

# A Code of Practice for the Control of Bed Bug Infestations in Australia (Draft)

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Bed Bug Code of Practice Working Party.

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20/Oct/2005



**COMMENTS**

The Working Party invites submissions on this draft Code of Practice for the control of Bed Bugs. Submissions are to be directed to:

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The closing date for comments is 28/Feb/2006.

All submissions will be compiled and made available on [www.bedbug.org.au](http://www.bedbug.org.au). If you wish to remain anonymous, please note this with your submission. Following the closing date, the Working Party will meet and all comments will be considered in the formulation of the final release of Version 1 of the Bed Bug Code of Practice. The Bed Bug Code of Practice will be released during 26-29 July 2006 at the joint AEPMA/FAOPMA meeting in Brisbane.



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## 1. INTRODUCTION

Towards the end of the 20<sup>th</sup> century, many pest managers throughout the western world began to notice an increase in the number of bed bug infestations. This was soon documented in Australia, with one pest control company reporting an increase in the number of bed bug treatments by 700% during the early 21<sup>st</sup> century (Doggett *et al.* 2004). By the end of 2004, the same company had recorded a rise of over 1,100% (Doggett 2005). Other pest control operators anecdotally had also observed a similar trend. The situation in Australia was further exacerbated by the introduction and establishment of the Tropical bed bug, *Cimex hemipterus* (Doggett *et al.* 2003). This species has a preference for warmer climatic zones, whereas the Common bed bug (*Cimex lectularius*), whose existence in the country had long been known, occurs mainly south of Brisbane. The presence of both species meant that the entire continent had become receptive to potential bed bug infestations.

For some 50 years prior to the current resurgence, bed bugs were not considered a serious public health nuisance as infestations had become rare. The decline in this once common pest was attributed to improvements in hygiene and the development of powerful residual insecticides such as DDT. However during the 1970's, the organochloride insecticides, including DDT, were gradually phased out due to environmental reasons. The non-availability of such highly effective insecticides and the changing philosophy of pest management to a more targeted approach led inadvertently to a niche being opened, which bed bugs were soon to exploit. By the early 21<sup>st</sup> century, bed bug infestations were growing at an alarming exponential level and it has been the accommodation industry that has been the most impacted. The ensuing financial costs associated with bed bugs has been a heavy burden to the Australian accommodation and tourism industry, which has probably lost hundreds of millions of dollars due to this pest.

The prolonged absence of bed bug activity meant that society was caught unaware. Few pest controllers had the theoretical knowledge and practical experience to successfully undertake treatments. Also, the hotelier did not know how to recognise this pest and what to do about an infestation, and finally research into modern control strategies has been nonexistent. This has meant that bed bugs have often gone undetected and treatment failures have unfortunately been all too common. The inevitable result is that the number of infestations has continued to increase.

In an effort to stem the rise of bed bugs and to develop a document that could form the basis of industry 'best practice', a working party was formed to develop

a Code of Practice (CoP) for the control of bed bug infestations in Australia. This working party first met in June 2005 at the Melbourne Australian Environmental Pest Management Association (AEPMA) National Conference. The two broad aims were:

1. To develop a CoP that encompasses a holistic approach to the eradication of active bed bug infestations and the management of potential infestations, and,
2. To develop a CoP through broad industry consultation. We will request feedback from pest managers, pesticide manufacturers & suppliers, the accommodation industry & tourism bodies, environmental health managers and other health workers, researchers in tertiary institutions, and any other affected stakeholder.

It is believed that this document is the first attempt anywhere in the world to develop such a CoP.

## **2. AIMS**

**The aims of the CoP are:**

- i. To provide education of stakeholders,
- ii. To define best practice and outcomes, &
- iii. To protect stakeholders.

The CoP endeavours to provide a reference document with broad acceptance by the pest management industry, which would be a guide to pest managers, the accommodation industry, service industries and professions and the general public on best practice in the control of active bed bug infestations, minimisation of the spread of existing infestations and the prevention of possible future infestations.

The expected outcome from adherence to the CoP would be to minimise the impact of bed bug infestations wherever they occur.

## **3. DOCUMENT REVIEW**

The CoP will be reviewed periodically to ensure that it incorporates the most recent advances in research and management technology of these pests.

The document will be valid for a maximum of five years from the date that

appears on the front cover. If superseded by a later version, this document becomes obsolete.

The document review committee will be established by and at the discretion of AEPMA and include at least; one representative of AEPMA, one published scientist who is a recognised expert, one member of a University or Institute of Higher Education (which may or may not be the expert), one representative of an insecticide company and at least three licensed pest controllers who are recognised as having experience in bed bug control.

Any new version will be made available for public comment for a minimum of three months before official release. All subsequent changes to the CoP will be documented and made available on request to AEPMA.

## **4. DEFINITIONS**

*AEPMA* – Australian Environmental Pest Managers Association.

*Alginate Bags* – Dissolvable laundry bags used for handling infectious bedding.

*APVMA* - Australian Pesticides and Veterinary Medicines Authority.

*Bed bug/s* – Either the Common bed bug (*Cimex lectularius*) or the Tropical bed bug (*Cimex hemipterus*).

*Client* – An individual, business or organisation that employs a pest manager to undertake a bed bug eradication program.

*CoP* – Code of Practice, this document.

*Guest* – In the context of this CoP, the term is used for any individual staying within any form of accommodation, excluding those privately owned (i.e. homes, units).

*Harbourages* – places where bed bugs hide.

*Hotel* – In the context of this CoP, this is a generic term used for any level of accommodation, excluding those privately owned (i.e. homes, units).

