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TERMGUARD Perimeter Retreatment and Armoured Shields Systems

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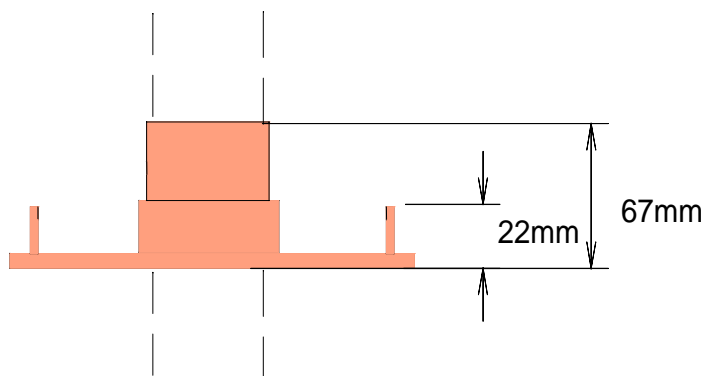
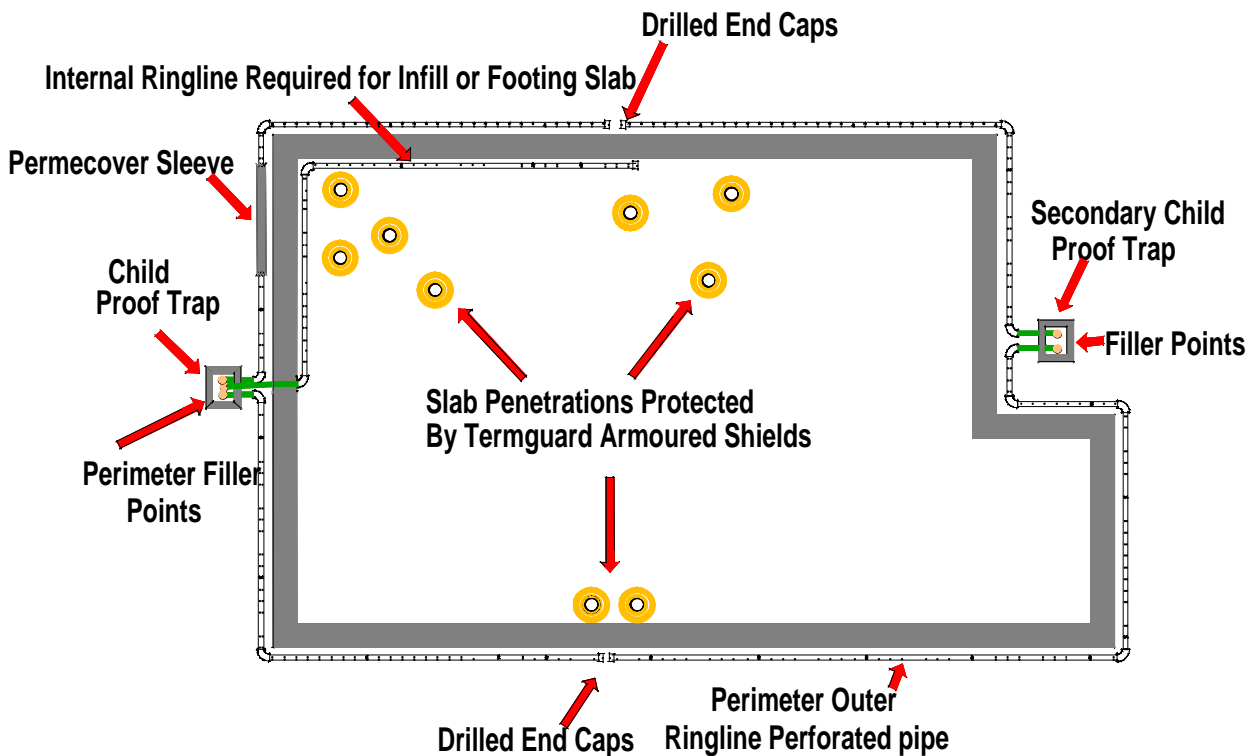
1. August 1998. Change of address and ACN
2. Formerly ABSAC Technical Opinion 230
3. April 2000. Updated references
4. May 2006. Update to BCA references.
5. July 2006. Revalidated until July 2009 (incl amended Manual).

