

SAFETY DIRECTIONS

Poisonous if swallowed. Will damage eyes and will irritate the skin. Avoid contact with eyes and skin. Do not inhale vapour or spray mist. When opening the container and preparing spray, wear cotton overalls buttoned to the neck and wrist, a washable hat, elbow-length PVC, neoprene or nitrile gloves, face shield or goggles and chemical resistant footwear. When using the prepared spray, wear cotton overalls buttoned to the neck and wrist, a washable hat, elbow-length PVC, neoprene or nitrile gloves and chemical resistant footwear.

When using in enclosed areas, wear cotton overalls buttoned to the neck and wrist, a washable hat, elbow-length PVC, neoprene or nitrile gloves, chemical resistant footwear and half facemask respirator with combined dust and gas cartridge. If clothing becomes contaminated with product or wet with spray, remove clothing immediately. If product or spray on skin, immediately wash area with soap and water. If product in eyes, wash it out immediately with water. After use and before eating, drinking or smoking, wash hands, arms and face thoroughly with soap and water.

After each day's use, wash gloves, face shield or goggles, respirator and if rubber wash with detergent and warm water and contaminated clothing.

Thoroughly ventilate treated areas before re-occupying.

FIRST AID

If poisoning occurs, contact a doctor or Poisons Information Centre. Phone Australia: 13 11 26.

If swallowed do not induce vomiting. Give a glass of water. If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor.

MATERIAL SAFETY DATA SHEET

Additional information is listed on the Material Safety Data Sheet for Termstar Termiticide and Insecticide which is available from PCT Holdings Pty Ltd on request. Call Customer Service Toll Free on 1800 630 877 or visit our web site at <http://pct.au.com>

NOTICE

PCT Holdings Pty Ltd warrants that this product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with Directions for Use under normal conditions of use. No warranty of merchantability or fitness for a particular purpose, express or implied, extends to the use of the product contrary to label instructions or under off-label permits not endorsed by PCT Holdings Pty Ltd, or under abnormal conditions.

POISON

KEEP OUT OF REACH OF CHILDREN
 READ SAFETY DIRECTIONS BEFORE OPENING OR USING

TERMSTAR*
TERMITICIDE AND INSECTICIDE

ACTIVE CONSTITUENT: 100 g/L BIFENTHRIN
SOLVENT: 562 g/L LIQUID HYDROCARBON
50 g/L N-METHYL-2-PYRROLIDONE

GROUP 3A INSECTICIDE

For Installing Chemical Soil Barriers for new Building Work in Accord with AS 3660.1, the post-construction management of subterranean termites in accord with AS 3660.2 and a range of other urban pests, as specified in the Directions for Use table.

RESTRICTED CHEMICAL PRODUCT
ONLY TO BE SUPPLIED TO, OR USED BY, AN AUTHORISED PERSON

IMPORTANT: READ THIS BOOK BEFORE USE



APVMA Approval No: 59665/0405
 *TERMSTAR is a registered trademark of PCT INTERNATIONAL PTY LTD
 (PCT Holdings Pty Ltd ABN 11 099 023 962)
 1/74 Murchoch Circuit, Acacia Ridge QLD 4110 • <http://pct.au.com>
 CUSTOMER SERVICE FREECALL 1800 630 877 EMERGENCY RESPONSE (ALL HOURS) FREECALL 1800 630 877

Soil type	Hole Spacing (mm)	Litres per hole
Heavy Clay	150mm	1.5
Clay loams	200mm	2
Loams	250mm	2.5
Sands	300mm	3

Application equipment used to inject Termstar Termiticide through pre-drilled holes in an interior situation must be in good working order, free of any leaks and the injector must have tip shut-off to prevent nozzle dripping. Lateral dispersion tips are recommended to ensure even distribution. Drill holes must be resealed following injection of the Termstar emulsion. The decision and/or need for drilling concrete floor slabs should only be made after a thorough inspection of the building. The degree of termite activity should also be taken into consideration. Refer to AS 3660.2.

Treatment In Conjunction with Physical Barriers: In situations where the termite management system is to consist of a combination of both a physical and a Termstar soil barrier, each certified system must be installed according to the relevant and appropriate product specification and the Australian Standard AS 3660 Series.