*Hotelier* – In the context of this CoP, any individual associated with any level of accommodation, excluding those privately owned (i.e. homes, units).

*MSDS* – Material Safety Data Sheet.

*PestCert* – The accreditation body for pest managers.

*Pest Manager* – A pest controller who is licensed under the relevant State Legislative Act, and who undertakes a bed bug treatment.

## **5. LIMITATIONS OF THE CoP**

Where possible the control and management strategies recommended herein are based on independent and peer reviewed scientific publications. However, due to the paucity of references since the recent bed bug resurgence, particularly in the areas of chemical control and prevention, it has been necessary to initiate this CoP using the successful anecdotal experiences of numerous pest managers and researchers. It should be noted that this CoP does not attempt to discuss every technology proposed for the control and management of bed bugs; only those where there is evidence of efficacy through common practice or via publications will be discussed.

As the bed bug situation is currently highly dynamic, it is envisaged that more insecticides will be registered for control and scientific publications will be forthcoming. Thus it will be necessary to regularly review this CoP.

The CoP does not attempt to provide detailed background information on the biology and ecology of bed bugs. It is recognised that this is essential information and such knowledge will aid in the control and management of bed bug infestations. The biology of the pest will be the guiding principle for management practices.

## **6. SCOPE OF THIS CoP**

The CoP will include currently identified effective measures which may be employed against bed bug infestations:

- To control active infestations,
- To minimise spread of active infestations, and
- To prevent future infestations.

These measures will include:

- Inspection and surveillance practices,
- Monitoring techniques,
- Hygiene practices,
- Management techniques and technologies,
- Environmental manipulation.

In describing measures which may be employed, the following details will be included:

- Risk assessment and management;

- How the measures should be employed for maximum effectiveness and safety;
- Circumstances under which the measures should be used;
- Possible integration of measures;
- Limitations of the measures;
- Contra-indications of measures;
- Documentation of measures;
- Required training of Pest Managers;
- Required client education.

The CoP is targeted towards any Australian individual, organisation (both government and non-government), or industry involved with the control and management of bed bugs, those who may be directly impacted by bed bugs, government organisations in the position of enforcing compliancy, or those who are in a position where they could inadvertently spread bed bugs (e.g. second hand furniture sellers, linen contractors). This includes pest managers, the accommodation industry & housekeeping staff, tourism operators, environmental health officers, charter boat operators, staff accommodation managers, housing organisations, landlords, transport operators, linen contractors, second hand furniture sellers and government.

## **7. REQUIRED PHILOSOPHIES**

For bed bug control the pest manager must realise that the normal practice of 'management' is not an option, only eradication is acceptable for the client. The cryptic nature of bed bugs means that complete eradication with a single treatment is unlikely, especially in heavy infestations.

The inspection process must be extremely thorough and may take several hours, as all harbourages need to be identified and subsequently treated. Follow up inspections are always required and repeated treatments are usually necessary even in minor infestations. Thus ongoing surveillance during the control program is essential. Inadequate control often leads to a spreading of the infestation with inevitable escalating control costs to the client. By aiming to achieve complete eradication, the risk of insecticide resistance will be reduced.

The pest manager should never undertake a bed bug treatment that does not conform to this CoP as a 'quick fix' solution. For example, the mattress should not be treated on one day and the remainder of the room on the next. This can lead to dispersal of the insect even to adjoining rooms and units, increase the risk of treatment failure, and potentially increase the overall control costs.

Although unlikely, the pest manager must attempt to eradicate the infestation with the first treatment. There should be a minimum of one call back (or more with heavy infestations) and the final inspection should determine the success of the treatment.

The pest manager should integrate both non-chemical and chemical means of control and aim to minimise pesticide exposure to the public. Only those products that are either currently registered or approved for use for bed bug control by the Australian Pesticides and Veterinary Medicines Authority (APVMA) must be used by the pest manager.

The pest manager must provide quality work as per 'best practice' defined in this CoP or warn the client that control will not be achieved.

Bed bug control can only be achieved if the client fully cooperates with the pest manager. Cooperation may include preparing the room for treatment, to possible room closure. If the client is unwilling to cooperate with the pest manager, then a warranty may not be issued, or better still, the pest manager should walk away from the job.

The hotelier can not solely rely on the pest manager for the prevention of bed bug infestations. It is up to the hotelier to undertake risk management, staff education, to ensure that appropriate hygiene measures are implemented and maintained, to ensure that rooms are not bed bug 'friendly', and undertake other strategies to reduce the risk of potential infestations and lessen the impact of actual infestations.

The hotelier must realise that the control of bed bugs can be expensive, especially in heavy infestations when rooms may be closed for extended periods. It is not the intention of the CoP to compromise any control activity on the basis of financial reasons, no matter how costly. Rather the intention of this CoP is to provide current 'best practice' for the control of active infestations, the prevention of spreading active infestations and the management of future potential infestations. However, research is encouraged to find the fastest control methods in an effort to minimise disruption and possible cost to the hotelier and their client/s.

## **8. TRAINING**

### **8.1. Pest Managers**

Pest Managers who undertake a bed bug treatment should be specifically trained in bed bug identification, biology and management. All training should ideally be through a PestCert appraised lecture or course. Due to the difficulty of bed bug control, under no circumstances should an untrained person undertake a bed bug treatment without the direct supervision of an experienced (as defined by previous sentence) licensed and accredited operator.

This CoP should form the basis on any bed bug training program. Likewise, any bed bug training program being appraised for PestCert compliance must ensure that this CoP forms the basis of the program.

