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Lined industrial rubber footwear for use at low temperatures

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FOREWORD

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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 2252 was drawn up by Technical Committee ISO/TC 45, *Rubber and rubber products.*

It was approved in June 1971 by the Member Bodies of the following countries :

Australia	India	Sweden
Austria	Israel	Switzerland
Ceylon	Netherlands	Turkey
Chile	Poland	United Kingdom
Czechoslovakia	Portugal	U.S.A.
Egypt, Arab Rep. of	Romania	U.S.S.R.
France	South Africa, Rep. of	
Hungary	Spain	

No Member Body expressed disapproval of the document.

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Lined industrial rubber footwear for use at low temperatures

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the requirements for lined industrial rubber footwear for use at low temperatures, to ensure that a sufficient degree of flexibility is retained to allow for comfort in wear.

2 REFERENCES

ISO/R 37, *Determination of tensile stress-strain properties of vulcanized rubbers.*

ISO/R 48, *Determination of hardness of vulcanized rubbers.*

ISO/R 1400, *Determination of hardness of vulcanized rubbers of high hardness (85 to 100 IRHD).*

ISO/R 1818, *Determination of hardness of vulcanized rubbers of low hardness (10 to 35 IRHD).*

ISO 2023, *Lined industrial rubber footwear.* [1)]

3 REQUIREMENTS

3.1 The footwear shall conform to the requirements of ISO 2023.

3.2 In addition, the footwear shall pass the tests for low temperature performance laid down in section 4.

4 TESTS

4.1 Soling and heel — hardness

Either sample pieces of the soling and heel, or alternatively, the entire article shall be kept in a suitable apparatus at a temperature of -25 ± 1 °C at atmospheric pressure for a period of 3 h. When tested in the low temperature apparatus the hardness shall be not more than 25 IRHD[2)] greater than the room temperature value.

4.2 Upper part of boot — flexibility

When sample pieces from the upper part of the boots are tested in accordance with the method given in the Annex at -25 ± 1 °C, the stress at 100 % elongation shall not be in excess of 8 MN/m^2.

5 MARKING

Each article of footwear shall be indelibly and legibly marked with the following particulars :

a) size;

b) manufacturer's identification;

c) reference number issued by the appropriate national standards organization.

1) At present at the stage of draft.

2) See ISO/R 48, ISO/R 1400 and ISO/R 1818.

ANNEX

METHOD OF TEST FOR FLEXIBILITY

A.1 TEST PIECES

Dumb-bell test pieces conforming to ISO/R 37, Type 2, shall be cut from the upper part of the boot, the fabric being carefully removed by buffing. The working section of the test piece shall be defined by marks applied before testing. The length of the working section shall be 25 mm, the width 4 mm, and the thickness approximately 2 mm.

A.2 APPARATUS (A suitable apparatus is shown in Figure 1)

The test piece shall be fixed in the clamps. The upper clamp (7) shall be connected to the screw action grip of the tensile tester by means of a steel strip (4).

The lower clamp (9) shall be connected by means of a steel bar to a universal rack (5), the latter being connected to the moving crosshead (10) of the tensile tester as shown in Figure 1. On the crosshead (10) shall be fixed a Dewar vessel (6) in which the clamps with the test piece shall be placed.

The clamps and test piece may be removed by loosening screws at A and B, and loosening the strip (4) from the grip (3).

If the tensile test machine has no crosshead, a platform shall be connected to the moving grip of the tensile tester. On this platform the same construction may be made. A suitable apparatus is shown in Figure 2.

A.3 PROCEDURE

The gauge length of the test piece shall be marked and the thickness measured. The test piece shall be fixed in the clamps according to the marks on the working section, and the clamp placed in the Dewar vessel which shall be cooled to $-25\ ^{\circ}C$ and kept at a constant temperature of $-25 \pm 1\ ^{\circ}C$. The heat transfer medium shall be either liquid or gaseous. Any material which does not affect the material being tested may be used.

The test piece shall be exposed to these conditions for 20 min and then stretched to an elongation exceeding 100 % by separating the clamps at a uniform rate of 100 mm/min. The force shall be determined by means of the tension cell (1) and recorded.

Three dumb-bell test pieces shall be tested in this way.

A.4 CALCULATION

$$\text{Tensile stress} = \frac{F}{A}$$

where

F is the observed force at 100 % elongation;

A is the cross-sectional area of the unstretched test piece.