Reticulation Systems: Termstar Termiticide and Insecticide can be used through reticulation systems to form horizontal and vertical barriers under and around structures and all service penetrations. The reticulation system must be certified and be capable of distributing the termiticide emulsion according to the product label and the Australian Standard AS 3660 Series.

In situations using reticulation systems to form barriers around the perimeter and/or service penetrations only, a full pre-construction hand-spray horizontal barrier is recommended. It is the responsibility of the builder and all relevant sub-contractors to ensure that all termite barrier systems are installed in accordance with the relevant product installation directions and the Australian Standard AS 3660 Series.

SERVICE REQUIREMENTS:

Service requirements are to be determined as a result of at least an annual inspection by a licensed Pest Manager are recommended. More frequent inspections may be required in high-risk termite areas.

In determining the need for service, factors such as local termite pressure, breaches of the barrier and termiticide longevity should be considered.

Subterranean termites are on occasions capable of bridging termite barriers and therefore regular inspections, as detailed in the Australian Standard AS 4349.3, will significantly increase the probability of detection of termite activity before any damage, or costly repairs are required.

Several factors contribute to longevity of the termite treatment and must be considered when evaluating the need for retreatment. The actual protection period will depend on the termite hazard, climate, soil conditions and rate of termiticide used. Refer to Table A for the protection periods provided.

				To control flies and mosquitoes apply prepared emulsion to surfaces where insects rest or harbour. Reapply as necessary. For perimeter treatments apply the prepared emulsion to a band of soil or vegetation two to three metres wide around and adjacent to the structure. Also treat the foundation of the structure to a height of approximately one metre. Use a spray volume of 5 to 10L per 100 m ² . Higher volumes of water may be needed if organic matter is present or foliage is dense.
Subterranean Termites	Domestic, Public, Commercial & Industrial areas	All States, except TAS	Refer to Table A	Refer to Table B
Subterranean Termites	Poles & Posts	All States, except TAS		

Table A: Termstar Termiticide use rates for the management of subterranean termites

Situations	All Areas South of the Tropic of Capricorn (except TAS)		All Areas North of the Tropic of Capricorn	
	Rate	Potential Protection*	Rate	Potential Protection*
Pre-Construction Barriers Under slabs and under suspended floors with less than 400mm crawl space	1L/100L	Up to 10 years or more	1.5L/100L	Up to 5 years
	500 mL/100L	Up to 10 years	1L/100L**	Up to 4 years
			750mL/100L**	Up to 3 years
	500mL/100L**		Up to 2 years	
Perimeter Barriers For new and existing buildings	1L/100L	Up to 10 years or more	1.5L/100L	Up to 5 years
	500 mL/100L	Up to 10 years	1L/100L	Up to 4 years
			750mL/100L	Up to 3 years
250 mL/100L	Up to 3 years	500mL/100L	Up to 2 years	
Post-Construction Barriers Under slabs and under suspended floors with less than 400mm crawl space	1L/100L	Up to 10 years or more	1.5L/100L	Up to 5 years
	500mL/100L	Up to 10 years	1L/100L	Up to 4 years
			750mL/100L	Up to 3 years
	500mL/100L		Up to 2 years	
Reticulation Systems Perimeter and/or service penetration treatment only	1L/100L	Up to 10 years or more	1.5L/100L	Up to 5 years
	500mL/100L	Up to 10 years	1L/100L	Up to 4 years
			750 mL/100L	Up to 3 years
250mL/100L	Up to 3 years	500 mL/100L	Up to 2 years	
Reticulation Systems Cavity infill & footing barriers	500mL/100L	Up to 5 years	1L/100L	Up to 2 years
Protection of Poles & Fence Posts	500mL/100L	Up to 10 years	1.5L/100L	Up to 5 years
			1L/100L	Up to 4 years
			750mL/100L	Up to 3 years
Nest Eradication	500mL/100L	Not Applicable	500mL/100L	Not Applicable

Vertical Barrier Treatments: To install a vertical barrier use a minimum of 100L of Termstar emulsion per m² of soil. Vertical barriers must be a minimum of 150mm wide, extend down to 80mm below the top of the footing and be complete and continuous. Vertical barriers can be installed by trenching and treating the soil, as it is backfilled, by soil rodding or by the use of reticulation systems, as described in the Australian Standard AS 3660 Series. When using the soil rodding method to establish a vertical barrier the distance between rod spacings should be as per the following table. To improve soil penetration, the soil should be loosened to a depth of 150mm.