### **8.2. Accommodation/housekeeping staff**

Housekeeping staff are in the position where they may recognise the signs of a bed bug infestation before the guests become aware of the problem. While this may not always happen, vigilance can prevent the bed bugs from becoming well established. Housekeeping staff should be trained in recognising the signs of bed bugs, including blood spotting on the sheets, mattresses and walls, and the bed bugs themselves. Samples of bed bugs should be kept for future reference and training. Management should record bed bug signs via digital imagery and even keep mattresses that have been infested (ensuring that they of course have been treated and stored sealed). As housekeeping staff in Australia often do not have English as the first language, staff information must be multi-lingual. For the hotelier, it is important to maintain records of staff training. Training should be undertaken by an appropriately skilled organisation, and include input by a suitably trained pest manager.

### **8.3. Publications**

Industry publications (be they in pest management, accommodation or housekeeping journals) should only be produced by recognised bed bug experts, and/or be externally refereed by a recognised bed bug expert. In the latter case, the referee/s should be included in the acknowledgement to show that the article has been externally reviewed by a recognised expert.

## **9. CUSTOMER RELATIONS & EDUCATION**

### **9.1. Pest Managers**

#### *9.1.1. Client confidentiality*

In the past, bed bugs were largely associated with substandard housing. While this is no longer the case, for many the past association has developed into a stigma by which the homeowner is embarrassed if an infestation occurs. The hotelier sees bed bugs as potentially impacting on their public image and clientele may be lost if in-house infestations became known. Thus the confidentiality of any bed bug infestation must be assured and must be written into the contract. In some situations, such as the treating of common areas, state legislation may require the pest manager to notify the relevant stakeholders, and this should be noted in the contract.

#### *9.1.2. Professionalism*

As noted above, bed bugs can give a hotel a poor public image. Thus all dealings with hoteliers must be conducted in a professional manner. An infestation should not be discussed in a location where guests may overhear the conversation, preferably only the management or housekeeping staff should be consulted. Treatments in common areas should be undertaken during times that would least inconvenience guests.

#### *9.1.3. Service contracts*

The service contract should state that the aim of the procedure is to achieve complete eradication of the infestation. Where possible, a warranty on the service should be provided. Service contracts should include the initial inspection and treatment, AND at least one follow up inspection and treatment (if re-treatment is necessary). The service contract should explain clearly the clients or organisation's responsibilities and include authorised signatures stating when they will carry out any recommendations made by the pest manager.

#### *9.1.4. Warranties*

If a client pays for a bed bug treatment, then eradication is expected and, thus where practicable, the pest controller should attempt to offer a written warranty. However, any warranty that a company is willing to offer has to vary with circumstances. This would include the potential risk of bed bug reintroduction, the cooperation of the client during treatment as described in this CoP, the quality of ongoing housekeeping and the nature of the room itself (whether or not it is 'bed bug friendly').

#### *9.1.5. Insecticide usage*

When insecticides are used, low odour insecticides should be employed wherever possible. All product label warnings should be discussed with the client prior to any insecticide application.

## **9.2. Accommodation Industry**

#### *9.2.1. Guest complaint/Bed bug detection*

There must be clear procedural guidelines followed if a guest lodges a complaint suggestive of bed bug involvement or if housekeeping staff detect bed bugs or their signs;

- Any report of a possible bed bug infestation must be investigated and be recorded as an incident report. This is the responsibility of the hotelier.
- Management should document when the putative infestation was reported, the room number, where the bed bugs were observed, and the customer complaint (this may include such things as if bite marks were evident).
- If guests have a severe reaction to the bite, the hotelier should encourage and assist the guest to seek medical assistance. The hotelier must never provide any medical advice.
- The hotel management should demonstrate empathy with the guest by explaining that bed bugs are becoming increasingly common globally and that the hotel has strict guidelines in handling an infestation.
- The room must be inspected for bed bugs on the same day by appropriately trained staff or a pest manager. If the room can not be inspected on the same day, then it should be vacated until an inspection is undertaken. The inspection date and time must be documented, along with the date when the pest manager was contacted (ideally the same day), the dates the room were closed, when treatment was undertaken and when the pest manager declared the infestation eradicated.
- If the guest has to be moved to another room, then the second room should also be inspected and treated once the guest has vacated (again ensuring all above procedures are documented).
- The washing of the guest's clothing in hot water prior to room reallocation may help to reduce the risk of further spreading bed bugs.
- In the event of a positive bed bug infestation, the hotel should provide information to the guest on how to prevent the establishment of bed bugs in their home.
- The hotelier may wish to contact past guests that had stayed in the room over the previous month to inform of the bed bug infestation and the possibility that the infestation could have been transferred to their home.

- The hotelier should undertake those processes relevant under the section 'Planning and preparing for inspections and treatments'.

## **10. OCCUPATIONAL HEALTH AND SAFETY**

All pest managers must comply with the relevant state occupational health and safety laws when mixing and applying insecticides. This includes wearing of the appropriate personal protection measures, and storage and disposal of insecticides. For any insecticide selected for use, the label should be consulted for application rates and application directions, safety instructions, and if there are any use restrictions or requirements (for example, some products can not be applied to mattresses).

If power needs to be disconnected in a room (e.g. switch plates removed for inspection and pesticide application) then hotel maintenance staff should be advised and requested to undertake any electrical related procedures.

It is likely that in the majority of bed bug jobs that the pest manager will need to move beds and other heavy furnishings to gain access to bed bug harbourages. For this reason, it is suggested that two pest managers are always used for controlling a bed bug infestation.