PURPOSE

A subterranean termite barrier system for use with concrete slab-on-ground for both monolithic slabs and infill slabs for protection of the perimeter and around slab penetrations

APPLICANT

Termguard Pty Ltd (ACN 009 302 265), Suite 302/Level 3, 65 Walker Street, North Sydney, New South Wales 2060 (Manufacturer/Distributor)



TECHNICAL OPINION

In the opinion of CSIRO Appraisals, the 'Termguard Perimeter Retreatment and Armoured Shields Systems' will provide a suitable protection of the perimeter of slab on ground construction for both monolithic slabs and infill slabs and around slab penetrations. The perimeter system when injected with an approved chemical termiticide to deter subterranean termite attack is capable of providing, in the treated areas, rates of application that comply with the requirements of AS 3660-2000, 'Termite management. Part 1. New building work' provided that:

1. The 'Termguard Perimeter Retreatment and Armoured Shields Systems' is installed and charged by installers licensed by Termguard Pty Ltd and in accordance with Termguard Pty Ltd, 'Technical Manual' (Feb 2005 – Edition 8).

Note: These instructions are available from Termguard Pty Ltd (ACN 009 302 265), Suite 302/Level 3, 65 Walker Street, North Sydney, New South Wales 2060 (Facsimile 02 9956 6494).

2. The concrete slab is designed and constructed in accordance with AS 2870-1996 'Residential slabs and footings - Construction' (incl. Amdt 1 1997 to Amdt 4 2003).
3. The components of the systems are as described in the Termguard Pty Ltd, 'Technical Manual' (Feb 2005 – Edition 8). The 40 mm and 20 mm pipes are identified with Termguard Reticulation system markings and patent numbers.
4. There is no overlap of the armoured shields when they are installed on plumbing pipes which are in close proximity to one another.
5. The systems are not used where the total outside perimeter length is greater than 60 metres. (Where over 60 metres needs to be covered, multiple systems can be installed provided no one system covers more than 60 metres.) Where the systems are used with no manifold for monolithic slabs, the length of any one perimeter line cannot exceed 20 metres (see CSIRO Appraisals Technical Assessment 198).
6. The termiticide used is one approved by Termguard and the Australian Pesticides and Veterinary Medicines Authority (APVMA) for Agricultural and Veterinary Chemicals and injection is carried out by licensed Pest Control Operators.
7. The system uses a packing sand with a grading within the following specification - 95-100% passing 6.7 mm and 0-10% passing 75 µm. The sieve sizes comply with AS 1152-1993 'Specification for test sieves'.
8. The external system is protected either by paving or advisory signs fixed to or in close proximity to the wall.

9. A durable notice (in accordance with BCA requirements (Clause B1.3 (i)(ii) Volume 1 and Part 3.1.3.2 (b), Volume 2) is attached to the building which states that the 'Termguard Perimeter Retreatment and Armoured Shields System' is installed.
10. Inspections shall be carried out on an annual basis, or more often if required by local conditions or regulation, to ensure that no bridging or breaching of the barrier has taken place.
11. A building site inspection shall be carried out prior to installation and the following precautions taken in accordance with Clause 3.2 of AS 3660.1:
 - Eliminate nests of wood feeding species of subterranean termite found within the property boundaries, up to distance of 50m from the proposed building work;
 - Excavate and remove all tree stumps, roots and logs from the building footprint;
 - All timber off-cuts, debris, removable framework and other waste material should be removed from the area in which the barrier is to be installed.

Notes:

- (i) The Building Code of Australia draws attention to the need for regular inspections.
- (ii) The installation of a termite barrier does not negate the need for regular competent inspections. Any additions, alterations or earth works, including gardening adjacent to the building, may render the barrier ineffective. Such activity should be referred to a contractor for appropriate advice and treatment.
- (iii) Any additional treatment should be done in accordance with the relevant State or Territory regulations.

