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Touring ski-boots for adults — Interface with touring ski-bindings — Requirements and test methods

Chaussures de ski de randonnée pour adultes — Zone de contact avec les fixations de skis de randonnée — Exigences et méthodes d'essai

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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 9523 was prepared by Technical Committee ISO/TC 83, *Sports and recreational equipment*, Subcommittee SC 3, *Ski bindings*.

This second edition cancels and replaces the first edition (ISO 9523:1990), which has been technically revised.

The requirements of ISO 9523:2008 become valid as of the date of publication of this second edition. However, the provisions specified in the first edition (ISO 9523:1990) remain valid for a further 2 years beyond the date of publication of this second edition.

Touring ski-boots for adults — Interface with touring ski-bindings — Requirements and test methods

1 Scope

This International Standard specifies the dimensions and characteristics of the interface, requirements, test methods and marking of ski-boots with a rigid sole (see 3.5) which are used with current systems of touring ski-bindings with attachment at the boot toe and boot heel, the proper release function of which depends on the dimensions and design of the interfaces.

For ski-binding systems that function irrespective of the sole shape or that have different requirements for the sole dimensions, it is not always necessary for the ski-boot soles to comply with this International Standard in order to achieve the desired degree of safety.

This International Standard applies to ski-boots of sizes 15,0 and larger in the Mondopoint system (see Annex A).

It applies to rigid touring boots. Boots with softer shells like Telemark boots are excluded as they do not have the necessary shell stability to act as part of the release systems.

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 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)*

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

ISO 9407, *Shoes sizes — Mondopoint system of sizing and marking*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5355 as well as the following apply.

3.1
interface
that part of the ski-boot intended for contact with the ski-binding

3.2
toe interface
that part of the ski-boot intended to fit with the front binding

3.3
heel interface
that part of the ski-boot intended to fit with the rear binding

3.4
free space
space intended to avoid contact between ski-boots and binding, especially during step in/step out or release

3.5
rigid ski boot sole
ski boot sole which does not flex when walking

NOTE See 4.3.5.1.

3.6
median plane
middle plane of the sole, longitudinal and perpendicular to the bearing surface

3.7
bearing surface
toe or heel surface of the boot sole which is in contact with a plane on which the boot is standing

3.8
ski-brake
device to stop the ski after release of the binding

4 Requirements and test methods

4.1 General

If no specific test methods are indicated, check the characteristics as appropriate, e.g. by measurement.

If not otherwise indicated, execute the testing under standard atmosphere 23/50 (see ISO 554) with ordinary tolerances.

4.2 Dimensions

The dimensions of the boot toe and heel shall correspond to Figure 1. Other boot dimensions need not correspond to Figure 1.

Fundamentally, all dimensions shall be within the indicated tolerance. However, relevance to safety varies in importance depending on the indicated dimensions.

Looking at several dimensions (“dimensions of the 2nd degree”, see Annex B), a deviation from the tolerances may be accepted, provided that the following requirements are respected.

a) The deviations remain exceptional.

