
**Graphic technology — Ink, paper and
labels — Requirements on hot alkali
penetration and resistance**

*Technologie graphique — Encres, papier et étiquettes — Exigences de
pénétrabilité et résistance aux alcalins chauds*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 12632:2015](https://standards.iteh.ai/catalog/standards/sist/7d015e25-d32a-4ffe-afd3-49d562e6cf3e/iso-12632-2015)

<https://standards.iteh.ai/catalog/standards/sist/7d015e25-d32a-4ffe-afd3-49d562e6cf3e/iso-12632-2015>



iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 12632:2015

<https://standards.iteh.ai/catalog/standards/sist/7d015e25-d32a-4ffe-afd3-49d562e6cf3e/iso-12632-2015>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword.....	iv
Introduction.....	v
1 Scope	1
2 Terms and definitions	1
3 Principle	1
3.1 Test method for the penetration time of hot alkaline solution on labels.....	1
3.2 Test method for the removal time of labels by hot alkaline solution.....	2
3.3 Test method for the resistance of labels against hot alkaline solution.....	2
4 Apparatus and reagents	2
4.1 Apparatus.....	2
4.2 Reagents.....	2
4.3 Preparation of the thymolphthaleine containing glue.....	3
5 Specimens	3
5.1 Penetration and removal time.....	3
5.2 Resistance against hot alkaline solution.....	3
6 Test procedure	3
6.1 Penetrability time of hot sodium hydroxide solution through labels.....	3
6.2 Removal time of labels.....	4
6.3 Resistance against hot alkaline solution.....	4
7 Test report	4

<https://standards.iteh.ai/catalog/standards/sist/7d015e25-d32a-4ffe-afd3-49d562e6cf3e/iso-12632-2015>
 ISO 12632:2015

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 130, *Graphic technology*.

ISO 12632:2015

<https://standards.iteh.ai/catalog/standards/sist/7d015e25-d32a-4ffe-afd3-49d562e6cf3e/iso-12632-2015>

Introduction

Bottles or other containers for beverages and soft drinks may be labeled with wet glued printed labels of various substrates. If the bottles and containers are reused, they need to be cleaned thoroughly. Often, bottles and containers are used for different types of drinks. This requires the removal of the labels from the bottles and containers during the cleaning process. Usually, hot alkaline solution is used within the cleaning facilities. To ensure the stability of the process, the penetration of the cleaning solution through the label needs to occur rapidly. In addition, the labels need to stay intact to ease the process of removing them from the cleaning agent. Also, no dyeing of the solution must occur so as to minimize costs for the waste treatment of the cleaning solutions after neutralization. The test methods given in this International Standard have been successfully applied in the European beverage industry for decades and are also standardized as DIN Standards.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 12632:2015](https://standards.iteh.ai/catalog/standards/sist/7d015e25-d32a-4ffe-afd3-49d562e6cf3e/iso-12632-2015)

<https://standards.iteh.ai/catalog/standards/sist/7d015e25-d32a-4ffe-afd3-49d562e6cf3e/iso-12632-2015>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 12632:2015

<https://standards.iteh.ai/catalog/standards/sist/7d015e25-d32a-4ffe-afd3-49d562e6cf3e/iso-12632-2015>

Graphic technology — Ink, paper and labels — Requirements on hot alkali penetration and resistance

1 Scope

This International Standard specifies test methods for

- penetrability and removal times of labels that have been wet glued on bottles intended to be refilled and reused, and
- resistance of printed labels against hot alkaline solution.

Test results always deal with systems comprising of substrates, ink films and varnish films if present. This International Standard is valid for label substrates and printed labels. Label substrates include metalized papers. The test procedures are also valid for the evaluation of inks and papers to be used in printing labels.

This International Standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this International Standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

iTeh STANDARD PREVIEW

2 Terms and definitions (standards.iteh.ai)

For the purposes of this document, the following terms and definitions apply.

2.1 penetration time
time of travel for a liquid through a substrate
<https://standards.iteh.ai/catalog/standards/sist/7d015e25-d32a-4ffe-afd3-49d562e6cf3e/iso-12632-2015>
ISO 12632:2015

2.2 removal time
time of separation of a glued label from a glass substrate

2.3 thymolphthaleine
organic chemical compound that is employed as an acid-base indicator, changing in appearance from red to yellow to blue as the pH changes from acidic (low pH) to neutral (pH = 7) to basic (high pH)

2.4 wire bar
coating device consisting of a metal rod covered with a tightly wound wire, in which the applied coating thickness is a function of the diameter of the wire (also known as a wire-wound rod)

3 Principle

Labels of bottles intended to be refilled and reused are removed from the bottles by applying hot alkaline solution.