Soil type	Rod Spacing (mm)
Heavy Clay	150mm
Clay loams	200mm
Loams	250mm
Sands	300mm

Perimeter Barrier Treatments: Perimeter barriers consist of horizontal barriers at least 150mm wide adjoining a vertical barrier of at least 150mm in width. A perimeter barrier with suspended floors with greater than 400mm crawl penetrations. In buildings with suspended floors with greater than 400mm crawl penetrations, perimeter barrier must completely surround all buildings, pipes and service areas. Perimeter barriers should be installed to surround piers, stumps and service penetrations and completely about all substructure walls. External horizontal barriers should be created by loosening the soil to a depth of 80mm and then applying 1.5L of the diluted Termstar per linear metre around the outside of the structure. To ensure provision of a continuous barrier use a minimum of 100L of emulsion per m² of soil. This equates to a delivery volume of 5L of emulsion per linear metre for a 300mm vertical barrier, or 10L of emulsion per linear metre for a 600mm vertical barrier. Termstar may gain access behind engaged piers against single brick walls unless the soil is treated on both sides of the wall down to the footing.

Post-Construction Treatments under Concrete Slabs: For concrete slabs, the emulsion may be injected through pre-drilled holes through the slab, at intervals between 150mm and 300mm. The following table shows the recommended hole spacing and recommended volume of spray solution required per injection hole, depending on the soil type.

Situations	Critical Comments
Pre-construction Barriers – Under slabs for protection of new buildings.	Apply with suitable application equipment to form a complete and continuous chemical barrier (both vertical and horizontal) under the slab. The formation of the barrier may require a combination of conventional open wand application and soil trenching and/or rodding applications. Recommended rod spacing should be between 150mm and 300 as per soil type. For additional information refer to CRITICAL APPLICATION DETAILS on this label and the Australian Standard AS 3660 Series.
Pre-construction Barriers – Under suspended floors.	An external perimeter barrier (both horizontal and vertical) is an essential part of a termite management program and must be installed at the completion of the building. Refer to "Perimeter Barriers" below. For further details. Chemical barriers that have been disturbed by construction, excavation and/or landscaping activities will need to be reapplied to restore continuity of the barrier.

Table B: Critical Comments for the Management of Subterranean Termites

Australian Standard AS 3660 Series.

**This rate must be used in conjunction with a certified reticulation system that is capable of distributing the Termstar emulsion according to the product label and the on the termite hazard, climate, soil conditions and rate of termiticide used.

Regular, competent inspections by a licensed Pest Manager are recommended as part of an overall termite management program to determine the prevailing termite pressure and environmental conditions and consequent requirement for further termite management options. Inspections should be performed at least on an annual basis, but more frequent inspections are strongly recommended. Several factors contribute to longevity of the termite treatment and must be considered when evaluating the need for retreatment. The actual protection period will depend on the termite hazard, climate, soil conditions and rate of termiticide used.

PROTECTION OF WILDLIFE, FISH, CRUSTACEANS AND THE ENVIRONMENT

Dangerous to fish and aquatic organisms. Do not contaminate dams, rivers, streams, waterways or drains with product or the used container.

PROTECTION OF PETS AND LIVESTOCK

Before spraying, remove animals and pets from the areas to be treated. Cover or remove any open food and water containers. Cover or remove fish ponds, aquariums etc before spraying.

STORAGE AND DISPOSAL

Store in closed original containers, in a cool, well ventilated area away from children, animals, food and feedstuffs. Do not store for prolonged periods in direct sunlight.

In case of spillage, confine and absorb spilled product with absorbent material such as sand, clay or cat litter. Dispose of waste as indicated below or according to the Australian Standard AS 2507 - Storage and Handling of Pesticides. Do NOT allow spilled product to enter sewers, drains, creeks or any other waterways.

The method of disposal of the container depends on the container type. Read the "Storage and Disposal" instructions on the label that is attached to the container.

RE-ENTRY PERIOD

DO NOT spray into the air or directly on humans, pets or animals. Avoid contact with food, food utensils or preparation surfaces.

