

Australian/New Zealand Standard™

Adhesives for timber and timber products

Part 1: Adhesives for manufacture of plywood and laminated veneer lumber (LVL)



AS/NZS 2754.1:2016

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Australian Wood Panels Association
Building Research Association of New Zealand
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PREFACE

This Australian/New Zealand Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TM-011, Engineered Timber Products.

The objectives of this Standard are to—

- (a) provide the specifications for adhesives suitable for use in the plywood and laminated veneer lumber (LVL) manufacturing industry;
- (b) incorporate the technical content of AS 2754.1—1985, *Adhesives for timber and timber products*, Part 1: *Adhesives for plywood manufacture*;
- (c) include non-formaldehyde-based adhesives for use in non-structural, interior applications; and
- (d) develop the document as a Joint Australian/New Zealand Standard.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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Australian/New Zealand Standard
Adhesives for timber and timber products

Part 1: Adhesives for manufacture of plywood and laminated veneer lumber
(LVL)

1 SCOPE

This Standard specifies requirements for adhesives suitable for use in the plywood and laminated veneer lumber (LVL) manufacturing industry, the criterion for suitability being the ability of an adhesive to produce bonded plywood and LVL products of defined types quality and durability under a range of exposure conditions and structural and non-structural conditions.

Table 1 provides details of the relationship between the standardized bond types A, B, C and D, the adhesive chemical type required for the bond type and the service conditions applicable to the four bond types. Pre-treatment requirements for each bond type are also specified in Table 1.

The Standard does not specify the bond test methods which are detailed in AS/NZS 2098.2. Test requirements for pH, non-volatile solids content, viscosity, gelation time and bond quality are also specified in the Standard.

2 NORMATIVE REFERENCES

The following documents are indispensable to the application of this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS

2162 Verification and use of volumetric apparatus

2162.1 Part 1: General—Volumetric glassware

2244 Laboratory glassware—Test tubes

AS/NZS

2098 Methods of test for veneer and plywood

2098.2 Part 2: Bond quality of plywood (chisel test)

2245 Laboratory glassware—Filter funnels

4491 Timber—Glossary of terms in timber-related Standards

ASTM

D5895 Standard test methods for evaluating drying or curing during film formation of organic coatings using mechanical recorders

BS

1647 pH measurement—Specification for pH scale (all Parts)

3145 Specification for laboratory pH meters

ISO

3696 Water for analytical laboratory use—Specification and test methods

3 DEFINITIONS

For the purpose of this Standard, the definitions given in AS/NZS 4491, and the one below apply.

3.1 Adhesives, plywood or LVL

Those adhesives in use in the plywood and LVL manufacturing industry, which are based on synthetic phenol-formaldehyde, natural polyphenol-formaldehyde, melamine-formaldehyde and urea-formaldehyde resins, and mixtures thereof.

NOTE: Polyvinyl acetate (PVA) and isocyanate/polyurethane adhesives are included for interior non-structural applications.

4 CLASSIFICATION OF ADHESIVES

The adhesives shall be classified according to their ability to produce bond types in plywood. Bond types A, B, C and D are classified in Table 1 in terms of their long-term durability under a range of service conditions, adhesive types and water soak treatments.

NOTES:

- 1 Where adhesives other than those specified in Table 1 are being considered, the criteria for long-term performance should be based on Bulletin No. 38 'The efficiency of adhesives for wood'.
- 2 This Standard should be read in conjunction with the test methods specified in AS/NZS 2098.2.

5 SAMPLING

Selection of the adhesive or resin sample shall be such that it is representative of the batch of resin or mixed adhesive.

6 TEST CONDITIONS

Unless otherwise specified, testing shall be carried out at a temperature of $23 \pm 2^{\circ}\text{C}$.

7 PRODUCT INFORMATION

Information shall be supplied to specify the allowable limits on specific gravity, viscosity, non-volatile matter (solids) and gelation time of resin and mixed adhesive for each specific adhesive formulation.

The method for the determination of gelation time is given in Appendix A.

NOTES:

- 1 These limits are a matter for agreement between the adhesive manufacturer and the purchaser.
- 2 The method used for determining viscosity should be in accordance with Appendix B or by means of a flow cup if this method is agreed to between the adhesive manufacturer and the purchaser.
- 3 The method for the determination of non-volatile matter (solids) is given in Appendix C.
- 4 Tests should be carried out within 72 h of receipt of the adhesive components/mixed adhesive.

