

AS/NZS 1604.2:2021



Australian/New Zealand Standard™

Preservative-treated wood-based products

Part 2: Verification requirements



AS/NZS 1604.2:2021

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee TM-012, Timber Grading and Preservation. It was approved on behalf of the Council of Standards Australia on 24 March 2021 and by the New Zealand Standards Approval Board on 03 March 2021.

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- Australian Timber Importers Federation
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- Engineered Wood Products Association of Australasia
- Forest and Wood Products Australia
- Forestry Corporation of NSW
- Glued Laminated Timber Association of Australia
- Ministry of Business, Innovation and Employment (NZ)
- National Centre for Timber Durability and Design Life
- NATSPEC
- New Zealand Timber Industry Federation
- New Zealand Timber Preservation Council
- New Zealand Wood Processors Association
- Responsible Care New Zealand
- Scion
- Tasmanian Timber Promotion Board
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Part 2: Verification requirements

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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TM-012, Timber Grading and Preservation.

The objective of this Standard is to present minimum product verification requirements for preservative-treated wood-based products. Alternative verification methods are presented to meet the needs of 1st, 2nd and 3rd parties. These methods allow for both quantitative and qualitative test results.

This Standard is part of a series on preservative-treated wood-based products as follows:

AS/NZS 1604.1, *Preservative-treated wood-based products, Part 1: Products and treatment*

AS/NZS 1604.2, *Preservative-treated wood-based products, Part 2: Verification requirements*

AS/NZS 1604.3, *Preservative-treated wood-based products, Part 3: Test methods*

This document is referenced in AS/NZS 1604.1 and its requirements apply to preservative-treated wood-based products claimed to be produced in accordance with that Standard. This document also refers to AS/NZS 1604.3 as the basis for testing preservative retention and penetration in treated wood-based products.

AS/NZS 1604.1 prescribes preservative-treated wood-based products by defining and setting requirements for the following characteristics:

- (a) Preservative retention.
- (b) Preservative penetration.
- (c) Natural durability (timber species).
- (d) Traceability and marking.

The verification requirements herein can provide confidence that the above characteristics conform to the requirements of AS/NZS 1604.1. This standard does not provide a means of verifying the durability performance of preservative-treated wood-based products.

Preservative-treated wood-based products may also be subject to requirements not within the scope of AS/NZS 1604.1. For instance, these products may also require specific structural properties, appearance, moisture content and utility requirements. These characteristics are not covered in this Standard and where requirements for these characteristics need to be verified, reference should be made to the relevant product and/or verification Standard.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is for information and guidance only.

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Australian/New Zealand Standard

Preservative-treated wood-based products

Part 2: Verification requirements

Section 1 Scope and general

1.1 Scope

This Standard specifies minimum requirements for verifying the conformance of preservative-treated wood-based products to AS/NZS 1604.1.

1.2 Application

This Standard shall be applied to make a statement regarding conformance of preservative-treated wood-based products with AS/NZS 1604.1 whereby:

- (a) Products classified as “verified”, using the requirements herein, shall be claimed to be in conformance with AS/NZS 1604.1.
- (b) Products classified as “conditionally verified”, using the requirements herein, shall be subject to additional conditions, which may include further verification activities. After two consecutive “conditionally verified” results, the products being verified shall not be claimed to be in conformance with AS/NZS 1604.1.
- (c) Products classified as “not verified”, using the requirements herein, shall not be claimed to be in conformance with AS/NZS 1604.1.

NOTE The following normative and informative appendices are provided to support the assessment of conformance, as referenced in [Clause 2](#):

- (a) [Appendix A](#) — Reference method for verifying penetration and retention.
- (b) [Appendices B, C and D](#) — Deemed to satisfy methods that have been calibrated to give a similar retention verification outcome.
- (c) [Appendix E](#) — Methods for verifying natural durability (timber species) and marking.
- (d) [Appendix F](#) — Guidance on sampling.
- (e) [Appendix G](#) — Guidance on interpreting verification outcomes.
- (f) [Appendix H](#) — Requirements for sampling and preparation of test specimens.
- (g) [Appendix I](#) — Worked examples for retention verification using [Appendices A, B, C and D](#).

1.3 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:

AS 5604, *Timber — Natural durability ratings*

AS/NZS 1604.1, *Preservative-treated wood-based products, Part 1: Products and treatment*

AS/NZS 1604.3, *Preservative-treated wood-based products, Part 3: Test methods*

AS/NZS 4491, *Timber — Glossary of terms in timber-related Standards*

1.4 Terms and definitions

For the purpose of this Standard, the definitions given in AS/NZS 4491, AS/NZS 1604.1 and those below apply. Where the definitions in this Standard differ from those given in AS/NZS 4491 those below apply.