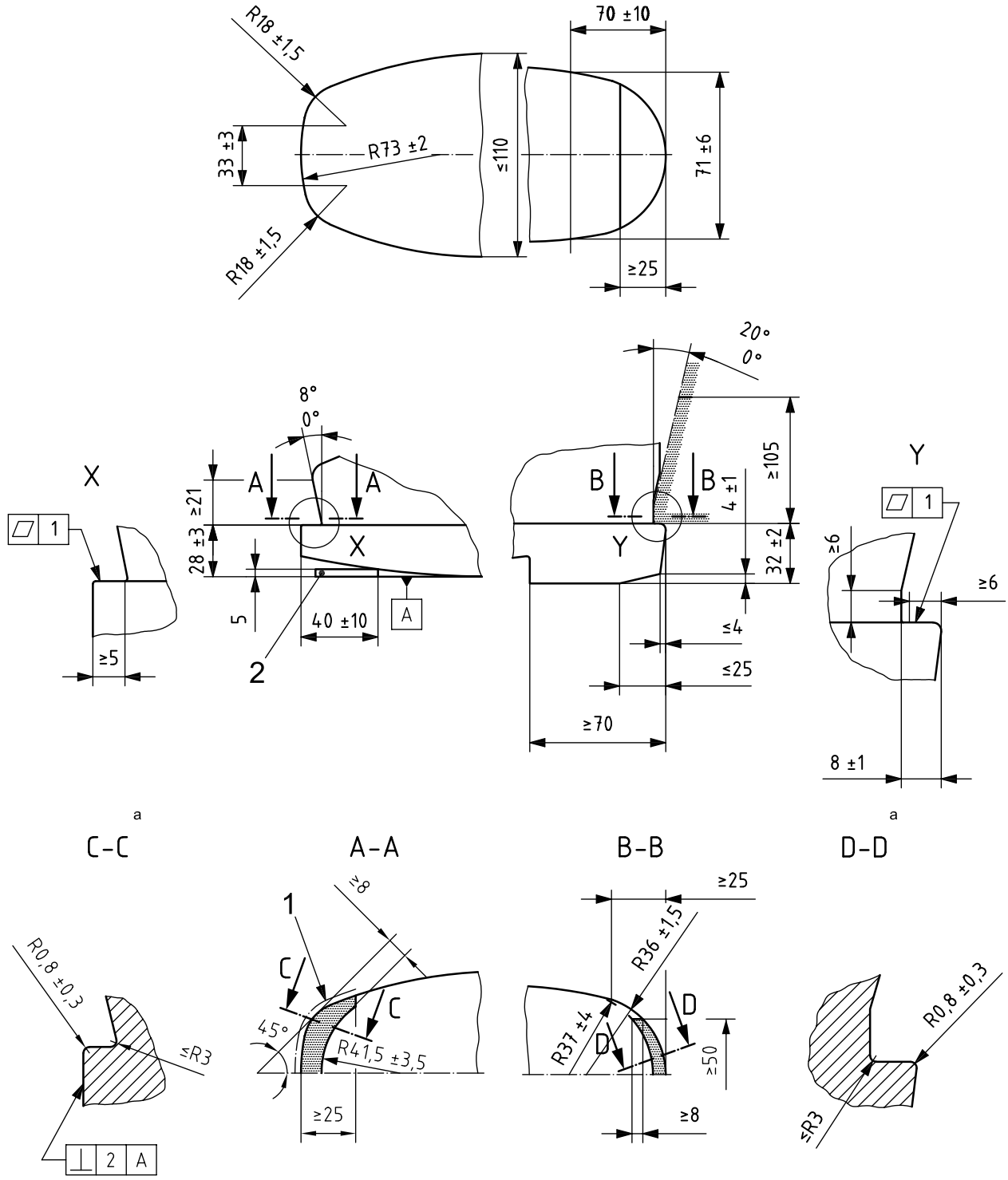
b) The deviations are small.

c) No limitations of function arise with all marketable and critical bindings.

d) The tolerance is respected at the next possible chance (e.g. reconstruction of a tool).

The gauge (see Key 2 in Figure 1) shall be wider than the boot sole.

Dimensions in millimetres



Key

1 area where perpendicularity tolerance is valid

2 gauge

[a] Enlarged cross section.

NOTE Shaded areas are those in which the tolerance of evenness and the dimensions 28 ± 3 mm and 32 ± 2 mm are valid.

Figure 1 — Dimensions of boot toe and heel

4.3 Design

4.3.1 Sole length

The sole lengths of the two ski-boots in a pair shall not differ by more than 2 mm.

4.3.2 Boot sole interface

The sole dimensions in the toe and heel boot binding interface areas shall be symmetrical about the median plane within an admissible deviation of 1 mm.

There shall be no protrusion of the sole beyond the shell for the whole perimeter of the whole boot sole interface areas.

4.3.3 Side walls at boot toe

The side walls of the sole at the boot toe, up to a distance of at least 25 mm from the toe end, shall be perpendicular to the bearing surface within an admissible inward-outward deviation as is described in Figure 1, section C-C.

If the side walls of the sole are built in two parts, it shall be ensured that no part of the lower area of the sole protrudes beyond the upper profile.

4.3.4 Side walls at boot heel

The lateral side walls of the sole at the boot heel, up to a distance of at least 70 mm from the heel end, shall be perpendicular to the bearing surface, or tapered inwards-outwards between 0° and 10° up to a height of 14 mm.

If lateral grooves of more than 2 mm depth are present at the heel (see Figure 2), supports at least complying with Figure 3 shall remain.

Other configurations of grooves are allowed if they have no influence on the mechanism and function of the boot/binding system.

