

Australian Termite Standards

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July 2018 (This document can be found at tiprm.com)



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History

Australia has been trying to set good standards for termite management since the early 1980s. They started out telling builders how to install metal sheeting through walls and onto sub-floor supports in an attempt to block termites' access. Then they introduced rules for applying pesticide into the soil. In the early 1990s they put it all together (and a whole lot more) in AS 3660, which covered all aspects (except baiting). The Standard was intended to be informative but not too restrictive. Then we had a whole lot of innovation and the banning of some pesticides. Once again, the Standard was re-focussed and then split, with a suitable deemed-to-satisfy document for a national building code covering new buildings (AS 3660.1 1995 & 2000) and one for existing buildings (AS 3660.2-2000). A third Standard, AS 3660.3 2000) was written to define suitable test methodology with the idea that properly tested systems could be trusted. The three volumes gave industry a guide to effective termite management and a way to assess new developments. After all this effort, nobody wanted to update things until it was really absolutely necessary and major revisions of AS 3660.1 & AS 3660.3 were only published in 2104. It took another three years to update AS 3660.2 for existing buildings. Baiting is now well covered and the seemingly restrictive requirements work to protect both pest managers and consumers.

Australian Termite Management – New Buildings

Buildings in Australia are required to comply with the National Construction Code (NCC). Free copies may be downloaded from the Australian Building Codes Board (ABCB, [see abcb.gov.au](http://abcb.gov.au)). The NCC sets out requirements for buildings to withstand expected “actions”. There is a list of possible actions that a building must, in the right circumstances, be designed and constructed to resist. Earthquakes and snow damage come in at numbers four and five.

Termite risk is mentioned last at number fifteen. The NCC is only worried about structural failure. You can build with steel, concrete and treated timbers and, as long as the structure is not at risk of failure, termite damage to fittings and trims is not considered a defect. The NCC also “calls up” Australian Standard 3660.1-2014 as a means to manage termite risks. This Standard takes a different approach and is entirely written with the idea that a management system be applied so that subterranean termites, attacking from the ground, should not be able to gain concealed access to the structure. That is, methods are intended to deter termites from the whole of the building and not just the load-bearing structural components.

The NCC sets performance targets and there are many ways to claim compliance. Following the Standard is the most common but the ABCB has a compliance path where outside certifiers provide an opinion of suitability of an “alternative solution” but this opinion is not binding on building certifiers who must judge each on its merits. A formal version of this scheme, called Codemark, provides a certificate that, by law if installed according to the instructions, a building inspector has no alternative but to accept. Codemark certificates often refer to the Standard but do not necessarily describe works that would comply with the Standards. An example of this is a Dow termite bait which has been given a Codemark certificate despite the approach being outside the scope of the Standards. Some Codemark certificates do not mention the termite Standards at all. These systems deserve careful evaluation before use. A further confusion is that the NCC requires any chemical used to deter termites to have been tested to AS 3660.3-2014 (See NCC Volume 2, Clause 3.1.3.3), the testing Standard written to provide pathways for new product compliance with AS 3660.1 & AS 3660.2. The use of baits for new construction is outside AS 3660. AS 3660.3 at a Note to the definition of bait (Clause 1.4.4) excludes the use of baits for new construction as does Clause 3.5.6 and Table 3.1 so it is uncertain how the Codemark certificate for Sentricon Always Active’s approach can meet assessment to AS 3660.3. The current certificate is believed to expire on 25 February 2019 and users should be certain that a new certificate covers any work from that date. The reason that Standards exclude colony control (baits) for new construction is that it is not certain that termites will be necessarily be excluded or even impeded from gaining concealed access since they can travel between perimeter baits. That is, baits did not meet the criteria for complete and continuous concealed exclusion measures.

Buildings constructed before the mid 1990s (when AS 3660 first appeared) are not expected to be termite resistant. Where older buildings are substantially extended or rebuilt, they may need to be entirely made suitably termite resistant.

AS 3660.1 sets out termite management systems. Systems can be physical (non-toxic with little if any maintenance) and chemical (toxic) whether applied into the soil or included in other materials such as plastic sheets, collars, glues and fillers. To make that perfectly clear, if a product contains a chemical component kills or repels termites, that product is by definition a chemical product. The term “barrier” is no longer used in AS 3660. Modern non-repellent chemicals applied to the soil, may be substantially penetrated before their toxicity kills termites and preventing recruitment of attackers, so these are not barriers.

