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PROTECTION OF BUILDINGS FROM SUBTERRANEAN TERMITES— CHEMICAL TREATMENT OF SOIL FOR BUILDINGS UNDER CONSTRUCTION

STANDARDS ASSOCIATION OF AUSTRALIA
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The following interests are represented on Committee CH/5:

Agricultural and Veterinary Chemicals Association of Australia Ltd.

Australian Chemical Industry Council

Australian Institute of Agricultural Science

Australian Institute of Petroleum Ltd

Australian Veterinary Association

Council of Australian Pest Control Associations

CSIRO, Division of Applied Organic Chemistry

Department of Agriculture, NSW

Department of Agriculture, SA

Department of Agriculture and Rural Affairs, Vic

Department of Health

Department of Health, NSW

Department of Industrial Relations, NSW

Department of Labour, Vic

Department of Primary Industries, Qld

Department of Primary Industry

Department of Science

Health Department, Victoria

Health Services Department, Tas

National Farmers Federation

Representatives of the following interests also participated in the drafting of this standard

Australian Consumers Association

Chemical Manufacturing Interests

Council of Australian Pest Control Associations

CSIRO—Division of Chemical Technology

CSIRO—Division of Entomology

Department of Agriculture, NSW

Department of Foestry, Qld

Department of Health

Department of Housing and Construction, NSW

Forestry Commission of NSW

South Australian Health Commission

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AUSTRALIAN STANDARD

PROTECTION OF BUILDINGS FROM SUBTERRANEAN TERMITES— CHEMICAL TREATMENT OF SOIL FOR BUILDINGS UNDER CONSTRUCTION

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PREFACE

This edition of this standard was prepared by the Association's Committee on Pesticides in order to incorporate improvements shown to be desirable during practical application of the standard and to rectify difficulties experienced under some conditions of use; especially when applied where slab-on-fill construction has been used.

This new standard should ensure that adequate amounts of chemical treatment are applied to soil under all conditions and that such treatment creates a complete chemical barrier in the substructure of buildings treated in this way.

The wording of Clauses 4 and 6 has been made more explicit and complete. The diagrams shown in Appendix B have been altered to ensure completeness of barriers under all conditions of interpretation and use of the standard.

The intention of this standard is to provide for treatment of the substructure of buildings under construction but it may also provide some guidance for the protection of existing buildings. Treatment for existing buildings is covered in AS 2178, Protection of Buildings from Subterranean Termites—Detection and Treatment of Infestation in Existing Buildings.

It must be recognized that the requirements of Statutory Authorities take precedence over standards (which may not have been brought into legislation), and that they may specify the use of additional measures or that they may impose limitations on the applications of chemical techniques. In this regard, the relevant State regulations should be consulted before work is commenced.

Furthermore, this standard requires the issuing of a certificate covering each stage of treatment. This certificate shall serve as a valuable record for the building owner, local government authority and the pest control operator of the work carried out.

Upon completion, a permanent notice advising that treatment has been carried out shall be affixed to the building.

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FOREWORD

A. NOTES ON TERMITES. More than 300 species of termites have been recorded in Australia. Only about 30 achieve economic importance as pests of timber in service. With the exception of the drywood termites, all species of economic importance in Australia are soil-dwelling and have more or less similar habits. Several of them have a wide geographic distribution.

Subterranean termites are responsible for most of the termite damage of economic importance to timber in Australia. It is important to realize that termites may seek out any material containing cellulose—its principal food—and this could include some of the contents of buildings, such as furniture, printed materials (newspapers, records, blueprints, books) fabrics, clothing, footwear, packing cases, tools etc. In addition, termites can damage many other non-cellulosic materials, components or structures. Typically, their colonies form nests underground in the soil, near ground level in a stump or other suitable piece of timber or in the trunk of a living tree. Sometimes the nest takes the form of a conical or dome-shaped mound. A colony may persist for many years and, as it matures, could contain a population running into millions. All attacks by subterranean termites originate from the nest. Timber lying on or buried in the ground may be reached by underground foraging galleries but attacks may occur well above ground level either inside the wood or by way of mud-walled shelter-tubes 'plastered' on the outside. Timber resting on the substructure of buildings which termites cannot penetrate may be reached by means of these shelter-tubes or else by the erection of an independent, free-standing structure. In rare cases a nest without soil contact may be established inside a building. This can occur where a source of permanent moisture is available to the termites within the building e.g. leaking plumbing.

'Drywood termites' are of economic importance only in restricted coastal, tropical, sub-tropical and adjacent tableland areas of Australia and, unlike subterranean termites, do not have contact with the soil. They form their nest inside the wood upon which they feed and hence attack may take place in any piece of susceptible timber, regardless of its position in a building. The evidence of attack by these species is the presence of dry granular faecal pellets which may be stored in disused galleries or ejected through small openings in the surface of the wood. Drywood termites do not construct galleries or tunnels connecting the infested timber with the soil.