## **11. PLANNING AND PREPARING FOR INSPECTIONS AND TREATMENTS**

### **11.1. Pest manager preparation**

The most important preparation that the pest manager can undertake is to explain the inspection and treatment processes in detail with the client. The pest manager should provide;

- Information on bed bugs and their biology (a fact sheet should be available), and include why bed bugs are difficult to control due to their elusive nature.
- Information which states that bed bugs do not transmit disease, although some people can develop allergic reactions. If the client has any medical issues, the pest manager must suggest that the client consults their General Practitioner. The pest manager must never provide medical advice.
- Instructions that it will be necessary to inspect the bedroom, including looking through cupboards and drawers.

- Instructions on any activities the client will be required to undertake prior to the inspection (see below).

Following the initial inspection the pest manager should advise the client on:

- An outline of the treatment proposal.
- A list of insecticides proposed for use and their MSDS's (if requested).
- Where the insecticides will be actually applied and any post-treatment recommendation in relation to the insecticides (such as the placement of a mattress cover over treated mattresses).
- A time frame for treatment and an estimate of when the infested area should be closed off prior to re-entry and when it may be re-opened.
- Contract details, including pricing, warranties, and details of any post treatment processes necessary for the client to undertake. The latter should be explained in full with the client and signed by the client.

#### *11.1.1. Pest manager equipment*

The pest manager will find the following necessary for a bed bug inspection;

- A powerful torch.
- A 10x magnifying lens (to inspect for live bed bugs and eggs).
- Collection bottles with 70% ethanol (for gathering bed bugs for later confirmation of identity, sticky tape can also be used for gathering bugs).
- Fine tipped forceps (for picking up bed bugs).
- Plastic bags (large and small) to hold bottles, tape, infested items, etc.
- Notepad, for recording details of the infestation.
- Dental mirror for hard to access areas.
- Digital camera (for recording infested sites, the digital images or printouts can also be given to the hotelier in a report or provided as part of an educational package).
- Appropriate tools for dismantling fittings.
- Checklists for a bed bug service (Appendix B & C).

## **11.2. Client preparation & preparation of infested sites**

The client must be advised to undertake the following prior to treatment:

- All bed linen, curtains and clothing must be removed from the infested areas. It is preferable to handle all such items as infectious; they must be bagged before removal from the room and washed in the hottest water possible and/or dried in a hot air clothes drier. Alginate bags are preferable for infested linen, as the bags with the linen enclosed can be placed directly into the washing machine and the bags will dissolve. This reduces extra handling of infested linen and reduces potential cross contamination in laundry

facilities. Delicate items can be placed into the freezer after bagging. If a linen contractor is used then all potentially infested linen must be kept isolated with instructions to wash separately in hot water.

- Likewise, all wardrobes, drawers and cupboards must be emptied and the contents treated as above. After clothing and materials have received the heat treatment, these should not be returned to wardrobes but kept sealed in plastic bags until the infestation is controlled.
- All loose articles must be removed from the floor.
- Cover up any fish tanks or preferably remove them from the treated room.
- All occupants and pets must vacate the premises and/or area of treatment.
- For infested hotel rooms, the room must be kept closed upon bed bugs being detected until the infestation is declared eradicated.
- To sign and date any bed bug service checklist and return a copy to the pest manager.

## **12. INSPECTION PROCEDURES**

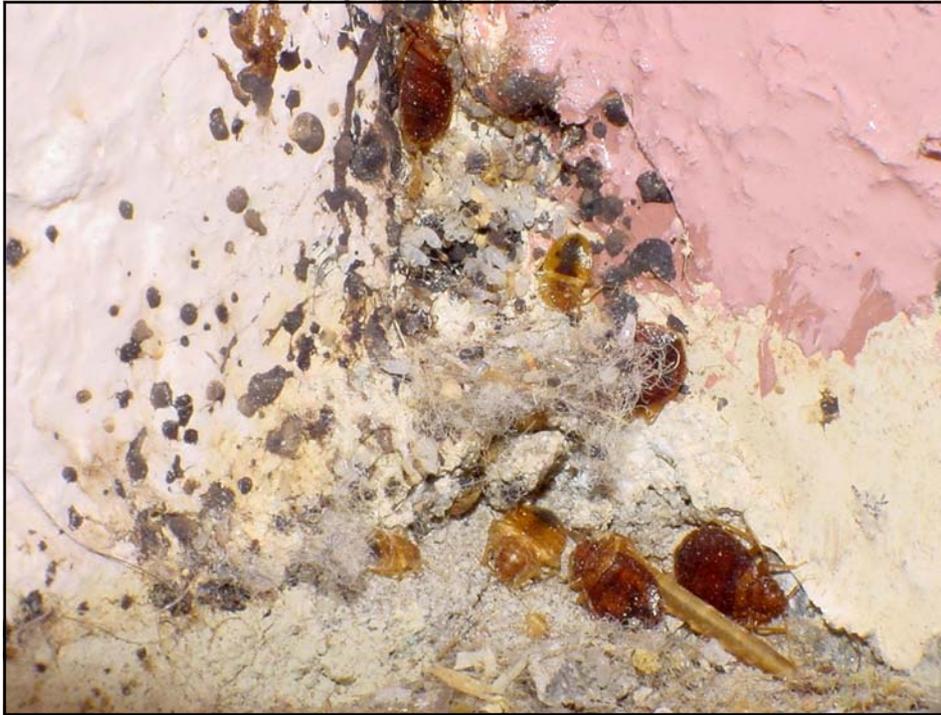
### **12.1. Introduction**

The main aim of the inspection process is to detect every possible bed bug harbourage. It is thought that one of the most common reasons for control failures is the result of poor inspections that fail to reveal all hiding places. A proper inspection is also necessary to anticipate the time required to undertake control, which is a prerequisite for accurate job costing.