1.4.1

batch

quantity of preservative-treated wood-based products of the same product type produced by the same process over a specified period of time, or a supplied parcel or shipment of preservative-treated wood-based products of the same product type, treatment chemical(s) and hazard class

1.4.2

batch monitoring

testing and analysis of a sample taken only from a specified batch of timber to infer the preservative-treated characteristics of the entire batch

1.4.3

continuous monitoring

testing and analysis of one or more preservative-treated wood-based product characteristics, intended to ensure that the product has the required characteristics by using a specified sampling rate

1.4.4

cumulative sum

CUSUM

statistical procedure that is used to verify preservative-treated wood-based product requirements

1.4.5

may

indicates the existence of an option

1.4.6

sample

defined quantity of timber specimens selected from a batch

1.4.7

shall

indicates that a statement is mandatory

1.4.8

should

indicates a recommendation

1.4.9

specimen

single piece of preservative-treated wood-based product, from a sample, used for testing purposes

1.4.10

test comparison value

TCV

1.4.10.1

verified test comparison value

minimum value for a test result to provide designated confidence that the characteristic from the preservative-treated wood-based product is above the requirement of AS/NZS 1604.1

1.4.10.2

not verified test comparison value

maximum value for a test result to provide designated confidence that the characteristic from the preservative-treated wood-based product is below the requirement of AS/NZS 1604.1

1.4.11**verification**

process for demonstrating that preservative-treated wood-based products conform to AS/NZS 1604.1

1.5 Notation

For the purpose of this Standard, the following notation applies:

i	=	numerical ranking of a specimen or sample in a data set or series of samples
k	=	CUSUM constant
k_s	=	sampling factor, a function of test and analysis methods and confidence level
m	=	mean on $\ln(X)$
n	=	number of tests performed
$R_{0.10}$	=	tenth percentile value of the preservative retention of the data
RC_{Target}	=	target preservative retention for CUSUM analysis
R_g	=	factor for setting target production preservative retention value
s	=	standard deviation of $\ln(X)$
TCV	=	test comparison value
T_R	=	target value specified for preservative retention
TV_R	=	target production retention value
V	=	coefficient of variation
X	=	a collective set of retention results comprising $X_1, X_2, \dots, X_N$ individual results
y	=	CUSUM constant
z	=	CUSUM constant

Section 2 Verification

2.1 General

Preservative-treated wood-based products shall be deemed “verified” where the preservative penetration, preservative retention, natural durability and marking requirements are all assessed according to the requirements of [Clauses 2.2, 2.3 and 2.4](#) and determined to be “verified”.

If any one product characteristic is determined to be “not verified”, it is not necessary to continue further testing of other characteristics of the product.

Retention testing shall be conducted on material that has met the penetration requirements.

2.2 Verification of preservative penetration and retention

2.2.1 Verification method selection

Preservative penetration shall be verified using the method in [Appendix A](#).

Preservative retention shall be verified using one of the methods from [Appendix A, B, C or D](#).

NOTE 1 Worked examples showing the application of these appendices are provided in [Appendix I](#).

Other verification methods may be used, provided confidence in the batch verification result can be shown to equal or exceed that of the methods presented in this Standard.

Where a verification method is used repeatedly, it shall be updated in response to feedback from the check on verification method requirements given in [Clause 2.3](#).

Where a significant change to a treatment process occurs, the verification process shall be reviewed and updated.

In the event of any dispute concerning verification, the verification method given in [Appendix A](#) shall be considered as the reference method for both penetration and retention.

NOTE 2 Multiple retention verification methods are provided as the needs of the verifying party may vary. Some parties may prefer batch monitoring while others may prefer continuous monitoring. The nature of test results from AS/NZS 1604.3 may also govern verification method selection as quantitative and qualitative (categorical or binary type results) test data may apply.

NOTE 3 Verification may be determined using an analysis of a discrete batch, a series of discrete batches or rolling batches where the batches analysed are indexed by consecutive samples.

NOTE 4 [Appendix G](#) provides guidance on interpreting verification outcomes.

2.2.2 Minimum specimen retention requirement

In applying [Appendix A, B, C or D](#), any specimens that are part of an assessment contributing to a verified or conditionally verified retention outcome, but do not meet the specified retention requirements of AS/NZS1604.1, shall have a minimum retention of 66 % of the required retention. Where this requirement is not met, the verification outcome shall be “not verified”.