A.5 TEST REPORT

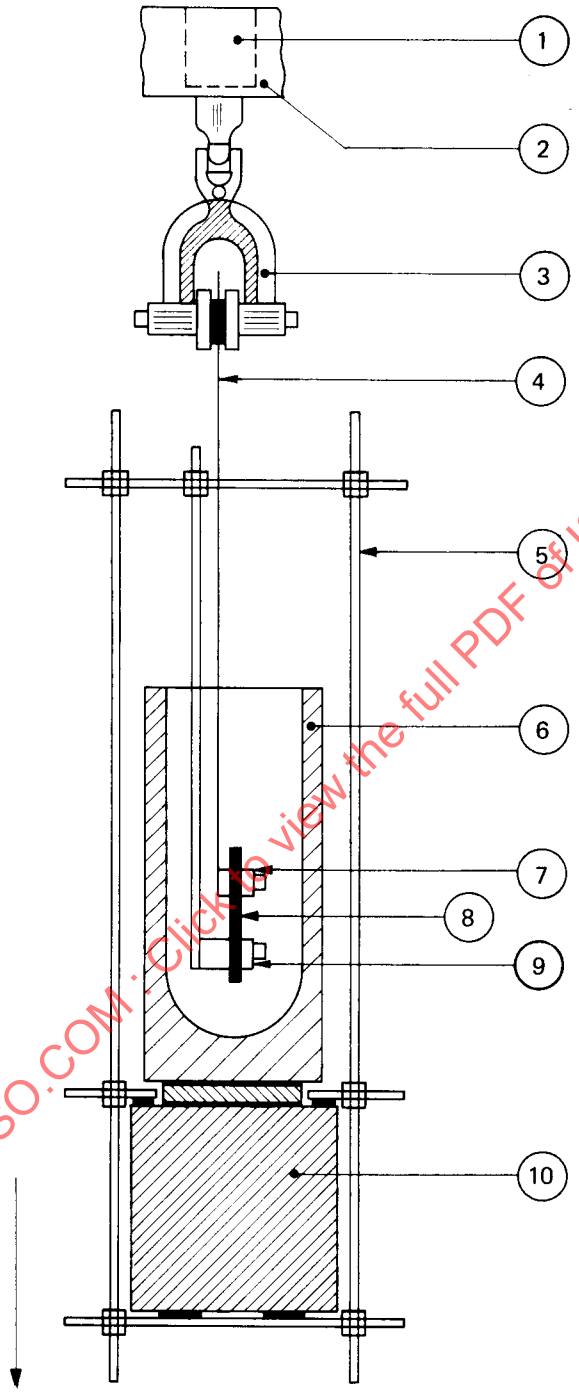
The test report shall include the following particulars :

a) identification of the footwear tested;

b) sample thickness;

c) the stress at 100 % elongation;

d) any other information concerning the test.



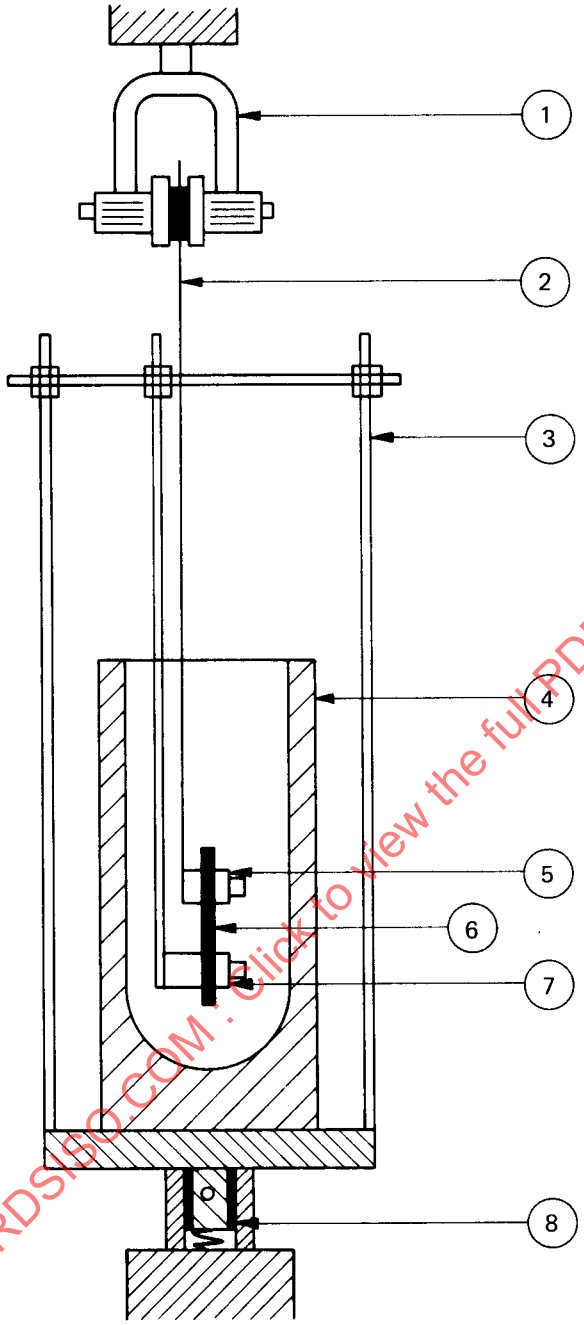
Fixed parts

1 Tension-cell
2 Fixed crosshead of tensile tester
3 Grip
4 Steel strip
7 Fixed clamp

Moving parts

5 Universal laboratory rack
6 Dewar vessel
8 Test piece
9 Moving clamp
10 Moving crosshead of tensile tester.

FIGURE 1 — **Cross-section of suitable apparatus**



Fixed parts

1 Fixed grip
2 Steel strip
5 Fixed clamp

Moving parts

3 Universal laboratory rack
4 Dewar vessel
6 Test piece
7 Moving clamp
8 Moving grip holder

FIGURE 2 – **Suggested apparatus suitable for tensile tester without crosshead**