### **12.2. Bed bug signs**

Signs of a bed bug infestation include (Figures 1-4);

- Blood spotting. This is digested blood defaecated by the bed bugs. It may be initially observed on the sheets, but will be commonly noticed along the mattress seams and other places where bed bugs hide. Note that the faeces of nymphal cockroaches appear similar, however bed bug blood spotting tends to occur in groups as the insect by nature is gregarious.
- Live or dead bed bugs. Live bed bugs will confirm that the infestation is currently active. Adult bed bugs are a reddish brown, 5-6mm when unfed. The nymphs are cream in colour and from 1-4mm (depending on stage).
- Eggs (cream, ~1mm), which tend to be laid in crevices in dark areas.
- A bed bug smell, sometimes described as 'sickly sweet' but is akin to that of stink bugs. This is usually only noticed in heavy infestations or if close to the bugs.



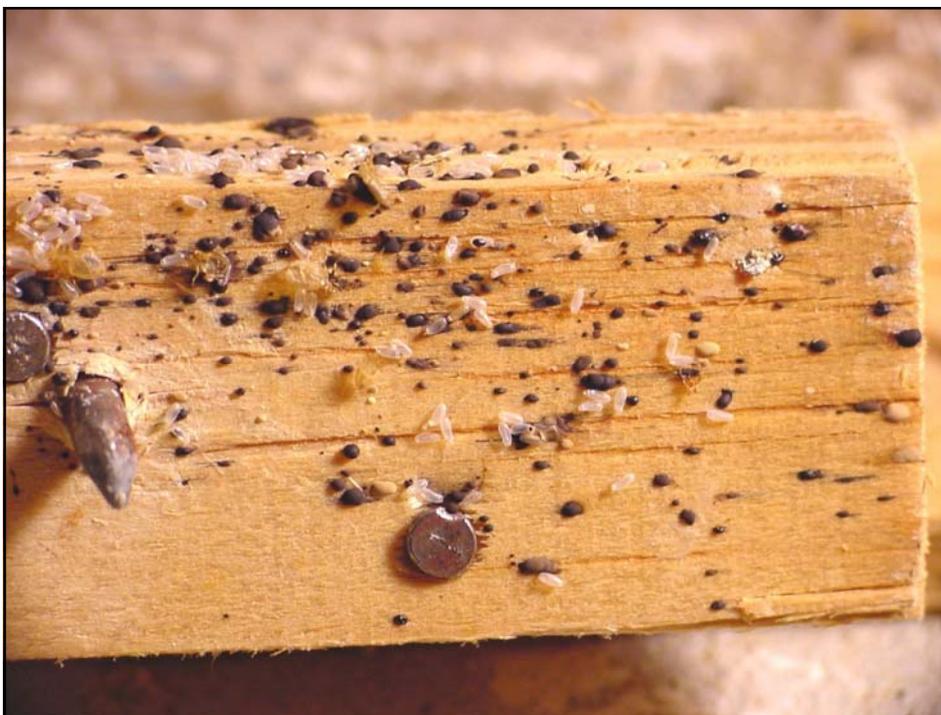
**Figure 1.** Bed bug adults, nymphs and eggs, along with blood spotting.  
©2005 Department of Medical Entomology, Westmead Hospital, Westmead.



**Figure 2.** Blood spotting on a mattress, which is typically grouped, indicating the gregarious nature of the insect. No bed bugs can be seen in this image.  
©2005 Department of Medical Entomology, Westmead Hospital, Westmead.



**Figure 3.** A massive bed bug infestation in an ensemble base. It is always necessary to remove the material covering the base in order to treat the infestation. ©2005 Department of Medical Entomology, Westmead Hospital, Westmead.



**Figure 4.** The 'straight edge' that holds the carpet in place. Numerous eggs and blood spotting are evident. ©2005 Department of Medical Entomology, Westmead Hospital, Westmead. For more bed bug related images see Doggett (2005).

### **12.3. The inspection process**

If a treatment is being undertaken in a hotel, then it is important that the housekeeping staff are interviewed. Such staff are at the coalface and are more likely to have detailed knowledge about an infestation than the management.

To avoid the risk of transferring bed bugs in equipment a minimum of items should be brought into the infested room. When done so, these should be placed either on a previously inspected chair (with the clients permission and then on plastic to protect the chair) or positioned in an open area away from walls. Equipment should never be placed onto beds, on other furniture or next to walls.

Bed bugs have a very flat body shape, and thus they can hide in virtually any crack and crevice. Generally, efforts should be concentrated on dark, isolated and protected areas. Bed bugs prefer wood, paper and fabric surfaces and so these materials should be paid special attention in the inspection process.

The mattress should be the first site inspected and close attention should be paid to the seams, beading, under buttons, labels, and corner protectors if not previously removed. For an ensemble, the base is more likely to harbour the bugs than the top mattress. The edge of the material underneath the ensemble base is a favourite spot for bugs as well as any hollow plastic caster legs. It will be necessary to remove the material covering the base of the ensemble. Generally, bed bugs are more likely to be present in the darker areas near the wall. For metal framed beds if wooden slats are present these contain many cracks for bed bugs to hide in and lay their eggs. If the wooden slats are bolted to the bed frame, the bolts should be undone and the drilled holes inspected. Bed bugs can also hide in coils of bed springs and inside hollow bed posts.