2.2.3 Sampling and test specimens

Requirements for sampling and the preparation of test specimens from preservative-treated wood-based product samples shall be as specified in [Appendix H](#). Sampling and testing shall be in accordance with the following:

- (a) [Appendix A](#) — Specimen pass rate assessment.
- (b) [Appendix B](#) — Testing and analysis.
- (c) [Appendix C](#) — Conservative production parameters.
- (d) [Appendix D](#) — CUSUM analysis.

NOTE For general product sampling information and guidance, see [Appendix F](#).

2.2.4 Testing

All testing of specimens selected from each sample shall be undertaken using well-maintained and calibrated test equipment, trained staff and standard test procedures.

The test equipment shall be calibrated at least annually and shall be traceable to a certified reference source.

Preservative penetration and retention tests shall be conducted in accordance with AS/NZS 1604.3.

NOTE Test equipment includes timber and process-measuring devices.

2.3 Check of verification method for penetration and retention

2.3.1 General

The verification methods used for preservative penetration and retention shall be checked, by sampling and testing the verified timber, at least once per year.

NOTE The purpose of this check is to check the calibration of the verification method so that adjustments can be made if necessary to maintain confidence in the verification of treated timber.

2.3.2 Sampling

A sample comprising at least 40 specimens of a single high-volume preservative-treated wood-based product (same size, grade and hazard class) shall be obtained for the verification method being checked.

The specimens shall be cumulatively drawn from batches that have met the requirements of this Standard (see [Clause 1.2](#)).

Where the product contains a mix of species, the proportion of species in the sample shall be similar to that in a normal batch.

Where the product has been assessed as “not verified”, any specimens taken during this period or from this batch shall not be included in the cumulatively drawn sample.

2.3.3 Testing

The preservative-treated wood-based product samples shall be tested for preservative penetration and retention in accordance with AS/NZS 1604.3.

There are two test stages of testing as follows:

- (a) First stage — A minimum of 20 specimens shall be selected at random from the accumulated sample and tested. Test results shall be evaluated as described in [Clause 2.3.4](#).

NOTE Where both the preservative penetration and retention meet or exceed the requirements of AS/NZS 1604.1, there is no need to progress to the second stage.

- (b) Second stage — If the first stage testing gave preservative penetration or retention that did not meet or exceed the requirements of AS/NZS 1604.1, the remaining specimens in the sample shall be then tested for penetration and retention.

The results of the first and second stage tests shall be pooled to give a single data set.

2.3.4 Evaluation

2.3.4.1 Preservative penetration

The preservative penetration characteristic shall be evaluated as follows:

- (a) Where at least 18 of the 20 preservative penetration test specimens conform to the penetration requirement of AS/NZS 1604.1, the result shall be a “pass” for preservative penetration.
- (b) Where less than 18 of the 20 preservative penetration test specimens conform to the penetration requirement of AS/NZS 1604.1, the result shall be a “fail” for preservative penetration.

2.3.4.2 Preservative retention

The 35th percentile preservative retention of the test specimens shall be evaluated using a statistically appropriate fit through all of the test data. Where there is insufficient information to reliably establish the distribution type, a non-parametric distribution shall be used. The coefficient of variation of preservative retention shall be calculated as the standard deviation of all preservative retention results divided by the mean preservative retention.

The check retention value shall be:

- (a) For verification using [Appendices A, B and D](#), the retention value presented in AS/NZS 1604.1.
- (b) For verification using [Appendix C](#), R_g times the retention value presented in AS/NZS 1604.1.

The preservative retention characteristic shall be evaluated as follows:

- (i) Where the 35th percentile retention ($R_{0.35}$) is greater than or equal to the check retention value, AND no value is less than 66 % of the retention value presented in AS/NZS 1604.1, the result shall be a “pass” for preservative retention.
- (ii) Where the 35th percentile retention ($R_{0.35}$) is less than the check retention value, OR any value is less than 66 % of the retention value presented in AS/NZS 1604.1, the result shall be a “fail” for preservative retention.

2.3.5 Results

The result of the check of verification method shall be a “pass” only if both preservative retention and penetration give “pass” results. Otherwise, the result shall be a “fail”.

A “pass” result shall be interpreted as meaning that the verification method does not require modification.

A “fail” result shall be interpreted as meaning that the verification method requires some modification and it shall be modified before further product is classified as verified.

NOTE 1 A “fail” result does not imply that verified product produced during the period over which the sample for the check was taken is no longer verified.

