



Termite management

Part 3: Assessment criteria for termite management systems



This Australian Standard® was prepared by Committee BD-074, Termites. It was approved on behalf of the Council of Standards Australia on 18 September 2014.
This Standard was published on 5 November 2014.

The following are represented on Committee BD-074:

- Australian Building Codes Board
 - Australian Environmental Pest Managers Association
 - Australian Pesticides and Veterinary Medicines Authority
 - Cement Concrete and Aggregates Australia
 - CHOICE
 - Forest and Wood Products Australia
 - Forest Corporation of NSW
 - Housing Industry Association
 - Institute of Building Consultants
 - Local Government and Shires Associations of New South Wales
 - Master Builders Australia
 - Timber Preservers Association of Australia
 - Total Environment Centre
-

This Standard was issued in draft form for comment as DR AS 3660.3.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

Keeping Standards up-to-date

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting www.standards.org.au

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.org.au, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

Australian Standard[®]

Termite management

Part 3: Assessment criteria for termite management systems

First published as AS 3660.3—2000.
Second edition AS 3660.3:2014.

COPYRIGHT

© Standards Australia Limited

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968.

Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 1 74342 871 9

PREFACE

This Standard was prepared by the Standards Australia Committee BD-074, Termites, to supersede AS 3660.3—2000.

The objective of this Standard is to provide manufacturers, suppliers, assessors and appraisers with minimum criteria that have to be met before termite management systems can be used in and around buildings and structures.

The objective of this revision is to update the Standard, remove ambiguity and further clarify assessment needs.

This Standard is part of a series on termite management, as follows:

AS

3660 Termite management

3660.1 Part 1: New building work

3660.2 Part 2: In and around existing buildings and structures—Guidelines

3660.3 Part 3: Assessment criteria for termite management systems (this 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.

CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE.....	5
1.2 APPLICATION	5
1.3 NORMATIVE REFERENCES	6
1.4 DEFINITIONS.....	6
1.5 NEW AND ALTERNATIVE SYSTEMS	9
SECTION 2 ASSESSMENT METHODOLOGY	
2.1 GENERAL.....	10
2.2 PURPOSE.....	10
2.3 ASSESSMENT PROCESS	10
2.4 PRELIMINARY ASSESSMENT	10
2.5 ASSESSMENT REPORT	11
SECTION 3 BIOASSAY TEST METHODS	
3.1 GENERAL.....	15
3.2 APPLICATION	15
3.3 LABORATORY TESTING	16
3.4 FIELD TESTING.....	18
3.5 PASS/FAIL CRITERIA.....	19
SECTION 4 PHYSICAL TERMITE MANAGEMENT SYSTEMS	
4.1 GENERAL.....	24
4.2 RESISTANT SHEET MATERIALS.....	24
4.3 RESISTANT GRANULAR MATERIALS	25
4.4 RESISTANT EXTRUSIONS AND MOULDED AND SHAPED COMPONENTS ..	25
SECTION 5 TEST METHODS FOR CHEMICAL TERMITE MANAGEMENT SYSTEMS	
5.1 GENERAL.....	26
5.2 APPLICATION	26
5.3 SELECTION OF CONTROLS	26
5.4 SERVICE LIFE PREDICTION	26
5.5 TREATED SHEET	27
5.6 RETICULATION TO SOIL SYSTEMS	27
5.7 HAND APPLICATION TO SOIL	27
5.8 TREATED EXTRUSIONS AND MOULDED AND SHAPED COMPONENTS.....	28
SECTION 6 TEST METHODS FOR COLONY ELIMINATION	
6.1 GENERAL.....	29
6.2 APPLICATION	29
6.3 PHYSICAL COLONY ELIMINATION	29
6.4 CHEMICAL DELIVERED BY A BAITING SYSTEM	29
6.5 CHEMICAL DUSTS FOR COLONY ELIMINATION	30
6.6 OTHER SLOW-ACTING NON-REPELLENT CHEMICALS FOR COLONY ELIMINATION APPLIED TO SOIL OR A BUILDING COMPONENT IN WHICH TERMITES ARE ACTIVE.....	31
6.7 BIOLOGICAL METHODS	31
6.8 CULTURAL AND ALTERNATIVE APPROACHES.....	32