Dimensions in millimetres

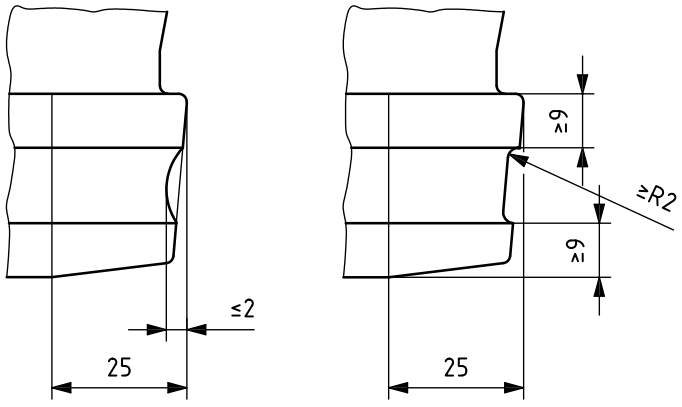


Figure 2 — Lateral grooves at heel

Dimensions in millimetres

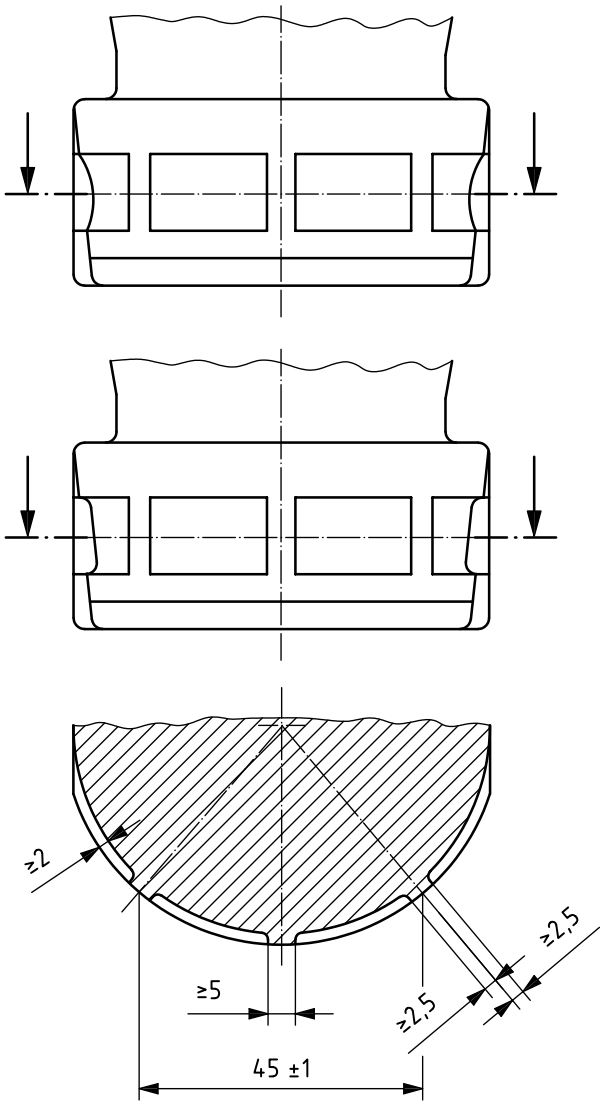


Figure 3 — Lateral supports at heel

4.3.5 Rigidity

4.3.5.1 Requirements

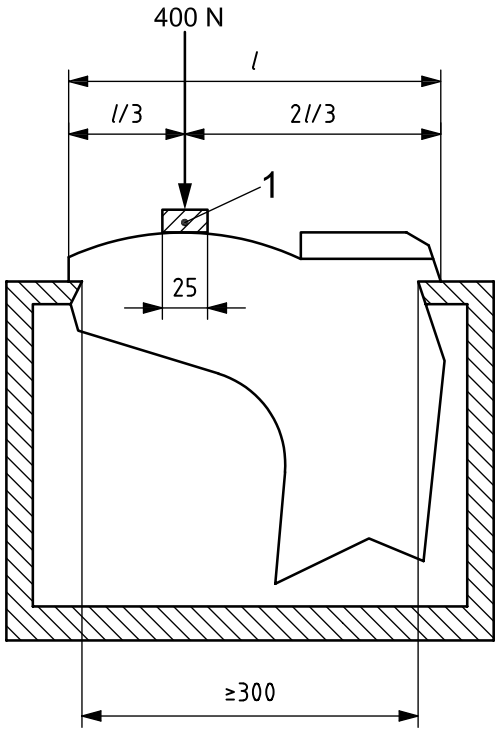
When measured in accordance with 4.3.5.2, the sole shall not deflex more than 5 mm.