BUILDING CODE of AUSTRALIA

In the opinion of CSIRO Appraisals, the systems described in this Technical Assessment and installed under the conditions listed herein will satisfy the performance requirements of Clause BP1.1 (b) 'other actions' (Volume 1 - Class 2 to Class 9 buildings) and Clause P2.1 'Structure' (b) 'other actions' (Volume 2 - Class 1 and Class 10 buildings) of the Building Code of Australia (2006).

To meet the requirements of Clause P2.1.1 (relevant to Qld only) (Volume 2 Class 1 and Class 10 buildings) of the Building Code of Australia (2006), the applicant has provided a declaration of system design life, which is set out in the Durability section of this Technical Assessment. This declaration is only relevant for the system as described in this Technical Assessment and installed under the conditions listed in this Technical Assessment.

Notes:

- (i) The inclusion of this clause with reference to the BCA is aimed at assisting those involved in the design, specification and building approval/permit process, relating the Appraisal to the relevant Performance Requirements of the BCA.

- (ii) Any changes made to the BCA will be reviewed during the term of validity of this Technical Assessment and, where necessary, any amendment required will be published on the CSIRO Appraisals web pages on <http://www.cmit.csiro.au/Appraisals>.
- (iii) The BCA has AS 3660.1-2000 as deemed to comply for protection from concealed termite entry.

RELATED INFORMATION

VALIDITY OF THE ASSESSMENT

Condition:

This Technical Opinion applies only to the use of the 'Termguard Perimeter and Armoured Shields Systems' as described herein.

Withdrawal:

This Technical Assessment will be withdrawn or amended if CSIRO Appraisals considers that a change in design or manufacturing quality renders the basis of appraisal invalid, or if reported field experience convinces CSIRO Appraisals of unsatisfactory quality or performance.

Term of Validity:

This Technical Assessment will lapse three years after the date of issue unless revalidation has been requested and granted (see back page). Technical Assessments may be amended during the term of validity. Users of this Technical Assessment should verify that it remains valid and is the current version by checking on the CSIRO Appraisals website:
<http://www.cmit.csiro.au/services/appraisals/>.

RELEVANT DOCUMENTS

Termguard Pty Ltd, 'Technical Manual' (Feb 2005 – Edition 8)

Standards Australia, AS 1152-1993 'Specification for test sieves'

Standards Australia, AS 2870-1996 'Residential slabs and footings - Construction' (Amdt 1 January 1997, Amdt 2 June 1999)

Standards Australia, AS 3660-2000, 'Termite management. Part 1. New building work'

CSIRO Appraisals Technical Assessment 198 - TERMGUARD Underslab Chemical Delivery System (October 1995)

CSIRO Appraisals Technical Assessment 212 - TERMGUARD Perimeter & Retreatment System (September 1996)

APPROVED ASSESSMENT EXTRACT

The 'Termguard Perimeter Retreatment and Armoured Shields Systems' installed by licensed installers of Termguard Pty Ltd (ACN 009 302 265), North Sydney, New South Wales are a suitable reticulation system that will provide protection of the perimeter of slab on ground construction for both monolithic slabs and infill slabs and around slab penetrations, after the reticulation part is injected with a termiticide for use against subterranean termite attack when the conditions of CSIRO Appraisals Technical Assessment 230 are fulfilled.

APPRAISAL

DESCRIPTION

The following description is based on information provided by the applicant.

General:

'Termguard Perimeter Retreatment and Armoured Shields Systems' are reticulation systems designed to deliver termite protection to the perimeter of concrete slabs and collars around slab penetrations. The systems consist of two parts. The first for infill slabs is a pair of perforated PVC tubes laid either side of the footings and for monolithic slabs one laid around the outside of the slab. The second part is for around penetrations where a UPVC protective collar is solvent welded onto the UPVC penetration. A liquid termiticide is pumped into the reticulation system through connectors positioned adjacent to the building and enclosed within a specially designed child-proof trap. For in-fill slabs, the underslab reticulation is laid on the sand bed and before the waterproof membrane is laid. The systems are referred to as 'Termguard Perimeter Retreatment and Armoured Shields Systems' and the Figure on the cover show a typical arrangement of the system for infill slabs and an Armoured Shield profile.