NOTE 2 A “pass” result may also imply that the verification method is conservative and requires adjustment.

2.4 Verification of marking and natural durability

Marking of preservative-treated wood-based products and the natural durability characteristics of the timber species used in those products shall be verified using the method for sampling, testing and analysis specified in [Appendix E](#). Conformance to the specified limits shall indicate a verified characteristic.

2.5 Records

Records shall be maintained to support any claim that preservative-treated wood-based product has been verified to this Standard. This shall include documentation of the methods used, sampling, testing and analysis undertaken, results obtained and decisions made.

Appendix A (normative)

Specimen pass rate assessment

A.1 General

This appendix sets out the method for the combined verification of penetration and retention using an assessment of specimen pass rates per sample of preservative-treated wood-based product.

This appendix may also be used for verification of penetration only, in conjunction with verification of retention using [Appendix B](#), [C](#) or [D](#). In such cases, only the requirements herein relevant to penetration shall apply.

Retention testing shall be conducted on material that has met the penetration requirements.

A.2 Sampling

The sample shall be sufficient in size to determine, with acceptable confidence, the preservative penetration and retention characteristics of the batch it represents.

The sample size (n) shall be at least 10 using a sampling rate that gives more than one specimen per 2 000 output pieces of preservative-treated wood-based product.

NOTE 1 Additional specimens are to be accumulated for the check of verification method (see [Clause 2.3](#)).

NOTE 2 Guidance on sampling is given in [Appendix F](#).

A.3 Testing

Ten specimens shall be obtained from the sample and individually tested in accordance with the test methods in AS/NZS 1604.3.

A.4 Verification

A.4.1 General

The criteria specified in [Clause A.4.2](#) shall be used to determine the preservative penetration and retention verification status. Batch verification shall be based on the verification outcomes for penetration and retention as shown in [Figure A.1](#). The “conditionally verified” status of a batch shall be interpreted, for the purpose of releasing product, as “verified” if the previous batch status was “verified”. Otherwise, it shall be interpreted as “not verified”.

A.4.2 Verification status

A.4.2.1 Verified

The following criteria apply:

- (a) *Penetration* — “Verified” status shall apply where 9 or 10 specimens meet the penetration requirements of AS/NZS 1604.1.

- (b) *Retention* — “Verified” status shall apply where 9 or 10 of the verified penetration specimens meet the retention requirements of AS/NZS 1604.1 and no specimen has less than 66 % of the required retention.

A.4.2.2 Conditionally verified

The following criteria apply:

- (a) *Penetration* — A “conditionally verified” status shall apply where 8 specimens meet the penetration requirements of AS/NZS 1604.1.
- (b) *Retention* — A “conditionally verified” status shall apply where 8 of the verified or conditionally verified penetration specimens meet the retention requirement of AS/NZS 1604.1 and no specimen has less than 66 % of the required retention.

A.4.2.3 Not verified

The following criteria apply:

- (a) *Penetration* — A “not verified” status shall apply where less than 8 specimens meet the penetration requirements of AS/NZS 1604.1.
- (b) *Retention* — A “not verified” status shall apply where less than 8 of the verified or conditionally verified penetration specimens meet the retention requirement of AS/NZS 1604.1 or if any specimen has less than 66 % of the required retention.