NOTE This is to avoid any contact point outside the frontal zone and the boot sole interface area (see Figure 5) in order to ensure proper lateral release function.

4.3.5.2 Test method

The rigid metal test bar (width 25 mm) shall cover the whole width of the sole (see Figure 4).

Dimensions in millimetres



Key

1 rigid metal test bar

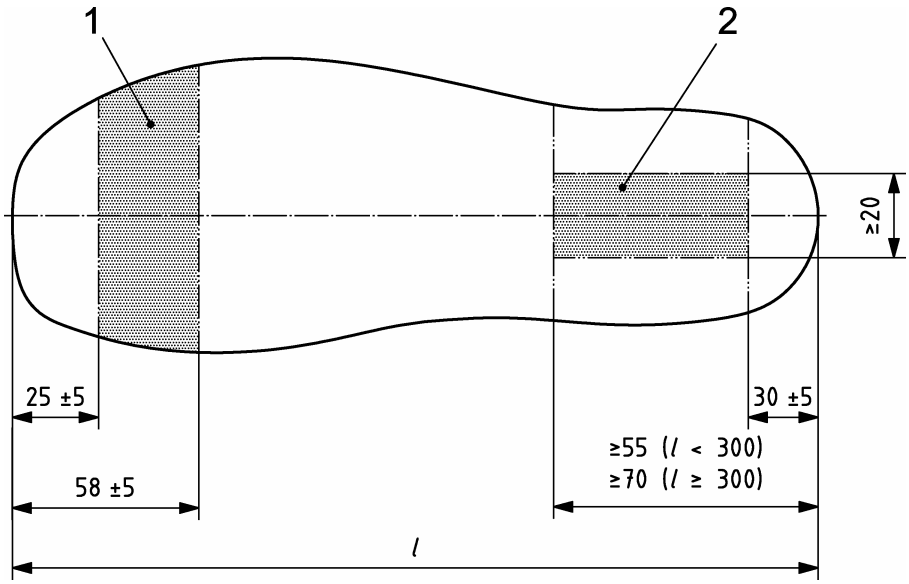
Figure 4 — Testing of rigidity

4.3.6 Boot sole interface areas with the binding

The boot sole interface areas shall conform to Figure 5.

In the toe interface area (see Key 1 in Figure 5) and in the heel interface area (see Key 2 in Figure 5) there shall be no gaps > 10 mm between two studs in any direction.

Dimensions in millimetres



Key

1 toe interface area
2 heel interface area
l length of sole

Figure 5 — Contact zones with the binding

Table 1 — Boot sole interface area with the binding

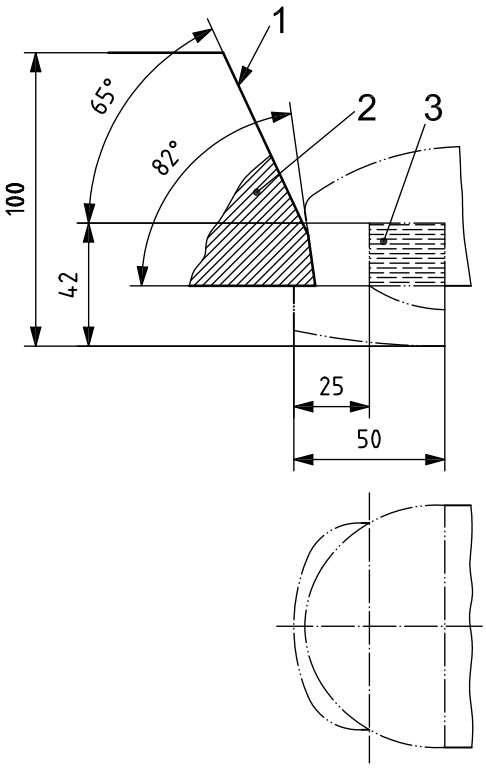
Interface area	Percentage of the area in contact with the bearing surface of the binding
Toe	> 25
Heel	> 40

4.3.7 Free spaces

4.3.7.1 Requirements

4.3.7.1.1 The boot shell in the toe of the boot along the arcs with radius of 41,5 mm ± 3,5 mm (see Figure 1, section A-A) shall lie outside the free space 1 (see Figure 6).