SECTION 7 TEST METHODS FOR RESISTANT MATERIALS

7.1	GENERAL.....	33
7.2	APPLICATION	33
7.3	CONCRETE	33
7.4	METAL	33
7.5	PLASTIC.....	34
7.6	TIMBER.....	34
7.7	MINERALS.....	35

SECTION 8 TEST METHODS FOR OTHER SYSTEMS

8.1	GENERAL.....	36
8.2	APPLICATION	36

APPENDICES

A	PROCEDURES AND PARTIES	37
B	ECONOMICALLY IMPORTANT WOOD-FEEDING SPECIES OF SUBTERRANEAN TERMITES IN AUSTRALIA.....	40
C	SOIL SAMPLING PROTOCOL FOR DETERMINING THE LOWEST EXPECTED THRESHOLD VALUES FOR CHEMICAL SOIL TERMITE MANAGEMENT SYSTEMS	41
D	SOIL SAMPLING PROTOCOL FOR TESTING THE UNIFORMITY OF HORIZONTAL AND VERTICAL CHEMICAL TERMITE MANAGEMENT SYSTEMS	45

BIBLIOGRAPHY.....	49
-------------------	----

STANDARDS AUSTRALIA

Australian Standard

Termite management

Part 3: Assessment criteria for termite management systems

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies the criteria for assessing the effectiveness of termite management systems for buildings and structures, and criteria for the assessment of termite resistance of materials and components.

NOTES:

- 1 Termite management systems, tested and reported in accordance with this Standard, and having demonstrated the required levels of performance, may be appraised as meeting the design requirements of AS 3660.1 and the management requirements of AS 3660.2.
- 2 The ability of a measurement to function appropriately as a primary building element or to function so as not to impede the functions of primary building elements is outside the scope of this Standard.

1.2 APPLICATION

This Standard is intended for use by termite management system proponents, assessment providers and appraisers, where the systems are intended for use in any part of Australia where subterranean termites pose a risk.

This Standard is intended to be read in conjunction with the relevant mandatory requirements of the pesticides registrar and the National Construction Code (NCC).

Termite management systems and their components that are not fully detailed in the requirements of AS 3660.1 shall be deemed not to comply with AS 3660.1 unless tested and assessed in accordance with this Standard.

NOTES:

- 1 Any proposed termite management systems required to satisfy the requirements of AS 3660.1 will need to be assessed in accordance with this Standard. Approval for such systems by appropriate authorities is dependent on demonstration of assessments that meet the conditions outlined in this Standard.
- 2 Termite management systems, assessed in accordance with this Standard to meet the management requirements of AS 3660.2, do not necessarily meet the requirements of AS 3660.1.
- 3 Assessments, additional to those specified in this Standard, may be necessary to determine whether the system components function appropriately as components of a building or structure.

1.3 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes and further reading material are listed in the Bibliography.

AS

1604 Specification for preservative treatment

1604.1 Part 1: Sawn and round timber

2870 Residential slabs and footings

3600 Concrete structures

3660 Termite management

3660.1 Part 1: New building work

3660.2 Part 2: In and around existing buildings and structures—Guidelines

AS/NZS

1604 Specification for preservative treatment (series)

ABCB

NCC National Construction Code

Australasian Wood Preservation Committee (AWPC)

Protocols for assessment of wood preservatives. Corporate Initiatives. Melbourne, March 2007.

1.4 DEFINITIONS

For the purposes of this Standard, the definitions below apply.

1.4.1 Aggregation device

A device employed to cause significant numbers of termites to recruit, feed or otherwise congregate.

NOTE: Aggregation devices may be supplemented with accessories or may be installed in a pattern to form an aggregation system.

1.4.2 Appraise

To assess the efficacy and application of a termite management system based upon the findings of an assessment.

1.4.3 Assess

To use experimental procedures to provide a measure of the applicability, performance and action of a termite management system.

1.4.4 Baiting system

For the purposes of this Standard, this term is used to cover aggregation system and systems where a termiticide is applied either in a bait matrix or onto termites feeding in baits.

