TECHNICAL MANUAL 2013

ADVANCED TERMITE CONTROL

SENTRICON®

CONTENTS

BEFORE INSTALLING SENTRICON COMPONENTS

a) Carry out a Termite Inspection of the structure to AS3660.2 Section 3.
b) Ensure recommendations are made to the owner (in writing) to rectify any conducive conditions that may reduce the effectiveness of the Sentricon components. For example; recommend fixing gutters, down-pipes or leaking taps in order to reduce moisture problems from around the foundation edge; removal of alternative food sources such as tree stumps or decorative railway sleepers from the surrounding garden.
c) Obtain, where possible, the termite management history of the site particularly taking note of where chemicals have been used.
d) If installing Sentricon In-Ground Stations it is important to identify any underground utility lines.

SENTRICON IN-GROUND STATIONS

1. PLACEMENT OF SENTRICON IN-GROUND STATIONS

Wherever possible, In-Ground (IG) stations should be installed in areas conducive to termite foraging, as this will increase the likelihood of the monitoring station getting a 'hit' with termites.

Conducive conditions include:

- Areas that create a zone of high moisture around the foundation edge, such as air conditioning units, hot water units, irrigation systems, down-pipes and water run-off areas.
- Foundation walls, concrete edges or paved paths (see notes below).
- Near tree stumps, trees, woodpiles or any other cellulose materials in the garden.

Foundation walls and concrete or paved edges are conducive to termite foraging. There is often a moisture gradient coming off of a concrete edge, together with soil materials that make travel for the termites easier i.e. sand and gravel.

It is best to place IG stations in the soil 300 to 500 mm off of a foundation wall, but if coring paths is not desired to achieve this spacing, then stations butted up along the path edge where there is a natural moisture gradient, is acceptable. Coring in some situations may be the best option.

Avoid placing stations into soil that has been previously treated with chemicals. In these situations place the station as close to the foundation wall as possible but outside of the chemical zone.

Good 'hit' rates in IG stations have been achieved when stations are placed around the entire structure, 300 to 500 mm off of foundation walls and spacing between them is at approximately 3 m intervals.

2. INSTALLATION OF SENTRICON IN-GROUND STATIONS

IG stations need to be placed into soil, either directly or via holes cored through concrete, pavers or asphalt (see section on Coring concrete, pavers or asphalt). They need to be installed so that the **soil-cover sits flush** with the soil surface (see picture 1) restricting entry by termite predators and occasional invaders as well as helping to maintain conducive conditions inside the station. Any lawn thatch, gravel or mulch needs to be removed from under the soil-cover before the station is installed. The best way to do this is to insert a monitoring device inside the auger channel so that when the auger is turned the monitoring device clears a circular, flat surface for the soil-cover to sit (see picture 2).

Picture 1: Shows Sentricon soil-cover sitting flush with the soil surface, also shows station number.

Picture 2: Shows MD in auger channel, a technique used to create a flat base for the Sentricon soil-cover. Can be used to remove lawn thatch, gravel or mulch.

The best way to push the IG station into the augered hole is by using a specially designed sliding-hammer (see picture 4). This hammer is designed so that it fits inside the IG station preventing it from collapsing and the sliding hammer comes down and taps on the outer ring of the IG station. This tool is very handy and efficient in stony or clay soils. In soft soils, a mallet tapped onto the top of the station may be sufficient to push the station into the ground or a moulded-nylon insert together with a mallet (see picture 5) can be used in place of the sliding hammer. The nylon insert has been manufactured to fit snuggly inside the IG station; fully supporting it as it is tapped into the augered hole.

In **sandy soils** you may find removing soil from an augered-hole easier if you first pour water in the area before augering. The water helps keep the soil firm and reduces the tendency for the hole to cave in. The station should then be wrapped in **paper or cardboard** (see picture 3) before inserting it into the hole, this stops sand falling into the station which then can prevent the monitoring devices from fitting correctly. This latter technique can be used for all soil types as it allows the stations to settle in before the paper perishes; this reduces the requirement for cleaning maintenance. In **clay soil** situations ensure the hole is augered deep enough to allow water to drain out of the IG station. You may need to auger a larger hole and back fill with sand if the clay is too dense. Augering holes in **stony soil** types is a difficult task and may require the use of a tungsten tip auger.

When installing an IG station through a core hole the soil-cover will not be used. In this situation ensure that the station sits into soil, even if this requires you to add some soil/ sand to the hole. A **stainless steel sealing core cap** will restrict entry by occasional invaders, help to maintain an environment conducive to termite activity as well it helps prevent the station from flooding. It is also important from a safety viewpoint, as animals or children may be injured if core holes are not properly covered and secured. For a list of suppliers of stainless steel core caps consult Dow AgroSciences Customer Service. Whenever possible install the station with at least 2 **external monitoring devices** (see picture 3). This technique has been successful in reducing termite abandonment from the station after bait has been installed. It gives the termites a larger food source that increases the chance of establishing the station as a preferred feeding site.

When handling Sentricon components, especially monitoring devices, ensure your hands are clean of residues such as smoke and chemicals. To be sure always wear disposable **latex gloves**.

To aid identification of IG stations at monitoring visits it is strongly recommended that you **number the station** with a permanent marker pen designed for outdoor use (see picture 1). Mark the location of each IG station on your site map.

Picture 3: IG stations should be installed with at least 2 external monitoring devices. To prevent soil from falling into the station during install wrapping it in cardboard can be beneficial.

Picture 4: Sliding hammer inserted into.

Picture 5: Nylon station insert & Mallet IG Station.

3. CORING CONCRETE, PAVERS OR ASPHALT

If there is no soil a reasonable distance from a foundation edge, then a core hole through the concrete, pavers or asphalt may be required in order to adequately install the IG stations around the structure. Don't place stations too close to the foundation wall as room is needed to turn the auger that creates the hole. 300 mm should be as close as you need to go to the foundation wall. If you were unsure of the chemical barrier history of the site then you would be wise to avoid this area as it may contain chemical residues that may repel termites. Look for the telltale signs of previous chemical applications such as loose earth along foundations, filled in drill holes along concrete or check the meter box for a treatment certificate.

