INTERNATIONAL STANDARD

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Adhesives — Test methods for the evaluation and selection of adhesives for indoor wood products —

Part 1: Resistance to delamination in non-severe environments

Adhésifs — Méthodes d'essai pour l'évaluation et la sélection des adhésifs destinés aux produits en bois pour l'usage intérieur —

Partie 1: Résistance à la délamination dans des environnements non sévères

Reference number
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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

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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 26842-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

ISO 26842 consists of the following parts, under the general title *Adhesives — Test methods for the evaluation and selection of adhesives for indoor wood products*:

— *Part 1: Resistance to delamination in non-severe environments*

— *Part 2: Resistance to delamination in severe environments*

Adhesives — Test methods for the evaluation and selection of adhesives for indoor wood products —

Part 1:
Resistance to delamination in non-severe environments

SAFETY STATEMENT — Persons using this document should be familiar with normal laboratory practice, if applicable. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any regulatory conditions.

It is recognized that some of the materials permitted in this document may have a negative environmental impact. As technological advances lead to more acceptable alternatives for such materials, they will be eliminated to the greatest extent possible.

At the end of the test, care should be taken to dispose of all waste in an appropriate manner in accordance with local regulations.

1 Scope

This part of ISO 26842 gives guidelines for the selection, by means of delamination-resistance tests, of adhesives for use in wood products placed in non-severe environments, indoors or during transport, in which the products are not exposed to extreme changes in temperature and humidity.

A series of exposure cycles at various temperatures and humidities is provided to verify that the adhesive selected, or a product bonded with the adhesive, meets the necessary requirements for resistance to delamination.

This part of ISO 26842 is intended to help the user not only to select a suitable adhesive but also to evaluate adhesives and adhesively bonded wood products.

NOTE When actual wood products are tested using this method, the test results may not be comparable due to the fact that the test laboratory will not normally have had adequate control over the way the product was assembled.

This part of ISO 26842 is not intended for use in the qualification of structural components.

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 6238, *Adhesives — Wood-to-wood adhesive bonds — Determination of shear strength by compressive loading*

ISO 9424, *Wood-based panels — Determination of dimensions of test pieces*

ISO 16999, *Wood-based panels — Sampling and cutting of test pieces*

3 Principle

Test specimens or actual products that have been bonded with the adhesive under test are placed in chambers at a specified temperature and humidity for a length of time and/or number of cycles depending on the delamination-resistance grade under consideration. On completion of this exposure, the length of any delamination at the bond line is determined as a percentage of the overall length. If the length of delamination does not exceed 10 %, the adhesive can be certified as complying, under the test conditions used, with the requirements of the delamination-resistance grade under consideration.

4 Apparatus

NOTE Apparatus may be available which includes the features of all the chambers specified in 4.1 to 4.4, in which case it will not be necessary to have one of each.

4.1 Conditioning chamber, capable of being maintained either at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 10) % or at a temperature of (27 ± 2) °C and a relative humidity of (65 ± 10) %.

4.2 Dry-heat chamber, capable of being maintained at a temperature of (40 ± 2) °C, with no provision for humidity control.

NOTE This temperature may be experienced in the bottom of ships sailing in tropical seas or on heated floors.

4.3 Cold chamber, capable of being maintained at a temperature of (–5 ± 3) °C, with no provision for humidity control.

NOTE This temperature may be experienced inside warehouses in cold latitudes.

4.4 Humidity chambers, capable of being maintained at relative humidities of 30 % and 85 %, and fitted with the following:

a) equipment capable of maintaining the temperature at (30 ± 2) °C and measuring it to within ± 2 °C;

b) equipment capable of measuring the relative humidity to within ± 3 %.

5 Specimens

5.1 Preparation and number

Test specimens shall be parallel two-ply laminates of dimensions 300 mm (width) × 300 mm (length) × 7,5 mm (thickness), prepared in accordance with ISO 6238 and ISO 16999 and measured in accordance with ISO 9424.

For each delamination-resistance grade and specific set of test conditions within the grade, a minimum of ten specimens is required.

If appropriate, actual adhesively bonded products can be tested using the test requirements and conditions specified in this part of ISO 26842. As these test specimens are from actual production, the maximum delamination requirements may need to be established for each particular combination of end-use conditions.

5.2 Conditioning

Prior to testing, condition all specimens in the conditioning chamber (4.1) at the standard atmospheric conditions of (23 ± 2) °C and (50 ± 10) % RH or (27 ± 2) °C and (65 ± 10) % RH for a minimum of 88 h.

