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Alpine ski-bindings — Selection of release torque values

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



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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 8061 was prepared by Technical Committee ISO/TC 83, *Sports and recreational equipment*, Sub-Committee SC 3, *Ski bindings*.

This second edition cancels and replaces the first edition (ISO 8061:1984), of which the designation of skier type L; A; S has been replaced by 1; 2; 3.

Annex A forms an integral part of this International Standard.

Introduction

This International Standard is one of a series of International Standards dealing with the safety of ski-bindings, the other International Standards of this series are ISO 9462 and ISO 9465.

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

- combined loading;
- 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.

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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. It gives information necessary to determine the release torques; these 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.

It applies to alpine ski-bindings in current use.

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

Manufacturers may use either of the two specified methods, or a combination of the two, as the basis for their recommended release torques.

The methods apply to torque-measuring binding test machines. If force-measuring test machines are used, it is necessary to report the release force, calculated as shown in clause 3.

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.

2 Symbols

See figure 1.

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 .

4 Mass method

4.1 A range of release torques based on the mass of the skier can be calculated from the equations given in 4.1.1 to 4.1.3 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.

4.1.1 The upper limit for M_z , in newton metres, is given by the equations:

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

$$M_z = 0,84 \frac{\text{m}^2}{\text{s}^2} \cdot m_s + 4 \text{ N} \cdot \text{m}$$

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

$$M_z = 0,69 \frac{\text{m}^2}{\text{s}^2} \cdot m_s + 15 \text{ N} \cdot \text{m}$$

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

4.1.2 The lower value for M_z , in newton metres, is given by the equations:

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

$$M_z = 0,71 \frac{m^2}{s^2} \cdot m_s$$

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

$$M_z = 0,59 \frac{m^2}{s^2} m_s + 9 \text{ N}\cdot\text{m}$$

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

4.1.3 The release torque M_y , in newton metres, is given by the equation

$$M_y = M_z(3,6 + 0,006 \text{ 5N}^{-1} \cdot \text{m}^{-1} M_z)$$

4.2 Skiers whose actual mass is greater than the maximum recommended mass for their height, h , should use release torque values corresponding to their maximum recommended mass, $m_{r, \text{max}}$, which is given by the equation

$$m_{r, \text{max}} = 100(h - 1)$$

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

4.3 The recommended release torque shall be corrected for skier type (see annex A) by applying skier-type correction factors and age corrections (see 4.3.1 and 4.3.2 respectively).

4.3.1 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 ;

For skier type 3a: + 15 % for M_z and + 30 % for M_y .

NOTE 1 If the skier's style requires a greater correction factor than that indicated above, the skier may change the setting at his own risk.

4.3.2 The age correction is determined as follows. Skiers above the age of 50 years should subtract 5 N·m from the release torque in twist for every 10 years in age above 40 years.

The release torque in forward lean should be that calculated using the equation in 4.1.3, using the age-corrected value for M_z .