A core-drill bit with a 75 mm inside diameter should be used to cut the core-hole as it provides a smooth access port that can be sealed with a specially made stainless steel port cover, otherwise known as stainless steel sealing core cap or core cap.

Before starting any coring it is important to locate any utility lines and pipes so that you can avoid coring in these locations.

4. MONITORING PROCEDURE FOR SENTRICON IN-GROUND STATIONS

Hygiene as discussed above for installation is also very important for monitoring visits. Ensure you have clean hands or wear disposable latex gloves. Be mindful not to cross contaminate your gloves by touching 'dirty' equipment in your car.

When monitoring IG stations we recommend you use a torch and a clean metal skewer to view and probe the monitoring devices (MD) checking the resistance level indicating termite

activity. By using this technique you will be able to determine, with minimal disturbance, whether termites have 'hit' the station and what percentage of MD consumption has resulted.

It is important at **all times** to minimise the time the station remains open. If it is noted that additional maintenance or recruiting is required, then replace the cap (upside down is acceptable) until you are ready to proceed, thus minimising disturbance.

Part of the monitoring procedure is to ensure that the MDs are kept in good condition so that foraging termites will always find an acceptable food source. IG station and MD maintenance will be required in the following circumstances:

a) **When MDs do not sit flush in the station making it difficult for the locking cap to fit**. In these situations loose soil or debris has likely fallen into the station preventing the extractor from sitting at the bottom of the station. Assuming termites are not present, you will need to clean out the station using an augering tool attached to a cordless drill (see picture 6) or a modified extractor can be used if there is not too much to clean out (see picture 7). A little water poured into the hole may assist with lifting out loose sandy-like soils and debris.

Picture 6: Cordless drill with auger attachment for cleaning out IG Stations.

Picture 7: Extractor that has been modified to clean out debris from inside IG stations incase no other tool is available.

b) **MDs that appears mouldy**. When mould is excessive and cannot be scraped off, it will likely discourage termites feeding and so these MDs will need to be replaced. If mould is minimal the MDs need not to be replaced this visit, though try to clean the mould off by scraping the two MDs together.

c) **MDs that are soft and spongy when touched**. In wet locations MDs will deteriorate faster than other situations. It is important to test that the MDs are still firm when squeezed between your fingers, if the MD is soft and spongy then it will need to be replaced. You may also need to auger a deeper hole under the IG station if water is not draining away sufficiently. MDs that are darkly discoloured but structurally sound are still palatable to termites thus don't require replacement.

d) **The soil-cover does not sit flush with the soil surface**. In some situations the hole may need to be re-augered to help create a flat surface for the soil cover using the technique shown in picture 2. The problem may be hard to rectify when the station is installed in reactive soils that swell when they get wet and push the IG station out of the ground. Use your best judgment in these situations.

e) **Re-occurring problems with occasional invaders or water logging that would prevent termites entering the IG station**. In these situations if the problem cannot be rectified within a few monitoring visits then it may be best to re-position the station to get away from that area.

5. BAITING PROCEDURE FOR SENTRICON IN-GROUND STATIONS USING SENTRICON IG TERMITE BAIT

When inspecting the MDs during monitoring visits, a few things should be observed prior to baiting an IG station:

1. There should be significant feeding or fluting of the MDs indicating sufficient feeding activity and reinforcing that the station has been established as a preferred feeding site. Use your skewer and torch to determine the degree of MD consumption by the termites as this can be difficult to see if the top has been mudded over. Use your best judgment.
2. Preferably there should be at least 40 worker termites in the station before recruiting. This number of termites gives a good indication that the station has been established as a preferred feeding site and so the risk of abandonment is reduced. If there are not enough termites you should leave the station undisturbed and make a note for your next monitoring visit, this is based on the assumption that very little of the MDs have been consumed.
3. Ensure that at all times the top cap is removed for the shortest period possible to minimise disturbance of the termites and prevent entry by predators such as ants. Turning the top cap upside down to cover the IG station opening is a quick and effective way of minimising disturbance.
4. Prepare the bait before the MDs are disturbed. Two baiting procedures have been developed for the Sentricon IG station. One is by recruiting termites into a Baitube™ device and the other is by using the technique called a SMAG (Soil Mounted AG). Following is a description of each of these two baiting procedures.

a) Recruiting procedure for Sentricon IG Termite Bait

Prepare the Sentricon IG Termite Bait Baitube before MDs are removed from the IG station. This involves moistening the bait matrix with either water or a sugar solution (see section below on sugar water) to a level that suits the climatic & station conditions.

MOISTENING THE BAIT MATRIX

The moisture level of the bait matrix needs to be maintained at a level to suit the individual site. If the site were excessively wet such as in winter time or if a drain or sprinkler is near by, then you would add less moisture to the bait matrix as the site will naturally soak up more moisture.

To moisten the Baitube device it is recommended that you immerse it in a shallow dish of approximately 100-150 mL of sugar solution (use water if ants are a possible threat to the site), then remove the outer yellow plastic wrap and allow the solution to soak into the matrix. When the matrix absorbs moisture it forms a dough-like consistency and prevent the matrix from falling out of the Baitube slits. The remaining solution should be poured into the top of the Baitube. If using sugar solution be careful not to splash it around as it may attract black ants to the area.