PRECAUTIONS

For insecticide resistance management Termstar is a Group 3A insecticide. Some naturally occurring insect biotypes resistant to Termstar insecticide and other Group 3A insecticides may exist through normal genetic variability in any insect population. The resistant individuals can eventually dominate the insect population if Termstar insecticide and insecticide or other Group 3A insecticides are used repeatedly. The effectiveness of Termstar insecticide and insecticide may be significantly reduced. Since Termstar insecticide and insecticide is difficult to detect prior to use, PCT Holdings Pty. Ltd. accepts no liability for any losses that may result from the failure of Termstar insecticide and insecticide to control resistant insects. Termstar insecticide and insecticide may be subjected to specific resistance management strategies. For further information contact your local supplier, PCT representative or local agricultural department agronomist.

Pre-Entry Period

Do not allow entry into uncovered treated areas until the spray has dried. When prior entry is necessary, wear cotton overalls buttoned to the neck and wrist and elbow-length PVC, neoprene or nitrile footwear. Clothing must be laundered after each day's use.

Post-Construction and Urban Pest Control: Do not allow people and pets to contact treated areas until the spray has dried. When prior entry is necessary, wear cotton overalls buttoned to the neck and wrist and elbow-length PVC, neoprene or nitrile gloves and chemical resistant footwear. Clothing must be laundered after each day's use.

INSECTICIDE RESISTANCE WARNING GROUP 3A INSECTICIDE

Do NOT use this product at less than indicated label rates. Do NOT apply to soils if excessively wet or immediately after heavy rain to avoid run-off of the chemical. Do NOT use in cavity walls (except via certified cavity infill reticulation systems or for direct treatment of the nest).

Pest	Situations	Rate	Critical Comments
Spiders	External areas & surrounds of States All	25 - 50 mL/10L	Use the higher rate in situations where pest pressure is high or when rapid knockdown and/or maximum residual control is desired. Pay particular attention to protected dark areas such as cracks and crevices, under floors, eaves and other known hiding or resting-places. As a surface spray, apply as a coarse, low-pressure spray to areas where spiders hide. frequent and rest. Spray to the point of run-off using around 5L of spray per 100 m ² ensuring thorough coverage of the treated surfaces. For crack and crevice treatments use an appropriate solid stream nozzle.
Papermats	External areas & surrounds of States All	50mL/10L	Apply prepared emulsion to the point of run-off directly to the papermat ensuring thorough and even coverage. When all adult wasps have been knocked down the nest may be safely removed from the structure.
Wasps	External areas & surrounds of States All	10L/10L	On non-porous surfaces apply as a coarse spray at the rate of 1L of emulsion per 20m ² . When treating non-porous surfaces do not exceed the point of run-off.
Ants, cockroaches, mosquitoes, fleas, flies, ticks (excluding the paralysis tick Ixodes holocyclus) - adults & nymphs	External areas & surrounds of States All	50-100mL/10L	On porous surfaces or for use through power equipment, spray at the rate of 1L of emulsion per 10m ² . When treating porous surfaces do not exceed the point of run-off. Use the higher rate in situations where pest pressure is high, when rapid knockdown and/or maximum residual protection is desired. The lower rate may be used for follow-up treatments. To control ants apply to trails and nests. Repeat as necessary. To control fleas and ticks apply prepared emulsion to outside surfaces of buildings and surrounds including but not limited to foundations, verandas, window frames, eaves, patios, garages, pet housing, soil, turf, trunks of woody ornamentals or other areas where pests congregate or have been seen.

