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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#).

The committee responsible for this document ISO/TC 83, *Sports and other recreational facilities and equipment*, Subcommittee SC 4, *Snowsports Equipment*.

This third edition cancels and replaces the second edition (ISO 9523:2008), which has been technically revised.

# 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 is applicable to ski-boots of sizes 15,0 and larger in the Mondopoint system (see Annex A).

It is applicable 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

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 1183 (all parts), *Plastics — Methods for determining the density of non-cellular plastics*

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

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

ISO 9407, *Shoe 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 and the following apply.

### 3.1

#### **interface area**

part of the ski-boot intended for contact with the ski-binding

### 3.2

#### **toe interface area**

part of the ski-boot intended to fit with the front binding

**3.3**

**heel interface area**

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 1 to entry: 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, in accordance with 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](#).

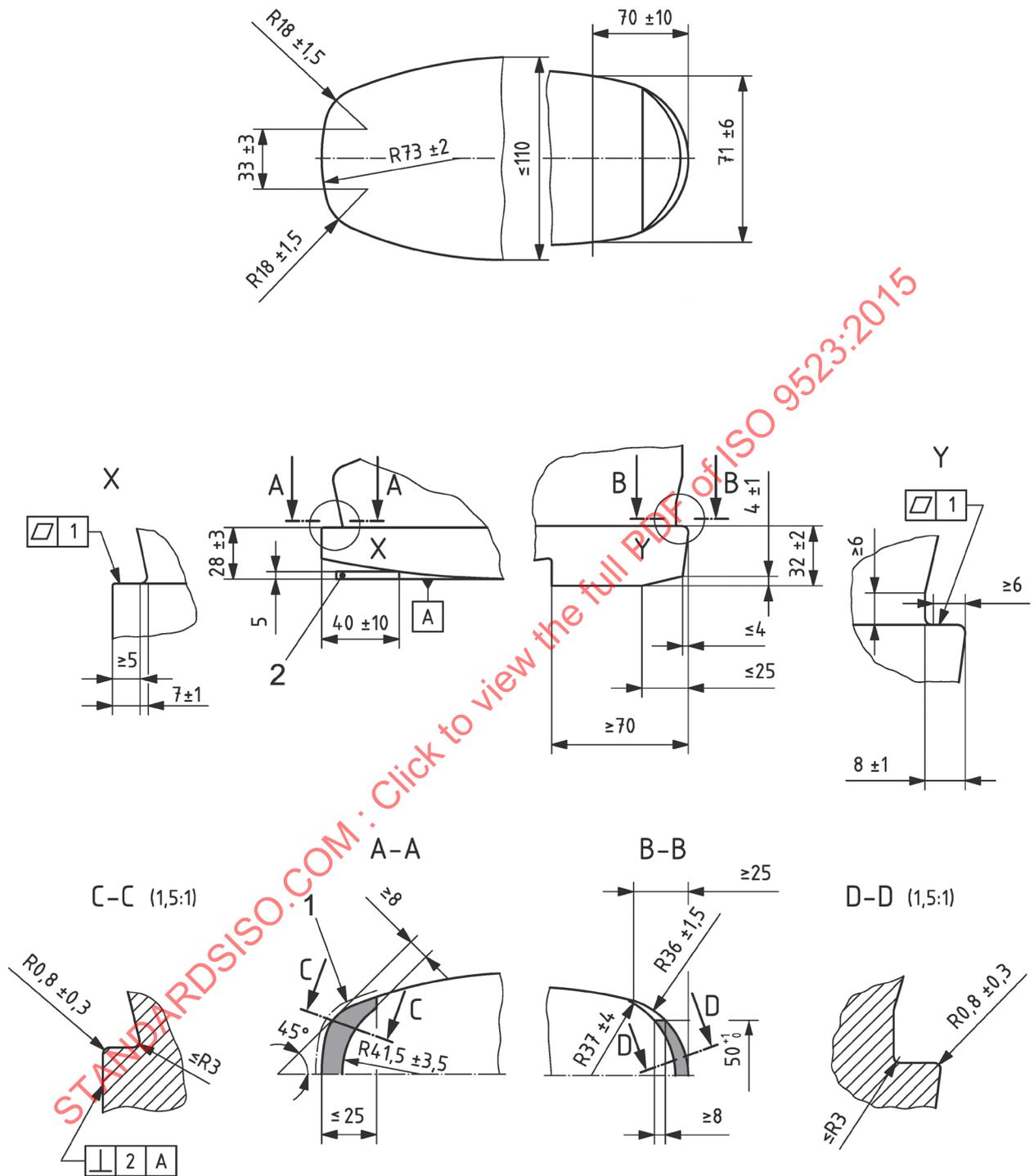
Fundamentally, all dimensions shall be within the indicated tolerance. However, relevance to safety varies in importance depending on the indicated dimensions.