RECRUITING THE TERMITES

Recruiting is a technique where by termites are carefully transferred from the monitoring devices into the top of the Sentricon IG Termite Bait Baitube. It is important if performing this technique not to disturb the termites more than necessary as they may produce alarm pheromones which could cause the colony to abandon the site. When your Baitube is prepared you are ready for recruiting. Lift the top cap off the IG station and slowly pull the extractor so that the MDs are removed with minimal disturbance. Gently place them into a suitable plastic recruiting container and allow the termites to crawl off. Do not tap the MDs together but a soft paint brush may be used to assist with removing an adequate number of termites. While this is happening gently place the prepared Baitube into the IG station ensuring you line the 'window holes' of the Baitube with those of the IG station. The way to do this is to lineup the barcode on the Baitube with the locking cap slots of the IG station. Now carefully tip the recruited termites into the Baitube.

If on inspection of the MDs (that you have extracted from the IG station) you find mostly soldier termites it is probably best to put the Baitube in without recruiting any termites. Soldier castes cannot feed and so will not be able to eat their way out of the matrix making recruiting them pointless. With experience you may find that if the station has been established as a preferred feeding site then installing a Baitube without recruiting will often still result in a successful hit on the Sentricon IG Termite Bait. Dispose of any unused termites away from the vicinity of the IG station. Make sure you wash out the recruiting container before you get to the next station, as it may be contaminated with alarm pheromones.

Replace the Baitube lid with only a couple of turns (so as not to turn the Baitube in the IG station) and then the locking top cap of the IG station. Over tightening the Baitube lid will make it difficult to remove next monitoring visit, resulting in movement of the Baitube device which could break termite mud leads that may have been established into the Baitube.

b) Baiting an IG station using a SMAG

This technique has proved very successful in Australia for achieving feeding from an IG station, as it achieves far less disturbance of the termites than during the recruiting procedure. The MDs are not removed from the station, instead the termites are allowed to naturally tunnel up into the bait matrix inside the Sentricon AG Termite Bait station.

When considering using this technique, it is important to bear in mind whether the SMAG will be suitable for the site in question. Will it interfere with the aesthetic of the site based on what the customer understands, but more importantly can the SMAG be disturbed once in place or will it be a safety hazard. For example, SMAGing an IG station in a high traffic area may become a tripping hazard for children or animals resulting in station disturbance, not to mention potential injuries. In public locations it would likely lead to vandalism or tampering of the station thus rendering the baiting location useless. A SMAG is not suitable for all situations.

Prepare the Sentricon AG Termite Bait matrix the same as you would for installation indoors (see preparation of bait matrix page 10). If ants are not a concern or a good seal can be achieved then sugar water is the preferred moistening agent.

ATTACHING THE SENTRICON AG TERMITE BAIT STATION TO THE IG STATION'S SOIL-COVER

While the IG station top cap is still in place prepare the AG station housing with sealer (see picture 8), then remove the top cap from the IG station and quickly place the AG station over the hole on to the soil-cover (see picture 9). Pulling one of the MD slightly out of the IG station and up into the AG may be effective in helping to draw the termites up into the bait matrix. Use the screws supplied if additional fixing is needed to the soil cover. Place the prepared bait matrix, hole-side down into AG station housing and gently press the matrix down into the IG station so that some covers the top of the MDs. Leave the plastic bag around the matrix as this helps to hold the moisture in. Replace the lid on the Sentricon AG station.

Use No-More Gaps® or a similar water based product to seal the station around the base near on the soil cover as well as around the Sentricon AG station lid. In many circumstances

you will need to cover the SMAG with black plastic, an ice-cream container or an empty pot plant container, whatever is available to prevent the station from getting knocked or tampered with. Black plastic is often placed on SMAGed stations and then soil is mounded over the station, this helps to insulate the AG station, creating very favourable conditions inside the SMAG for termite activity.

c) How to prepare sugar water

Studies have shown that termites prefer cellulose moistened with sugar solution compared to plain water (Waller & Curtis, 2003). Observations by Dow AgroSciences and Sentricon technicians have also noted the marked improvement in strike rate on a baited station when the matrix is moistened with sugar solution. We recommend that wherever possible you use a sugar solution commonly referred to as sugar water, for moistening the bait matrix. Obviously in situations where ants are prevalent, sweet sugar water may further encourage ant activity and it may be best to use only water. Avoid water that could contain contaminants such as chlorine and other chemicals and make sure water is always at room temperature or even use warm water so that termites don't get a cold shock when the matrix is put into place so as to reduce the risk of station abandonment.

Sugar solution should be made fresh daily. A 10% solution is commonly used which equates to approximately 100 grams of brown or white sugar to 1 litre of water. Always use water from a source that is known not to contain potential termite repellants such as chlorine or pesticides. Do not use cold water from the fridge.

Picture 8: No-More Gaps sealant applied to the base of a Sentricon AG station

Picture 9: SMAG (Soil Mounted Above-Ground station)

6. MONITORING PROCEDURE FOR SENTRICON IG TERMITE BAIT

It is important to keep note of which stations are baited and when this occurred so that at monitoring visits you can be prepared when opening baited stations. It is important to always carry your torch and skewer as these tools allow you to inspect the baited station with minimal disturbance.

When inspecting a Baitube, slowly unscrew the lid and then if necessary, insert your skewer into the matrix to determine the amount of bait consumed. The degree of resistance should give you a good indication. Try this in the middle of the matrix and on the side in a couple of places. Lots of resistance means that very little matrix has been consumed.

Generally if the Baitube is 70-80% consumed it should be replaced, if consumption is less than 70% the decision to replace depends on how fast the termites have been feeding to this point. For example if they took 2 weeks to consume 70% then in another 2 weeks the bait is likely to be fully consumed and the station may be abandoned for quite some time. Your decision to re-bait will depend on you customer run schedule. Use your best judgment here.

Re-baiting simply involves replacing a newly prepared Sentricon IG Termite Bait Baitube with the one that has been consumed. Work as fast as possible so as not to expose the termites too long and remember to line up the slots in the Baitube with those of the IG station.