Components:

These are detailed in the Termguard Pty Ltd, 'Technical Manual' (Feb 2005 – Edition 8). The main components are as follows:

'Child Proof Trap'. A rigid plastic enclosure with an inset screw-secured lid which is set into the ground or pathway adjacent to the building.

'Connector Locking Device'. A special end-fitting on the treatment hose, designed to provide a secure, quick means of attachment to the **'Termguard Connector'**.

'Connector Sleeve'. A short section of 40 mm or 20 mm diameter pipe, threaded at one end, used to join the **'Connector'** to the **'Perimeter System'**.

'Elbows'. Right angled fittings in PVC of 40 mm or 20 mm, used to direct either the **'Manifold'** or the **'Ringline'** and **'Drilled Service Pipe'** runs.

'Non Return Valve'. A fitting on the **'Manifold'** designed to ensure fluid flow in one direction - that of the arrow marked on its side.

'Permecover'. This is a non-woven, needle punched, continuous filament, polyester geotextile. It is placed over pipes used for the perimeter pathway part of the systems before covering with backfill.

'Ringlines' and **'Drilled Service Pipes'**. A 20 mm diameter PVC pipe (Class 15 AS 1477) which carries termiticide from the **'Manifold'** to the perimeter. The pipe is pre-perforated along its shoulders with 2 mm holes and is terminated with an end cap carrying a 2 mm hole.

'Termguard Connector'. A special end fitting, in either 40 mm or 20 mm sizes, used to provide the connection between the treatment hose and **'Main System'**.

'Termguard Armoured Shields'. These are UPVC collars made in four sizes to fit 80 mm, 65 mm, 50 mm, and 40 mm diameter UVPC plumbing pipes. They are solvent welded on to the matching pipe and are located with their flange against the water vapour membrane, with the collar up-stand being to the top.

Joiners, elbows, caps, screw caps and valve sockets are specified and a PVC solvent cement is used to connect them.

Installation:

The systems are laid by installers licensed by Termguard Pty Ltd.

Installation instructions are contained in the Termguard Pty Ltd, 'Technical Manual' (Feb 2005 – Edition 8).

For infill slabs, the inner ringline of the reticulation system is installed after the sand layer has been compacted and before the waterproof membrane is laid for concrete slab on ground.

A design layout is prepared using the footing plans and then marked on the ground. A trench is dug out for the 'Manifold' which is laid in a central position on the sand bed and which protrudes past the external edges of the slab. The internal 'Ringline' is installed to cover the inside of the outside footing (not more than 100 mm from the inside edge of the footing). The 'Ringline' is positioned with holes facing up. When all the pieces have been positioned, they are glued in place.

The external 'Ringline' is placed after the slab is poured and is constructed in two equal halves running in a clockwise and anticlockwise direction and parallel to the internal 'Ringline'. The external 'Ringline' is installed in a trench not more than 75 mm deep and not more than 100 mm from the outside edge of the footing. When all fittings have been glued, the pipe is covered with 'Permecover'. The trench is then backfilled and compressed firmly.

The 'Filler Point Assembly' is then installed with a 'Non Return Valve' to finish at the 'Child Proof Trap'. This must be located in the outside area.

The reticulation system is checked with pressurised water before closing the trenches.

Termguard Armoured Shields are placed on all UVPC plumbing penetrations through the slab. The collars are not to overlap and, to enable them to be solvent welded to the pipe, they must be the correct matching size.

A plan of the building and layout of the system, litres of emulsion, concentration of mix, and date is recorded to the requirements of AS 3660-2000, 'Termite management. Part 1. New building work'

Chemical injection:

Termiticide application is carried out by licensed Pest Control Operators (licensed by Termguard Pty Ltd). The chemical injection is performed immediately prior to, or following completion of, the construction. The chemical injection requires a vehicle with a suitable tank and a high volume pump specifically modified for the Termguard application.

