INTERNATIONAL STANDARD

ISO 1522

Third edition
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Paints and varnishes — Pendulum damping test

Peintures et vernis — Essai d'amortissement du pendule

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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 1522 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This third edition cancels and replaces the second edition (ISO 1522:1998), which has been technically revised. The main changes are the following:

— The references to the original national standards, DIN 53157 (König pendulum) and NF T 30-016 (Persoz Pendulum), and to the ASTM standard ASTM D 4366 have been deleted since Germany, France and ASTM have adopted ISO 1512.

— The hardness of the ball bearings for the Persoz pendulum has been corrected.

— For the Persoz pendulum, the tolerance on the time for damping from a 12° displacement to a 4° displacement on a polished plate-glass panel has been changed from ± 10 s to ± 15 s.

— A preferred minimum dry-film thickness of the coating under test of 30 µm has been added.

— For the König pendulum, it is common practice to measure the number of swings. A note has been added explaining how the number of swings can be converted into the time for the amplitude of swing to decrease.

Introduction

Two test procedures are considered in some detail, namely those of König and Persoz. The instruments embody the same principle — that the amplitude of oscillation of a pendulum touching a surface decreases more rapidly the softer the surface — but differ in respect of dimensions, period and amplitude of oscillation.

The interaction between the pendulum and the paint film is complex, depending as it does on both elastic and viscoelastic properties, and it is not possible to establish a general relationship between results obtained by the two tests. Therefore, only one type of pendulum should be used in a given series of measurements of damping time.

The following considerations may serve as a guide when considering which pendulum may offer an advantage for a particular purpose.

a) On surfaces with a low coefficient of friction, the Persoz pendulum may skid, which would invalidate results; however, this occurs only rarely with paints and varnishes.

b) It should be noted that both instruments reflect the sensitivity of the physical properties of a paint to its environment, and the test therefore should be under controlled conditions of temperature and humidity and in the absence of draughts. The thickness of the paint film and the nature of the substrate may also affect the damping times.

Paints and varnishes — Pendulum damping test

1 Scope

This International Standard specifies two methods of carrying out a pendulum damping test on a coating of paint, varnish or other, related, product. It is applicable to single coatings and to multicoat 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 1513, *Paints and varnishes — Examination and preparation of samples for testing*

ISO 1514, *Paints and varnishes — Standard panels for testing*

ISO 2808, *Paints and varnishes — Determination of film thickness*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

3 Principle

A pendulum resting on a coating surface is set into oscillation and the time for the oscillation amplitude to decrease by an amount specified in this International Standard is measured. The shorter the damping time, the lower the hardness.

4 Apparatus

4.1 Pendulum.

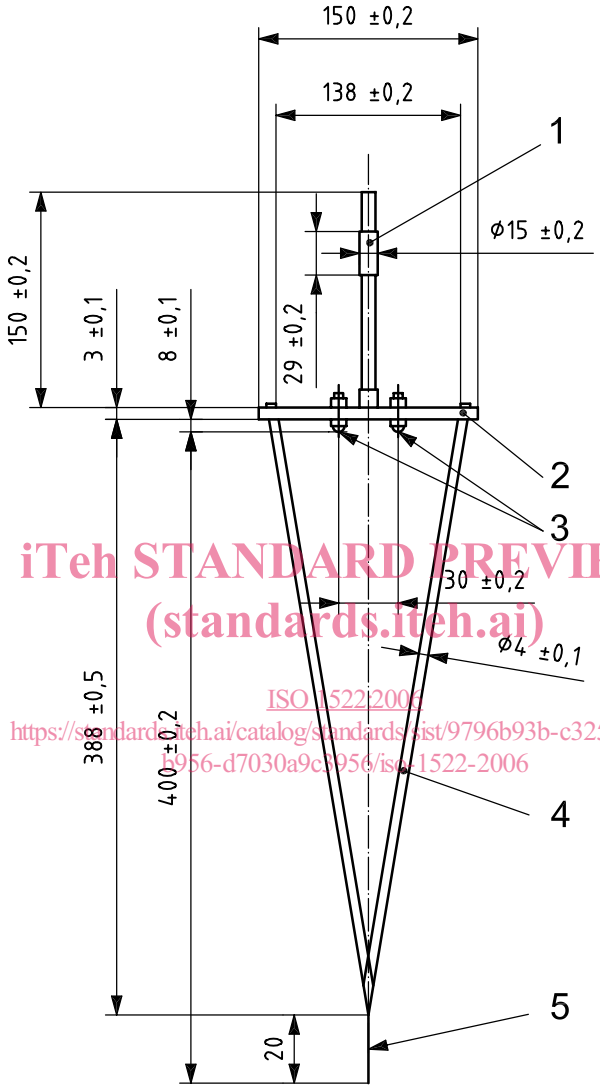
4.1.1 Both the pendulums, as described in 4.1.2 and 4.1.3, comprise an open framework connected by a cross-bar on the under face of which two balls are inset to serve as the fulcrum, the lower end of the framework being formed into a pointer. The two pendulums differ in shape, mass, swinging time and other details, as described in 4.1.2 and 4.1.3.

