
Alpine ski-bindings — Selection of release torque values

*Fixations de skis alpins — Sélection des valeurs du couple de
déclenchement*

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Foreword

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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 8061 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 8061:1991), which has been technically revised.

Introduction

This International Standard is one of a series of International Standards dealing with the safety of ski-bindings; the other International Standards in this series are ISO 9462:1993, *Alpine ski-bindings — Safety requirements and test methods* and ISO 9465:1991, *Alpine ski-bindings — Lateral release under impact loading — Test method*.

National standards, complying with legal regulations, may be more extensive, for example regarding

- combined loading, and/or
- deflexion of the ski.

International Standards covering these aspects are being prepared.

To verify the safety of ski-bindings, it is necessary to use all three International Standards of the series and also national standards covering aspects which are not yet standardized internationally.

In recommending the release torques, it is necessary to take into account the abilities of the skier concerned by applying skier-type correction factors. For this purpose, three types of skier are defined, as described in Annex A.

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Alpine ski-bindings — Selection of release torque values

1 Scope

This International Standard specifies methods for the selection of the release torques for alpine ski-bindings in current use, and gives information necessary to determine the release torques.

It applies to torque-measuring binding-test machines.

It may be inappropriate for non-mechanical bindings or bindings used with boots which reach more than half-way up the lower leg.

NOTE Manufacturers may use either of the two specified methods as the basis for their recommended release torques.

Release torques are to be recommended for use by ski-binding manufacturers in their instructions for installation and use, and by ski shops for the adjustment of already mounted ski-bindings.

2 Symbols

For the purposes of this document, the following symbols apply.

See Figure 1.

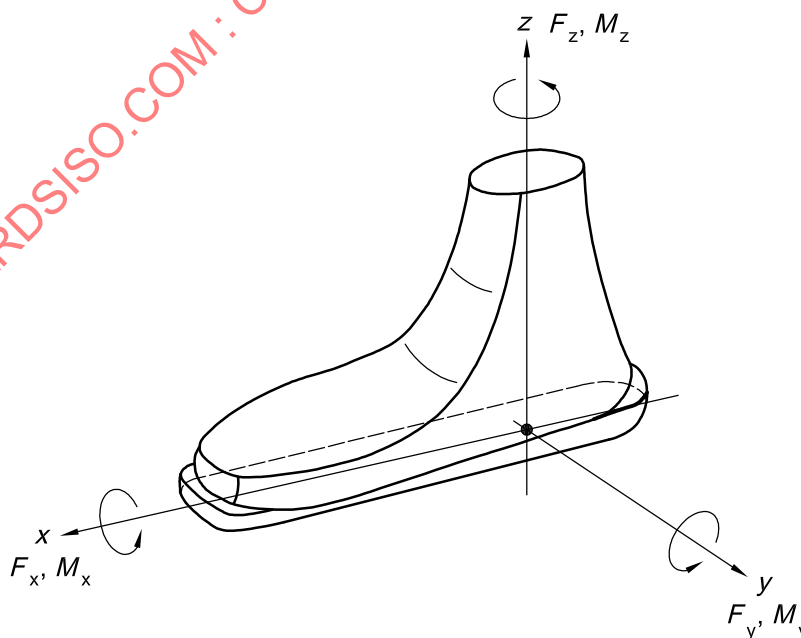


Figure 1 — Symbols

All imaginable loads on the ski boot can be referred to a force F acting along the x , y or z axes of a system of coordinates, and a moment of rotation M about that axis.

The origin of the system of coordinates is fixed at approximately the bottom of the boot sole.

The torques and forces shown in Figure 1 are positive. Torques and forces in the opposite directions are negative.

3 Release force

The release force, F_r , in newtons, is given by the equation

$$F_r = \frac{M}{l}$$

where

M is the release torque, in newton metres;

l is the lever arm, in metres (i.e. the distance from the point of force application by the test machine to the point about which the boot or plate pivots).

The value of l should be determined empirically by measuring F_r for several values of M .

If force-measuring test machines are used, report F_r .

4 Weight method

4.1 Calculation of release torques

4.1.1 A range of release torques based on the mass of the skier can be calculated from the equation given in 4.1.2 to 4.1.4 for both twist release, M_Z , and forward lean release, M_Y .

Ski-binding manufacturers shall not recommend release torques higher than the upper limit of this range; they may recommend torques below the lower limit. Manufacturers may provide additional information to guide the fitter and user in the selection of such values.

4.1.2 The upper limit for M_Z , in newton metres, is given by the following equations:

a) if the mass of the skier is less than 70 kg:

$$M_Z = 0,84 m_s + 4$$

b) if the mass of the skier is equal to or greater than 70 kg:

$$M_Z = 0,69 m_s + 15$$

where m_s is the mass of the skier, in kilograms.

4.1.3 The lower value for M_Z , in newton metres, is given by the following equations

a) if the mass of the skier is less than 75 kg:

$$M_Z = 0,71 m_s$$

b) if the mass of the skier is equal to or greater than 75 kg:

$$M_Z = 0,59 m_s + 9$$

where m_s is the mass of the skier, in kilograms.