All necessary information on bonding procedures such as mixing, spreading, open and closed assembly times, prepress and press times, temperatures and pressures as well as thickness and range of moisture content, and the bond type(s) that can be expected to be produced, shall be supplied. Recommendation on the conditions for storage and the expected shelf life under the storage conditions shall also be provided.

8 TEST REQUIREMENTS

8.1 Testing of pH of mixed adhesive

When determined in accordance with Appendix D, the pH of the mixed adhesive shall be not less than 2.

8.2 Bond quality of assemblies

8.2.1 *Tested dry*

When prepared and tested in accordance with Appendix E, the bond quality of the dry specimen shall be a minimum of 5 in every glueline.

8.2.2 *Tested wet*

When prepared as specified in Appendix E and tested in accordance with Appendix F, the bond quality of the wet specimen shall be a minimum of 5 in every glueline.

NOTE: This minimum exceeds that specified in plywood product Standards AS/NZS 2269, AS/NZS 2270, AS/NZS 2271, and AS/NZS 2272, in order to make allowance for the close control of conditions in the laboratory as compared with the plywood mill.

9 LABELLING

Where containers such as bags or drums are used, they shall be legibly marked with the following information:

- (a) Manufacturer's name or registered trade name or trademark.
- (b) Description of material, including adhesive type (see Table 1) and formulation number.
- (c) Date of manufacture.
- (d) Batch number.
- (e) Expiry date under recommended storage conditions.
- (f) Reference to the manufacturer's instructions for use.

Where tankers are used for transport, the above information shall be included in the accompanying documentation.

Notwithstanding the above requirements, labelling shall comply with any relevant statutory requirements.

NOTE: Manufacturers making a statement of compliance with this Australian/New Zealand Standard on adhesive containers, on packaging or on literature related thereto are advised to ensure that such compliance is capable of being verified.

TABLE 1
BOND TYPE CLASSIFICATION

Bond type	Service condition	Adhesive type (see Note 2)	Water soak treatment (prior to testing to AS/NZS 2098.2)	
			Temperature	Time
A	Type A bonded plywood panels can be used in applications involving extreme long-term exposure to weather or wet or damp conditions and/or long-term structural performance requirements without glueline breakdown or glueline creep. Examples: Structural plywood flooring, highway signs, exterior cladding, marine plywood and scaffold planks.	Synthetic phenol-formaldehyde, natural polyphenol-formaldehyde, resorcinol formaldehyde or mixtures thereof	100°C	72 h +1h, –0 or 6 h at 200 kPa steam pressure
B	Type B bonded plywood panels can be used in applications involving extreme short-term (not more than two years) exposure to weather or wet or damp conditions and/or short-term structural performance without glueline breakdown or glueline creep. They can also be used in applications involving long-term exposure to protected exterior non-structural environments. Examples: Concrete formwork, exterior door skins.	Melamine-urea-formaldehyde	100°C	6 h +5, –0 min
C	Type C bonded interior plywood panels can be used in non-structural applications involving full protection from the weather or wet or damp conditions. They can be used in applications involving long-term exposure to generally high humidity and short-term exposure to extremely high humidity. Examples: Interior panelling in geographical locations that have prolonged periods of high humidity. Panelling in a bathroom.	Urea-formaldehyde Polyvinyl acetate (PVA) Isocyanate/polyurethane	70 ±1°C	3 h +5, –0 min
D	Type D bonded plywood panels can be used in non-structural interior applications fully protected from the weather or wet or damp conditions. They can be used in interior applications involving long-term exposure to medium humidity with occasional exposure to high humidity. Examples: Furniture, interior wall panelling.	Extended urea-formaldehyde Polyvinyl acetate (PVA) Isocyanate/polyurethane	15°C to 20°C	16 h to 24 h

NOTES:

- 1 Experience has shown that Type A bonded plywood will withstand complete exposure to the weather for 30 years or maintain its integrity in structural situations for 50 years without glueline breakdown or glueline creep.
- 2 With adhesives of other chemical types, compliance with the test requirements alone would not indicate equal durability, and confirmation by actual service trials would be required.
- 3 The equivalency with ISO 12465 is as follows:
 - (a) Type A bonds as defined herein are appropriate for Exposure 3—High humidity/exterior conditions
 - (b) Type B bonds as defined herein are appropriate for Exposure 2—Tropical dry/humid conditions
 - (c) Types C and D bonds as defined herein are appropriate for Exposure 1—Dry conditions