For actual bonded products, 88 h may not be sufficient. In such cases, specimens shall be conditioned to the equilibrium moisture content corresponding to the specified end-use conditions.

Conditioning shall be carried out after the adhesive has been cured in accordance with the material specification or as specified by the manufacturer of the adhesive.

6 Delamination-resistance grades

Two delamination-resistance grades are specified, each representing a different type of use, i.e. the different conditions of temperature and humidity which different adhesively bonded wood products may experience in service:

— **delamination-resistance grade 1** applies to low-delamination-resistance indoor use (e.g. pencil boxes, coasters);

— **delamination-resistance grade 2** applies to medium-delamination-resistance indoor use (e.g. panels, cabinets, doors).

7 Delamination-resistance tests

The following four tests shall be used when testing to confirm a particular delamination-resistance grade:

— **Test A — Cyclic hot/cold test**, intended for testing using temperature variation only;

— **Test B — Cyclic humid/dry test**, intended for testing at a fixed temperature using humidity variation only;

— **Test C — Hot and humid test**, intended to represent the conditions of service or transport in tropical regions;

— **Test D — Hot and dry test**, intended to represent the conditions of service or transport in desert regions.

Details of these tests are given in Tables 1 and 2.

Usually, test A and test B are required, while test C and test D can be added in order to confirm the performance of the adhesive under specific conditions of service or transport.

8 Procedure

Select a delamination-resistance grade based on the conditions in which the wood product is expected to be used (see Clause 6) and then select suitable delamination-resistance tests based on the expected meteorological conditions of service and transport (see Clause 7).

Conduct the delamination-resistance tests in accordance with Table 1 and Table 2, placing the test specimens in the chamber appropriate to the particular test and making sure that the grain direction of the wood is oriented in the direction of the flow of air in the chamber:

— For test A, place the specimens in a cold chamber (4.3) for the specified length of time, then immediately transfer them to a dry-heat chamber (4.2) for the specified length of time. Carry out the number of cycles specified in Table 1.

— For test B, place the specimens in a humidity chamber (4.4) at the higher humidity for the specified length of time, then immediately transfer them to a humidity chamber (4.4) at the lower humidity for the specified length of time. Carry out the number of cycles specified in Table 1.

— For tests C and D, place the specimens in a humidity chamber (4.4) for the specified length of time.

Except when transferring the specimens from one chamber to another, do not remove them from the chamber until the test has been completed.

At the end of the final test period, measure and record the total length of delamination of each specimen at the bond line.

Table 1 — Delamination-resistance grades

Delamination-resistance grade	Delamination-resistance tests and test conditions							
	Test A		Test B		Test C		Test D	
1	A3	1 cycle	B2	1 cycle	C2	7 days	D2	7 days
2	A3	5 cycles	B2	2 cycles	C2	14 days	D2	14 days

Table 2 — Delamination-resistance tests and test conditions

Test cycle	Conditions for 1 cycle
A3	–5 °C for 4 h/40 °C for 4 h
B2	30 °C, 85 % RH for 2 days/30 °C, 30 % RH for 5 days
C2	30 °C, 85 % RH
D2	30 °C, 30 % RH

9 Assessment of the delamination-resistance grade chosen

At the end of the test period specified in Table 1, visually examine each specimen. Immediately measure and record, to the nearest 1 mm, the length of any delamination (bond line separation) in each of the four edge faces of each specimen. Calculate the total delamination length by adding together the individual delamination lengths recorded for the bond lines in the edge faces of all the specimens.

If the percentage delamination, i.e. the total delamination length divided by the total length of the bond lines in all four edge faces of all the specimens multiplied by 100, does not exceed 10 %, the adhesive tested can be certified as having, for the specific set of test conditions used, the delamination-resistance grade initially selected.

10 Test report

The test report shall include the following particulars:

a) a reference to this part of ISO 26842 (ISO 26842-1);

b) all details necessary for the identification of the adhesive tested;

c) (if actual wood products were tested) all details necessary for the identification of the products tested;

d) (if test specimens were prepared) the type of wood used to prepare the specimens;

e) the method of application of the adhesive and the drying or curing conditions, as applicable, including the temperature and pressure;

f) the number of specimens tested and the conditions under which the specimens were conditioned before testing;

g) the delamination-resistance grade to which the specimens were tested and the specific delamination-resistance tests carried out (see Table 1);

h) the percentage delamination measured after the test and the result of the assessment of the delamination-resistance grade chosen;

i) the date(s) of testing.

Annex A gives an example of a report form which may be used to record the results.