Dimensions in millimetres



Key

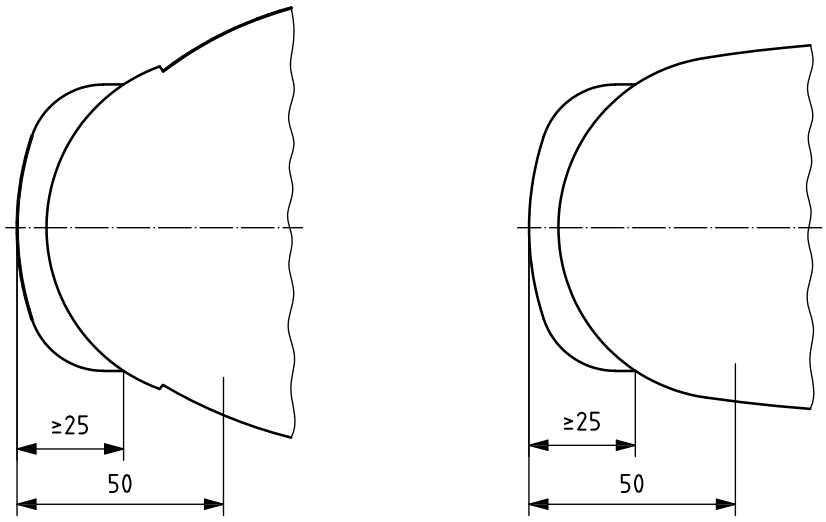
1 cone
2 free space 1
3 free space 2

Figure 6 — Free spaces at boot toe

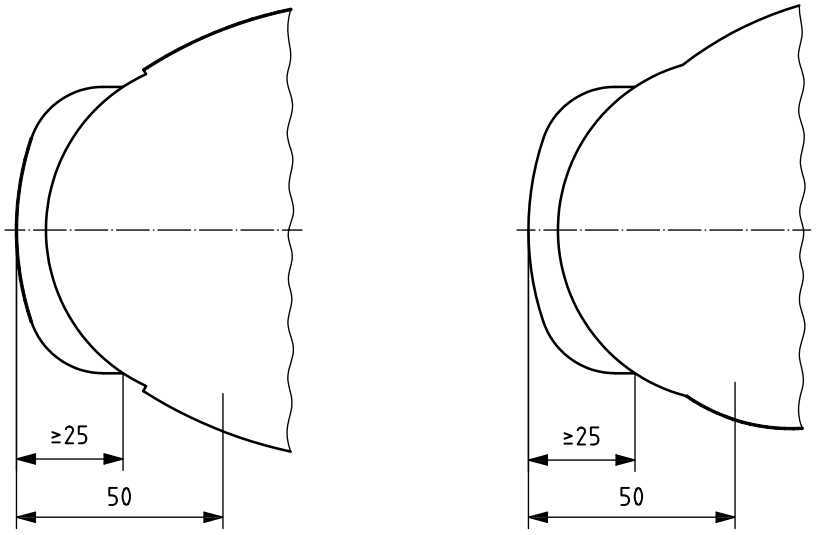
4.3.7.1.2 Within free space 2 (see Figure 6), the arcs with radius of 41,5 mm ± 3,5 mm (see Figure 1, section A-A) shall be continued as an arc without discontinuity, providing a smooth transition to the sides of the shaft, between 25 mm and 50 mm. This condition is fulfilled when the curvature of the shell within free space 2 remains convex (according to Figure 7) in both longitudinal and vertical planes.

Symmetry is not required.

Dimensions in millimetres



a) acceptable

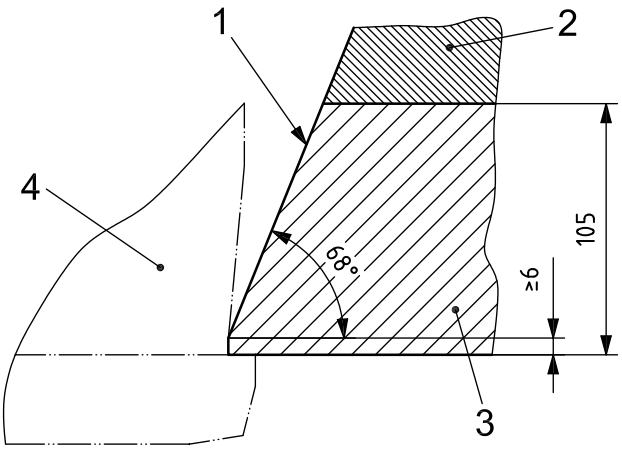


b) not acceptable

Figure 7 — Curvature of the shaft in free space 2 (examples)

4.3.7.1.3 The boot shell at the heel of the boot along the arcs with radius of 37 mm ± 4 mm (see Figure 1, section B-B) shall lie outside free spaces 3 and 4 (see Figure 8), available for the ski-binding and for handling boot and binding.