NOTE: Such systems are applicable to AS 3660.2 but not to AS 3660.1.

1.4.5 Bioassay

A method, either laboratory or field, of assessing a system, material or method against the response of a healthy group or population of subterranean termites.

1.4.6 Biological control

A termite management system using live organisms to destroy, deter or modify behaviour so as to manage the risks associated with subterranean termites.

1.4.7 Chemical

Any compound, element or mixture of substances that is used to attract, repel or kill termites such that its use would require an application for registration to be made to the pesticides registrar (see also *termiticide*).

1.4.8 Competent person

A person who has, through a combination of training, education and experience, acquired knowledge and skills enabling that person to correctly perform a specific task.

1.4.9 Disjunctions

A joint, edge, termination or penetration of a termite management system component, particularly an interface with another component either of the termite management system or of the building or structure.

1.4.10 Drywood termites

Termites that do not travel through the soil and attack structures from hidden galleries, and tend to live in small colonies entirely within timber members.

NOTES:

- 1 Drywood termites are not covered in AS 3660.1.
- 2 Drywood termites are normally managed via other methods.

1.4.11 Economically important wood-feeding termites

A species of termite that frequently cause significant damage to structures, and is suitable for use in a bioassay.

NOTE: A listing of economically important wood-feeding termite species is given in Appendix B.

1.4.12 Experimental control

A test unit or group of units that contain or cover all the variables except for that one particularly under test.

1.4.13 Granular

Describes loose and separate particles.

NOTE: Typically such particles will be larger than 1.5 mm diameter but small enough that, when placed, there are insufficiently sized gaps to allow free termite passage.

1.4.14 Management system

Any system that is used to control, protect against, eliminate or otherwise modify the impact of subterranean termites on buildings, structures or materials.

NOTE: Typically, the system will be comprised of integrated components and required actions.

1.4.15 Maintenance material

A medium used to maintain the termites during a laboratory bioassay or in field apparatus, to encourage termite activity adjacent to the system component under test.

1.4.16 May

Indicates an option.

1.4.17 Pass criteria

The levels of system performance required to comply with the requirements of the AS 3660.1 and/or AS 3660.2.

1.4.18 Pesticides registrar

The government body responsible for the registration of pesticides.

NOTE: Currently, the Australian Pesticides and Veterinary Medicines Authority (APVMA); <http://apvma.gov.au> coordinates the registration scheme.

1.4.19 Physical termite management system

A system that relies on components that, due to the physical nature of the materials used, act to deter termite passage.

NOTE: A physical termite management system does not rely on any insecticidal or repellent chemicals.

1.4.20 Reference control

A scheme that uses an established system or system component as a comparator in order to demonstrate relative effectiveness of the system under test.

NOTE: A reference control is similar to an experimental control (see Clause 1.4.12).

1.4.21 Registered testing authority

An organization providing testing services, which is—

- (a) an organization accredited by signatories to the International Laboratory Accreditation Corporation (ILAC) through their Manual Recognition Agreement (MRA) for the specific tests described in this Standard; or

NOTE: In Australia, an ILAC MRA accredited body is the National Association of Testing Authorities (NATA).

- (b) an organization recognized as being a registered testing authority under legislation at the time the test was undertaken.

1.4.22 Replenishable

Defines (a termite management system) where there is access to successfully permit the required re-application to the soil or building components onto which the product was originally applied or, where such access is not possible, a replenishable application that is achieved where an effective reticulation or delivery system is placed to deliver the required chemical dose and distribution.

1.4.23 Resistant material

Any material that can withstand long-term exposure to subterranean termites without any substantial loss of functional integrity.

NOTE: Not all resistant materials could function effectively as termite management system components.

1.4.24 Service life

The length of time for which a termite management system or any of its components will function effectively.

NOTE: Service life is predicted based on experimental results that show rates of dissipation, degradation and/or dispersion.

1.4.25 Shall

Indicates that a statement is mandatory.

1.4.26 Should

Indicates a recommendation.

1.4.27 Termite

For the purposes of this Standard, economically important wood-feeding species of subterranean termites of the Families *Mastotermitidae*, *Rhinotermitidae* and *Termitidae*.