Many termite management systems rely on an “inspection zone” provided by a termite resistant material such as the edge of a concrete slab or the visible edge of a sheet. Where such systems are used, it is imperative that the visible edge defining the inspection zone has a 75 mm minimum path over which termites would have to travel/build to pass above the zone. 75 mm was chosen as it is roughly the height of a typical house brick and is not readily covered by wind-blown debris. Of course, 75 mm is a minimum and the greater the inspection zone, the less likely it is that termites will seek to pass over it. This is important where inspection zones are present under a raised floor. The NCC permits a raised floor to be only 150 mm above ground level where this is within 2 m of a 400 mm clearance height so that inspection and access for remedial work is possible. Ideally, all of the timber framing of a raised floor and all services suspended from it would be constructed so that the clearances for access were always above 400 mm. AS3660.1 at Clause 2.4 specifies that a termite management system be applied to the whole of the sub-floor where 400 mm is not available except (Clause 3.3.2(b)) where, on the inside face of an external wall, it may be reduced to 150 mm where the finished ground level slopes to 400 mm clearance within 2 m. The required dimension includes height lost from ductworks or other attachments. This is a carry over from earlier provisions that assumed the poisoning of soil beneath a floor could be easily replenished across this distance.

Replenishment of chemicals is set out in Clause 7.1.1 and specifies that “chemical termite management systems applied under concealed and inaccessible areas” (meaning primarily sprays) need to have provision for future application provided by a pipe (“reticulation”) system that is capable of providing an even and continuous distribution of chemical into the soil. This has effectively killed off the market for poisoning soil under concrete slabs. Fortunately, the Standard sets out lots of ways to have a slab floor be termite resistant, so it is mainly at the building perimeter that regular inspection becomes important. There is no requirement for access to replenish the chemical impregnated into plastic sheet or other materials. Manufacturers of these have all provided a statement for installation in Queensland, claiming a “design life” of not less than 50 years for these products. While the

ABCB would not agree to the Standard extending this provision to all of Australia, it remains a default position for suppliers.

Managing termites in existing buildings

The drafting of the first AS 3660.2 was an extremely long and difficult process with the proponents of each system have little interest or knowledge of the other options. Towards the end, the Committee chose to make the whole document just guidelines, with no mandatory provisions. When it came time to revise, the rules for writing standards had changed, and each section of a Standard required mandatory provisions. There is little room in the new drafting rules for guidelines other than as notes or comment boxes. There are requirements that “shall” be done and some that “should” be done, though where a “should” is not being followed, the technician is expected to explain the deviation. It came down then to finding agreement on what everybody does or should do to get it right, that is, those factors common to every possible situation. This took a very long time, meaning that 3660.2 2017 appeared three years after its expected publication date of 2014.

Scope

AS 3660.2 covers the management of termite risk where termites are subterranean but not drywood or dampwood. Drywood termites are regarded as a minor risk in Australia. A building in good condition, such as one constructed in compliance with the NCC, so that it has proper drainage and ventilation, is not at significant risk from dampwood termite damage. Any infestation of dampwood termites would be secondary to problems with water and decay. It provides “guidance” on ways to detect and manage termite activity in and around existing structures. It covers physical and chemical termite management systems and instances where a range of systems are used together. It also sets out the steps to be followed to assess infestations, the actions taken to manage that risk by eliminating or deterring the termites, the use of termite-resistant materials, and managing the risk of future reinfestation. Details are given for the content of inspection reports, management plans and certification of work.

A workable definition of ‘colony’

A termite colony is defined as “*a group of termites that share a gallery system and work with a degree of cooperation.*” This is deliberately intended to be broad and encompass the full range of cohabitations observed. Increasingly with modern DNA work, we find some termites working together that do not share the same parents.

Following on from AS 3660.1, the purpose of termite management systems is said to be to impede concealed termite entry into buildings. Of course, termites can still build around termite management systems, but in doing so, they leave visible evidence and can be more readily detected during regular, competent inspections.

Things outside the building

The Standard explains how to identify risk factors around buildings and with attachments to buildings. One important aspect is the diversion of surface waters away from a building, and for suspended floors, the maintenance of adequate ventilation. Other provisions talk about the maintenance of inspection zones and the gaps between exterior walls and attachments (such as air conditioners) so that these do not block visual inspection. In Clauses 5.3 & 5.4 much detail is provided on how to take actions to reduce risks in and around a structure. These include vegetation and storage practice management and even (Clause 5.4.4) that “Management actions shall not remove populations of predatory native ants, birds and lizards.” This doesn’t mean that you shouldn’t manage ants, it means that your termite work, as with all pest work these days, should be targeted.

