INTERNATIONAL STANDARD

ISO 4630-1

First edition
2004-11-15

Clear liquids — Estimation of colour by the Gardner colour scale —

Part 1: Visual method

Liquides clairs — Évaluation de la couleur au moyen de l'échelle Gardner —

Partie 1: Méthode visuelle

Reference number
ISO 4630-1:2004(E)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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 4630-1 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.* It has been harmonized with ASTM D 1544-98, *Standard Test Method for Color of Transparent Liquids (Gardner Color Scale)*.

It cancels and replaces ISO 4630:1997, which has been technically revised. The main changes are that the chromaticity coordinates and luminous transmittances are now used as reference standards instead of liquid standards and that the conversion procedure for glass test tubes having an inside diameter other than (10,65 ± 0,025) mm has been deleted.

ISO 4630 consists of the following parts, under the general title *Clear liquids — Estimation of colour by the Gardner colour scale*:

— *Part 1: Visual method*

— *Part 2: Spectrophotometric method*

Clear liquids — Estimation of colour by the Gardner colour scale —

Part 1: Visual method

1 Scope

This part of ISO 4630 specifies a method for estimating, by means of the Gardner colour scale, the colour of clear, yellow/brown liquid products using colour-measuring instruments. The results might be invalid if other products are tested.

It is applicable to drying oils, varnishes and solutions of fatty acids, polymerized fatty acids, resins, tall oil, tall oil fatty acids, rosin and related products.

It is applicable to products having colours from Gardner 1 to Gardner 18. The Gardner scale is not applicable to products with colours lighter than 1 or darker than 18.

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 3696, *Water for analytical laboratory use — Specification and test methods*

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

CIE Publication No. 15.2, *Colorimetry*

3 Principle

The colour of a sample of the product under examination is viewed in a glass tube of standard diameter and visually compared with the colours of arbitrarily numbered colour standards. The standard that most closely matches the colour of the test sample is identified and the result is expressed in terms of a number on the Gardner colour scale.

4 Apparatus and materials

4.1 Gardner colour standards.

4.1.1 Reference standards

The chromaticity coordinates and luminous transmittances specified in Table 1 are required as reference standards for calibration.

Colour standards that do not conform to the requirements in Table 1 shall be rejected.

Table 1 — Colour specifications for reference standards

Gardner colour standard number	Chromaticity coordinates		Luminous transmittance, Y	Tolerance on transmittance
	x	y	%	$(\pm)$ %
1	0,317 7	0,330 3	80	7
2	0,323 3	0,335 2	79	7
3	0,332 9	0,345 2	76	6
4	0,343 7	0,364 4	75	5
5	0,355 8	0,384 0	74	4
6	0,376 7	0,406 1	71	4
7	0,404 4	0,435 2	67	4
8	0,420 7	0,449 8	64	4
9	0,434 3	0,464 0	61	4
10	0,450 3	0,476 0	57	4
11	0,484 2	0,481 8	45	4
12	0,507 7	0,463 8	36	5
13	0,539 2	0,445 8	30	6
14	0,564 6	0,427 0	22	6
15	0,585 7	0,408 9	16	2
16	0,604 7	0,392 1	11	1
17	0,629 0	0,370 1	6	1
18	0,647 7	0,352 1	4	1

4.1.2 Working standards

Used as working standards are 18 glass or liquid standards having chromaticity coordinates that differ from those of reference standards by not more than one-third of the difference in x or y (see Table 1) between adjacent reference standards.

In any one set of working standards, no two standards shall be closer together than two-thirds of the difference in x or y between the corresponding reference standards.

The luminous transmittance shall be as specified in Table 1.

In cases of dispute, only reference standards (4.1.1) shall be used.

The standards shall be mounted in such a way that they can be conveniently handled and allow simultaneous viewing of two adjacent standards in the colour comparator (4.3).

When using liquid working standards — coloured solutions contained in glass tubes (4.2) — they shall be checked by the method specified in Annex A.

Potassium hexachloroplatinate(IV) solutions are used for the lighter standards (1 to 8), and solutions of iron(III) chloride and cobalt(II) chloride in hydrochloric acid are used for the darker standards (9 to 18).

The compositions of the liquid standards are specified in Annex B.

4.2 Glass test tubes, clear, colourless, round, preferably of inside diameter $(10{,}650 \pm 0{,}025)$ mm, outside diameter about 12,5 mm and outside length about 114 mm.

4.3 Colour comparator, providing uniform illumination and permitting simultaneous visual comparison of light transmitted through two colour standards and through a sample in a test tube in the transverse direction.