
**Adhesives — Classification of
thermoplastic wood adhesives for
non-structural applications**

*Adhésifs — Classification des colles thermoplastiques pour bois à
usages non structuraux*

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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.

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 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 the following URL: www.iso.org/iso/foreword.html.

ISO 19209 was prepared by CEN/TC 193 as EN 204:2016 and was adopted (without modification) by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

Introduction

International Standards giving a common classification with respect to durability classes for wood adhesives allow considerable improvement in consumer protection in any future product liability system with regard to properties guaranteed by the adhesive manufacturer.

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Adhesives — Classification of thermoplastic wood adhesives for non-structural applications

1 Scope

This document classifies thermoplastic resin-based wood adhesives for non-structural applications into durability classes D1 to D4 based on the dry and wet strengths of bond lines measured under specified conditions after various conditioning treatments.

For special applications, further tests that do not fall within the scope of this document can be applicable.

The adhesives specified in this document are suitable for the bonding of furniture and interior structures, panelling, doors, windows, stairs, etc. made of wood or derived timber products.

This document does not specify the temperature resistance of bond lines.

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 19210, *Adhesives — Wood adhesives for non-structural applications — Determination of tensile shear strength of lap joints*

EN 923, *Adhesives — Terms and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 923 and the following apply.

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

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

3.1

thermoplastic resin

thermoplast

polymer or copolymer capable of being softened by heating and hardened by cooling

[SOURCE: EN 923:2005+A1:2008, 2.2.8, modified — Note 1 to entry has been removed.]

3.2

thermoplastic wood adhesive

adhesive whose main constituent is a thermoplastic resin and which has been formulated for bonding wood

4 Classification

An adhesive shall be classified in accordance with [Table 1](#), which gives examples of climatic conditions and fields of application in which the bonded member is to be used. The classification shall be based on tests on thin bond lines as defined in ISO 19210.

Table 1 — Description of durability classes

Durability class	Examples of climatic conditions and fields of application
D1	Interior, in which the moisture content of the wood does not exceed 15 %
D2	Interior with occasional short-term exposure to running or condensed water and/or to occasional high humidity provided the moisture content of the wood does not exceed 18 %
D3	Interior with frequent short-term exposure to running or condensed water and/or to heavy exposure to high humidity; exterior not exposed to weather
D4	Interior with frequent long-term exposure to running or condensed water; exterior exposed to weather but with protection by an adequate surface coating

5 Test method

The adhesive shall be tested in accordance with ISO 19210 and as follows:

- bond lines shall be tested according to their assigned durability class (see [Table 1](#));
- the tests shall be performed using the appropriate conditioning sequence given in [Table 2](#);
- the individual strength values, τ , in N/mm² rounded to 0,1 N/mm² and the mean value of the 20 test pieces for each conditioning sequence shall be recorded. Results from tests in which failure occurred in the wood at values below the specified minimum are invalid. Test pieces that are twisted, bended or showing other irregularities in form are valid if they reach the requirements; otherwise, or if visual examination shows that the adhesive was not correctly applied, the results are invalid. All results, valid or invalid, shall be reported. Explanation of the invalid values shall be reported.

The standard atmosphere used as a control climate is either (20 ± 2) °C and (65 ± 5) % relative humidity (20/65) or (23 ± 2) °C and (50 ± 5) % relative humidity (23/50).

6 Requirements

When tested in accordance with ISO 19210, the mean strength of an adhesive shall conform to the values shown in [Table 2](#).

Table 2 — Minimum values of adhesives strength for thin bond lines

Conditioning sequences		Adhesive strength in N/mm ² Durability classes			
Sequence number	Duration and condition	D1 ^c	D2 ^c	D3 ^c	D4 ^c
1	7 days ^a in standard atmosphere ^b	≥10	≥10	≥10	≥10
2	7 days in standard atmosphere 3 h in water at (20 ± 5) °C 7 days in standard atmosphere	—	≥8	—	—
3	7 days in standard atmosphere 4 days in water at (20 ± 5) °C	—	—	≥2	≥4
4	7 days in standard atmosphere 4 days in water at (20 ± 5) °C 7 days in standard atmosphere	—	—	≥8	—
5	7 days in standard atmosphere 6 h in boiling water 2 h in water at (20 ± 5) °C	—	—	—	≥4

In each conditioning sequence, specimens shall change from one step to another immediately (not gradually). For the conditioning sequences 3 and 5, the specimens shall be tested in wet state after removing them from water.

NOTE 1 The 7 days in standard atmosphere are included in the conditioning time mentioned in ISO 19210:2017, 7.2.

NOTE 2 A longer conditioning time between gluing and testing might be necessary as advised by the adhesive manufacturer.

NOTE 3 The number used in the designation does not indicate ranking order. A given adhesive can be assigned to more than one durability class.

^a 1 day denotes 24 h.

^b (20 ± 2) °C and (65 ± 5) % relative humidity or (23 ± 2) °C and (50 ± 5) % relative humidity.

^c All minimum values indicated in the columns of durability classes D1 to D4 shall be reached as mean values for the classification of an adhesive (for example, for D4, the conditioning sequences are 1, 3 and 5).

— = no test required.