



SLOVENSKI STANDARD
oSIST prEN ISO 4624:2022
01-november-2022

Barve in laki - Preskušanje oprijema z odtrganjem filma (ISO/DIS 4624:2022)

Paints and varnishes - Pull-off test for adhesion (ISO/DIS 4624:2022)

Beschichtungsstoffe - Abreißversuch zur Bestimmung der Haftfestigkeit (ISO/DIS 4624:2022)

Peintures et vernis - Essai de traction (ISO/DIS 4624:2022)

Ta slovenski standard je istoveten z: prEN ISO 4624

ICS:

87.040

Barve in laki

Paints and varnishes

oSIST prEN ISO 4624:2022

en,fr,de

DRAFT INTERNATIONAL STANDARD

ISO/DIS 4624

ISO/TC 35/SC 9

Secretariat: BSI

Voting begins on:
2022-09-05Voting terminates on:
2022-11-28

Paints and varnishes — Pull-off test for adhesion

Peintures et vernis — Essai de traction

ICS: 87.040

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 4624:2022](https://standards.iteh.ai/catalog/standards/sist/d3f8704d-ed1b-4346-b25f-49918c3911ec/osist-pren-iso-4624-2022)<https://standards.iteh.ai/catalog/standards/sist/d3f8704d-ed1b-4346-b25f-49918c3911ec/osist-pren-iso-4624-2022>

This document is circulated as received from the committee secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

ISO/CEN PARALLEL PROCESSING



Reference number
ISO/DIS 4624:2022(E)

© ISO 2022

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN ISO 4624:2022](https://standards.iteh.ai/catalog/standards/sist/d3f8704d-ed1b-4346-b25f-49918c3911ec/osist-pren-iso-4624-2022)

<https://standards.iteh.ai/catalog/standards/sist/d3f8704d-ed1b-4346-b25f-49918c3911ec/osist-pren-iso-4624-2022>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Apparatus	2
6 Adhesives	5
7 Sampling	6
8 Test panels	6
8.1 Substrate.....	6
8.2 Preparation and coating.....	6
8.3 Drying and conditioning.....	6
8.4 Thickness of coating.....	6
9 Procedure	6
9.1 Number of determinations.....	6
9.2 Ambient conditions.....	6
9.3 Adhesive.....	6
9.4 Test assemblies.....	7
9.4.1 Method A: General method (using two dollies) for testing both rigid and deformable substrates.....	7
9.4.2 Method B: Method for testing from one side only, using a single dolly (suitable for rigid substrates only).....	7
9.4.3 Method C: Method using dollies, one as a painted substrate.....	8
9.5 Measurement.....	9
9.5.1 Breaking strength.....	9
9.5.2 Nature of the fracture.....	9
10 Calculation and expression of results	9
10.1 Breaking strength.....	9
10.2 Nature of failure.....	10
10.3 Example.....	10
11 Precision	10
12 Test report	10
Bibliography	12

ISO/DIS 4624:2022(E)

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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This fourth edition cancels and replaces the third edition (ISO 4624:2016), which has been technically revised.

The main changes are as follows:

- [Clause 3](#) on terms and definitions has been added, including a normative reference to ISO 4618;
- additional information has been added to the single dolly method ([9.4.2](#)) that the test assembly shall be so that the substrate cannot go out of shape;
- the text has been editorially revised and the normative references have been updated.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document is one of two documents which describe methods for assessing the adhesion of a single coating or a multi-coat system of paint, varnish or related product by measuring the minimum tensile stress necessary to detach or to rupture the coating in a direction perpendicular to the substrate.

The test result is influenced not only by the mechanical properties of the system under test, but also by the nature and preparation of the substrate, the method of paint application, the drying conditions of the coating, the temperature, the humidity and other factors like the type of test instrument which has been used.

One other document for the evaluation of adhesion characteristics is ISO 2409.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 4624:2022](https://standards.iteh.ai/catalog/standards/sist/d3f8704d-ed1b-4346-b25f-49918c3911ec/osist-pren-iso-4624-2022)

<https://standards.iteh.ai/catalog/standards/sist/d3f8704d-ed1b-4346-b25f-49918c3911ec/osist-pren-iso-4624-2022>

Paints and varnishes — Pull-off test for adhesion

1 Scope

This document specifies three methods (i.e. one dolly or two dollies on a painted panel and two dollies, one as painted substrate) for determining the adhesion by carrying out a pull-off test on a single coating or a multi-coat system of paint, varnish or related product.