Dimensions in millimetres



Key

1 cone
2 free space 3 (free space for handling boot and binding)
3 free space 4 (free space for ski-binding)
4 sample boot

NOTE The width of the free spaces 3 and 4 is 50 mm.

Figure 8 — Free space and heel interface for ski-binding at boot heel

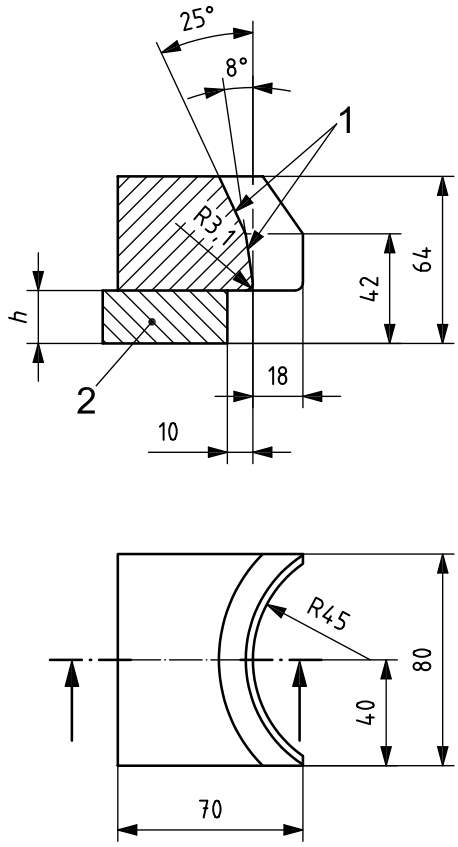
4.3.7.2 Test methods

4.3.7.2.1 Measuring free space at boot toe

Place the boot with its front part on a measuring plane. Set the test body (see Figure 9) on a supporting block. By using such blocks as correspond to the set value and to the tolerance limits of the front sole height (28 mm ± 3 mm), a check can be made as to whether this dimension is met.

Check whether the sole height exceeds the maximum value of 28 mm ± 3 mm and whether the requirements for free space for the binding is met.

Dimensions in millimetres



Key

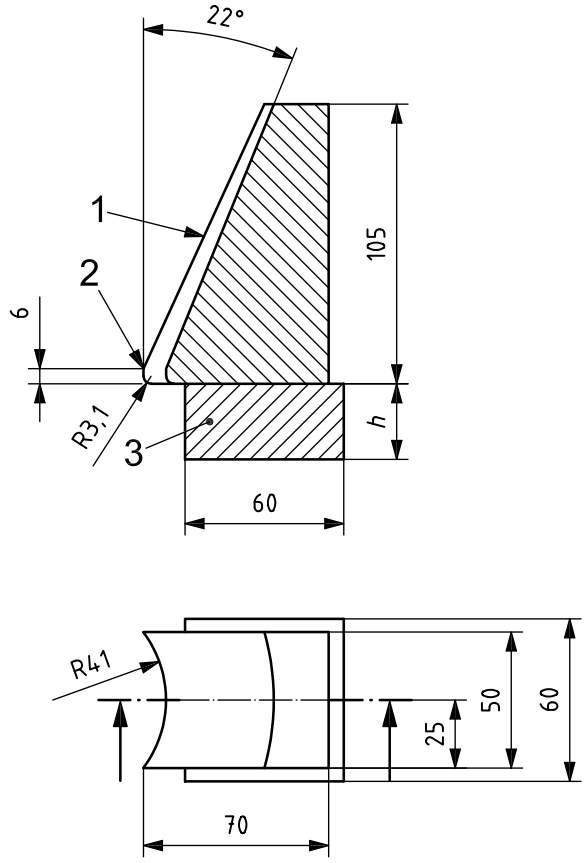
1 concentric cones
2 supporting blocks:
h = 25,1 mm
h = 28,1 mm
h = 31,1 mm

Figure 9 — Test body for the free space at boot toe

4.3.7.2.2 Measuring free space at heel of boot

Place the boot with its rear part on the measuring plane. Set the test body (see Figure 10) on a supporting block. By using such blocks as correspond to the set value and to the tolerance limits of the rear sole height (32 mm ± 2 mm), a check can be made as to whether this dimension is met.