Three types of inspection

There are three types of building inspection. The first, the “pre-purchase inspection”, of a building that is for sale, is covered in AS 4349, particularly in part AS 4349.3 and so is only mentioned in passing in AS 3660.2. The second type of inspection, the “regular inspection”, covers all other first-visit situations and periodic inspections that are not part of a management process (the misnamed ‘annual inspection’). The Standard introduces a third type of inspection, the “special purpose” inspection. This is essentially a less-than-complete inspection that is provided as part of ongoing works. A good example of ongoing work is a baiting program or other multi-step control strategy. Special purpose inspections may not be more than six months apart. In Australia the maximum time between inspections is given as one year (Clause 3.3.2.2), with more frequent inspections in high risk areas. This means that you should always schedule on or before the anniversary, not after and certainly not wait for a year to pass before contacting your client.

The regular inspection assesses the termite risk as affected by local factors, and includes all of the property (up to 50 m from a structure) where there is “reasonable safe access”. The inspector assesses each of the following areas, where they are present, and safe to access, using both visual assessment and tools:

(a) The building interior but not necessarily all the furniture and stored items. Concealed timbers are excluded from visual inspection.

(b) The building exterior and surrounds, including trees, stumps and timbers on or within the property boundaries.

(c) Any roof void that is safe to enter.

(d) Any sub-floor space that is safe to enter.

Safe entry is rather loosely defined as expectations vary between States and their laws. Sounding tools and a moisture meter are to be used wherever visual evidence indicates that they may provide additional value. You would still be well advised to scan likely areas with your moisture meter.

The default regular inspection is non-invasive. An invasive inspection (see Clause 3.3.3) that will result in damage to the wall linings, cladding, timbers etc. requires formal permission from “the owner or an authorised representative”. This formal agreement manages the risk of clients not understanding the full costs and impacts. If you do damage without prior agreement as to who makes it ‘good’, then your client is most likely to be entitled (under consumer law) to assume that you will cover the costs as part of your works.

Minimum Dimensions For Reasonable Access

Area	Access hole (mm)	Crawl space (mm)	Height
Interior of a roof	400 x 500	600 x 600	Accessible from a 3.6 m ladder
Exterior of a roof	-	-	Accessible from a 3.6 m ladder placed on the ground
Sub-floor	-	400 high (from AS 3660.1)	-

Reporting inspection

Clause 3.4.1 sets out the must-include parts of the report of the Inspection:

- The inspector’s identity (include business name etc.)
- The client’s identity
- The address of the property that was inspected.
- The date and times of the inspection (it is good to include arrival and departure times, just as you would for a chemical application).

- The weather conditions at the time of the inspection (include how hot/cold it was, whether it was raining, sunny or cloudy and wind speed-*actual or Beaufort Scale*).
- The limits of the inspection caused by any unsafe or inaccessible areas.
- Any areas that were not inspected, and the reasons why they were not.
- Any other limitations such as not being permitted to use tools or invasive processes.
- The inspector's observations including, where termite activity was detected, the locations and an assessment of the potential for damage. Where evidence of earlier termite activity was detected, the nature of the evidence, the locations where it was present and an assessment of the potential for associated damages.

Clause 3.4.4 covers how the inspection addresses factors and conditions that may increase the risk of termite damage. "Where practical", the inspection is to cover:

- Any evidence of or, anything that relates to, evidence installation and maintenance of any termite management system or system components.
- The expected period of effectiveness for any termiticides thought to have been applied.
- An assessment of any construction and site development issues, moisture conditions and how
- these might affect the choices termite management.
- Aspects of the construction or maintenance of the structure which impact termite risk.
- Assessment of site factors which may increase the risks, "such as vegetation against structures which reduces ventilation".
- Other things on the site which may attract termites, such as stored timber, or items.

Water and dampness in unintended locations are highlighted:

- Absent or ineffective moisture barriers (which block water moving vertically in walls/floors).
- Inadequate sub-floor drainage and/or ventilation.
- Excessive dampness of timbers
- Water entry from leaks
 - through damp-proof courses or flashings;
 - of plumbing
 - through waterproofing membranes
 - from roof and storm water drainage.