Looking at several dimensions (see [Annex B](#)), a deviation from the tolerances may be accepted, provided that the following requirements are respected:

- a) deviations remain exceptional;
- b) deviations are small;
- c) no limitations of function arise with all marketable and critical bindings;
- d) tolerance is respected at the next possible chance (e.g. reconstruction of a tool).

The gauge (see [Figure 1](#)) shall be wider than the boot sole.

Dimensions in millimetres



**Key**

- 1 area where perpendicularity tolerance is valid
- 2 gauge

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

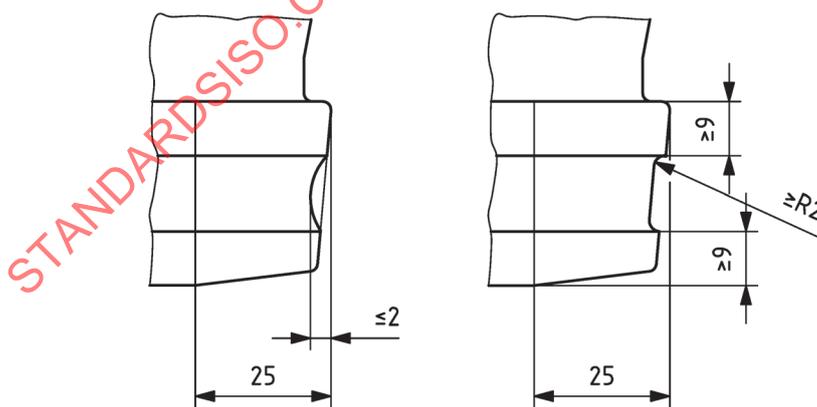