When inspecting a SMAG, use the same monitoring procedure as you would for an internally mounted Sentricon AG Termite Bait station. Either stack another AG station onto the first or simply remove the plastic bag and replace with a newly prepared matrix. Be careful not to disturb the termite workings.

REMEMBER to always make a note of the date and how much bait has been consumed for each station. This is important record keeping information for supporting your future claims of colony elimination.

7. MONITORING INTERVALS FOR SENTRICON IN-GROUND STATIONS

Many factors affect the feeding and foraging behaviour of termites such as time of year; species of termite; soil structure; moisture level and disturbance. It is important to have an understanding of these factors and how they can influence the interval between monitoring visits for each site.

For a **Peace-of-Mind/Preventative** site or a **post-colony elimination** site, whilst no termite activity occurs, a minimum of 4 monitoring visits should occur per annum.

For a Curative or termite active site we recommend monitoring intervals do not exceed 4 weeks in summer or 6 weeks in winter while bait is present on site. In some situations the interval may be as short as 2 weeks depending on the feeding behaviour of the termite colony.

When termites encounter an IG station your objective is to establish that station as a preferred feeding site. In order to achieve this you need to maintain all stations so that they present a favourable environment for termites to feed should they encounter the station. (See notes on monitoring procedure). Once you are confident that a 'hit' station has been established as a preferred feeding site you can confidently bait that station. A large number of worker termites feeding on the MDs in the station indicates that it is a preferred feeding site. The termites should continue to feed on the bait matrix presented to them in the Baitube. Feeding on the bait should continue through until the colony has been eliminated.

When managed correctly, one active IG station is enough to achieve colony elimination though more baiting points is preferred to spread the risk of potential abandonment.

With our objective in mind, it is important that our monitoring intervals are such that there is still some 'food' remaining at every monitoring visit to reduce the risk of station abandonment. For aggressive feeding species such as *Coptotermes acinaciformis* or *C. raffrayi*, the interval will need to be shorter than a slow feeding species such as *Heterotermes* spp. Stick with the rule of thumb time periods given above and you should be fine in most instances, with experience your judgment on this monitoring interval will get better.

On a site where colony elimination has been achieved it is important to be mindful of the potential for a new colony utilising the existing underground galleries. This may influence your monitoring interval on a site where colony elimination has recently been achieved; you may choose intervals from 4-12 weeks depending on the site's risk assessment.

Monitoring intervals by termite species
These monitoring intervals are guidelines only, but show the importance of knowing which species you are trying to eliminate. The table below shows the relative monitoring frequencies of most key species or genus based on observations of their feeding behaviour. It is important at all times to use your professional judgment of the site risks and local termite knowledge to determine actual monitoring frequency for a site.

Termite Species	Monitoring Frequency (weeks)
Coptotermes acinaciformis	2 – 4
Coptotermes acinaciformis raffrayi	2 – 3
Coptotermes michaelseni	3 – 5
Coptotermes frenchi	3 – 5
Coptotermes lacteus	3 – 5
Schedorhinotermes spp.	2 – 4
Nasutitermes spp.	3 – 5
Heterotermes spp.	4 – 5
Mastotermes spp.	1 – 3

8. HOW TO MANAGE OCCASIONAL INVADERS

There are pests other than termites that invade the Sentricon bait stations. Some of these invaders are detrimental to the baiting station's performance such as ants while others appear to have minimal affect such as earthworms.

The most common reason for invader pests entering the station is due to incorrect installation of the soil-cover, namely it does not sit flush with the soil surface. Gaps under the soil-cover allow entry into the station for these soil-surface dwelling pests. For more information see sections 2 and 4 above on IG station installation and monitoring maintenance. Following are some helpful hints with how to rectify problems with occasional invaders:

Ants
Ants are of course predators of termites and are therefore the most destructive invaders in Sentricon stations. The preferred way to deter ants from 'living' inside the IG station is to flood the IG station with water. The ants will generally vacate the area if this happens often enough. If flooding is not successful then you may need to consider relocating the IG station or try a very light application of a registered chemical around the IG station ensuring the material is not applied within 5 cm of the soil cover.

Wood Slaters
Slaters may deter termites from establishing the area as a feeding site and so need to be prevented from entering. Generally entry is gained via an air gap between the soil-cover and the soil. Use the techniques described in section 4d to rectify this gap.

Earthworms
Earthworms are generally not a problem and when they do occur they tend not to affect the performance of the IG station. If the station becomes excessively wet, worms will occupy the bait matrix rendering it necessary to replace. The station may need to be moved if water logging can't be prevented in the current position.

Slugs
Like slaters, slugs normally enter under the soil cover. If not managed, a station can get invaded by a large number of slugs that will likely deter termite invasion of the IG station. Clean out the station and rectify the gap under the soil cover (see section 4d).

Other pests
Other pests can often be found in IG stations that have not been installed or maintained correctly. These include earwigs, spiders, and tiny soil dwelling insects such as collembola (spring-tails), all of which should be managed through regular station maintenance.

9. PCF WINGS

Wings are often used on challenge sites where it has been difficult to achieve a hit with termites in an IG station. The idea of the wing is to create a physical barrier, which if encountered by the foraging termites, it will lead them along its length and into the IG station where a plentiful food supply will be encountered.

The PCF (Plastic Core Flute) wing is installed into a spade cut (or an in-filled trench in hard soil) between two IG stations with the internal flutes running horizontally (see diagram 1). The wing can be cut to fit around obstacles in the soil such as roots, rocks and plumbing as well as it can be bent to go around corners. The shorter edge of the PCF wing is installed so it makes contact with the IG stations, and the top of the wing sits just below the soil cover making it at ground level. A knife can be used to cut off any excess wing.

Use water to moisten hard soils to make digging easier or help prevent sandy soils from caving-in while trying to install the wing.