When the required volume of chemical emulsion has been injected, clean water is then pumped in behind the chemical emulsion. When the required volume of water has been injected, the cap is replaced and the Child Proof Trap locked.

Termiticides:

These are subject to legal and local government approval. The applicant has a list of termiticides used in the system at given concentrations that provide the recommended amount of chemical according to AS 3660.1.

Record of treatment:

In addition to the requirements for certificates of treatment in AS 3660.1, Termguard will provide an additional sticker to be placed alongside it indicating that the Termguard system has been installed.

DESIGN INFORMATION

General:

The applicant states that 'Termguard Perimeter Retreatment and Armoured Shields Systems' are reticulation systems designed to deliver termite protection to the perimeter edges of concrete slab floors in new buildings and physical barriers where UVPC plumbing penetrations are made through the concrete slab. It comprises UPVC tubes laid which carry the appropriate termiticide around the perimeter and UVPC collars for placement around the penetrations.

Maintenance:

Records of treatment used are kept as required by the Building Code of Australia (Clause B1.3 (i)(ii) Volume 1 and Part 3.1.3.2 (b), Volume 2). A copy of the site plan, showing pipe layout is also kept.

An annual inspection is made of the building to check for bridging or breaching of the barrier. If requested by the owner, this inspection is carried out by the installer. If bridging or breaching is found, a further treatment is done.

Durability:

CSIRO Appraisals does not assess the durability of termite barriers.

The applicant has declared under its sole responsibility that:

- the 'Termguard Perimeter Retreatment and Armoured Shields Systems', has been designed to achieve a service life of at least 50 years during which period the 'Termguard Perimeter Retreatment and Armoured Shields Systems', including its constituent components, is expected to maintain efficacy and function as a termite barrier in accordance with AS 3660.1-2000;
- the 'Termguard Perimeter Retreatment and Armoured Shields Systems' has been designed in accordance with a quality management system that incorporates a set of rules for the design, manufacture, installation and maintenance of all elements of the system; and
- the components used in the manufacture of the 'Termguard Perimeter Retreatment and Armoured Shields Systems' have been selected for their intended purpose and are expected to operate in accordance with their specification for the duration of the design life of the 'Termguard Perimeter Retreatment and Armoured Shields Systems'.

BASIS OF APPRAISAL

CSIRO Appraisals has assessed the following aspects in undertaking this appraisal:

- (a) installation procedures
- (b) long term effectiveness of the systems
- (c) the ability of the distribution pipe system to remain functional over a fifty year design life (including its ability to withstand any loading due to soil movements).
- (d) Standards Australia, AS 3660-2000, 'Termite management. Part 1. New building work'.

Note: For concrete slabs on ground AS 3660.1 has an area requirement for the underneath of the whole slab being treated with chemicals in Clause 8.8.2.1. However, Section 4 of the Standard allows for the slab to form part of the protection if it is constructed in accordance with AS 2870-1996. CSIRO Appraisals has evaluated the systems for the periphery and around slab penetrations being protected by the Termguard Perimeter Retreatment and Armoured Shields Systems with the concrete slab forming part of the protection against termite entry.

The following documents and inspections were used in carrying out the appraisal:

Manufacturer's Information:

1. **Termguard Pty Ltd, Suite 302/Level 3, 65 Walker Street, North Sydney, New South Wales 2060. 'Technical Manual (Feb 2005 – Edition 8):**
This contains instructions for laying the irrigation systems, the injection of the termiticide and the placement of the UPVC collars. Details are included for the graded sand for which, with for certain soils specified on the chemical label by the NRA, a bedding of builder's sand to a depth of 50 mm is required.

Also mentioned in the application was that Termguard is in the process of obtaining Quality Assurance.