Figure 2 — Lateral grooves at heel

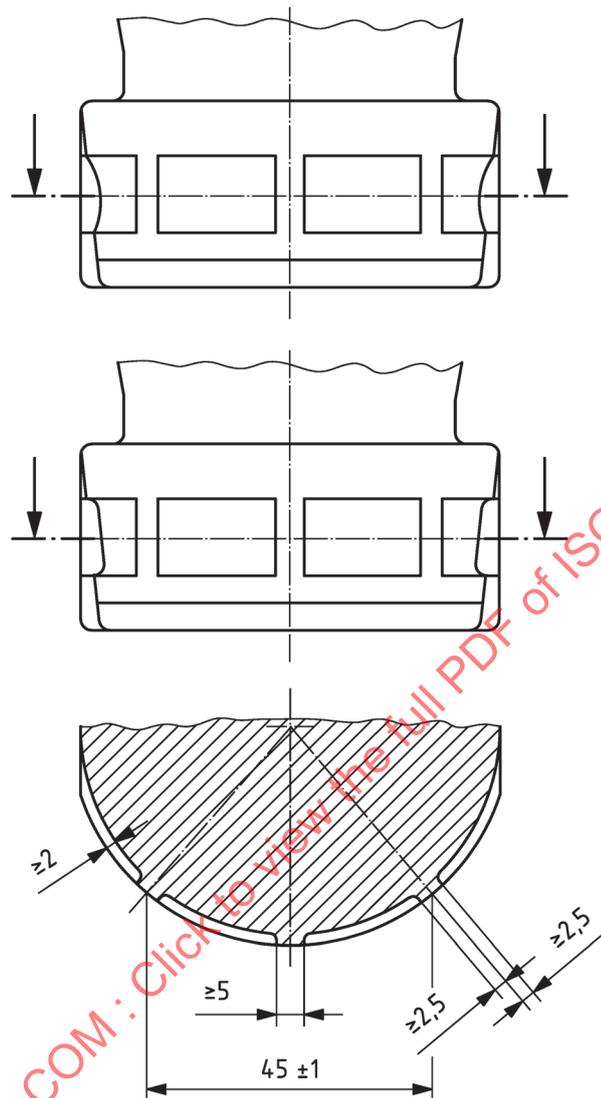


Figure 3 — Lateral supports at heel

#### 4.3.5 Rigidity

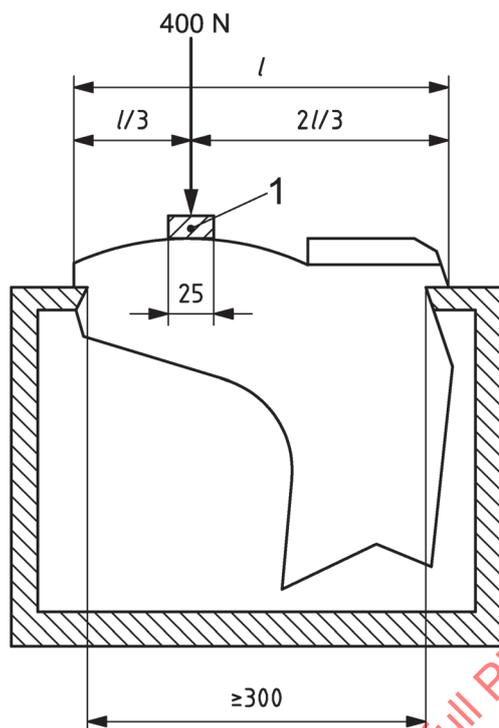
##### 4.3.5.1 Requirements

When measured in accordance with [4.3.5.2](#), the sole shall not deflect 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](#)).

**Key**

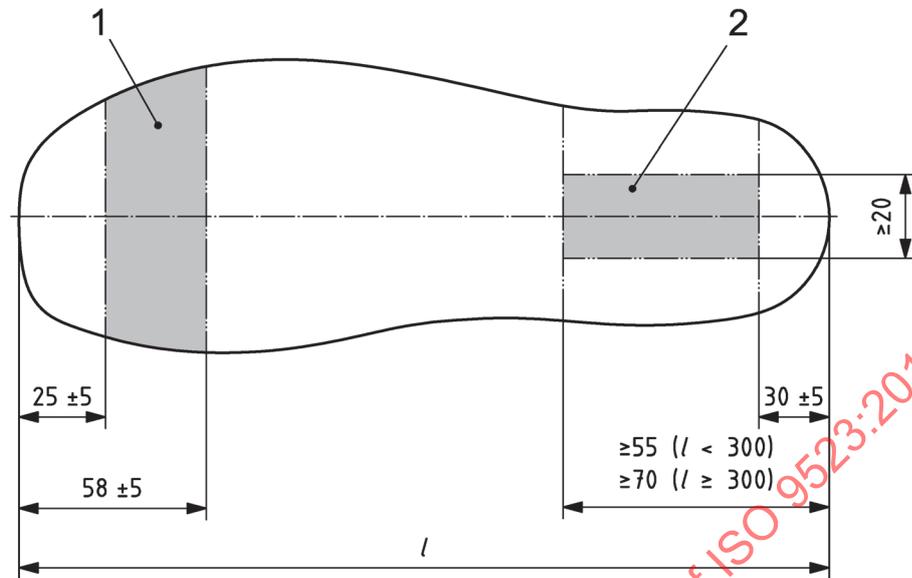
1 rigid metal test bar

**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](#).

There shall be no gaps  $>10$  mm between two studs in any direction in the toe interface area and heel interface area (see [Figure 5](#)).

