International Standard ISO 8061

Alpine skis — Ski bindings — Methods for the selection of release torque values

Skis alpins — Fixations — Méthodes de 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 developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 8061 was developed by Technical Committee ISO/TC 83, *Sports and recreational equipment*, and was circulated to the member bodies in January 1983.

It has been approved by the member bodies of the following countries:

Austria	Japan	USA
France	New Zealand	USSR
Germany, F.R.	Poland	
India	South Africa, Rep. of	

No member body expressed disapproval of the document.

Alpine skis — Ski bindings — Methods for the selection of release torque values

1 Scope and field of application

This International Standard specifies methods for the selection of release torque values for alpine ski bindings. It gives information necessary for determining release torque values 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 is applicable 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 are applicable to torque-measuring binding testers. If force-measuring testers are to be used, it is necessary to report the release force.[1]

In recommending release torque values, it is necessary to take into account the abilities of the skier by applying skier type correction factors. For this purpose, four types of skiers are described in an annex.

2 Symbols

See figure 1.

All imaginable loads on the ski boot can be referred to a force F acting along 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 sole of the boot.

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

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[1] 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 tester to the point about which the boot or plate pivots).

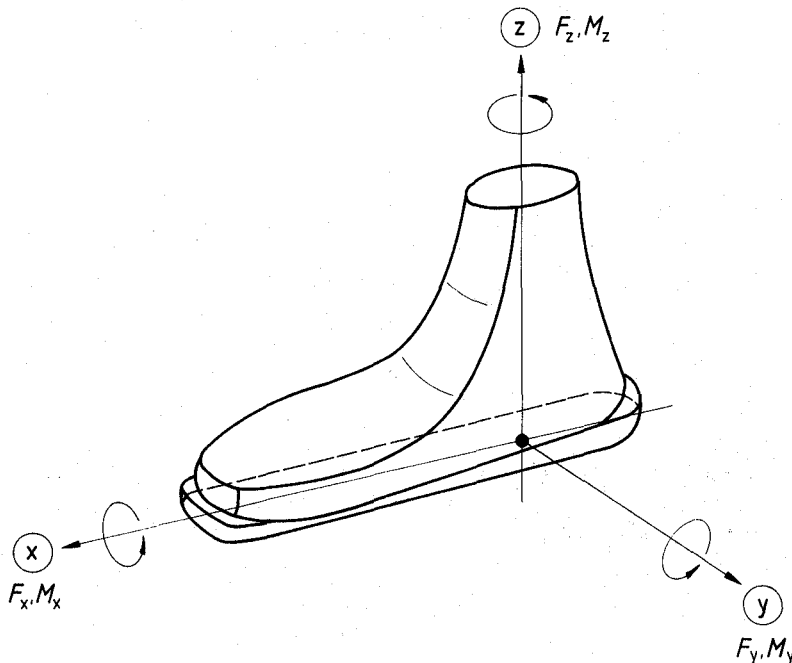The value of l should be determined empirically by measuring F_r for several values of M.

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Figure 1 — Symbols

3 Mass method

3.1 A range of release torque values based on the mass of the skier can be calculated from the equations given in 3.1.1 to 3.1.3 for both twist (M_z) and forward lean (M_y) release.

Ski binding manufacturers should not recommend release torque values higher than the upper limit of this range, but may recommend settings below the lower limit. Manufacturers may provide additional information to guide the installer and user in the selection of such values.

3.1.1 The upper limit for twist M_z, in newton metres, is given by the equation

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 greater than or equal to 70 kg :

$$M_z = 0,69\ m_s + 15$$

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

3.1.2 The lower value for twist M_z, in newton metres, is given by the equation

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 greater than or equal to 75 kg :

$$M_z^* = 0,59\ m_s + 9$$

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

3.1.3 The release torque in forward lean M_y, in newton metres, is given by the equation

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

3.2 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 ($m_{r\ max.}$), which is given by the equation

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

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

3.3 The recommended release torque shoud be corrected for skier type (see the annex) by applying skier type correction factors and age corrections.

3.3.1 The skier type correction factor is given in table 1.

Table 1

Twist M_z N·m	Type of skier		
	L	A	S
25	− 2,5*	0	+ 2,5*
25 to 50	− 5	0	+ 5
50	− 10	0	+ 10

* The use of these values is optional. They may be 2,5 or 0.

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

3.3.2 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 3.1.3, using the age corrected value for M_z.

4 Tibia size method

4.1 Release torque values based on the width of the tibia as shown in figure 2 are given by the equations in 4.1.1 to 4.1.3. Measurements of the width of the tibia, d, in millimetres, should be made with calipers pressed firmly against the bone while the knee is in a bent position.

4.1.1 For children, the release torque in twist M_z, in newton metres, is given by the equation

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

4.1.2 For women, the release torque in twist M_z, in newton metres, is given by the equation

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

4.1.3 For men, the release torque in twist M_z, in newton metres, is given by the equation

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

4.1.4 The release torque in forward lean is given by the equation in 3.1.3.

4.2 The recommended release torque should be corrected for the age and ability (see the annex) of the skier by adding or subtracting an appropriate correction factor.

The age and ability correction factor is given in table 2

Table 2

Âge	Type of skier		
years	L	A	S
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 should be used to correct M_z and the equation in 3.1.3 used to calculate the corrected value of M_y.
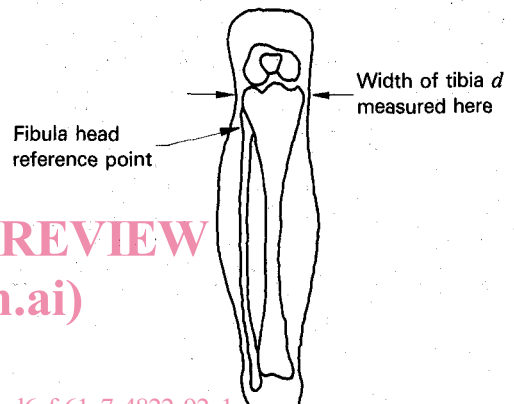
Width of tibia d measured here

Fibula head reference point

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

Annex

Description of types of skiers

(This annex does not form part of the standard.)

A.1   Four types of alpine skiers can be identified, according to their abilities.

These four types have been elaborated on the basis of statistical data characterizing adult skiers (from the age of 14 years upwards) according to their ability, preferred skiing speed range and preferred course conditions. The four types are designed by appropriate code letters.

A.2   The description of the four types is given in table 3 and is in widespread use in Europe.[1]

Table 3 — Descriptions of types of skiers

Code letters	Ability of skier	Preferred skiing speed range	Course conditions
S	Parallel skiing in all course conditions	Prefers the upper speed range in all course conditions	No restriction
A	Parallel skiing at least in good course conditions	Prefers the medium speed range	Prefers course conditions of medium difficulty
L	Parallel skiing possible in case of easy course conditions	Prefers the lower speed range	Prefers course that are moderately inclined or easy
I	This type corresponds to all those skiers having individual pretensions which cannot be assigned to groups S, A and L (for example trick skiers, top competitive sportsmen). Skis that are offered for this type may have greatly different features.		

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1)   This description corresponds to DIN 7890 and ÖNORM S 4050.