4.1.4 The release torque M_Y , in newton metres, is given by the equation

$$M_Y = M_Z (3,6 + 0,006 5 M_Z)$$

4.2 Release torques corresponding to user's maximum recommended mass

If the actual mass of the skier is greater than the maximum recommended mass for his/her height, h , the release torque values shall be calculated using the maximum recommended mass, $m_{T,max}$, which is given by the equation

$$m_{T,max} = 100 (h - 1)$$

for $h \geq 1,50$ m, where h is the height of the skier, in metres.

4.3 Correction of the release torque

4.3.1 The recommended release torque values shall be corrected for skier-type (see Annex A) and age (see 4.3.2 and 4.3.3 respectively).

The result may be eventually lowered or raised upon request of the skier (see 4.3.4 and 4.3.5).

4.3.2 The skier-type correction factor should be

For skier type 1: -15% for M_Z and M_Y ;

For skier type 2: 0;

For skier type 3: $+15\%$ for M_Z and M_Y ;

4.3.3 The age correction is determined as follows.

- Skiers under 10 years: -15% for M_Z and M_Y ;
- Skiers aged 50 years and above: -15% for M_Z and M_Y ;

4.3.4 Release torque values other than those recommended above may be used in the following cases:

- a) Skiers who have satisfactory experience with lower settings regarding these recommendations may request settings based on their experience.
- b) Skiers who have skiing experience without inadvertent releases may request a setting up to 15% lower than that recommended above.
- c) Skiers having certain characteristics, such as a neutral skiing technique, defensive attitude, high degree of control, etc. may request a setting up to 15% lower than that recommended above.
- d) Skiers who have experienced inadvertent releases may request a setting up to 15% higher than that recommended above.

4.3.5 Skiers may request settings that are different for twist and forward lean.

4.3.6 If the skier's style requires greater corrections than those indicated above, the skier may change the setting at his/her own risk.

Annex A (normative)

Definition of skier type

A.1 Skier types

A.1.1 It is the responsibility of the skier to determine his/her skier-type classification as defined in Table A.1.

A.1.2 Skiers are classified by type of skiing into three types, 1, 2 and 3. The definitions are as follows:

- Type 1: cautious skiing on smooth slopes of gentle to moderate pitch. This type also applies to entry-level skiers uncertain of their classification. Skiers who designate themselves as type 1 receive lower than average release/retention settings. This corresponds to an increased risk of inadvertent binding release, in order to gain increased capacity for release in a fall.
- Type 2: skiers not classified in type 1 or 3.
- Type 3: fast, aggressive skiing on slopes of moderate to steep pitch. Skiers who designate themselves as type 3 receive higher than average release/retention settings. This corresponds to decreased capacity for release in a fall, in order to gain a decreased risk of inadvertent binding release.

Designations 1, 2 and 3 should not be used by equipment manufacturers to categorize their products.

A.1.3 The information given in Table A.1 is an example of the kind of layout which may be used to assist the skier in determining his skier-type classification.

Table A.1 — Determination of skier-type classification

Type	1	2	3
Speed	Slow to moderate	Skiers that do not meet all the descriptions of either 1 or 3	Fast
Terrain	Gentle to moderate		Steep
Style	Cautious (or smooth)		Aggressive

A.1.4 The information given in A.1.2 can be used to assist the skier in determining the appropriate skier-type classification and to make him/her aware of the risks related to each classification.

A.2 Discretionary settings

A.2.1 Skiers 10 years of age and older of any type who desire a higher or lower setting than the setting of their skier type according to 4.3.4 a), b), c) or d) may designate their preference with a + or – next to their skier-type designation.

A.2.2 The use of these definitions in determining the release setting may be inappropriate for some types of competition skiing.

Annex B (informative)

Tibia-width method

B.1 Calculation of release torque

B.1.1 Release torque values based on the width of the tibia as shown in Figure B.1, are given by the equations in B.1.2 to B.1.4. Measurements of the width of the tibia, d , in millimetres, shall be made with calipers pressed firmly against the bone while the knee is bent.

B.1.2 For children, M_Z , in newton metres, is given by the equation

$$M_Z = 9,9 \times 10^{-6} \times d^{3,41}$$

B.1.3 For women, M_Z , in newton metres, is given by the equation

$$M_Z = 13,2 \times 10^{-4} \times d^{2,35}$$

B.1.4 For men, M_Z , in newton metres, is given by the equation

$$M_Z = 8,47 \times 10^{-4} \times d^{2,5}$$

B.1.5 The release torque M_Y is given by the equation in 4.1.4.

B.2 Correction of release torques

The recommended release torque values shall be corrected for skier-type (see Annex A) and age. The correction factors for type and age are given in Table B.1.

The result may be eventually lowered or raised upon request of the skier (see 4.3.4 and 4.3.5).

Table B.1 — Correction factors for type and age

Age years	Correction factor for type of skier		
	Type 1	Type 2	Type 3
Under 16	−5	0	+5
16 to 17	−15	−5	+5
18 to 50	−10	0	+10
51 to 60	−15	−5	+5
61 and over	−20	−10	0