2. **Termite Proofing Installation Services Pty Ltd (as Trustee for the Termguard Unit Trust), Unit 8/23 Acrylon Road, Salisbury South Industrial Park, South Australia 5106. Letters (9 August 1995 & 17 August 1995):**
These letters refer to training of installers. All installers and licensees are trained and supplied with the current manual. Successful trainees are issued with a certificate and photographic licence. All licensees are reviewed on a regular basis and installations must be to the companies' specifications or else the licence will be withdrawn.

3. **David Grays Micro-Lo Chlorpyrifos Termiticide & Insecticide Label:**

This label gives the National Registration Authority No 48051/1 for the use of the termiticide and insecticide for use in systems including under slab reticulation systems.

Reports:

1. **Robert W James, Consulting Engineer, 25 Princes Avenue, Crafers, South Australia. Report No LM9602D.doc (11 February 1996):**
This report is based on a computer spreadsheet which simulates the flow characteristics of the proposed system. The distribution within a 200 square metre area was within the tolerances that would be expected with ground spraying.
Note: Termguard has a further restriction of a maximum length of a periphery run of 60 m as well as the 200 m² used in the analysis. In addition, a maximum length of 20 metre of perimeter pipe per 20 mm pump-up point should be used for the external perimeter piping when it is not tied into the main manifold e.g. monolithic slabs.
2. **Casey's Pest Control Pty Ltd, 145 Murray Avenue, Renmark, South Australia 5341. Letter (31 May 1996):**
This letter confirms that the company has installed the Termguard Perimeter and Retreatment system with some of the initial trials being installed as long ago as 8 years. Of the 90% dwellings inspected annually with this system, no termite infestations have been recorded.

3. Barclays Termguard W.A., 57 McDonald Street, Osborne Park, Western Australia 6017. Letter (16 May 1996):

This letter confirms that the company has installed in excess of 850 of the Termguard Perimeter and Retreatment Systems around Perth, Kalgoorlie, Exmouth and Esperance since August 1995 and 'to our knowledge there has been no termite attack on any property protected by a Termguard Perimeter Retreatment System.'

4. ABSAC Technical Opinion 198 - TERMGUARD Underslab Chemical Delivery System (October 1995):

This is an assessment of a full coverage reticulation system under concrete slab-on-ground, and around building peripheries into which is injected a termiticide for use against subterranean termite attack.

5. ABSAC Technical Opinion 212 - TERMGUARD Perimeter & Retreatment System (September 1996, Amdt April 1997):

This is an assessment of a partial reticulation system under concrete slab-on-ground, and around penetrations into which is injected a termiticide for use against subterranean termite attack.

6. CSIRO Division of Forest Products Confidential Report No FFP 477 'Evaluation of UPVC flange in accelerated field simulator as a physical barrier against subterranean termites of the genus COPTOTERMES' (May 1996):

This is an assessment of the UVPC collars used with the system against subterranean termite attack. The report concludes that the termites used in the test were not able to penetrate past the UVPC collars.

7. University of New South Wales, Building Research Centre, Unisearch Limited, Report titled 'Amended Appraisal Report on Keyplas UPVC Termite Barrier Shields for Pipe Penetrations' (June 1997):

This is an assessment of the UPVC collars to meet the requirements of the Building Code of Australia in regard the prevention of termite attack. The assessment used work undertaken in the CSIRO Division of Forest Products reported in Report No FFP 477 (May 1996) in conjunction with load testing to evaluate their ability to withstand loadings imparted with normal construction practices. The report concluded that the barriers should remain intact through construction and therefore will act as an effective termite barrier.

8. Robert W James, Consulting Engineer, 25 Princes Avenue, Crafers, South Australia 5152. 'Biflex Termiticide and the Termguard Reticulation System' Job No 9703 (17 April 1997):

This is an assessment of a distribution of a bifenthrin product under a concrete slab and with perimeter treatment. After removal of the slab, soil samples were analysed for termiticide content. The report concludes that the system should result in an effective barrier to termites 'providing the installation adheres to the details of the Termguard Installation Manual, and the soil concentrations recommended by the suppliers of the termiticide are effective in providing a chemical barrier to termites.'

