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Third edition
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Ski-poles for alpine skiing — Requirements and test methods

Bâtons de skis alpins — 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 7331 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 7331:1990), Clauses 1 and 8 of which, and also 7.4, 7.5.2, 7.5.3, 7.5.6, 7.6.3, 7.7.3, 7.8.4 have been technically revised.

Ski-poles for alpine skiing — Requirements and test methods

1 Scope

This International Standard specifies the minimum requirements for safety in ski-poles for alpine skiing and gives test methods to check conformity with these requirements.

It applies to ski-poles for alpine skiing in the following ranges of total length, l_T (see Clause 3):

— group A, $l_T \geqslant 1\,050$ mm (adults' poles);

— group B, 1 050 mm $> l_T \geqslant 700$ mm (junior poles);

— group C, $l_T \leqslant 700$ mm (children's toy-poles).

Special designs may deviate from this International Standard, but are required to be marked durably as special designs (see 8.2).

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 554:1976, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 6508:1986, *Metallic materials — Hardness test — Rockwell test (scales A — B — C — D — E — F — G — H — K)*

3 Terms, symbols and units

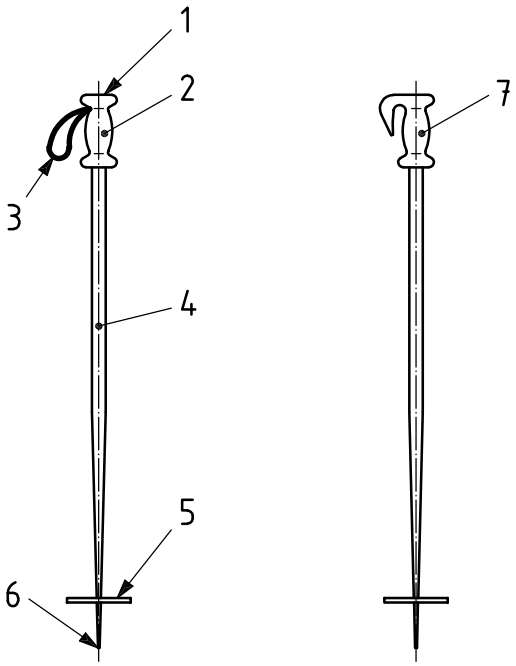
3.1 Terms

Terms used to designate the different parts of a ski-pole are given in Figure 1.

There are two types of grips for ski-poles:

— grips with a strap;

— strapless grips.



Key

1 upper surface of the grip, A_G
2 grip
3 strap
4 shaft
5 basket
6 tip
7 strapless grip

Figure 1 — Ski-pole — Terms

3.2 Symbols and units

The symbols used in Figures 1 and 2 relate to the following concepts, which shall be expressed in the units given:

A_G is the upper surface of the grip, in square centimetres (impact area);

$-F_z$ is the compressive force in the axis of the ski-pole, in newtons;

l_T is the total length, in millimetres;

l_H is the length measured from the tip to the middle of the hand, in millimetres;

l_B is the length measured from the tip to the lower surface of the basket, in millimetres;

d_B is the maximum diameter of the basket, in millimetres.

The length l_H is determined by means of an average hand, with a width of

— group A: 93 mm;

— group B: 73 mm;

— group C: 57 mm.

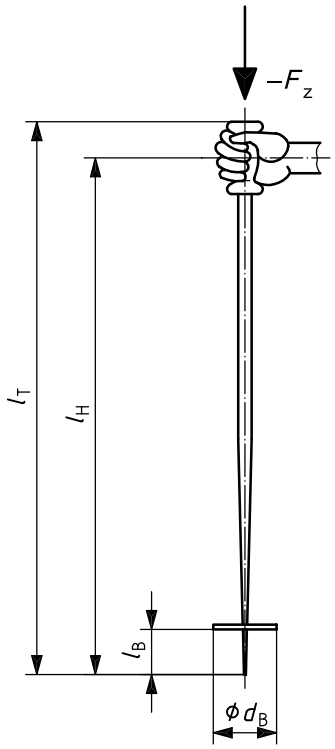


Figure 2 — Centre of rotation and dimensions

4 Materials

The materials used shall meet the requirements prescribed in this International Standard.

5 Test conditions

Unless otherwise specified, the test shall be carried out as a type test in the standard atmosphere indicated in ISO 554 with reduced tolerances.

The reference value for the quasi-static structure of force is given by:

$$\frac{\mathrm{d}F}{\mathrm{d}t} \leqslant 100 \text{ N/s}$$

The test equipment shall be such that all measurable variables such as forces, temperatures, angles, lengths, surfaces, weights and time of oscillation can be measured or determined to the following accuracies:

Forces, weights ± 2 %;

Temperatures ± 2 °C;

Angles ± 1°;

Lengths of poles ± 1 mm;

Radii and other lengths ± 0,2 mm.

6 Test sample

For the test, three poles each from the longest and from the shortest lengths of one group shall be submitted to the testing establishment.

In addition, for testing of group A, three poles of 1 200 mm length and of group B, three poles of 1 000 mm length shall be submitted to the testing establishment.

One long pole and one short pole shall be selected for the tests in accordance with 7.2 to 7.9.2.