The areas around the bed should be investigated next. This includes the bed frame, bed head and bedside furniture. The drawers in tables and cupboards should be removed and examined. If bed heads are attached to the wall, they should be removed after consulting maintenance staff. Other furniture in the room should be inspected, especially locations where luggage is placed, such as luggage racks. For these, close attention should be paid to the seams and buttons (if upholstered) and any wooden join (especially if constructed of chipboard). Other inspection sites include appliances such as telephones and in hi-fi equipment, books, power points and behind switch plates, underneath carpet edges and the straight edge that holds the carpet in place along with rugs, skirting boards, joins in floor boards and under floor boards, loose wall paper and paint, architraves, old nail and screw holes, ornaments, window casings and wall voids. In moderate to severe infestations, bed bugs may be

found higher on the wall in wall hangings, picture frames, wall mirrors, Venetian and vertical blinds, curtains and curtain rods, books, behind electrical conduit, cracks and joins in the ceiling, under ceiling mouldings, smoke detectors and light fittings. Bed bugs are often found in lounges in common rooms of backpacker lodges.

In any infestation, the adjoining rooms, both either side, and above and below, should be inspected.

A room site plan should be drawn showing the location of any activity. The room inspection should be as methodical as possible noting all sites of bed bug activity on the site plan.

## **13. TREATMENT PROCEDURES**

### **13.1. Non-Chemical Control**

#### *13.1.1. Introduction*

Non-chemical options should be considered as management tools only. Thus while they can be utilised to reduce the overall bed bug population, complete control of an infestation is unlikely unless pesticides are used as an adjunct.

#### *13.1.2. Hygiene*

Reducing the overall biomass of a bed bug infestation can be achieved through discarding infested furnishing. While this option can be recommended by the pest manager, it can be very expensive to the home owner or hotelier and not always necessary. The exceptions are mattresses that are torn; these are difficult to treat and should be recommended to be discarded. Any item to be removed must be sealed in plastic before removal. Ideally, such furnishings should be treated before discarding.

#### *13.1.3. Physical Removal*

Bed bugs should be physically removed via vacuuming or by sticky tape if numbers are small on mattresses. A crevice nozzle should be used on the vacuum machine for carpet edges adjoining walls, bed frames, mattress seams and in ensemble bases, furniture, and other potential harbourages. Vacuuming cracks and crevices prior to treatment will not only remove the bugs but dirt as well, which will allow the chemicals to penetrate better and reduce the rate at which the insecticides are broken down. After vacuuming is complete, the

contents must be emptied into a plastic bag and sealed. This should then be destroyed by heat, rather than just being placed into the general rubbish. As there are reports of bed bugs being transferred by cleaning equipment, the vacuum unit itself should preferably be kept in a sealed bag when not in use. Stiff brushes are sometimes suggested for removing bed bug eggs, however this can disperse the eggs and make control more difficult.

#### *13.1.4. Heat*

Bed bugs are very sensitive to heat and are rapidly killed when exposed to temperatures over 45°C. If heat is used for bed bug control it is important that the high temperatures are applied suddenly; a gradual rise in temperature will cause the bed bugs to disperse, thereby potentially spreading an infestation. Thus using heaters to heat up a room to a lethal point for bed bugs is inappropriate. The most practical method of exploiting heat is through the use of steam. The great advantage is that it will kill all bed bug stages including the eggs (most insecticides are non-ovicidal). A study from the United States (Meek 2003) has shown that using a combination of steam and insecticides provides better long term control than by using insecticides alone. As steam is composed only of heated water, some clients favour this treatment over chemicals, particularly for their mattress and bed. In fact at least one company in the United States will only use steam for controlling bed bugs on mattresses due to fears of litigation in case a guest has an adverse reaction to the insecticides.

It is important to note that there are many different brands and types of steam machines on the market, however not all are appropriate; the unit must be able to produce steam of a low vapour flow and high temperature. Steam flow rate must be kept to a minimum to avoid blowing bed bugs about and to reduce wetting. Like any tool, steam machines are only as effective as the operator. To achieve anywhere near eradication, an intimate knowledge of the pest and its ecology are essential, inspections must be diligent and the treatment process must be meticulous. The instructions of the steam machine must be read thoroughly noting all safety instructions prior to use. As all steam machines take time to reach operating temperatures, this can be done while the inspection is in progress.

As the steam machines are operated with a low vapour flow rate it is necessary to place the nozzle directly onto the surface being treated; the temperature drops away rapidly from the nozzle and a separation of only a few centimetres will not be lethal to the bugs. The nozzle should be moved along at a rate of only 30cm per every 10-15 seconds.

The steam treatment should start with the mattress and be applied to the

seams, under labels and handles, and both inside and out of an ensemble base. It will be necessary to remove the material base of the ensemble which should be kept, and if required, re-stapled after the infestation has been eradicated. Cushions of chairs and sofas should be treated next, paying particular attention to seams and buttons. Always check if the sofa is a sofa bed, and if so, treat the mattress as above. Carpet edges can also be treated with steam, along with the straight edge both above and below.

Note that steam cannot be used everywhere. Being water based, electrocution is an issue and thus power points and other electrical fittings cannot be treated. Also, the heat and steam may damage sensitive materials. While steam will kill all bed bug stages, the most important disadvantage is that it is non-residual. Thus bugs that are not directly killed (and it is prudent to assume that a certain percentage will not be contacted) will not be exposed to any further control influence unless a pesticide is present. Thus it is always necessary to complete the control process by following up any steam treatment with a residual insecticide.