Dimensions in millimetres

**Key**

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

**Figure 5 — Interface areas****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

The rubber material for the interface areas shall have Shore A hardness of at least 65 and coefficient of dynamic friction of  $\leq 0,2$ .

Testing of Shore A hardness shall be in accordance with ISO 868.

Testing of the coefficient of dynamic friction shall be in accordance with [4.3.6.1](#).

**4.3.6.1 Test method****4.3.6.1.1 Principle**

The coefficient of dynamic friction is determined by the ratio of the force  $F_1$ , necessary to move a low-friction element over the two interface areas of the boot, to the test load  $F_2$ , which is applied to the low-friction element.

**4.3.6.1.2 Test equipment and conditions**

The following test equipment and conditions shall be required.

- a) Six sample boots of at least three different sizes, stored for at least 14 d with the last 12 h of storage before the test under standard atmosphere.

- b) Low-friction element, minimum of 100 mm wide, 40 mm long, minimum of 1 mm thick of peeled PTFE with the following characteristics:
- 1) density, in accordance with ISO 1183 (all parts):  $16 \text{ g/cm}^3 \pm 0,02$ ;
  - 2) strength, in accordance with ISO 527-1 and ISO 527-2:  $\geq 24 \text{ MPa}$ ;
  - 3) strain at break, in accordance with ISO 527-1 and ISO 527-2:  $\geq 250 \%$ ;
  - 4) mean ball-indentation hardness, in accordance with ISO 2039-1:  $\pm 4 \text{ N/mm}^2$ .

NOTE The low-friction element can be used for more than 30 measurements until marks of abrasion are visible.

- c) Standard atmosphere: 23/50 or 20/65, in accordance with ISO 554.
- d) Test load F1:  $500 \text{ N} \pm 5 \text{ N}$ .
- e) Measuring distance: 8 mm.
- f) Relative speed of the boot to the low-friction element  $1 \text{ mm/s} \pm 0,2 \text{ mm/s}$ .

#### 4.3.6.1.3 Procedure

Submit the low-friction element to 10 preliminary measurements, which are not taken into account for the evaluation.

Clean the interface area of the sample boot using neutral soap and hot water, rubbing with a soft brush.

Allow to dry. After cleaning, the interface area shall be free from grease and soap.

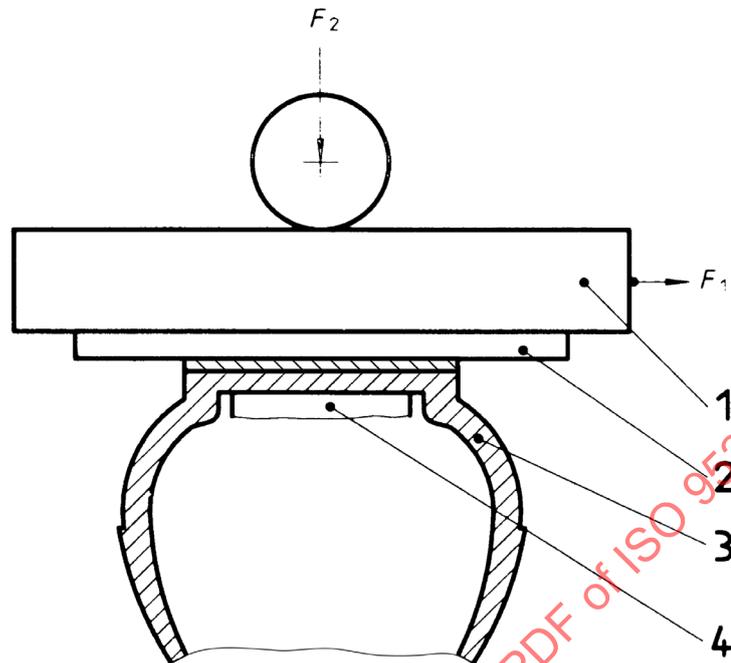
Carry out five measurements, the first of which is ignored, on each sample boot. Deformation of the sole greater than 1 mm which can be avoided by using an appropriate support (see [Figure 6](#)) is not permitted.