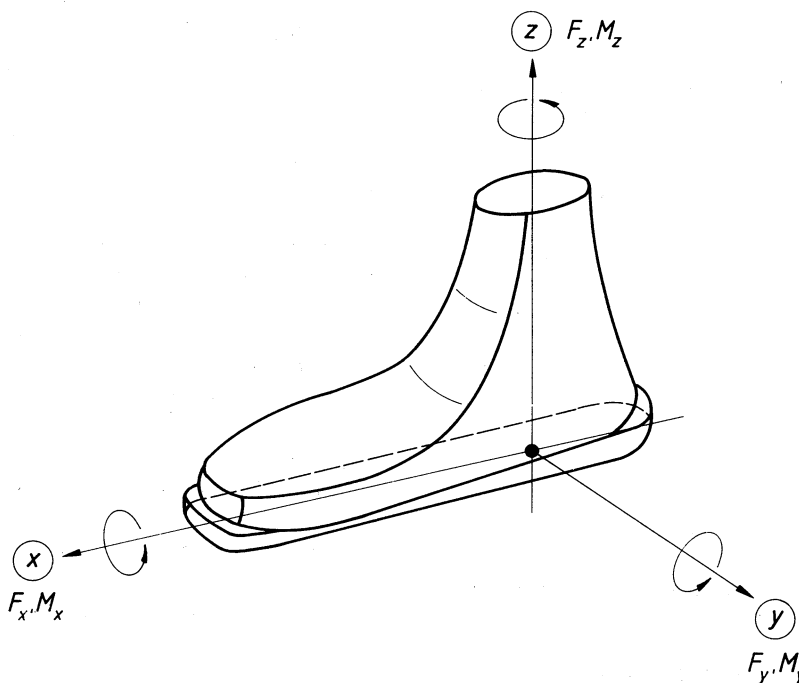


Figure 1 — Symbols

5 Tibia size method

5.1 Release torque values based on the width of the tibia as shown in figure 2, are given by the equations in 5.1.1 to 5.1.3. 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.

5.1.1 For children M_z , in newton metres, is given by the equation

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

5.1.2 For women M_z , in newton metres, is given by the equation

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

5.1.3 For men M_z , in newton metres, is given by the equation

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

5.1.4 The release torque M_y is given by the equation in 4.1.3.

5.2 The recommended release torque shall be corrected for the age and ability (see annex A) of the skier by adding or subtracting an appropriate value; these are given in table 1.

Table 1

Age years	Correction factor for type of skier:		
	1	2	3
under 16	- 5	0	+ 5
16 to 17	- 15	- 5	+ 5
18 to 50	- 10	0	+ 10
over 50 to 60	- 15	- 5	+ 5
over 60	- 20	- 10	0

These values shall be used to correct M_z and the equation in 4.1.3 used to calculate the corrected value of M_y .

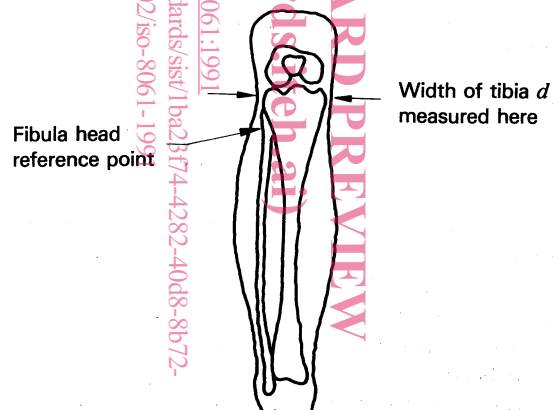


Figure 2 — Measurement of tibia width d (front view of right leg)

Annex A (normative)

Definition of skier type

A.1 It is the responsibility of the skier to determine his skier-type classification as used in 4.3.1 and table 1.

A.2 Skiers are classified by type of skiing into three categories, 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.
- Type 2: skiers not classified in type 1 or 3.
- Type 3: fast, aggressive skiing on slopes of moderate to steep pitch.
- Type 3a: skiers who plan to participate in race training or have experienced retention problems using type 3 release adjustments while skiing on properly functioning equipment.

NOTE 2 These new designations, 1, 2, 3 and 3a, should not be used by equipment manufacturers to categorize their products.

A.3 The information given in A.3.1 and A.3.2 can be used to assist the skier in determining the appropriate skier-type classification.

A.3.1 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 fall.

A.3.2 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.

NOTE 3 The designations L, A, S which were used in the first edition of ISO 8061:1984 are currently used to refer to definition types 1, 2 and 3 respectively.

The new designations 1, 2 and 3 will now be reserved, in this International Standard, for the purpose of setting the bindings.

A.4 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.

A.5 The use of these definitions in determining the release setting may be inappropriate for some types of competition skiing.

Table A.1

Type	1	2	3	3a
Speed	slow to moderate	skiers that do not meet all the descriptions of either 1 or 3	fast	see definition in clause A.2
Terrain	gentle to moderate		steep	
Style	cautious (or undetermined)		aggressive	

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