Additional external MDs around the IG station has been shown to improve the performance of the PCF wing as they provide extra food for the termites helping to establish the station as a preferred feeding site, as well it reduces the risk of station abandonment. Once you bait one IG station always bait the IG station at the other end of the PCF wing as termites are likely to encounter that station too.

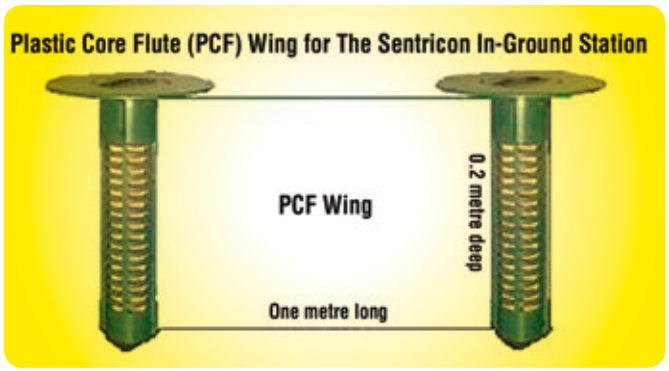


Diagram 1: PCF Wing placed between two IG stations.

SENTRICON AG TERMITE BAIT

10. HYGIENE

Before handling the Sentricon AG Termite Bait stations ensure your hands have been washed thoroughly so they are free of any potential contaminant. Contaminated AG stations may deter termites from entering or lead to station abandonment. It is advisable to always wear disposable latex gloves whenever handling Sentricon AG Termite Bait stations.

Always store Sentricon components, both in your vehicle and in the warehouse, away from any potential contaminants such as chemicals, fuel, smoke etc. It is preferable for you to carry Sentricon components inside a sealed plastic container or the like.

11. PLACEMENT OF SENTRICON AG TERMITE BAIT

Sentricon AG Termite Bait stations can be used just about anywhere where termites are located. The success of the AG station is often determined by how well it is positioned relative to where the termites are feeding. Though good hit rates have been achieved when placing an AG station over a mud lead and not on an actual feeding area.

It is imperative that you use your termite locating skills together with the commercial tools that are available such as a moisture meter and movement and sound detection devices to locate exactly where the termites are actively feeding. The feeding site is the prime location for placement of the Sentricon AG Termite Bait station. Placement should be on or just ahead of the feeding front so as to encourage termites out of the cellulose material and into bait matrix of the AG station. When moistened the bait matrix is pliable and can be pushed gently into the termite workings acting like a wick to draw them out into the AG station. Termites tend to follow wood grain so bear this in mind when placing the station.

Termite flight cuts can often be located. Mounting Sentricon AG stations over flight cuts has generally been unsuccessful as it is usually the reproductive caste members that travel this route and not the feeding worker termites.

12. INSTALLATION OF SENTRICON AG TERMITE BAIT

Now that you have located the termites' concealed feeding front it is important to mount the AG station housing and prepare the bait matrix before exposing the termites. Exposing the termites too early will likely cause them to be alarmed and start mudding over the exit hole you have created and thus reducing the likelihood of drawing the termites out of the feeding site and into the AG station. Exposing the termites should be done immediately prior to inserting the bait matrix in to the AG station housing.

Your objective when installing a Sentricon AG Termite Bait station is to create an environment inside the station in which termites would happily feed. This generally means completely sealing the station with a sealant like No-More Gaps so that moisture can't escape and the termites can maintain the humidity and CO2 levels inside. Sealing the station also helps to hold in onto the termite active surface as well as helping to keep out termite predators such as ants.

Picture 10: Screws are supplied with Sentricon AG stations, which can be used to help secure the station to a wooden surface.

Follow the procedure below as a guide to installing Sentricon AG Termite Bait stations:

Install the Sentricon AG Termite Bait station housing

- Carefully spread Selley's No-More Gaps on the base of the AG station (see picture 8) so that a good seal will be made between the AG station housing and the surface it is to be mounted on.
- If needed use the internal screws to help hold the station to the mounting surface (see picture 10). If mounting onto a concrete surface, where screws cannot be used, a small amount of hot glue can be used to fix the station to the concrete surface, too much could be repellant to the termites. No-More Gaps can then be spread around the outside of the station to seal any air gaps. Using masking tape to hold the station in place while the sealant dries could also be beneficial.
- Windows can be broken or cut out of the station housing to allow for it to be placed over mud leads or other obstacles. Sealant can then be squeezed around the opening to create a seal.
- Other handy techniques are placing an MD or 2 behind the AG station housing to allow for it to be placed in places such as the edge of a door frame.
- In all situations don't break open a mud lead or expose the working termites until the housing is securely in place and the bait matrix is ready to be installed.

Prepare the bait matrix

- The bait matrix is contained with in a sealed polyethylene bag inside the Sentricon AG station housing.
- Cut one corner of the polyethylene bag containing the bait matrix with scissors.
- Pour approximately 200 mL of sugar solution or plain water (do not use cold water from the fridge) into the bag and massage until the bait matrix is evenly wetted and becomes a doughy consistency. Add more water if necessary. The matrix will swell and form a dough-like consistency. Ensure that the entire matrix has absorbed some moisture so that it is no longer grainy.
- The amount of moisture you add to the bait matrix will vary with climatic conditions and the moisture levels anticipated within the termite workings. You want enough moisture to encourage the termites into the matrix but not too much as it may deter them from entering. Most importantly we want the matrix to remain moist until our next monitoring visit, generally if termites successfully hit the station this is not a problem as they will bring in more moisture if required.
- With a clean knife or scissors, cut a generous size opening in the bag and place it into the previously mounted station housing with the bait making firm contact with the termite workings.
- This opening allows for the matrix to be squeezed out in to the workings as it is installed but more importantly allows the termites to gain easy access to the bait matrix which we wish for them to consume.
- Always leave the plastic bag in place until you are ready to re-bait. The plastic helps the termites maintain a favourable microenvironment around the matrix, assisting with rapid consumption. This is especially important in the drying summer months.
- Clip the bridge in place and replace station lid.