The measurement error for the four significant measurements shall not exceed  $\pm 5 \%$ .

Clean the low-friction element before measuring the next sample boot by rubbing with a clean, soft cloth. After cleaning, the low-friction element shall be free from grease.

Determine the coefficient of dynamic friction by taking the mean value of the 24 measurements (6 boots  $\times$  4 measurements each).

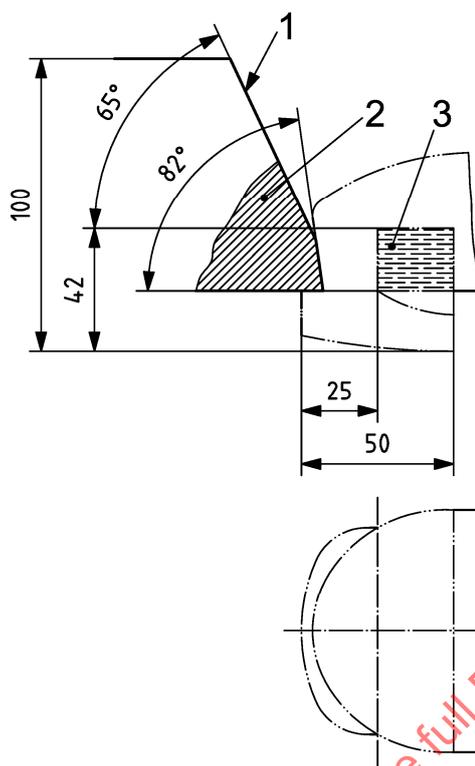
Dimensions in millimetres

**Key**

- 1 low-friction element support
- 2 low-friction element
- 3 sample boot
- 4 support to prevent boot deformation
- $F_1$  force necessary to move a low-friction element over the interface zone
- $F_2$  force applied to the low-friction element

**Figure 6 — Coefficient of dynamic friction test****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  $41,5 \text{ mm} \pm 3,5 \text{ mm}$  (see [Figure 1](#), section A-A) shall lie outside the free space 1 (see [Figure 7](#)).

**Key**

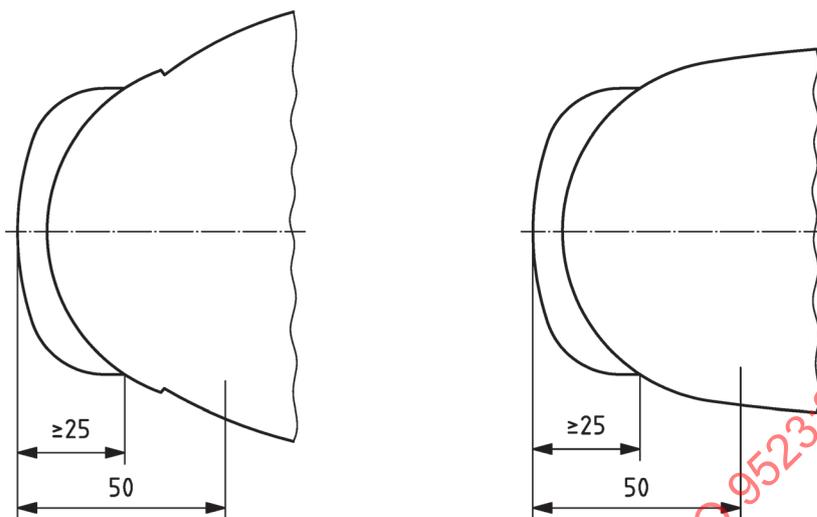
- 1 cone
- 2 free space 1
- 3 free space 2

