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ISO 6271-2

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Clear liquids — Estimation of colour by the platinum-cobalt scale —

Part 2: Spectrophotometric method

Liquides clairs — Évaluation de la couleur au moyen de l'échelle platine-cobalt —

Partie 2: Méthode spectrophotométrique

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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 6271-2 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 10, *Test methods for binders for paints and varnishes*, in collaboration with ASTM D 01.34, *Naval Stores*.

ISO 6271 consists of the following parts, under the general title *Clear liquids — Estimation of colour by the platinum-cobalt scale*:

— *Part 1: Visual method*

— *Part 2: Spectrophotometric method*

Clear liquids — Estimation of colour by the platinum-cobalt scale —

Part 2: Spectrophotometric method

1 Scope

This part of ISO 6271 specifies a spectrophotometric method for estimating the colour, in Pt-Co units, of clear liquids. It is applicable to clear liquids having a colour characteristic similar to those of the reference platinum-cobalt scale specified in ISO 6271-1.

The method described provides a more precise way of measuring Pt-Co colour than that described in ISO 6271-1.

NOTE The term “platinum-cobalt colour (Pt-Co colour)” used here is preferred over the terms “Hazen colour” and “APHA colour”.

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 6271-1, *Clear liquids — Estimation of colour by the platinum-cobalt scale — Part 1: Visual method*

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

CIE Publication No. 15.2, *Colorimetry*

3 Principle

The colour of a liquid sample is measured using an instrument capable of measuring transmitted colour and reporting in Pt-Co colours or in a colour system that can be converted into Pt-Co colours.

4 Apparatus and materials

4.1 Colour-measuring instrument, capable of measuring transmitted colour ($0^\circ/180^\circ$ geometry) and reporting the results in the platinum-cobalt colour scale described in ISO 6271-1. If such an instrument is not available, one may be used which is capable of measuring transmitted colour and reporting in tristimulus values or chromaticity coordinates using standard illuminant C and the 2° observer, described in CIE Publication No. 15.2.

4.2 Glass absorption cells, 50 mm path length, unless a different path length is specified by the instrument manufacturer.

Or

4.3 Glass tubes, clear, designed for the specific instrument used. Glass tubes might provide less accuracy than glass absorption cells and should be used only when a decrease in accuracy is acceptable. Glass absorption cells should preferably be used for referee purposes.

5 Sampling

Take a representative sample of the product to be tested, as described in ISO 15528.

6 Procedure

Baseline calibration of the instrument shall be performed following the instrument manufacturer's recommendations.

If the material shows any visual haziness, first remove the haze by filtration, centrifugation, heating, ultrasonic treatment or any other suitable means (see Note).

If the haziness cannot be removed, the measured value will be unreliable and too high, and therefore unusable.

Then, using the same type of glass tube or absorption cell as used for the baseline calibration, fill the glass tube or absorption cell with the product to be tested. Take care not to touch the measurement area of the glass tube or absorption cell.

Avoid creating air bubbles when filling the glass tube or absorption cell. If air bubbles are formed and remain trapped, remove them by heating, vacuum, ultrasonic treatment or any other suitable means (see Note).

NOTE Some sample pretreatments can change the colour.

Insert the glass tube or absorption cell in the instrument and measure the platinum-cobalt colour, following the instrument manufacturer's recommended procedure.

Regular checks as per the instrument manufacturer's recommendations should be carried out. This will normally be in the form of checks with certified reference materials.

7 Expression of results

Report the Pt-Co colour in units as given by the instrument.

8 Precision

8.1 General

The precision of the test method was determined by interlaboratory testing in accordance with ISO 5725-2. Four different materials were tested by 143 laboratories.

8.2 Repeatability limit (r)

The repeatability limit r is the value below which the absolute difference between two single test results, each the mean of duplicates, obtained on identical material by one operator in one laboratory within a short interval of time using the standardized test method can be expected to lie with a probability of 95 %.

The repeatability, expressed as the repeatability limit r, for three repeated measurements made in accordance with this part of ISO 6271 is 1,9 % relative to the mean.

8.3 Reproducibility limit (R)

The reproducibility limit R is the value below which the absolute difference between two single test results, each the mean of duplicates, obtained on identical material by operators in different laboratories using the standardized test method, can be expected to lie with a probability of 95 %.

The reproducibility, expressed as the reproducibility limit R, for three repeated measurements made in accordance with this part of ISO 6271 is 4,8 % relative to the mean.

8.4 Bias

Since there is no accepted reference material suitable for determining the bias of the procedure in this test method, bias has not been determined.

9 Test report

The test report shall contain at least the following information:

a) a reference to this part of ISO 6271 (ISO 6271-2);

b) all details necessary to identify the product examined;

c) whether any pretreatment was necessary;

d) the result of the test as indicated in Clause 7;

e) any deviation from the test method specified;

f) the date of the test.

Bibliography

[1] EN 1557, *Surface active agents — Colorimetric characterization of optically clear coloured liquids (products) as X, Y, Z tristimulus values in transmission*

[2] ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

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