Expose the termites to the inside of the Sentricon AG station

- When the Sentricon AG station is in position and the bait matrix is prepared, only then should you expose the termite-feeding site inside the AG station.
- Use a knife or screwdriver to make an opening or maybe a small hole will need to be drilled into the area. If drilling, keep disturbance to a minimum plus angle the hole so it goes with the grain of the timber.
- Quickly place the prepared bait matrix, with the opening side of the plastic down towards the termites, into the AG station. Press gently on the pliable matrix and ensure some is pushed down into the termite workings as this will act as a wick to draw the termites out into the matrix.
- Use the plastic bridge provided to help hold the matrix in place when on an upright surface.
- Replace the Sentricon AG station lid using the screws provided. To ensure a good seal place a small amount of sealant or masking tape around the edge of the lid to close up any gaps. Additional sealant may also be required at the base of the Sentricon AG also.
- Number or mark the AG station so you can identify it next time you visit the site. Common coding used is 'SK2.1' which means station number two stack number one. 'SK1.3' means station number one, stack three i.e. Whatever you use make it clear for future reference. Mark all station positions on your site map.

a) Hints for mounting on narrow surface

- If the mounting surface is narrower than the base of the Sentricon AG station then it will need to be adapted. Place a couple of monitoring devices under the area of the AG station which is not making contact with the mounting surface.
- Fix the AG station with the screw to the mounting surface, then fix the MDs in place using sealant and possibly masking tape (see picture 12) if they need extra support while the No-More Gaps sealant dries. Seal all remaining gaps with sealant.
- Variations of this technique can be used for other awkward surfaces. There are no hard rules except seal up the AG so that a suitable environment is created and is able to be maintained by the termites inside.

b) Mounting Sentricon AG Termite Bait on trees

- Remove outer bark layers so that the station is mounted directly on the hard wood of the tree. Access holes will generally need to be drilled.
- Cover with black plastic or a plastic container where possible to give some localised protection.
- Mounting on a tree will make the AG station more prone to invasion by ants and other predators. Ensure you have created a good seal with No-More Gaps to restrict their entry.
- Ensure that the station is sealed well and protected from wind and rain.

Picture 12: When addition bait is required, the Sentricon AG station can be double stacked so as to prevent disturbance of the feeding termites below. Note: masking tape is used to help hold the AGs on the wall while the sealant dries.

c) Mounting Sentricon AG Termite Bait on painted or treated surfaces

- If **paint or varnish** is covering a surface that termites are feeding within, it is advisable to scrape back these layers around the access hole as it may repel the termites and stop them from tunnelling out into the AG station.
- If termites are feeding inside **treated timbers**, to draw them out into an AG station, the treated layers may need to be removed so that it doesn't repel the termites.
- Remove **pesticide residues** from the mounting surfaces with warm water prior to mounting a Sentricon AG station. This would be necessary if the homeowner has tried to 'kill' the termites in the local area with a common household insect spray.
- Surfaces treated in **creosote** will need to have this repellent layer chiselled away before mounting the AG station.
- Do not install stations onto **Gyprock**® unless direct access to the affected timber can be accessed. This may mean removal of the Gyprock and direct attachment of the AG station to the underlying timber.

d) Notes on other fixing or sealing products

- **Liquid Nails**® is only suitable for use unless external to the station. Do not make contact with the bait matrix. It can be used use sparingly to help attach stations to plastic, brick, and concrete etc., but avoid its use if possible.
- **Insulation tape, masking tape, duck tape**, etc. can be used to hold stations in place while sealant or fixing agents dry. Ensure tape does not make contact with the bait matrix. Tape can be removed gently once fixing agents have dried to help the station mounting look neat and professional.
- **Silicone and putty** contain strong solvents which can repel termites so neither should not be used anywhere near the Sentricon AG stations.

13. MONITORING FREQUENCY FOR SENTRICON AG TERMITE BAIT

The objective when monitoring Sentricon AG Termite Bait is to ensure your monitoring visits occur when about approximately 90% of the bait has been consumed. For sites that have been established as a preferred feeding site and where 100% of the bait is consumed by the next monitoring visit it is common for the termites to return shortly after the bait is replenished. The key to successful re-baiting is to minimise the time between complete consumption of the bait to replacement. You need to avoid situations where the termites have vacated the area because they have had no food available for several weeks.

The monitoring intervals as discussed in the section on Sentricon IG Termite Bait also apply for Sentricon AG Termite Bait. In brief, for an active termite site we recommend monitoring intervals do not exceed 4 weeks in summer or 6 weeks in winter. In summer, the active months of the year, the monitoring interval may be as short as 2 weeks if the termite species appear to be feeding aggressively.

For the latter example you may wish to monitor the Sentricon AG Termite Bait station 2 to 3 weeks after the initial install to gauge the level of termite activity and then decide whether to make the next visit longer. Every site needs to be judged on its own merits based on your risk assessment of the location and your knowledge of the termite species.

14. MONITORING PROCEDURE FOR SENTRICON AG TERMITE BAIT

Care must be taken to avoid excessive disturbance when inspecting Sentricon AG Termite Bait stations.

To open the Sentricon AG Termite Bait station, score the sealant around the lid with a sharp knife and then using a flat screwdriver gently pry open the lid. Have your torch ready if you are in a poorly lit area. Quickly view the bait matrix to assess the extent of feeding. A skewer may be useful to probe the matrix checking for resistance levels.

Be aware that the bait can appear to be complete when in fact it is fully consumed but the plastic has just remained in the shape that it was in when installed. Always gently probe to test the resistance level. Another point to note is that sometimes termites will bring mud into the station. There could be as much mud as there was bait in the station, where the bait has been fully consumed. In this latter situation it is best to scrape out the mud before installing a new bait matrix.