If one test sample fails these tests, the tests may be repeated with two further test poles, both of which then shall pass the tests.

7 Requirements and test methods

7.1 Total length

7.1.1 Requirement

The total length l_T shall not vary from the given length by more than ± 10 mm. Furthermore, the lengths of one pair of ski-poles shall not differ by more than 7 mm.

7.1.2 Testing

Determine lengths of all test samples indicated in Clause 6.

7.2 Outward design

7.2.1 Requirement

Sharp design (except the tip) and rough surfaces, which might cause injury, shall be avoided.

7.2.2 Testing

Check visually.

7.3 Anti-catching design

7.3.1 Requirement

The ski-pole shall be so designed to limit the strain that can be transmitted to the wrist and arm of the skier, should the pole get caught during skiing. This requirement can be met by a design according to 7.6.3 or 7.8.4, or by a strapless grip.

7.3.2 Testing

Test according to 7.6.3 or 7.8.4, or carry out a visual and functional test.

7.4 Release mechanism

7.4.1 Function

If so equipped a release mechanism shall be manufactured so that it functions correctly in environmental conditions encountered during skiing.

7.4.2 Temperature and ice conditions

7.4.2.1 Requirement

If a release mechanism is provided in the shaft, the compressive force in the axis of the pole necessary to cause the release at a temperature of – 20 °C and in icy conditions, and at a temperature of + 20 °C shall not vary by more than 30 %.

In addition, the release force at – 20 °C and in icy conditions shall not exceed the values given in 7.6.3.

7.4.2.2 Testing

Determine the release force at room temperature, five times per function on one test sample and calculate the mean value.

Store the release mechanism at a temperature of – 20 °C until this temperature is reached then determine the release force once and compare it with the mean value at + 20 °C.

Again determine the release force at room temperature five times on one test sample and calculate the mean value.

Spray the vertically placed ski-pole with water at 10 °C or more for 1 min from a distance of 1 m, and then store the pole vertically at – 20 °C until it reaches this temperature then determine the release force once and compare it with the mean value at 20 °C.

7.4.3 Fatigue conditions

7.4.3.1 Requirement

The release mechanisms shall be protected against wear so that they still function correctly after 100 releases. The release forces shall not vary by more than 20 % after the fatigue test.

7.4.3.2 Testing

Carry out 100 releases on each release mechanism; compare the mean value of the first five releases with the mean value of the last five.

7.5 Grip

7.5.1 Shape

7.5.1.1 Requirement

The shape of the grip shall be designed to facilitate good control of the pole, i.e. the grip shall be shaped to the hand and not be slippery. With all grips, whether straps are included or not, the shape of the moulded portion shall not be such as to force the thumb outward or upward beyond the edge of the impact area, A_G, of the top of the handle/grip.

7.5.1.2 Testing

This is accomplished by both visual and manual means.

7.5.2 Impact area

7.5.2.1 Requirement

The impact area, A_G, shall be:

— group A: $\geqslant$ 13 cm^2;

— group B: $\geqslant$ 10 cm^2;

— group C: $\geqslant$ 7 cm^2.

7.5.2.2 Testing

Designate the largest section, taken from the outer contour at a level between 0 and 10 mm from the upper edge of the grip and at a slope of between 0 and 10° to the perpendicular; this shall be the impact area.

In the case of deformable surfaces of the grip, this measurement can be carried out at a compressive force of 400 N.

7.5.3 Edges

7.5.3.1 Requirement

Edges on the grip, which could cause injury, shall have a radius of at least 2,0 mm. Soft grips (with a hardness of < 80 shore A at – 10 °C) may have a radius of at least 1 mm.

7.5.3.2 Testing

This is accomplished by both visual and dimensional means.

7.5.4 Piercing resistance

7.5.4.1 Requirement

The piercing resistance of the impact area, A_G, to the top of the shaft, i.e. the force necessary for the shaft to pierce the impact area upwards, shall be higher by at least 100 % than the maximum compressive force, or than the maximum release force of those poles with a release mechanism.

7.5.4.2 Testing

Press a test sample against a fixed abutment by means of a plate (see Figure 3).

When the double compressive force, determined according to 7.7.2.2, is applied, the shaft shall not pierce the end of the grip. Carry out the test quasi-statically.

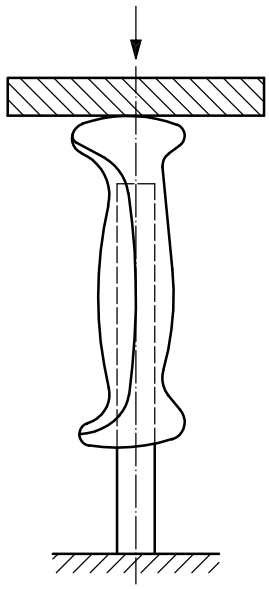


Figure 3 — Test arrangement for piercing resistance

7.5.5 Pulling-off force

7.5.5.1 Requirement

The force needed to pull the grip from the shaft shall be:

— group A: $\geqslant$ 500 N;

— group B: $\geqslant$ 400 N;

— group C: $\geqslant$ 300 N.

7.5.5.2 Testing

Carry out the test on a test sample in accordance with Figure 4.

Carry out the test quasi-statically.