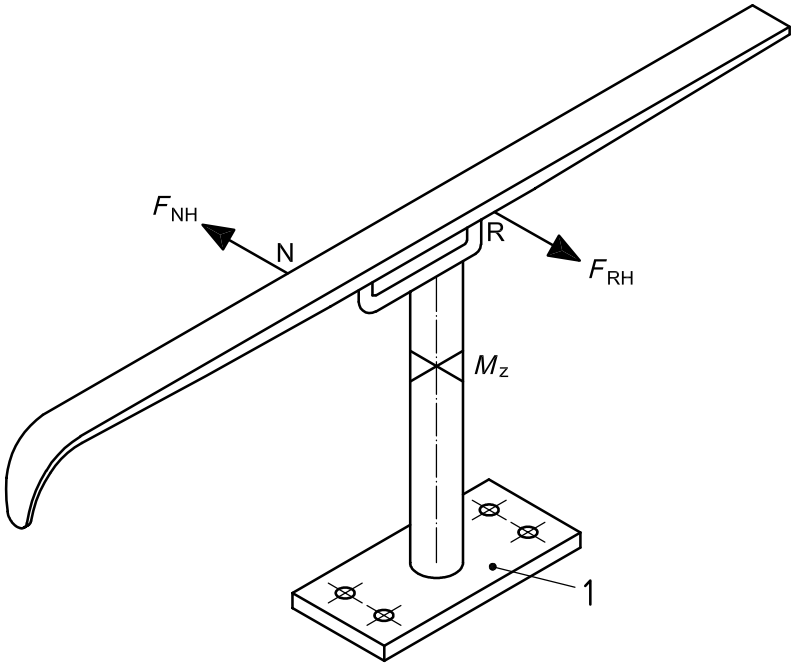
Key

1 fixed ski

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

5.2.2 Method B

See Figure 3.



Key

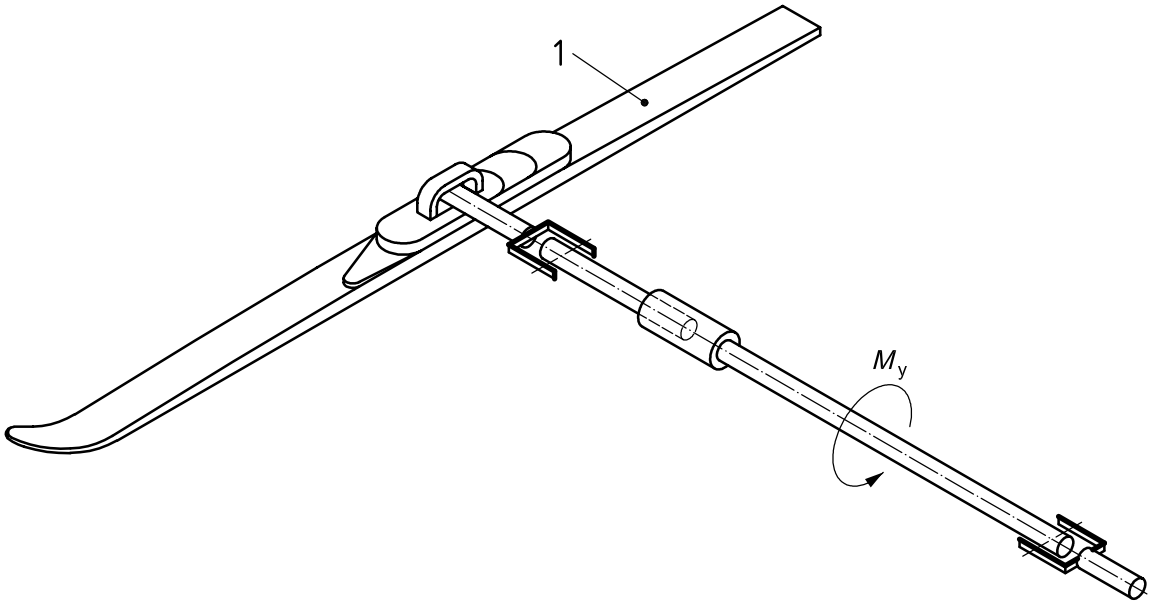
1 fixed base

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

5.3 Forward bending test

5.3.1 Method A

See Figure 4.



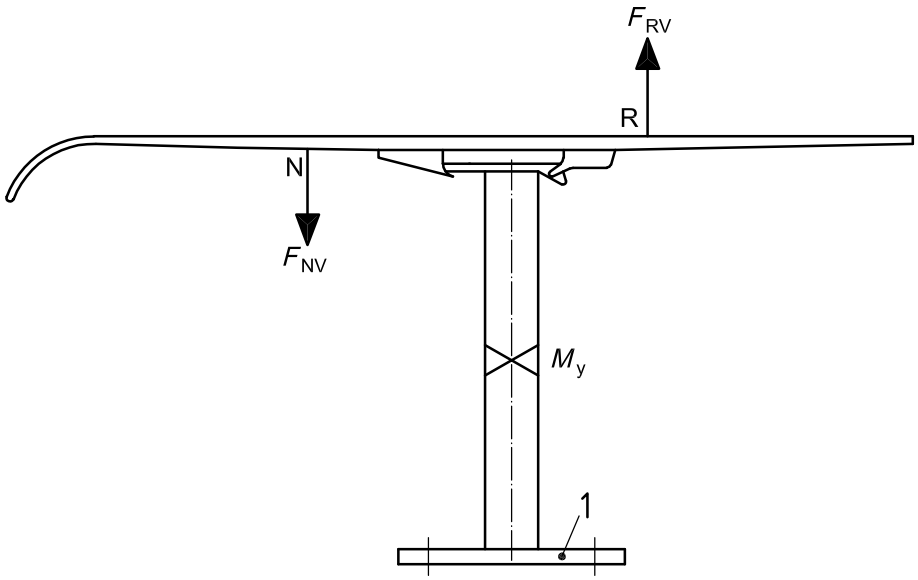
Key

1 fixed ski

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

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 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 below the dangerous level for all possible movements, and until all the risks associated with the coupling boot-ski are no longer apparent.

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.;

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

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

h) recommendation for setting the binding with a setting device;

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;

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) a 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 with which the binding is designed to function.

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 ten 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 N·m for Z = 1 and then increases linearly to ± 10 N·m for Z = 10.

For M_y, the tolerance is calculated by taking into account the relationship between M_y and M_z given in Table 2.

NOTE To determine the tolerances on M_z and M_y, use Figures D.1 and D.2.

This requirement applies to each of the mean values of the ten values of $|M_z|$ and each of the mean values of the five values of M_y corresponding to the settings L_2, 1/3, 2/3 and L_3.

For the highest setting (limit L_4, i.e. off the scale), these mean values shall not exceed the mean values corresponding to limit L_3 by more than 20 %.

6.2.2 Testing

6.2.2.1 Sampling

Carry out the test on four bindings randomly chosen from a set of six bindings. If the preceding requirements in 6.2.1 are not fulfilled, two of the four bindings can be replaced by the remaining two bindings in this set.

6.2.2.2 Choice of settings

Carry out the tests at ambient temperature (23 ± 5) °C, with the sole and bindings dry, for the following settings:

— limit L_2;

— at approximately 1/3 of the scale;

— at approximately 2/3 of the scale;

— limit L_3;

— limit L_4.

Carry out the tests using the sole length corresponding to the setting mark, according to Table 2.