If on inspection the termites are feeding on the bait matrix and sufficient matrix remains, quickly close the lid, reseal and make a note of the percent consumed. There will be times when you will want to restack when as little as 50% of the first matrix has been consumed, especially if you are not confident that enough bait will remain until next monitoring visit.

If there is only a small amount of bait matrix remaining in the station then there is likely enough room inside the first AG station housing to place another bait matrix. If on the other hand you feel that there is not enough room you can stack another AG station housing onto the first to create a larger baiting cavity, what we call a double stack (see picture 12).

How to stack Sentricon AG station housings

Prepare the new bait matrix first as described in section 12. To the new Sentricon AG station housing apply a small amount of sealant to the base of the station on its outer edge. Do the next steps a quickly as possible to minimise disturbance inside the existing AG station. Remove the lid of the active AG station then attach the second AG station housing, when in place quickly, but gently remove the plastic bag that surrounds the first bait matrix and then place the newly prepared bait matrix into the station ensuring it makes good contact with the workings below.

The pliable nature of the wetted bait matrix allows it to be moulded around the termite workings to create a favourable environment for them to feed. When happy with the position of the bait, replace the lid on the stacked station, the first lid can be re-used as this will contain the termite colonies' pheromones. Seal all air gaps with sealant. Modify this procedure where necessary but always be mindful of working quickly and efficiently so as not to disturb the termites unnecessarily.

Sometimes you will open the AG station and find that no bait has been consumed. In these situations slowly lift the bait matrix to see if the access hole is free of mud. If not, re-open the access hole and try again to draw termites out. If after several monitoring visits this is unsuccessful you may want to consider relocating the station to another termite active position.

If, when you open a Sentricon AG Termite Bait station, you find that the bait matrix has been either completely mudded over or has been 'peppered' over with mud dots but no bait has been consumed. This could indicate several things. The bait matrix may be marked as a food source for future use, or it could indicate that the bait matrix maybe too dry for feeding. Re-moistening the matrix may stimulate feeding in the latter situation. The peppering could indicate that the termites have been disturbed and consequently have abandoned the station. These behaviours are not conclusive but give you the opportunity to look for clues.

COLONY ELIMINATION

The most important aspect of the active ingredient, Hexaflumuron, used in Sentricon AG Termite Bait and Sentricon IG Termite Bait is that it has proven to be able to eliminate termite colonies (Peters & Fitzgerald 1999; extract from CSIRO Annual Report 1996-97). What this means is that the source of the problem or the threat to a structure can be conclusively removed, without the ability to eliminate the termite colony you only move the threat elsewhere, not necessarily away from the property in question.

Hexaflumuron is the active ingredient contained within the cellulose bait matrix of Sentricon AG Termite Bait and Sentricon IG Termite Bait. Hexaflumuron is a chitin synthesis inhibitor which as the name suggests inhibits the production of chitin, preventing the termites from moulting. If a termite is unable to moult when nature intends the termite will die. When the worker termites feed on the Sentricon bait matrix they then pass the active ingredient, unbeknownst to them, to other members of their colony through a behavioural process called trophallaxis. Trophallaxis is the transfer of chemical messages and nutrients between termites, Hexaflumuron is transferred between termites during trophallaxis. Elimination will occur when the entire worker population has attempted to moult after being exposed to Hexaflumuron. See more on Termite Biology and Behaviour below.

Colony elimination can be claimed after the following criteria are met:

a) Continuous feeding by termites on Sentricon AG Termite Bait and Sentricon IG Termite Bait has been recorded. The baited station needs to have been actively fed upon for at least 2 consecutive months and then at least 2 consecutive monitoring periods with no signs of worker termites. If termites abandon the bait before completing two consecutive months of active feeding, the colony cannot be considered eliminated.
b) Other signs that help reinforce that a colony is on its way to elimination are: when the ratio of soldier castes to worker castes increases; a visible cream/white colour change in the bodies of the termites, particularly worker termites (when viewed under magnification these appear as small white balls which are crystallised uric acid); and caste members start to exhibit odd behaviour such as erratic or sluggish movements. All of these changes should be noted down for your records so that they can be used to help support your claims of elimination in the near future.

TERMITE IDENTIFICATION

It is important to know what genus of termite you are dealing with; if possible, species determination is even better. To help you out here the name *Coptotermes* is the genus name and the *acinaciformis* is the name that defines the species. The species *Coptotermes acinaciformis* differs in its biology and behaviour from *Coptotermes frenchi*, highlighting the importance of knowing what species you are dealing with.

There are many publications to assist you with determining the termite genus such as Hadlington *et al* 1996, but to identify the termite to the species level you may need to go to an entomologist expert in termite identifications. The good news is that in reality you will only need to deal with a handful of different species in your area, and with a general understanding of the behaviour and macro appearance of those species you will be able to make relatively accurate identifications.

It is important to know the common species for your area. Termite behaviour and appearance may be enough to aid you with identification if the same species is regularly encountered. For each species find out what their workings commonly look like, how the soldier termites appear; do they have sickle shaped mandibles or a nasus as in *Nasutitermes* species., how do they behave; do they exude a white secretion from their fontanelle on top of their head as in many *Coptotermes* species. Any of these behaviours could help you determine which species you are trying to bait.

There will be times when you will not feel confident with your identification, when this occurs take a sample of termites to get them identified by entomologist expert in termite identifications. Always carry with you sample containers and methylated spirits to preserve the specimens for identification. Soldier or alate termites are the best caste member to collect; worker termites are generally not used for identification but can be helpful. A minimum of 5 caste members should be collected for identification. Always label the sample using white paper and write in sharp lead pencil the details of your collection which include: collection location; suburb/town; state; date and the collector's name. For example Internal door frame, West Beach S.A., 12th January 2003, John Smith. Drop this into the air tight sample container with 50:50 water and methylated spirits. This will preserve the specimen until you are able to get it identified.