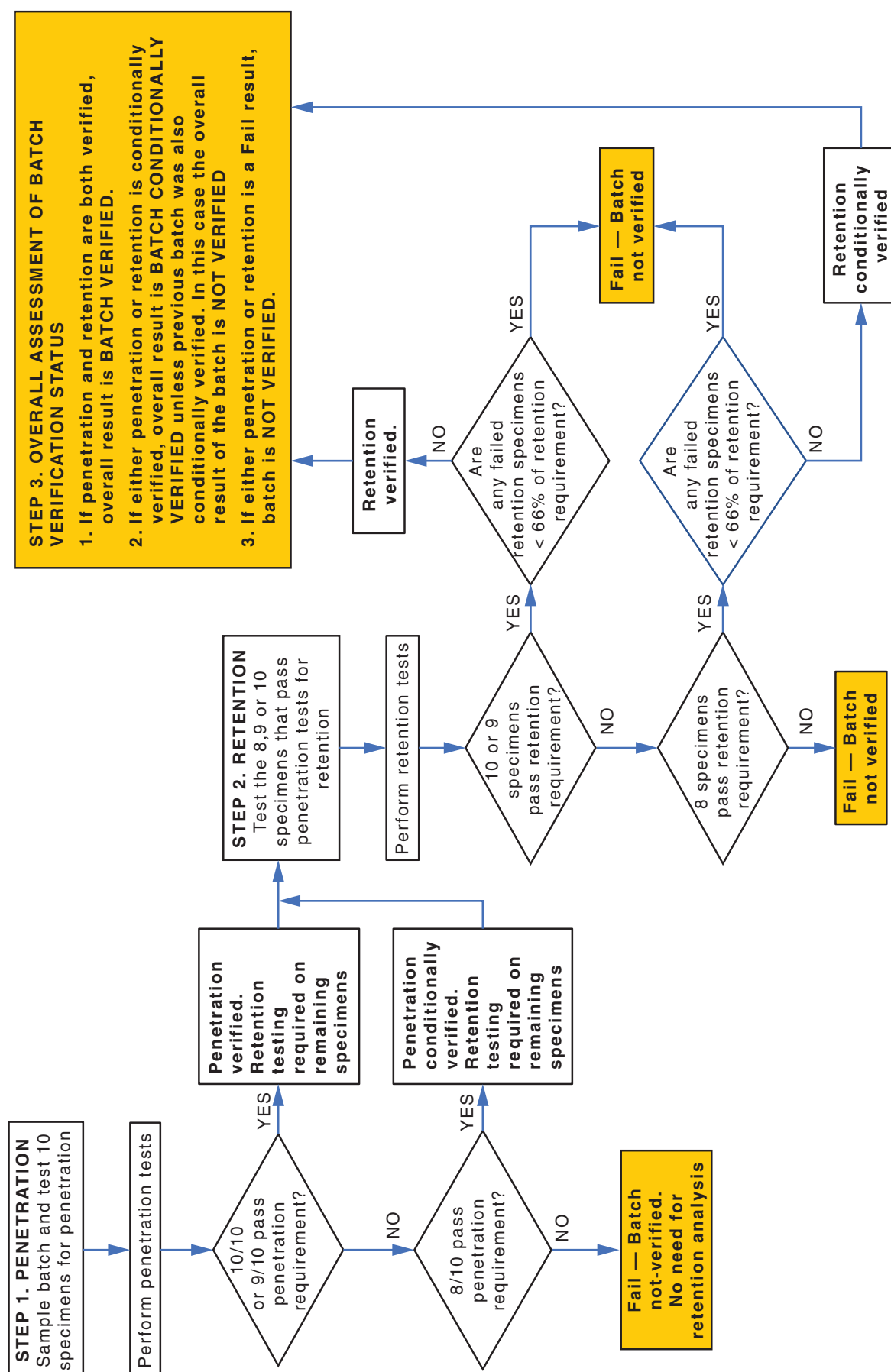


Figure A.1 — Verification flowchart for the specimen pass rate method

Appendix B (normative)

Testing and analysis

B.1 General

This appendix provides for the verification of retention in preservative-treated wood-based products by testing specimens from a sample of product drawn from a supplied or manufactured batch, and then analysing the test data using a procedure appropriate for the type and frequency of testing. It is applicable to batch monitoring or continuous monitoring and requires quantitative test results.

Penetration shall be verified in accordance with [Appendix A](#).

Retention testing shall be conducted on material that has met the penetration requirements.

B.2 Sampling

The number of specimens shall be sufficient in total to determine, with acceptable confidence, the preservative retention characteristics of the batch the samples represent, as follows:

- (a) For batch monitoring, the sample size (n) shall be the number of specimens taken from the batch sample.
- (b) For continuous monitoring, the sample size (n) shall be at least 10 and not more than 20, using a sampling rate that gives more than one specimen per 2 000 output pieces of preservative-treated wood-based product.

NOTE 1 Guidance on sampling is given in [Appendix E](#).

NOTE 2 Additional specimens are to be accumulated for the check of verification method (see [Clause 2.3](#)).

B.3 Testing

All testing shall be in accordance with the standard test methods in AS/NZS 1604.3.

B.4 Verification of retention — Option 1

B.4.1 General

This method applies a log-normal distribution fit to a sample of n discrete retention specimens as the basis for verifying preservative retention.

B.4.2 Evaluation

The evaluation shall be conducted in accordance with the following procedure:

- (a) Prepare n separate specimens from the population to be evaluated, and test them separately for retention. The results are $X_1, X_2, \dots, X_N$, collectively the set (X).
- (b) Compute m = mean of $\ln(X)$.
- (c) Compute s = standard deviation of $\ln(X)$.