**Figure 7 — Free space at boot toe**

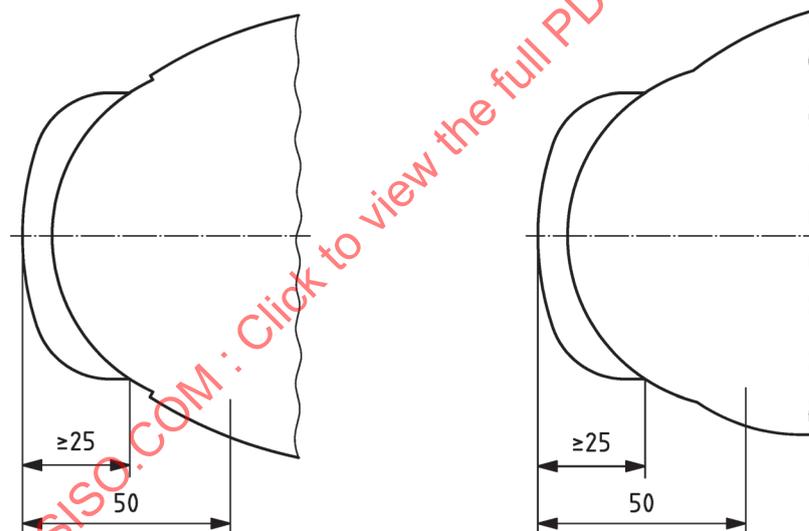
**4.3.7.1.2** Within free space 2 (see [Figure 8](#)), the arcs with radius of  $41,5 \text{ mm} \pm 3,5 \text{ mm}$  (see [Figure 1](#), section A-A) shall be continued as an arc without discontinuity, providing a smooth transition to the sides of the shaft, between 25 mm and 50 mm. This condition is fulfilled when the curvature of the shell within free space 2 remains convex (according to [Figure 8](#)) in both longitudinal and vertical planes.

Symmetry is not required.

Dimensions in millimetres



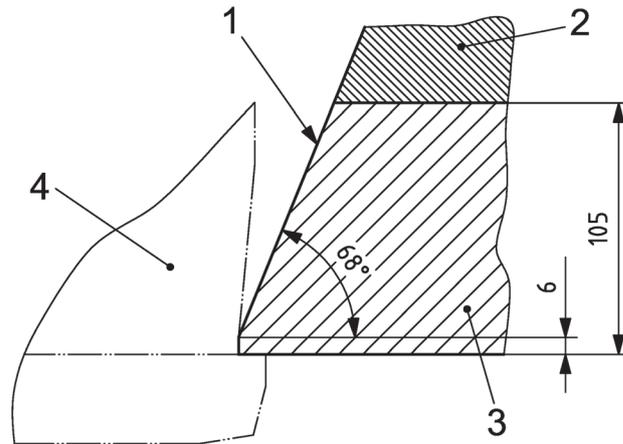
a) acceptable



b) not acceptable

Figure 8 — Examples of curvature of the shaft in free space 2

**4.3.7.1.3** The boot shell at the heel of the boot along the arcs with radius of  $37 \text{ mm} \pm 4 \text{ mm}$  (see [Figure 1](#), section B-B) shall lie outside free space 3 and free space 4 (see [Figure 9](#)), available for the ski-binding and for handling the boot and binding.



**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 space 3 and free space 4 is 50 mm.

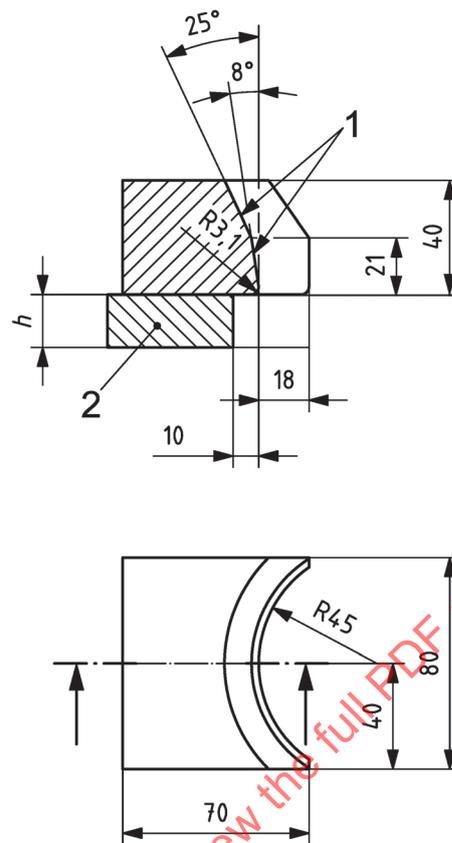
**Figure 9 — Free space and heel interface for ski-binding at boot heel**