TERMITE BIOLOGY AND BEHAVIOUR

It is important to have an understanding of termite biology and natural behaviour to assist you with installing and managing the Sentricon components.

From a biology perspective the following external factors can influence termite colony behaviour:

- Availability of food sources (cellulose)
- Moisture
- Climate
- Geography
- Protection from predators

Termite behaviour is an expanding field of study. Not all is fully understood, but the following is generally accepted as true:

Termites are social insects and so their colonies consist of several caste types.

The ratio of caste types varies from species to species and also with colony age. It is important to have the skills to recognise the different caste types as they have different roles to play within the colony and so can affect the performance of the Sentricon components in different ways. For example recruiting soldier termites into a Baitube device will be of little value as they will not be able to eat their way out as their role is predominantly colony defence – worker termites need to be recruited. Another example is placing a Sentricon AG Termite Bait station over flight cut holes where winged reproductives tend to travel and not the foraging and feeding worker termites. The likelihood of success in this situation would be poor.

The caste types that you may encounter and their respective roles within the colony include:

- **King and Queen** – These two members initiate the colony and continue producing hundreds to thousands of fertilised eggs per day.
- **Soldiers** – The primary responsibility of this caste is to protect the colony. Their defence mechanism include: mechanical via biting with large mandibles; chemical attack by secreting toxic or repellant chemicals, and defence via physically blocking access galleries with their bodies. The head and mandible shape of soldier termites is important for identification.
- **Workers** – These caste members make up the vast majority of the colonies mature population. They are responsible to building and repairing the nest and gallery systems together with gathering food and feeding the other caste members of the colony. A colony without worker termites will die.
- **Neotenics** – These are supplementary or replacement reproductives. Not all species have this caste present.
- Alates – These are winged reproductives which are released from the colony at a particular time of year to fly off in order to find a mate and start a new colony. In Australia the two main flight periods are late spring to early summer and autumn. Nests of the same species have been known to release their alates simultaneously (CSIRO 1991).
- **Immature stages** – These include all caste type in immature form from eggs through to various nymphal stages.

Random foraging behaviour

The foraging population with in the colony will forage randomly looking for new food sources. It is understood that they randomly feed at established feeding sites, guided by pheromone trails, this aids in spreading the bait throughout the entire colony. Even though foraging is random, it is only random to a point. When the foraging termite locates a moisture zone or encounters a physical barrier such as plumbing it is more likely to forage in and along these areas. Further supporting station placement in areas conducive to termite foraging.

Continuous foraging behaviour

Termites are constantly seeking new food sources. They forage in a 3 dimensional manner under the soil surface. When a new food source is located, it is marked with chemical messengers (pheromones) to identify the site. Termites can mark sites as a potential food source, but they may not begin feeding on that site until a later date.

IN-CONJUNCTION TREATMENTS

There will be situations where homeowners wish to stop termites immediately once they have been located feeding within home if this is the case then a spot treatment of a registered termiticide may need to be used. The idea behind this treatment is to halt the feeding front. Where possible Sentricon AG Termite Bait stations should be used to gain feeding in areas where damage has already been done while waiting for a strike in newly installed IG stations around the structure.

Observations to date have shown that termite workings have dried up when the Sentricon AG Termite Bait stations have become the preferred feeding site within the structure. This has occurred with in a matter of weeks of installing the bait station. Most homeowners will put up with potentially a little extra damage while the baits start to work on the termites instead of having chemicals used inside their home to rid their structure of termites.

When in-conjunction chemical treatments are used be mindful that they may alter the termites' behaviour and so alter the effectiveness of spreading bait throughout the entire colony, for this reason, behaviour altering products should be avoided.

MONITORING EQUIPMENT CHECKLIST

Diagram 2: (above) Basic equipment recommended to be carried when monitoring Sentricon IG and Sentricon AG stations. (right) Useful tools for installing IG Stations: Nylon Station Insert, Mallet and Sliding Hammer.

The following tools are recommended for you to carry with you when monitoring either Sentricon IG stations or Sentricon AG Termite Bait stations (see diagram 2):

- Torch
- Skewer
- Plastic recruiting container
- Screwdrivers (Phillips & flat)
- Small soft brush
- Utility knife
- Water bottle &/or mister
- Sugar for sugar water
- Disposable gloves
- Top Cap pliers
- Long-nose pliers
- Station cleaning auger
- Monitoring Devices
- Sentricon AG Termite Bait
- Sentricon IG Termite Bait
- No-More Gaps
- Site map and pen
- Extractor

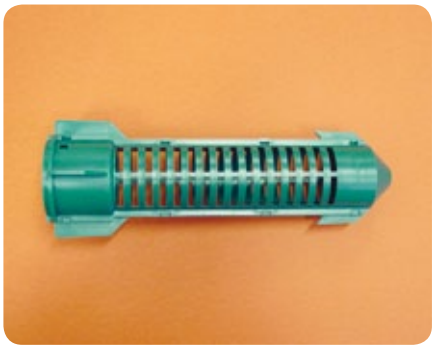
Other equipment to have available in your vehicle if required includes:

- Hand auger
- Cordless drill and bits
- Sliding hammer or Nylon Insert
- Sentricon IG station components
- Cardboard (to wrap stations)
- Bucket
- Mallet

APPENDIX:
SENTRICON COMPONENTS

SENTRICON II MONITORING COMPONENTS

Sentricon In-Ground Station - comprising of:



IG Station housing

Soil Cover

Locking Top Cap

Extractor

Monitoring Device (pair)

Top Cap Key

SENTRICON II BAIT COMPONENTS

Sentricon AG Termite Bait

Sentricon IG Termite Bait

INDEX

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SENTRICON®

For further information on Sentricon II, please contact Dow AgroSciences directly on 1800 700 096 or email auscustomerservice@dow.com with your information request.

www.sentricon.com.au

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