NOTE: The taxonomy of the termites, insects of the Order *Blattodea* and *Epifamily Termitoidae*, is in flux and it is likely that the Family *Rhinotermitidae* (as currently recognized in Australia) will, during the life of this Standard, be split into at least two groups, with significant pest species in both. Any such revision should not affect the application of this Standard.

1.4.28 Termite management system

A coordinated system designed to mitigate the risk of concealed access by subterranean termites causing significant damage to a structure.

NOTE: Such systems are typically comprised of integrated components, inspection zones and inspection regime.

1.4.29 Termite-resistant adhesive

An adhesive/sealant of low build, used to bond components or to bond the termite management system to structural components, acting as a termite management system.

1.4.30 Termite-resistant filler

An adhesive/sealant (of higher build than a termite-resistant adhesive) that functions as part of a termite management system and used to fill spaces that might otherwise be traversed by termites and bond termite management system components.

NOTE: The termite-resistant filler is applied between the termite management system components or system components and structural components acting as termite management system.

1.4.31 Termiticide

A chemical insecticide formulated to kill termites.

NOTE: A termiticide to be used commercially will typically require the approval of the Pesticides Registrar.

1.5 NEW AND ALTERNATIVE SYSTEMS

This Standard shall not be interpreted as preventing the inclusion of assessment criteria for any cultural, biological, new or alternative systems that are not specifically referred to herein.

NOTES:

- 1 Table 1 lists categories for management system approaches as covered by Sections 2 to 8.
- 2 For bioassay methods, see Clause 3.5.6.

SECTION 2 ASSESSMENT METHODOLOGY

2.1 GENERAL

This Section sets out the assessment pathway.

NOTE: Appraisal of the assessed system is outside the scope of this Standard.

2.2 PURPOSE

The purpose of the assessment is to provide a record of evidence of the performance of the termite management system in the form of a formal report produced by competent persons in compliance with the requirements of this Standard.

2.3 ASSESSMENT PROCESS

The principal evidentiary output of the assessment process is the formal report produced by competent persons and presented in compliance with the requirements of this Section. The required process steps are—

- (a) the preliminaries;
- (b) the assessment bioassays; and
- (c) the preparation of an assessment report.

NOTES:

- 1 Information regarding the assessment process is given in Appendix A.
- 2 Analysis of the report and any arising appraisal of the tested system is outside the scope of this Standard.

2.4 PRELIMINARY ASSESSMENT

2.4.1 General

The preliminary assessment shall give details on the method of integrating the system into, or used with, the listed forms of—

- (a) construction;
- (b) market; or
- (c) sphere.

The preliminary assessment shall include a review of existing regulations and intellectual property claims, and shall provide detailed descriptions of intended procedures and practices.

2.4.2 Information package

Before beginning the preliminary assessment, an information package shall be prepared and made available to all persons involved in the assessment. The information package shall provide the assessor with sufficient information to determine the scope of works, the bioassay designs and the competencies required for the identified tasks.

NOTES:

- 1 An information package enables the assessor to determine the scope of the works and their own competency for the assessment task.
- 2 The information package should be appended to the assessment report.

The information package shall include details of the following:

- (a) *Context* A statement defining the extent of the system to be assessed, including all components, processes and uses; and an explanation as to where, by whom and how the system will be applied [for example, whether it will be for new construction (AS 3660.1) or only existing structures (AS 3660.2) or whether it is for use Australian-wide or in a restricted geographic range below the tropics].
- (b) *Safety* Risk assessments, safety data sheets (SDS); and safe-handling instructions for any chemical, filler, adhesives, filler material, solvents or volatile, flammable or toxic substances or component that could pose a workplace hazard.
- (c) *Publication and communication* A note confirming the existence of any confidentiality agreement; and any publication restrictions on the bioassays findings.
- (d) *Purpose* A statement of claims intended to be made; compliance with certifications to be sought; and a statement setting out the proposer's legal entitlement to the system or, if not so entitled, purpose for commissioning the assessment works.
- (e) *Procedures* Draft installation or procedural manual setting out the manner in which the system is intended to be commercially applied.
- (f) *Performance* A statement detailing the expectation of performance, service life of the system and its individual components and any interactions with building components or services that may affect service life.