Dimensions in millimetres



Key

1 cones (concentric with the cylinder)
2 cylinder
3 supporting blocks:
h = 30,1 mm
h = 32,1 mm
h = 34,1 mm

Figure 10 — Test body for the free space at heel of boot

4.3.8 Toe and heel boot/binding interface areas

4.3.8.1 Material

4.3.8.1.1 Hardness

The hardness of the material at the toe and heel boot/binding interfaces (see shaded areas in Figures 11 and 12) shall be not less than Shore D hardness 50, measured at a temperature of (23 ± 2) °C.

This is not applicable for the bearing surfaces.

Testing shall be in accordance with ISO 868.

4.3.8.1.2 Antifriction

4.3.8.1.2.1 Requirements

The coefficient of dynamic friction at the toe (see shaded area in Figure 11) and heel binding interfaces (see shaded area in Figure 12) between the boot material and a low friction element of polytetrafluoroethylene (PTFE) shall be $\leqslant$ 0,1.

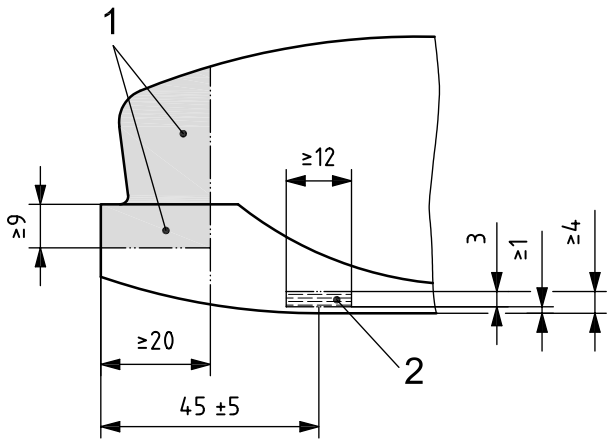
If the material is identical to the material of the low friction zone, no testing is necessary.

If the materials are different, test in accordance with 4.3.8.1.2.2.

4.3.8.1.2.2 Test method

Inject a test specimen in the form of a plate (dimensions greater than or equal to those of the low friction zone) or of a part of the sole with the low friction zone of the diverging material.

Dimensions in millimetres



Key

1 boot/binding toe interface

2 release value testing device

Figure 11 — Boot/binding front interface and release value testing device

4.3.8.2 Toe interface

At the toe interface (see Figure 11):

a) no material in the sole shall protrude perpendicular to the vertical surfaces;

b) the profile of the shell in the 82° to 90° space can be straight or convex in any vertical plane providing the profile stays within the 82° to 90° limit.

4.3.8.3 Interface for the toe locking mechanism of the adjustment device

On both sides at the same height of the boot soles, an interface for the adjustment device pushing rod as shown in Figure 11, Key 2 shall be available.

Bindings for which the release adjustment test can be carried out by applying a lateral force on the surface should be conceived so as not to interfere with the application of this force.

NOTE This test method is only one amongst many.

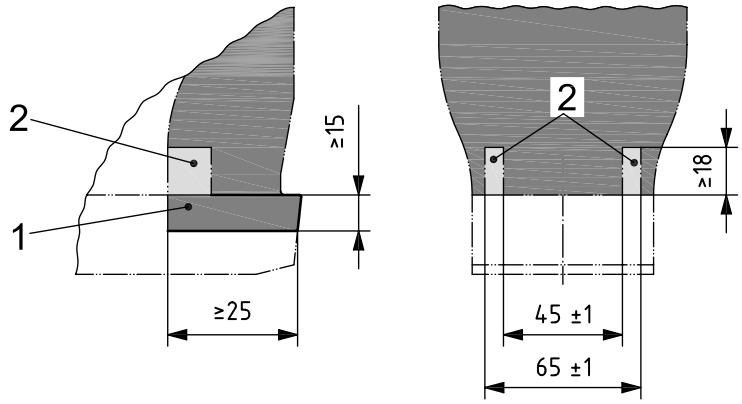
4.3.8.4 Interface for the heel locking mechanism of the adjustment device

On both sides of the boot shell an interface for the locking mechanism of the adjustment device as shown in Figure 12 shall be available.