**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. Use a supporting block to adapt exactly to the toe sole height ( $28\text{ mm} \pm 3\text{ mm}$ ) of the boot. Then, set the test body (see [Figure 10](#)) on a supporting block.

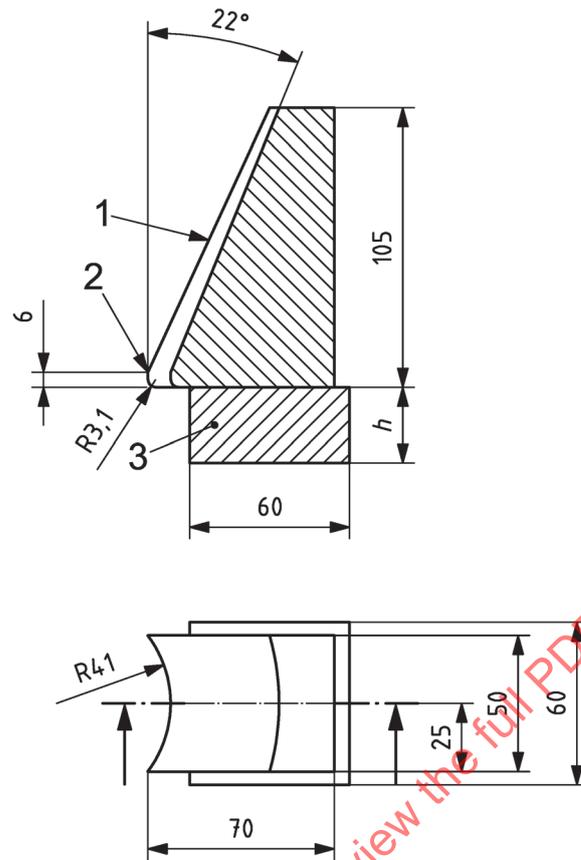
Check whether the sole height exceeds the maximum value of  $28\text{ mm} \pm 3\text{ mm}$  and whether the requirements for free space for the binding are met.

**Key**

- 1 concentric cones
- 2 supporting blocks:  
 $h: 25 \text{ mm} < h < 31$

**Figure 10** — 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. Use a supporting block to adapt exactly to the heel sole height ( $32 \text{ mm} \pm 2 \text{ mm}$ ) of the boot. Then, set the test body (see [Figure 11](#)) on a supporting block. Check whether the sole height exceeds the maximum value of  $32 \text{ mm} \pm 2 \text{ mm}$  and whether the requirements for free space for the binding are met.



**Key**

- 1 cones (concentric with the cylinder)
- 2 cylinder
- 3 supporting blocks:  
 $h: 30 \text{ mm} < h < 34$

**Figure 11 — 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 [Figure 12](#) and [Figure 13](#)) shall be not less than Shore D hardness 50, measured at a temperature of  $(23 \pm 2) \text{ }^\circ\text{C}$ .

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 12](#)) and heel binding interfaces (see shaded area in [Figure 13](#)) between the boot material and a low friction element of polytetrafluoroethylene (PTFE) shall be  $\leq 0,1$ .