2.5 ASSESSMENT REPORT

2.5.1 General

The assessment report is a formal report of the assessment process produced by competent persons in compliance with the requirements of this Standard and detailed in accordance with this Clause (2.5). The assessment report is the primary product of the assessment procedure. It shall contain all the information that is relevant to any appraisal of the work.

No claim of compliance with this Standard shall be made where an assessment report is deficient, incomplete, inconclusive, misses any step or requirement, relies on bioassays not performed within the territories of Australia or fails to provide the details specified in Clause 2.5.2.

2.5.2 Report

The assessment report shall include the following:

- (a) *System identity* A summary giving the name or names and nature of the system assessed including any trade names or trademarks.
- (b) *Assessment proposer* Name and contact details of the proposer and identification of the intended application of the assessment report.
NOTE: Assessment reports may be produced to demonstrate compliance with this Standard for purposes beyond a claim of compliance with the requirements of AS 3660.1 or AS 3660.2.
- (c) *Identity of the assessor* Name and contact details of the assessor who has signed the report, the researchers and their business company.
NOTE: Assessment reports may be produced to demonstrate compliance with this Standard for purposes beyond a claim of compliance with the requirements of AS 3660.1 or AS 3660.2.
- (d) *Process chronology* Detail of relevant dates, including—
 - (i) receipt of the proposer's information package, and completion of literature search;
 - (ii) delivery and acceptance of plan of experimental procedure;

- (iii) any prior history of related works on the system components;
- (iv) initiation and completion of each laboratory experiment;
- (v) initiation, inspection and completion date or expected completion date of each field assessment; and
- (vi) date of the assessment report and dates of any preliminary report presented to the proposer.

- (e) *Intended system application* An explanation on the manner in which the system is to be used.

Where a system imposes a need for periodic replenishment or other maintenance requirements, these shall be detailed.

- (f) *Geographical boundaries of the intended application* An explanation of how the system has been tested against economically important wood-feeding termites that occur in the regions of proposed use.
- (g) *Application* If the system is designed to meet the requirements of AS 3660.1 (new buildings), AS 3660.2 (existing buildings), or both, an explanation of the system's applicability to that Standard, including the types of building or structures deemed applicable.

NOTE: Not all systems are suitable for use at construction. Systems have limitations in the types and range of constructions that can be accommodated.

- (h) *Predicted service life* A statement of the expected service life of the system, giving the evidence behind that conclusion, including individual component durability and the dissipation, degradation and dispersion of any chemicals to be used.
- (i) *System description* A description of the system and all system components and accessories used in the assessment. Description of all details, disjunctions and components tested, along with an explanation of how this testing models actual real-world or commercial application.

NOTE: A detailed description provides information that may be useful in determining whether the system in actual use still reflects the system as tested.

- (j) *Structural variables* Description of how the assessment bioassays covered all the identified variations in structures to which the system is to be applied (such as design, construction variations, materials, soils and climate).
- (k) *Exclusions* For systems with termite management system components, any common construction details in accordance with AS 3660.1 (not covered by the experiments) and the geographical and termite species limitations. For other systems, a statement detailing structural variations, geographical locations and termite species for which testing bioassay has not shown efficacy.
- (l) *Laboratory assessment method* The identity (genus and species) of the termites used, including a statement on how, by whom and by which method they were identified, and details of the location, date and method of collection of the termites, and transport handling and maintenance processes.

NOTES:

- 1 The uncertain state of the taxonomy of *Rhinotermitidae* makes it advisable that, for at least these termites, voucher specimens be retained for any future verification.
- 2 Termites are particularly susceptible to handling-induced loss of vigour, which can lead to overestimation of system performance. The proper use of controls can lead to the exposure of such deficiencies.

Where an established assessment procedure is employed, reference to the method as published (and publicly available), including conditions, apparatus and durations employed, and details of all variations from that method.