It is often promulgated that bed bugs can be killed via heat by placing infested materials into black plastic bags and then into the sun. However, this has never been fully scientifically investigated and is probably not effective with large items, which have a high thermal inertia. Thus this method is not recommended within the CoP.

#### *13.1.5. Cold*

The alternative to extreme heat is extreme cold, i.e. freezing the bugs. This has the advantage that heat sensitive materials will not be damaged. While this method can not be directly used by the pest manager, it can be recommended to the home owner and hotelier for small items. The amount of time in the freezer would be dependent on the size of the item; the larger the item, the longer in the freezer. Items should be placed loosely into a bag, and as always, this must be done in the infested room prior to removal. Detailed scientific data does not exist on how long an item should be frozen, although some authors recommend four days. The longer an item is kept frozen, the more likely the bugs will be destroyed.

#### *13.1.6. Vacating a room*

Leaving a room vacant for extended periods is not an option to control the bugs as they can live for many months without a blood meal.

## 13.2. Chemical

### 13.2.1. Insecticide application & situational choices

Only those products that are either currently registered or permitted for use by the APVMA for the control of bed bugs shall be used. The label of the product must be consulted to ensure that it is currently registered.

The insecticide/s to be applied must be directed to all harbourage areas to all those areas identified in the inspection process. In most infestations, the carpet and underlay should be peeled back for at least 30cm, and the straight edge treated underneath.

The type of formulation selected will be dependant on its usage patterns. For example dusts and wettable powders if applied in obvious areas in a hotel will be quickly vacuumed up and rendered ineffective. Dusts can be used in electrical areas while liquid formulations can be utilised in more obvious locations. Dusts can be applied to wall voids if the bugs are suspected of penetrating such areas. They can also be directed to the underneath of carpet edges and under straight edges. Currently there are several brands of dust registered for the control of bed bugs in Australia, although only four different active ingredients occur in the products. These include bendiocarb (Ficam), permethrin (many brands), propoxur (Baygon Dust) and a combination of triflumuron/propoxur (Stardust), although the latter two products are no longer readily available. It should be noted that permethrin is anecdotally considered to be repellent and so bendiocarb dust may be more preferable.

Aerosols have their use as a quick killing agent. Products such as synergised synthetic pyrethroids act very effectively as a knockdown, killing the bugs rapidly *in situ*. With extension nozzles, the chemical can be very accurately applied to areas such as beading on mattresses, and cracks and crevices in furniture. For wall hangings and delicate or antique furniture, aerosols may be more appropriate than other formulations. Aerosols should never be used as a space spray; the fine droplets simply will not penetrate into the locations where bed bugs hide. As most contain pyrethroids, there is an associated excitory effect and by spraying into a space rather than harbourage areas, the bugs are likely to disperse and can spread an infestation. Like aerosols, the smoke generating insecticides (known as pyrotechnics) are also unlikely to penetrate into harbourage areas.

For applying liquid formulations, fan sprays should be used along carpet edges and pin streams for cracks and crevices. Avoid using hollow cone sprays.

It is important to note that not all surfaces can be treated by all pesticides and

so the label needs to be carefully consulted. For example, some of the carbamates and organophosphates cannot be used on mattresses. If mattresses are to be treated, there are often specific instructions for this use pattern and it is advisable to recommend to the client that a non-porous cover be placed between the mattress and sheets. Insecticides on a mattress should be kept to a minimum to reduce human exposure and it is preferable to use vacuuming and steam to remove and control bed bugs on beds.

In the past, fumigants were widely used for bed bug control, however as other effective methods exist that pose less operational risk to the pest manager and client, fumigants are not recommended within this CoP. Currently, no fumigants are specifically registered for the control of bed bugs. Fumigants also have the disadvantage of not offering any residual protection. The use of ozone as a fumigant is also not recommended within this CoP due to the associated health risks and the fact that the chemical is the main component of photochemical smog.

### *13.2.2. Available registered products*

A list of currently registered products is in Appendix D. The main chemicals available to the pest manager including their formulations are:

- Bendiocarb (dust & wettable powder formulations),
- Betacyfluthrin (suspension concentrate),
- Cyfluthrin (aqueous concentrate, wettable powder),
- Deltamethrin (suspension concentrate),
- Diazinon (emulsifiable concentrate),
- Permethrin (dust, emulsifiable concentrate, wettable powder),
- Pirimiphos Methyl (emulsifiable concentrate),
- Various aerosols containing synergised pyrethroids, some with propoxur.

### *13.2.3. Insecticide efficacy*

There have been very few recent studies comparing the efficacy of insecticides against bed bugs. Fletcher & Axtell (1993) showed that a wettable powder formulation of bendiocarb and an emulsifiable concentrate formulation of pirimiphos methyl offered little long-term residual activity, while permethrin provided good residual activity on metal and wood, but poor on cotton/polyester materials. Carbaryl and lambda-cyhalothrin offered the best residual activity after 12 weeks on a variety of surfaces, however neither are currently registered for bed bug control in Australia. Other investigations indicate that deltamethrin and cypermethrin are considerably more active than permethrin, both of which are registered against bed bugs (cypermethrin is in a number of aerosols). The pyrethroids are known to be excitatory and generally repel bed bugs to some

degree, and because of this appear to be less effective than the carbamates or organophosphates in the field situation. If poorly applied, the pyrethroids can spread an infestation making control more difficult. The carbamates appear not to repel bed bugs and anecdotally appear more effective as a killing agent. Currently the only registered carbamates are bendiocarb and propoxur. The former is available as both dust and wettable powder formulations, and it should be noted that bendiocarb is not registered for use on mattresses. Despite several formulations being registered, propoxur is only readily available in an aerosol.