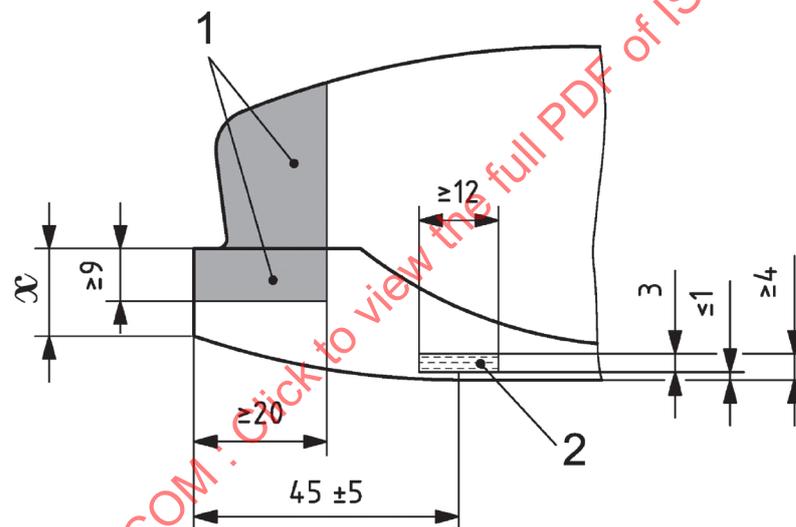
If the material is identical to the material of the interface area, no testing is necessary.

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 interface area) with the boot material of the toe and the heel interface. Test the coefficient of friction according to [4.3.6.1](#) and [Figure 6](#).

Dimensions in millimetres



#### Key

- 1 boot/binding toe interface
- 2 release value testing device
- x boot sole interface including rubber

**Figure 12 — Boot/binding toe interface and release value testing device**

#### 4.3.8.2 Toe interface

At the toe interface (see [Figure 12](#))

- a) no material in the sole shall protrude perpendicular to the vertical surfaces, and
- b) the profile of the shell in the 82° to 90° space can be straight or convex in any vertical plane provided that 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 12](#), release value testing device 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.

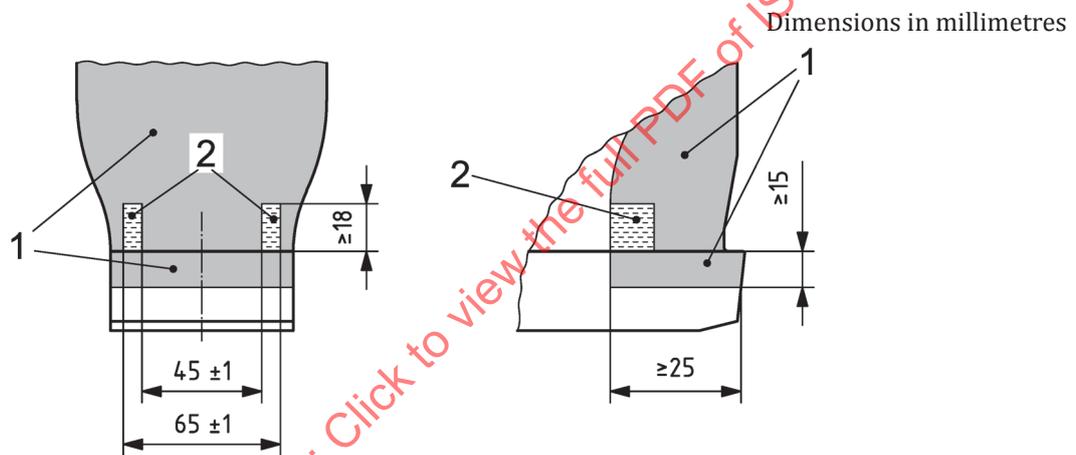
NOTE This test method is only one among many.

**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 13](#) shall be available.

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

The shaded areas in [Figure 13](#) shall correspond with the outer shell of the ski boot, but shall not contain any edges nor contain any protruding or set back areas.



**Key**

- 1 boot/binding heel interface
- 2 release value testing device

**Figure 13 — Release value testing device and 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) there shall be at least a bearing surface of 40 % in the shaded area specified as heel in [Table 1](#);
- 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.