- (m) *Field assessment method* The identity (genus and species) of the termites (see Note 1), both expected to be present and actually detected during the assessment, including a statement of how and by whom they were collected and identified, including the following information:
- (i) The means by which the abundance and activity of economically important wood-feeding termites was confirmed before the assessment began.
 - (ii) The means by which the continued presence of these termites was confirmed, including those not killed, deterred or rendered ineffective by the system, which remained after the testing.
 - (iii) The location of each trial site and installation, given as the nearest place name listed in the Australian Gazetteer of Geoscience Australia, with the State or Territory, and preferably including latitude and longitude of the trial sites
 - (iv) The distances between sites and installations, and a statement describing each site where testing will be required, including details of land use, vegetation, elevation, aspect, slope, soil type, average rainfall, seasonal temperature (minimum and maximum), general climate and a description of the actual conditions occurring during the testing (see Note 2).

Where sites are not part of a recognized permanent research field station, the data from the nearest, similarly situated, bureau of meteorology site.

Details of the bioassay methods, conditions, apparatus and durations, and a description of the apparatus explaining how the apparatus models installation in a building, including all disjunctions.

Where an established assessment procedure is employed, reference to the method as published (and publicly available), including, conditions, apparatus and durations, and details of all variations from that method (see Note 3).

NOTES:

- 1 The uncertain state of the taxonomy of *Rhinotermitidae* makes it advisable that, for at least these termites, voucher specimens be retained for any future verification. If the assessment provider lacks specific taxonomic training, the species identity may be determined by a museum service or an entomologist.
- 2 Where sites are part of a recognized permanent research field station, the local weather and climate data should be used.
- 3 The reference section should provide sufficient details to locate the method as published. Ideally, the method should be appended to the report.

- (n) *Results* Details of the outcome of each of the experiments. Where any material is used or where any component has observable or measurable degradation, the measurements. For chemicals, the results of dissipation, degradation or dispersion.

NOTES:

- 1 Tables and graphs are appropriate where raw results are appended to the report.
- 2 Photographs are particularly helpful in support of written descriptions of experimental outcomes.

- (o) *Discussion* The performance of the system under test, that is—

- (i) any deviations from expectations;
- (ii) any identified factors that potentially influenced outcomes;
- (iii) the completeness of the assessment and the need (if any) for further experimentation, including a listing of how each of the intended system applications was addressed and exclusions for any components, installations or interactions not directly supported by the bioassays;

- (iv) where the results sit in relation to what was known, the body of knowledge prior to the testing and how the results support the expected capability and service life of the system;
 - (v) whether and, if so, how the results support any claim of meeting the relevant pass criteria and the means of meeting the requirements of AS 3660.1 and/or AS 3660.2;
 - (vi) where any chemical is used or where any component has observable or measurable dissipation, degradation or dispersion, the modelling giving projections of expected service life;
 - (vii) whether any part of the system had impact upon any part of the modelled building or structure; and
 - (viii) discussion on any off-target or environmental impact of the system.
- (p) *Conclusion* A conclusion as to the ability of the system to meet the requirements of AS 3660.1 and/or AS 3660.2 and the performance expectations.
- (q) *Completion* A signed statement certifying the veracity of the work and report, stating that—
- (i) the studies are sufficiently complete;
 - (ii) no important information has been omitted or that no other work is required to support the conclusions reached;
 - (iii) the appropriate performance criteria (pass levels) have been in each case, met or exceeded;
 - (iv) the requirements of this Standard have been fully met; and
 - (v) the report is complete, with no deletions or omissions.

Each page shall be marked with—

- (A) both the page number and the total number of pages including appendices; and
- (B) the name and affiliation of the person who has undertaken the assessment works and is completing the report, including a signature and date.

NOTE: It is useful to include a statement of report ownership that advises whether or not the report is commercial-in-confidence.

SECTION 3 BIOASSAY TEST METHODS

3.1 GENERAL

This Section sets out appropriate bioassay methods to support the assessment of termite management systems.

This Section does not detail the range of possible bioassay methods but instead sets out the criteria to be applied to determine the appropriateness of bioassay procedures.

NOTE: Test methodologies differ greatly over the range of possible termite management systems, particularly between those intended only for use at construction and those intended for use primarily in response to infestation. The different systems approaches are herein placed into categories and addressed separately.

3.2 APPLICATION

3.2.1 Testing

Systems shall be tested using bioassays that have been selected as being appropriate to the manner in which the systems are to be applied.