<p>Perimeter barriers (both horizontal and vertical, external and, where required, internal or subfloor) are an essential part of termite management and must be installed at the completion of the building. Perimeter barriers should be installed around slabs, piers, substructure walls and external penetration points.</p> <p>Apply with suitable application equipment to form a continuous chemical barrier (both vertical and horizontal) around the structure and to a depth reaching to 80mm below the top of the footings, where appropriate. The formation of the barrier may require a combination of several application techniques, including soil trenching and/or rodding and open wand applications.</p> <p>Chemical barriers that have been disturbed by construction, excavation and/or landscaping activities will need to be reapplied to restore continuity of the barrier.</p>	<p>Perimeter Barriers existing and buildings</p>
<p>Apply with suitable application equipment to form a continuous chemical barrier (both vertical and horizontal) around the structure and to a depth reaching to 80mm below the top of the footings, where appropriate. The formation of the barrier may require a combination of several application techniques, including soil trenching and/or rodding and open wand applications.</p> <p>Chemical barriers that have been disturbed by construction, excavation and/or landscaping activities will need to be reapplied to restore continuity of the barrier.</p>	<p>Post-construction Barrier Treatment termite management of buildings.</p>
<p>Perimeter barriers consist of a horizontal barrier abutting (where required) a vertical barrier, which must reach down to the top of the footings.</p> <p>Perimeter barriers consist of a horizontal barrier abutting (where required) a vertical barrier, which must reach down to the top of the footings.</p> <p>Termstar must be used through a certified reticulation system to form and replenish perimeter barriers around buildings and service penetrations. The system must be installed according to the manufacturer's specifications and be capable of distributing the Termstar emulsion according to the product label and the Australian Standard AS 3660 Series.</p>	<p>Reticulation Systems Penetration and/or service</p>

To minimise the risk of termite infestation, the subfloor area of buildings should be kept free of stored or waste timber and all other building materials that attract termites. Appropriate action should also be taken to eliminate any undue dampness caused by leaking water or sewerage pipes, or inadequate drainage. Subterranean termites need a constant source of moisture to survive. Provision of adequate ventilation in the subfloor area also helps eliminate undue dampness.

Termite Colonies not in contact with the ground - Occasionally subterranean termites establish a colony in a building without having contact with the soil because they have access to a continuous supply of moisture (eg. from a faulty plumbing fixture or leaking roof). Such colonies are not affected by chemical soil barriers and should be treated as recommended for established colonies, as per Australian Standard Series AS 3660. Termstar Termiticide and Insecticide may be applied directly to the termite colony in such situations.

MIXING
Add the required quantity of Termstar Termiticide and Insecticide to water in the spray tank and mix thoroughly. Maintain agitation during both mixing and application. To facilitate even application of the termiticide emulsion over the area to be treated, the addition of a marker dye at label rates is recommended. On hard to wet soils, the penetration of the termiticide emulsion may be improved by the addition of a soil surfactant at label rates.

CRITICAL APPLICATION DETAILS
The application of Termstar Termiticide to form both horizontal and vertical chemical barriers must be in accordance with the Australian Standard AS 3660 Series.

For treatment of new and existing buildings, both horizontal and vertical barriers may be required around and under the building. External perimeter barriers and where required, internal perimeter barriers, are an essential part of this treatment. The purpose of a chemical termite soil barrier is to provide a continuous, no gap barrier between the building and the termite colony. It is therefore essential that the Pest Manager is familiar with the construction details of the building. For further details, refer to the "Horizontal Barrier Treatments" and "Vertical Barrier Treatments" statements in this leaflet and to the Australian Standard AS 3660 Series.

Horizontal Barrier Treatments: Use 5L of Termstar emulsion per m² of soil. Scarify the soil to a depth of 80mm and apply the Termstar emulsion evenly to the soil surface area to ensure the provision of a continuous barrier with no gaps. To minimise drift, use low pressure, high volume spray equipment delivering large coarse droplets. On impervious soils, where the application of 5L per m² would cause excessive run-off, the application volume may be reduced provided the concentration of the emulsion is increased by a corresponding amount. For example, the volume of applied concentrate must remain constant at 2.5, 50 or 75 mL/m² depending on the location and the situation. Do not apply emulsion volumes below 2L/m².