9. NSW Agriculture Laboratory Services Unit, Chemical Residual Laboratories, Lismore, New South Wales 2480. 'Analysis of Soil-Permicover Samples' Report No 97/231 (May 1997):

This is an assessment of a distribution of a chlorpyrifos product to determine the efficacy of the Termguard perimeter system used with a monolithic slab. The samples were prepared to the methodology used in the 'Perimeter system efficacy trial using David Gray Micro Lo Chlorpyrifos' (April 1997) and supervised by the Kempsey Shire Council building inspector. The results were discussed in the Termguard Pty Ltd, 'Perimeter system efficacy trial using David Gray Micro Lo Chlorpyrifos' (May 1997). This report states that even though the results show a reasonable degree of variation which would be expected from a soil sampling exercise, they also show that the system delivers an effective termite barrier. The results show average concentrations to a depth of 300 mm and 150 mm wide.

Inspections:

CSIRO Appraisals representatives have inspected installations of the systems. All installations complied with the specifications contained in the Termguard Pty Ltd 'Technical Manual' (Feb 2005 – Edition 8). Inspections of record keeping methods of licensed installers were found to be satisfactory.



S. Hanson
CSIRO Appraisals



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- Technical Assessments – full fitness for purpose appraisals of innovative products, systems or materials that may or may not be covered by Australian Standards or building regulations.
- Interim Reports – appraisals of products that have not yet reached the fully developed or manufacturing phase. They aid with product development and may be used as a step towards a subsequent Technical Assessment.
- Certification Assessments – appraisals of products, systems or materials solely against the requirements of the BCA and used for gaining approval from Federal or State authorities.

From 1978, under the auspices of the Australian Building Systems Appraisal Council ("ABSAC"), CSIRO ran an appraisal service in conjunction with the Australian Institute of Building Surveyors, the Housing Industry Association, the Insurance Council of Australia and the Master Builders Association. In 1999 CSIRO Appraisals was formed to continue the business of ABSAC under the sole patronage of CSIRO. This new scheme retains the committee structure of technical and interstate advisers that operated as ABSAC. All past ABSAC publications and appraisals are being continued and supported by CSIRO Appraisals.

Technical Assessment are intended to help all those concerned with the approval, specification and use of new products or systems. They are objective assessments of the fitness for purpose of the product, system or material but are not approvals or endorsements. They may be submitted to

approval authorities as part of the justification process required to obtain approval.

Each Technical Assessment is prepared by CSIRO Appraisals and then reviewed, revised and finally endorsed by the Technical Advisory Committee (TAC), detailed below. CSIRO makes the appraisals on a national basis by obtaining input from regional committees in each State and Territory to take account of variations in local building regulations, practice and local climatic features.

CSIRO Appraisals bases its assessment on the product and information it receives and cannot accept responsibility for deviations in the manufactured quality and performance of the material, product or system. However, Technical Assessments will be withdrawn where adequate quality or performance has not been maintained.

Technical Assessments are given a term of validity of three years from the date of issue, in the expectation that, after that period, the subject will no longer be an innovation. They are reviewed within the first twelve months and again, as necessary. At the end of the three-year term of validity, a review is undertaken. This can result in an extension to the term of validity. The limitation on the term of validity of the Technical Assessments should not be interpreted as implying a similarly limited life expectancy of the products or systems. The term of validity of the Technical Assessments can be checked at the registered office of CSIRO Appraisals.

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slab-on-ground; subterranean termites; termiticide; UPVC collar**H. RELATED DOCUMENTS****J. OTHER/OPTIONAL INFORMATION****14. ABSTRACT** *(CSIRO Appraisals Approved Assessment Extract)*

The 'Termguard Perimeter Retreatment and Armoured Shields Systems' installed by licensed installers of Termguard Pty Ltd (ACN 009 302 265), North Sydney, New South Wales are a suitable reticulation system that will provide protection of the perimeter of slab on ground construction for both monolithic slabs and infill slabs and around slab penetrations, after the reticulation part is injected with a termiticide for use against subterranean termite attack when the conditions of CSIRO Appraisals Technical Assessment 230 are fulfilled.