These test methods have been found useful in comparing the adhesion behaviour of different coatings. It is most useful in providing relative ratings for a series of coated panels exhibiting significant differences in adhesion.

The test may be applied using a wide range of substrates. Different procedures are given according to whether the substrate is deformable, for example thin metal, plastics and wood, or rigid, for example thick concrete and metal plates. To avoid distortion of the substrate during the tensile test, it is common to use a sandwich construction. For example, for special purposes, the coating may be applied directly to the face of a test dolly.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 test samples*

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

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

ISO 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

ISO 4618, *Paints and varnishes — Terms and definitions*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4618 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Principle

The product or system under test is applied at uniform thickness to flat panels of uniform surface texture.

After drying/curing the coating system, dollies are bonded directly to the surface of the coated, cured panel using an adhesive.

ISO/DIS 4624:2022(E)

After curing of the adhesive, the bonded dolly assemblies are placed in a suitable tensile tester. The bonded assemblies are subjected to a controlled tensile test (pull-off test), and the force required to break the coating/substrate bond is measured.

To avoid possible distortion of the substrate during the tensile test, dollies with a diameter smaller than the 2 cm diameter used for steel substrates may be used to reduce the force introduced.

The test result is the tensile stress necessary to break the weakest interface (adhesive failure) or the weakest component (cohesive failure) of the test assembly. Mixed adhesive/cohesive failures may also occur.

5 Apparatus

5.1 Tensile tester, suitable for carrying out the chosen procedure specified in [Clause 9](#). The tensile stress shall be applied in a direction perpendicular to the plane of the coated substrate and shall be increased at a substantially uniform rate, not greater than 1 MPa/s¹⁾ such that failure of the test assembly occurs within 90 s. Suitable designs for applying the tensile stress are shown in [Figures 1](#) and [2](#).

Instead of a tensile tester, other types of pull-off adhesion testers (mechanically, pneumatically, hydraulically or hand-driven) may be used provided that they give similar results. The type of instrument shall be reported in the test report, because hand-driven/mechanical/hydraulic instruments are reported to produce widely different results.

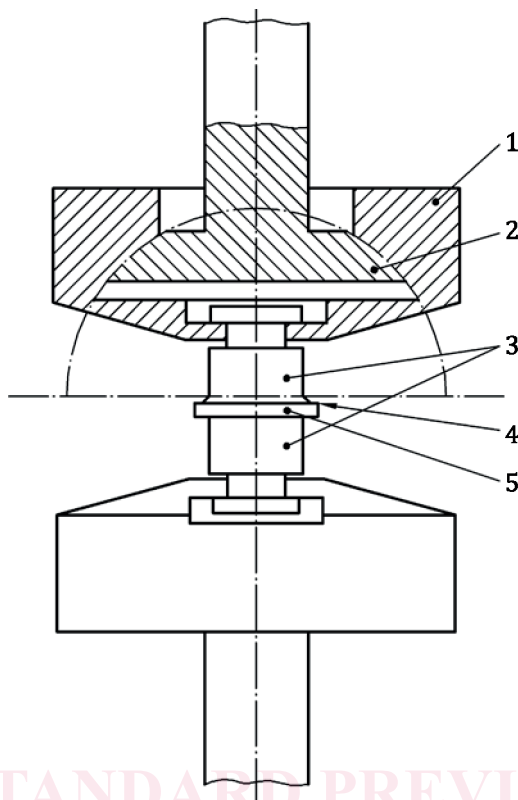
NOTE The results can be influenced by the test assembly used. Furthermore, the results are not reproducible unless coaxial alignment of the tensile forces is ensured.

ITeC STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 4624:2022](#)

<https://standards.iteh.ai/catalog/standards/sist/d3f8704d-ed1b-4346-b25f-49918c3911ec/osist-pren-iso-4624-2022>

1) 1 MPa/s = 1 MN/(m²·s).

**Key**

- 1 support
- 2 ball joint
- 3 dollies
- 4 coating
- 5 substrate

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 4624:2022](https://standards.iteh.ai/catalog/standards/sist/d3f8704d-ed1b-4346-b25f-49918c3911ec/osist-pren-iso-4624-2022)

<https://standards.iteh.ai/catalog/standards/sist/d3f8704d-ed1b-4346-b25f-49918c3911ec/osist-pren-iso-4624-2022>

Figure 1 — Example of a suitable test apparatus for the two-dolly methods described in 9.4.1 and 9.4.3 (methods A and C)