Inspection tools

All inspectors are expected to “have available” a range of basic tools including a

- torch or similar bright light
- knife or probing device
- measuring tape or ruler
- moisture meter
- camera
- ladder that can reach to 3.6 m
- donger (tapping tool)

In addition to this Clause 3.5.2 sets out three “specialist tools” of which a “competent person providing a specialist timber pest inspection” should normally have one or more available for use. These tools are a termite radar unit (Termatrac), a “termite detector animal” (trained sniffer dog) or a thermal imaging camera.

The management plan

Having inspected, there is an expectation that the inspector will provide the client with a plan for managing termite risks. A guidance flow chart puts the emphasis on “colony control”. The proposed courses of action normally includes several options and a recommended preferred procedure. Where it is considered that only one approach is suitable, the management plan is to include “an explanation as to why other approaches are not offered”. The management plan must include certain information:

- Property and client details
 - Physical address of the property and contact details
 - May include other details such as “geographic, geomorphological and land-use history”.
- Summary of the relevant findings of the inspection report
 - Taxonomic identity of any termites
 - The inspection report’s findings as to the presence, absence or assessed risk of termite activity
- Risk assessment
 - Risks to be explained must include “the known capabilities of the pest termites, the likely consequences of inaction and all risks associated with the proposed

management actions, including chemical used and the risk to off-target organisms.”

- Proposed course of action
 - Normally includes options and which option is preferred.
 - If only one action proposed, an explanation as to why other methods do not suit.
 - A description of the proposed works including preparations, all steps, number of visits, expected time frame and anything required to be done before work commences.
- Anticipated outcome
 - An explanation of expected results and ongoing requirements such as future inspection and maintenance needs. Termite risk management of the property is presented as an ongoing process.

Recognising that disputes sometimes arise where the client does not understand the purpose or likely outcomes of any works, Clause 4.3.6 sets out a requirement to provide “expected outcomes, ongoing risk-management requirements, expected duration of works and the criteria by which success or failure of the actions is to be measured.” Anything that impedes the process is to be detailed, such as work or changes that are “required to be made before termite management can begin”.

Focus on the colony

Clause 5.5.1 sets out that the first focus of work should be the colony. It stipulates, subject to a range of limitations, that “actions shall be taken with the aim of eliminating a termite colony”. Because elimination of one colony does not prevent the actions of other colonies, there is a warning that: “No claim shall be made that colony destruction methods, including baits, provides any ongoing or residual protection against future termite activity.” This disallows the use of wording that suggests a period of protection following a baiting program. The colony may be dealt with by physical removal, direct action of termiticides such as liquids, foams or dusts and baiting.

Clause 5.5.1.4 begins with “There is no generally accepted measure for the determination of colony collapse” and includes a warning that the later absence of termites at a point where termiticide has been applied (meaning bait unit or injection point), “shall not be taken as proof of colony destruction”. This enables the service provider and client, taking into account the species, circumstance and system used, to make use of their own definition of successful colony destruction.

There is however a usefully detailed explanation of colony collapse given AS 3660.3 which provides extremely rigorous pass/fail colony elimination criteria, for any and all methods, which has:

“The colony may be claimed as eliminated provided any one of the following criteria is satisfied:

- (a) A central nest is known and has demonstrably perished.
- (b) The only remaining termites detected are of the soldier caste or are moribund or deformed workers.
- (c) Where there is a complete cessation of activity and feeding in untreated monitors for an extended period of time (which in the case of the chemical employed is shown in laboratory assessment bioassay to be capable of killing termites within 20 days), there is no detectable activity for at least 75 days. In all other cases, including physical and cultural methods, or where slow-acting (as demonstrated by laboratory assessment) chemicals such as hormones or chitin synthesis inhibitors are used, there is no detectable activity for not less than 150 days.

NOTE: It is not necessary for every termite to have died for a colony to have been effectively eliminated. These criteria ensure that an insufficient proportion of the termites remains for the colony to recover and continue.

Detectable activity by another species is not evidence of failure. In rare instances, detectable activity by the same species may originate from an entirely separate colony. For elimination to be considered valid, proof of the separate identity of the target and reoccupying colonies shall be provided.”

This definition is extreme and may be expensive to meet, and while it is applicable to the assessment of colony elimination methods or products, the criteria are excessive where the outcome is elimination of a single attacking colony for a client. This is where the fuzzy provisions of Clause 5.5.1.4 kick in and the service provider takes the opportunity to provide to the domestic client the criteria to be used.

Termite management actions

This section of the Standard covers the management of infestation and also approaches to manage the risks of future infestation. It covers cultural methods to reduce the susceptibility of a building, actions to improve the inspection of a building and physical and chemical termite management systems intended to impede concealed termite entry. It states clearly that “no single strategy (is) suitable for all situations”.