<p>Reticulation systems cavity infill & footing barriers.</p>	<p>Delivery pipes must be placed in such a position to ensure that the requirements for both horizontal and vertical barriers, as specified in the Australian Standard AS 3660 Series, are met. Special attention must also be afforded to the positioning of the delivery pipes to ensure that the resultant termiticidal barriers are continuous and complete.</p> <p>Apply the prepared termiticide emulsion by pumping through the system according to the manufacturer's specifications. Use a minimum delivery volume of 100L of emulsion per m³ of soil. This equates to a delivery volume of 5L of emulsion per linear metre for a vertical barrier of 300mm x 150mm in dimension.</p> <p>Pre-Construction — For use in conjunction with full soil treatment horizontal barriers only: Apply the diluted emulsion through the perimeter reticulation system as specified above. Follow instructions for Pre-construction horizontal barrier formation.</p>
<p>Termstar must be used through a certified reticulation system to form and replenish cavity infill and footing barriers. The system must be installed according to the manufacturer's specifications and be capable of distributing the termiticide emulsion according to the product label and the Australian Standard AS 3660 Series.</p> <p>Delivery pipes must be placed in such a position to ensure that the requirements for both horizontal and vertical barriers as specified in the Australian Standard AS 3660 Series are met. Special attention must also be afforded to the positioning of the delivery pipes to ensure that the resultant termiticidal barriers are continuous and complete.</p> <p>Apply the prepared termiticide emulsion by pumping through the system according to the manufacturer's specifications with a delivery volume of 2L of emulsion per linear metre of delivery pipe.</p> <p>Note: Where this system is to be installed at the pre-construction stage, a full under slab pre-construction barrier, applied by either open wand application or suitably certified reticulation system, is also recommended.</p> <p>The recommended rate of application is 2L of emulsion per linear metre which equates to 2L of emulsion per 0.0068 m³ or approximately 7L of sand. Should the volume of fill in the wall cavity deviate from 7L (0.17 m x 0.04 m x 1 m = 0.0068 m³) per linear metre of wall cavity, then the amount of Termstar emulsion applied per linear metre of wall cavity should be adjusted accordingly. As a guide, the target bifenthrin loading of treated sand/soil in a cavity infill situation is 110 mg/kg South of the Tropic of Capricorn and 220 mg/kg North of the Tropic of Capricorn.</p> <p>To facilitate more even distribution of Termstar emulsion in the wall cavity, ensure that the fill is evenly compacted at the time of installation. To further enhance distribution saturation of the sand/soil in the infill is recommended at the time of treatment.</p>	

<p>Protection of Service Poles and Fence Posts</p>	<p>Create a continuous termiticide barrier 450mm deep and 150mm wide around the pole or post by soil injection or rodding. For new poles and posts, treat backfill and the bottom of the hole. Use 100L of emulsion per m³ of soil.</p> <p>Regular inspections should be undertaken to determine when and if retreatment is necessary. If disturbance of the barrier has occurred, retreatment of the area affected will be required. Posts and poles may also be drilled and injected with spray solution.</p> <p>Note: For existing poles and posts, it is impractical to treat the full depth and underneath of such poles and posts and therefore the possibility of future termite attack from below the treated area cannot be ruled out.</p>
<p>Eradication of Termite Nests</p>	<p>Locate nest and flood with Termstar emulsion. Trees, poles, posts and stumps containing nests may require drilling prior to treatment with Termstar emulsion. The purpose of drilling is to ensure the termiticide emulsion is distributed throughout the entire nest. Drill holes in live trees should be sealed with an appropriate caulking compound after injection.</p>

Note: The termiticide barrier provided by this product has a finite life. This, together with the recommendation to undertake annual inspections, must be stated on the durable notice required by the BCA (clause B1.3 (j) (ii)),

NOT TO BE USED FOR ANY PURPOSE, OR IN ANY MANNER, CONTRARY TO THIS LABEL UNLESS AUTHORISED UNDER APPROPRIATE LEGISLATION.

CONDITIONS OF USE BY AUTHORISED PERSONS

The pest manager must be licensed under state legislation. For pre-construction treatments, the pest manager must advise the site supervisor, if any, and any workers who may come into contact with uncovered treated soil prior to laying the moisture membrane, to wear appropriate personal protective equipment and to observe re-entry requirements. (For personal protective equipment, refer to "SAFETY DIRECTIONS", and for re-entry, refer to "PRECAUTIONS", below.)

GENERAL INSTRUCTIONS

Urban Pest Management - Termstar is a powerful knockdown and residual control agent. Ants, cockroaches, fleas, flies, mosquitos, spiders, ticks and wasps are controlled by direct contact with the spray and also by the residual action as they come into contact with treated surfaces.

Termites - Termstar should be used as part of an overall termite management program as detailed in Australian Standard Series AS 3660 - Termite Management. Use Termstar Termiticide and Insecticide to establish a continuous chemical soil barrier between the structure and the termite colony in accord with Australian Standard Series AS 3660. A great deal of care is required to understand the construction details of the building and to apply Termstar in a manner which ensures a complete and continuous chemical soil barrier.