3.1 Test method for the penetration time of hot alkaline solution on labels

To test if the hot alkaline solution is able to penetrate printed labels or label substrates from bottles within a required time, a glue, containing thymolphthalein solution is applied on the glue side of the label, the label is then glued onto the bottom of a petri dish and the dish is brought into contact with the hot alkaline solution. Appearance of a blue colour indicates the penetration of the hot alkaline solution

through the label. The experimenter records the time elapsed between adding the alkaline solution and the appearance of the blue colour.

3.2 Test method for the removal time of labels by hot alkaline solution

To test the time required to remove glued labels or label substrates from bottles, the test of 3.1 is continued until the labels are separated from the petri dish.

3.3 Test method for the resistance of labels against hot alkaline solution

To test the resistance of labels against hot alkaline solution, a specified area of printed labels will be placed in contact with a specified solution of NaOH at a defined temperature and for a specified period of time. The evaluation includes inspection of the surface of the labels [layer separation (ink and paper), colour changes] and the colour of the solution. To evaluate the usability of inks, either test prints on label stock or printed labels shall be used. The ink film thickness of test prints shall be comparable to that of printed labels.

4 Apparatus and reagents

4.1 Apparatus

4.1.1 **Beaker**, diameter ≥ 140 mm, volume about 2 l.

4.1.2 **Drying cabinet**.

4.1.3 **Filter hopper**.

4.1.4 **Glass plates**, 2, 60 mm \times 90 mm \times 2 mm.

4.1.5 **Hot plate**, equipped with thermostat and magnetic stirrer.

4.1.6 **Beaker insert for the beaker**, to avoid direct contact between labels and the magnetic stirrer.

4.1.7 **Laboratory filter paper**, for qualitative chemical analysis, white, neutral.

4.1.8 **Laboratory funnel**.

4.1.9 **Petri dish**, 90 mm to 100 mm in diameter.

4.1.10 **Safety glasses and protective gloves**.

4.1.11 **Stopwatch**.

4.1.12 **Tweezers**.

4.1.13 **Wire bar**, capable of applying wet films of a thickness of 50 μm .

4.2 Reagents

4.2.1 **1 % sodium hydroxide solution (by mass)**, for testing the penetrability and the removal time of labels, prepared from demineralized water. This solution may be used for up to 20 tests.

4.2.2 2,5 % sodium hydroxide solution (by mass), for testing the resistance of labels against hot alkaline solution, prepared from demineralized water. This solution shall contain commercial additives used in industrial bottle cleaning facilities in typical concentrations (e.g. 0,2 %).

4.2.3 Thymolphthaleine, ground into powder form.

4.2.4 Ethanol.

4.2.5 pH-neutral casein glue.

4.2.6 Demineralized water.

4.3 Preparation of the thymolphthaleine containing glue

Two spatula tips of thymolphthaleine are dissolved in 50 ml ethanol and filtered. Five parts of this solution are mixed with 95 parts of pH-neutral casein glue. Both the thymolphthaleine solution and the thymolphthaleine containing glue should not be older than one week. The pH neutral casein glue should not be older than one year.

5 Specimens

Inks shall be completely dried/cured, e.g. oxidative drying inks should be stored for 48 h prior to testing.

5.1 Penetration and removal time

At least three samples shall be tested. Circular specimens with a preferred diameter of 80 mm are cut out of larger sheets. Smaller die-cut labels may be used.

5.2 Resistance against hot alkaline solution

Multiple specimens shall be tested. They shall have an area of (500 ± 50) cm².

6 Test procedure

Hot alkaline solution might cause severe etching of the human skin. Hot alkaline solution may irreversibly damage the eye if droplets are spilled into the eye. Safety glasses and protective gloves shall be used.

6.1 Penetrability time of hot sodium hydroxide solution through labels

The glue is coated onto a glass plate using the wire bar. The size of the coated area shall be larger in all dimensions than the label specimen to be tested. The specimen is placed onto the coated area by means of tweezers and uniformly pressed onto the glass plate by a rubber roller. The label is removed from the glass plate using tweezers at an angle of 90°. The label is glued onto the outer bottom of the petri dish without bubbles and dried for 24 h at room temperature.

The petri dish with the specimen facing downwards is submerged into 1 000 ml hot 1 % sodium hydroxide solution in the beaker and placed on the beaker insert. The temperature of the sodium hydroxide solution shall be (75 ± 2) °C if labels for glass bottles are to be tested and shall be adapted to the real temperature of the cleaning equipment if labels for plastic bottles are to be tested. The hot sodium hydroxide solution shall be stirred magnetically with (250 ± 50) revolutions per minute. The time needed for the penetration of the sodium hydroxide solution through the label is measured. The endpoint is reached if three quarters of the specimen area have turned blue.