The main comment made over the use of baits is where they are installed as lures for long-term monitoring. It requires that they are inspected at least every three months as “undetected feeding may increase the risk to a structure”.

Clause 5.5.1 covers colony elimination and, while not explicitly stated, has wording which implies that there is a preference hierarchy with direct action against a discovered nest placed above the use of dusts, foams, and baits and in essence, direct actions over remote poisoning.

AS 3660.2 limits the use of chemicals

Chemicals (as defined) must not be “applied as a surface treatment to external timber, rocks, stones, masonry or similar materials and shall not be used to treat cavities in walls unless directly onto active termites for the purpose of colony destruction”. It is explained that some termites may pass through soil zones treated with slow-acting, non-repellent termiticides but that in doing so, they are not expected to be able to establish and attack. Chemical application to soil is required to be complete (with limitations) and continuous and to “interface well with other termite management system components”. The main limitations are where the chemical cannot be applied completely around a structure or cannot be applied because of risks to drains. Where a concrete slab is to be drilled to access the soil, the “drilling of concrete to permit direct injection of chemical shall not be allowed to compromise the function of the slab.” There is strong suggestion that chemicals may not be suitable for all structures. Externally, the limitations of chemicals for fences and retaining walls are spelt out. “Effective chemical treated zones cannot be installed around and beneath fence posts or behind and beneath a timber retaining wall.”

Retrofitting a system

Clause 5.7 covers the possibility of installing components to an existing structure as they would be for a termite management system for a new structure under AS 3660.1. An termites present in a structure have to first be eliminated, any limitations have to be detailed and a suggestion for the frequency of future inspections must be provided.

Certificates of installation

Certificates are required for the application of chemical and for the installation of termite management system components. For applied chemicals, there are many requirements: “In the case of a chemical soil or chemical sheet termite management system, the name of the chemical product used, the service life on the manufacturer’s product label and, if applied as a liquid, the dilution rate and total volume used. The locations of chemical

application with area, in metres squared, and perimeter and linear applications, in metres. Where a reticulation system is installed, the maximum pressure to be applied in replenishing the system, as specified by the reticulation system manufacturer, shall be prominently displayed on the Certificate of Installation, along with the volumes of termiticides required at each fill point.”

For installed physical components only the “name of the system and methods of installation” are required.

The certificate must also include, as applicable, a lot of detail and explanation (such as would be required in AS 3660.1) including the following:

date the work was completed.

- extent of the termite management system and whether it includes multiple approaches
- diagram showing the location of installed components.
- the scope and frequency of future inspections.
- limitations of the system or the “ability to maintain or inspect system components”
- any future maintenance required.
- the name and contact details of the person responsible for the installation and “the installer who performed the installation”
- where the installed system relies partly on the resistance of concrete slabs conformance with either of the concrete Standards AS 2870 or AS 3600 and. Where this is not known, the possibility on non-conformance is to be noted.
- for suspended floor works, minimum clearance under floor, details of any drainage works including grading and to prevent ponding, the presence (or absence) of any NCC compliant ventilation and works applied to piers/stumps/pillars and similar structures.
- building perimeter work, including whether “systems have been applied internally or externally” and the length in metres of any perimeter works.

Durable notice

The termite standards have always included a requirement that where chemicals are applied, a marker or ‘durable notice’ be fixed to the building to notify others. Typically these are placed in the electrical meter box, inside the doors of a kitchen cupboard or, under a suspended floor, inside, in a spot visible from the access door. Because this requirement for a durable notice was taken into the NCC, it was dropped from AS 3660.1 to avoid duplication. AS 3660.2 continues the durable notice tradition, and requires a notice which provides more details than before:

- name of the termite management system used
- date of installation
- for maintenance of chemical systems, the recommendation for the product to be used, the volume of diluted product required, the “means of application at each location, including the volume and pressure of delivery for any reticulation access point”
- where a chemical is used, its “life expectancy” as given on the product label
- recommendations for the scope and frequency of future inspections

Conclusion

The various Australian Standards covering termite risk management are now comprehensive in their cover of methods and systems that are deemed-to-satisfy or which meet the performance requirements. The tone and cover of the Standards has been affected greatly by new limitations imposed by the need to work with the NCC and also by changes to the style, content and editorial policies of Standards Australia. The inclusion of a strong AS 3660.3 allows manufacturers and consumers to have faith in new systems and chemicals.