NOTE This method for locking the binding by means of a mechanism is only one amongst many.

The shaded areas in Figure 12 shall correspond with the outer shell of the ski boot, but shall not contain any edges nor contain any protruding or set back areas.

Dimension in millimetres



Key

1 boot/binding heel interface

2 release value testing device

Figure 12 — Release value testing device and low friction zone of boot/binding heel interface

4.3.9 Bevelled areas

A tread pattern is permitted in the heel bevelled area (see Figure 1).

4.3.10 Bearing surface at heel

The bearing surface at the heel shall satisfy the following requirements:

a) in the shaded area specified as heel in Table 1 there shall be at least a bearing surface of 40 %;

b) it shall be suitable for closing the heel part and shall allow longitudinal travel of the binding;

c) it shall provide a correct fit on the bearing plate of the binding;

d) there shall be no hindrance to sideways movement of the sole if the binding releases;

e) there shall be no interference with proper functioning of ski-brakes.

4.3.11 Bearing surface at toe

The bearing surface at toe shall satisfy the following requirement:

in the shaded area specified as toe in Table 1 there shall be at least a bearing surface of 25 %.

4.3.12 Style of boot shell

In Figure 1, sections A-A and B-B, any style of boot shell (exterior surface) is admissible, provided:

a) it is symmetrical to the median plane;

b) in section A-A, the curvature at any point up to a distance of 25 mm minimum stays within the limits of 41,5 mm ± 3,5 mm;

c) in section B-B, the curvature at any point up to a distance of 25 mm minimum stays within the limits of 37 mm ± 4 mm.

4.3.13 Mounting point

The mounting point for positioning the binding on the ski shall be indicated by a line on each side of the lower surface of the boot as close as possible to the ski. This line shall be clearly visible and permanent. It shall not be less than 10 mm in length and shall not be more than 5 mm from the middle of the boot sole length.

5 Marking

Ski boots which meet the requirements of this International Standard shall be marked as follows:

a) reference to this International Standard, i.e. ISO 9523, excluding all national references;

b) name or trade-mark of the manufacturer or importer.

6 Instructions for use

Appropriate warning or instructions with regard to the potential compatibility problems between boot and binding and about the risk if such a warning is not accepted, shall be provided for the user.

Annex A
(informative)

Mondopoint system ski-boot sizing and marking

A.1 Reference

This ski-boot sizing system is based on ISO 9407, using only the length of the foot, measured in centimetres.

A.2 Range of sizes

This International Standard applies to sizes from 15,0 to 32,0.

A.3 Length intervals

The length intervals between sizes shall be multiples of 0,5 cm (i.e. the last figure of the size shall be 0 or 5).

Annex B
(informative)

Dimensions and requirements of “2nd degree”

B.1 Dimensions

Figure 1	Radius of the sole heel	36 mm ± 1,5 mm
	Radius of the heel of the boot	37 mm ± 4 mm
	Rounding radius	3 mm max.
	Length of heel bevel	25 mm max.
	Height of heel bevel	4 mm ± 1 mm
	Slope of the rear side of the sole	4 mm max.
	Tolerance of perpendicularity at the front	2 mm

B.2 Requirements

4.3.1	Difference in sole length	2 mm max.
4.3.3	Perpendicularity of the side walls at the toe	2 mm
4.3.4	Perpendicularity of the side walls at the heel	0° to 10°
4.3.12	Form of the boot shaft	
4.3.8.2 a)	No protrusions	
4.3.10	Bearing surface at heel	
4.3.13	Mounting point, proximity to the ski, length	10 mm min.
	Distance from middle of sole, length	5 mm max.

Bibliography

[1] ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

[2] ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pyknometer method and titration method*

[3] ISO 1183-2, *Plastics — Methods for determining the density of non-cellular plastics — Part 2: Density gradient column method*

[4] ISO 1183-3, *Plastics — Methods for determining the density of non-cellular plastics — Part 3: Gas pyknometer method*

[5] ISO 2039-1, *Plastics — Determination of hardness — Part 1: Ball indentation method*

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