B. GEOGRAPHIC DISTRIBUTION OF TERMITES. The practices recommended in this standard are intended for use in any part of Australia where subterranean termites are a risk. Tasmania is the only State in the Commonwealth where this risk is negligible. The risk must be regarded as high in most parts of mainland Australia, with parts of Victoria and some other limited areas being relatively free from termites. In all areas, experience should be regarded as the best guide to the degree of the local risk.

C. VALUE OF TREATMENT. Chemicals recommended in this standard have been available commercially since 1946 so that records of their performance over longer periods than this do not exist. The earliest tests of chemically treated soil barriers were in the United States of America, where the most effective of the chemicals tested have given complete protection against termite attack since 1947. In Australia similar tests have been in existence since about 1950 with comparable results. When applied in accordance with this standard, the chemicals bind to the soil and are not readily leached.

Both the building and its contents can receive significant protection by means of a chemical soil barrier which prevents termites, attacking from the soil, from reaching the superstructure. Chemical soil barriers will not give protection against attack by drywood termites, which may occur in the same areas as subterranean termites. Neither will they give protection in the rare cases where the nest has been established inside the building and has no contact with the soil.

Provided the treatment has been applied in accordance with this standard and provided the barrier is not subsequently bridged or breached (see Clause 5.4), protection for periods in excess of twenty years can be expected without the need for further treatment. Accordingly, this standard provides details on the most appropriate methods of preventing subterranean termite attack of buildings, from the soil.

D. CO-ORDINATION. Co-ordination of design, construction and treatment processes will be required to safely form an effective barrier system and to minimize on-site disruption. Where chemical soil barriers are to be installed by contract, consultation is necessary between the architect, the builder and the treatment

contractor before building commences. The treatment contractor may then be able to indicate where effective barriers would be difficult to install, to point out possible weaknesses in the barrier system, or to suggest alternatives (see AS 1694) or modifications which would either reduce costs or increase reliability. Similarly, where additions or alterations to an existing building with a protective treatment are intended, or in other circumstances where an existing barrier is to be breached, a treatment contractor should be consulted before the project commences.

E. WHEN TO TREAT. The formation of a barrier of chemically treated soil is most readily accomplished while a building is under construction. It becomes more difficult or even impossible when the building has been completed because of restricted access under the floor and the possibility that voids, wall cavities and other inaccessible areas may escape treatment altogether. In this standard it is therefore assumed that treatment will be carried out at a stage during construction when the whole of the subfloor area is readily accessible. It is preferable that the whole of the barrier system be installed completely at one time. In most cases, however, treatment will have to be made progressively. Special care must be exercised to ensure that the barrier system is complete and that each stage of treatment is well integrated with that previously applied so that no unprotected avenues of entry are left open to the termites. Treatment should not be performed just before or after heavy rain, unless the barrier can be physically protected, as rain may cause excessive leaching or run off before the chemical has bound to the soil.

F. BUILDING SITE PRACTICE. The removal of stumps, logs or roots from a building site reduces the risk from subterranean termites. Similarly, the subfloor area and steps should be kept free from all debris (e.g. timber off-cuts) which may encourage termite activity.

All practices which affect the substructure of a building are relevant to the prevention of termite attack in that building. A basic knowledge of the habits of subterranean termites coupled with sound building practice and attention to detail, will assist the architect and the builder to avoid practices which may cause the failure of treated soil barriers. Some of the facets of construction which can affect the integrity of the barrier system are as follows:

(a) *Appendages.* Carports, annexes, trellises, steps etc attached to the outside of a building provide an indirect route past the chemically treated soil barrier system. Unless the appendage is separated from the protected building by a clear gap of at least 50 mm, thus allowing for easy inspection, the substructures of the attachment should be provided with an effective termite barrier.

(b) *Subfloor ventilation and clearance.* The conditions of high humidity produced by poor subfloor ventilation favour termite infestation and may also be conducive to decay. Good subfloor clearance provides for a free flow of air and should be sufficient to allow easy access for maintenance and inspection. Reliable termite protection cannot be assured unless the substructure is free from voids, cavities and other inaccessible areas which cannot be reached for treatment or inspection.

(c) *Substructure walls, retaining walls.* These should preferably be of solid (not hollow) brick or masonry, with all joints fully mortared to the equivalent of two courses above final grade level. Where cavity walls, hollow blocks or perforated bricks are used in substructure walls and retaining walls, all joints should be fully mortared and the cavities progressively filled with concrete so as to form a solid mass, free from voids to the equivalent of two courses above final grade or the filled level, whichever is the higher. Unless special arrangements can be made to treat the enclosed area before any filling is placed, all joints in brick or masonry retaining walls should be fully bedded with cement mortar in order to prevent the termites from using the fill and gaps in the mortaring as a means of bypassing the barriers external to the retaining walls.