NOTES:

- 1 Laboratory bioassays are used to provide controlled and specific assessments of system components and processes.
- 2 Field bioassays are used to confirm laboratory findings and to demonstrate the performance of the entire system as it is intended to be used.

Experimental controls shall be used to provide a background of what happens in the absence of the system while the system itself is under test.

NOTE: Termites are variable in activity, feeding rate, behavioural response and tenacity. Bioassays, particularly field bioassays, are subject to variable conditions such as temperature, weather, moisture and other species interaction. It is only through the use of sufficient experimental controls that the effects of the system can be separated from these variable conditions. Reference controls that compare the proposed system or component with an established system or system component should be used where available.

All relevant aspects and all components of the system shall be identified and assessed in accordance with experimental procedures that model any intended use in compliance with AS 3660.1. For both AS 3660.1 and AS 3660.2, testing bioassays shall adequately model the intended applications.

3.2.2 Use of economically important wood-feeding termites

Bioassays provided as evidence of efficacy in the assessment report shall involve economically important species of termites.

NOTE: A listing of economically important wood-feeding termite species is given in Appendix B.

The primary species used for bioassay are *Coptotermes acinaciformis* and *Mastotermes darwiniensis*. Exposure to other *Coptotermes* and termites in the genera *Schedorhinotermes*, *Nasutitermes*, *Heterotermes* and *Microcerotermes* are generally provided in field bioassays. The widespread forest termite *Coptotermes lacteus* is very rarely recorded as damaging structures and as such is not an economically important pest termite.

Bioassay with *Coptotermes lacteus* shall not be used for the pass criteria nor for the assessment report. *Coptotermes lacteus* bioassays may be of general use in early screening tests used to assist in the development of bioassay parameters, in which case they may be reported.

Where a system is to be employed only where *Mastotermes* are not an established risk, generally south of 24° latitude (south of the Tropic of Capricorn), testing shall be carried out using *Coptotermes acinaciformis* and any other termite for which efficacy is to be claimed. Where a system is to be used north of 24° latitude, efficacy against *Mastotermes* shall also be shown.

NOTE: *Mastotermes* may also occur south of 24° of latitude.

The identity of termites used in a bioassay shall be provided by a competent person. The identification of termites shall not rely entirely on genetics but shall include morphological analysis.

Studies with drywood termites are not applicable for assessing compliance with AS 3660.1.

NOTE: There are more than 10 native species in the Family Kalotermitidae that may infest structures and one tramp pest, the West Indian drywood termite, *Cryptotermes brevis*. Attacks are mostly limited to the tropics and near coastal areas. Drywood termites may be managed using some of the approaches given in AS 3660.2. In this Standard, their management may be addressed principally under Colony Elimination and Resistant Materials—Timber (see Table 3.1).

3.3 LABORATORY TESTING

3.3.1 General

Laboratory assessments shall be carried out using termites and experimental bioassay methods selected to suit the system being assessed and the intended region of use.

NOTE: Given the wide range of available methods, it is important that the choice of bioassay methods be competently made.

Where a system has been developed and comprehensively tested overseas using economically important wood-feeding termites of comparable status to those in Australia (for example data obtained from testing with *Coptotermes formosanus* or *Coptotermes gestroi* but not from species of *Reticulitermes*), laboratory testing may be reduced or omitted. This information shall be included in the report. The system assessment shall include field bioassay.

The bioassay methods used shall be fully documented and the termite species competently identified.

Any variations to established methods that are proposed to be used shall be demonstrated at least once, before testing system components, in order to establish the capability of the proposed bioassay methods to produce reliable and repeatable results. Such preliminary testing of methods shall include the trialling methods of termite collection handling, transport and housing as well as experimental variations. Experimental design shall detail container type, size and volume, matrix type volume and moisture content, number of colonies used, number of replicates per treatment from each colony, termite group size and composition, experimental and reference controls, temperature, and humidity and test duration.

Available container and maintenance material volumes shall be not more than 125% of that required to maintain termite health and vigour, as restricted space increases termite pressure.

Replication is required to overcome natural variation. A test shall involve results of not less than five replicates for each treatment plus experimental and reference controls.