The pendulum shall be used away from draughts and vibrations.

The use of a protective enclosure is recommended.

4.1.2 The König pendulum (see Figure 1) rests on two tungsten-carbide balls of (5 ± 0,005) mm diameter, of hardness (1 600 ± 32) HV 30 [1)], and (30 ± 0,2) mm apart and is counterpoised (to adjust the natural frequency of oscillation) by means of a weight sliding on a vertical rod attached to the cross-bar. On a polished plate-glass panel, the period of oscillation shall be (1,40 ± 0,02) s and the time for damping from a 6° displacement to a 3° displacement shall be (250 ± 10) s. The total mass of the pendulum shall be (200 ± 0,2) g.

Dimensions in millimetres



Key

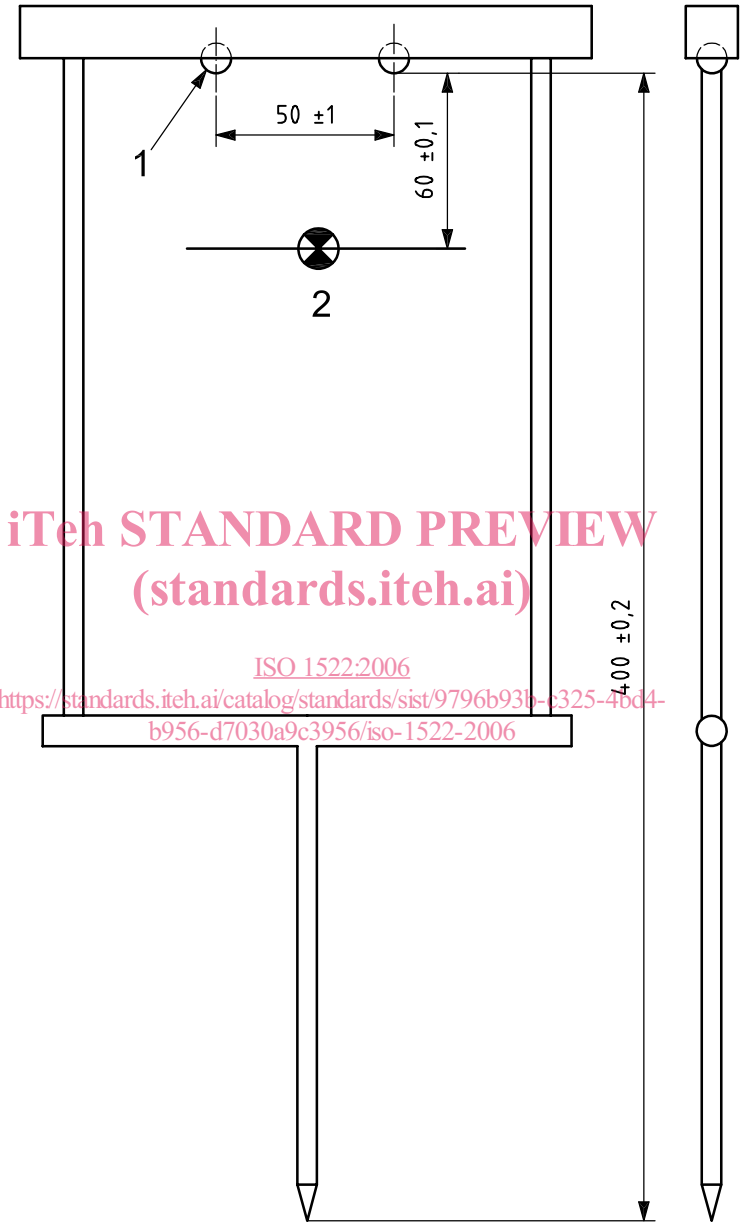
1 counterpoise (adjustable)
2 cross-bar, width 12 ± 0,1
3 ball, ∅ 5 ± 0,005
4 frame
5 tip

Figure 1 — König pendulum

1) HV = Vickers hardness determined in accordance with ISO 6507-1 [2].

4.1.3 The Persoz pendulum (see Figure 2) rests on two tungsten-carbide balls of (8 ± 0,005) mm diameter, of hardness (1 600 ± 32) HV 30 [1)] and (50 ± 1) mm apart. A counterpoise is not provided. On a polished plate-glass panel, the period of oscillation shall be (1 ± 0,01) s and the time for damping from a 12° displacement to a 4° displacement on the same substrate shall be (430 ± 15) s. The total mass of the pendulum shall be (500 ± 0,1) g and its centre of gravity at rest shall be (60 ± 0,1) mm below the plane of the fulcrum, the pointer tip being (400 ± 0,2) mm below the plane of the fulcrum.

Dimensions in millimetres



Key

1 ball, ∅ 8 ± 0,005
2 centre of gravity

Figure 2 — Persoz pendulum