G. TECHNICAL ADVICE. In special circumstances or difficult cases, technical advice on the most suitable procedures to be followed may be sought from the State Departments of Agriculture or Forestry and the CSIRO Divisions of Chemical and Wood Technology and Entomology. Pest control associations are also competent to give this advice and to give guidance on costing.

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1 SCOPE. This standard sets out a practice for the chemical treatment of soil for the protection of buildings from attack by subterranean termites. It includes reference to the chemicals to be used, lays down concentrations and rates of application, and outlines procedures to be followed while the building is under construction. It is also suitable for use as a guide for the protective treatment of completed buildings and of additions and alterations to existing buildings, or in other circumstances where an existing barrier is disturbed, e.g. as in installation of underground telephone cables (see Paragraph D of the Foreword). For application of soil barriers in termite eradication in existing buildings, see AS 2178.

2 REFERENCED DOCUMENTS. The following standards and other documents are referred to in this standard:

AS 1216 Classification, Hazard Identification and Information Systems for Dangerous Goods Part 1—Classification and Class Labels for Dangerous Goods

AS 1604 Preservative Treatment for Sawn Timber, Veneer and Plywood

AS 1694 Code of Practice for Physical Barriers Used in the Protection of Buildings Against Subterranean Termites

AS 1715 Selection, Use and Maintenance of Respiratory Protective Devices

AS 1716 Respiratory Protective Devices

AS 2161 Industrial Safety Gloves and Mittens (Excluding Electrical and Medical Gloves)

AS 2178 Protection of Buildings from Subterranean Termites—Detection and Treatment of Infestation in Existing Buildings

AS 2210 Safety Footwear

AVCA Code 4—Disposal of Pesticide Spills*

3 SITE PREPARATION.

3.1 General. To ensure uniform distribution of the chemical emulsion and to permit percolation into the soil to a sufficient depth to prevent termite penetration of the barrier, some site preparation is usually necessary. The following information is offered for the guidance of operators, who must exercise some discretion in preparing a building site for treatment after ascertaining that the site has been cleared as recommended in Paragraph F of the Foreword.

3.2 Heavy soils, sloping sites. On clays and other heavy soils where penetration is likely to be slow and on sloping sites where run-off of the treating emulsion is likely to occur, the surface of the soil should be scarified along the contours to a depth of 50 mm to 80 mm to retain emulsion where it is applied.

3.3 Sandy or porous soils. On loose, sandy or porous soils where loss of treating emulsion through 'piping' or excessive percolation is likely to occur, preliminary moistening with water is recommended.

NOTE: For the purposes of this standard, bedding sand is not considered to be fill.

3.4 Levelling, excavations and filling. All cuttings, trenches and excavations should be completed and all pipes, wastes or conduits in position before levelling and grading the subfloor. Before treatment, the soil against all substructure walls, stumps, piers and service connections must be prepared as described in Clause 6. Where fill is intended, the grade level should be treated to provide a bed of treated soil; borrowed fill must be free from wooden debris and should be well compacted. If these instructions are not followed, supplementary treatment must later be made to treat the filled area.

3.5 Concrete formwork, etc. All concrete formwork, levelling pegs, timber offcuts and other builder's debris must be removed from the area to be treated. If formwork is left in place at the time of the initial treatment, a supplementary treatment must be given after its removal.

4 CHEMICALS AND CONCENTRATION. Any one of the following chemical emulsions is effective when applied in accordance with Clause 5. To compensate for unusual site conditions, dilutions different from those prescribed may be used, but the rate of application must then be varied to allow for this factor to ensure that the whole of the area is adequately treated and that each part receives the recommended amount of active chemical.

Chemical	Dilution
Aldrin	An aqueous emulsion containing 5 g/L of aldrin
Chlordane	An aqueous emulsion containing 10 g/L of technical chlordane
Dieldrin	An aqueous emulsion containing 5 g/L of dieldrin
Heptachlor	An aqueous emulsion containing 5 g/L of heptachlor
Chlordane/ Heptachlor	An aqueous emulsion containing 5 g/L of technical chlordane and 2.5 g/L of heptachlor (see Note 3).

NOTES:

1. The chemicals described in this standard are organochlorine compounds which have a persistent action. These chemicals are POISONOUS and are hazardous if swallowed, absorbed through the skin, or inhaled as vapours or spray-mist.

* Agricultural and Veterinary Chemicals Association.