From the above information and the fact that dusts and wettable powder formulations, such as bendiocarb, leave an obvious deposit, these chemicals should be the insecticides of choice in less obvious locations, while for example deltamethrin, may be used on more open areas. Both of these chemicals belong to different insecticide groups (1A and 3A respectively), which if used concomitantly, may reduce the possibility of insecticide resistance developing. A synergised pyrethroid aerosol can be used as a knockdown and those that contain a residual (such as propoxur) can be applied to cracks and crevices.

## **14. POST-TREATMENT PROCEDURES**

### **14.1. Client**

The client should be advised to undertake the following post treatment:

- Occupants should be encouraged not to re-enter the treated area until after the chemical has completely dried. Refer to label instructions for re-entry period.
- The client should be requested not to vacuum floors and upholstered furniture for at least 10-14 days. However, dead insects should be lightly vacuumed between treatments to help assess the efficacy of treatment. The contents of the vacuum should then be bagged and discarded.
- The room should be kept vacant until the area is declared free of bed bugs by the pest manager in follow up visits. As the eggs take 7-10 days to hatch, this should be the minimum period, but will be longer in heavy infestations.
- All past signs of the infestation should be removed, such as dead bugs and the blood spotting on walls and mattresses, to avoid future confusion.
- To undertake any preventative measures as outlined below.

### **14.2. Pest Manager**

At least one follow up visit must be made in 7-10 days, with a further chemical

application. If the infestation is heavy, further inspection and treatments will be needed.

## **15. MEASUREMENT OF SUCCESS**

Treatment success should be based on assessing the level of client cooperation, along with follow up inspections and treatments. The pest manager should ensure that the client has followed all the recommendations prior, during and post treatment. The final inspection should be as detailed as the initial inspection, or even more so. All previously identified locations with bed bugs must be examined, cracks and crevices retreated with a knockdown agent and surrounding areas examined in case bugs have been flushed out by the insecticides. No living bed bugs should be observed otherwise another treatment should be undertaken, with another inspection after 24 hours.

## **16. PREVENTION MEASURES**

### **16.1. Accommodation Industry**

#### *16.1.1. Hygiene*

A regular regimen of vacuuming to all areas of a room, especially around skirtings and under lounges and sofas, can reduce the severity of a bed bug infestation, and limit the potential for spreading an infestation. The contents of the vacuum should be sealed and discarded, and the vacuum when not in use should ideally be confined to the one location. For larger establishments vacuums and cleaning trolleys should be confined to one floor or to a certain section of a floor. Bed bugs can be transferred via cleaning trolleys and isolating the trolleys to an area should help contain this possibility. A minimum of items should be brought into the room, for example cleaning trolleys should be left outside and used sheets and bedding sealed in plastic bags (or alginate bags) before being taken outside and placed into linen hoppers. Any crevices on the cleaning trolleys should be sealed with a caulking agent. Clean and used linen should be kept separate and both should not be transported to and from rooms via the same trolleys. If linen is washed by outside contractors, the dirty and clean linen should not be carted in the same vehicle. Clutter in a room should be kept to a minimum.

### *16.1.2. Guest Linen & Bedding*

As the transmission of bed bugs seemed to be intrinsically linked with luggage, guests should not be allowed to use their own sleeping bags and linen. All linen should be provided by and laundered by the accommodation facility or contractor, which should be on a daily basis in hot water. For backpacking lodges, rooms should have multi-lingual signs requesting guests to use the linen provided.

### *16.1.3. Luggage*

Isolating luggage such as backpacks separately from rooms may help in preventing the transmission of bed bugs to a particular room but this practice presents obvious logistical problems in terms of storage and security of belongings. If the bags are to be stored elsewhere, this would have to be in metal lockers, which provides less harbourages and could be readily treated, otherwise the storage area could aid in the spreading of the bugs. As there is no current information on the benefit of such procedures they are not recommended within this CoP.

### *16.1.4. Inspecting luggage for bed bugs*

Inspecting luggage for bed bugs is probably not appropriate; the eggs are too small and can be laid in any small crack and crevice, and thus would be logistically unfeasible. Such procedures may also violate state privacy laws.

### *16.1.5. Bed design*

Metal framed beds can limit the impact of bed bugs as they provide little in the way of harbourages and the bed bugs are averse to climbing smooth hard surfaces. Thus metal frames can help to contain an infestation; if the bugs fall off the bed, they are unlikely to climb back up and eventually die without a blood meal. Wooden beds offer numerous cracks and crevices for harbourages, and provide many footholds for the insect.

Metal bed frames can be rendered less effective if valances or bed linen are in constant contact with the floor or walls. Likewise this will happen if curtains are touching the bed. Such contact will allow access for the bed bugs. Ideally, the metal bed frame should be constructed so that the feet of the legs splay out so that it is impossible to push the bed hard against the wall. To be most effective, the bed must be made like an island and be isolated.

Other bed designs are not so effective at containing an infestation. Ensemble beds contain many places for bed bugs to hide and lay their eggs. The base of

this bed type is especially notorious; the material base cover limits inspection and the areas between the staples are a favoured bed bug haunt. If the caster legs are plastic, they will be hollow and provide further harbourages. The other problem with ensemble bases is that they can be pushed hard against the wall, enabling the bugs to spread via the wall and utilise other locations in the room as harbourages.

In motels the bed head is usually a separate component to that of the mattress and often firmly fixed to the wall. This makes inspection and treatment impossible unless the bed head can be completely removed from the wall (often they are nailed or even glued in place). If power points are attached to the bed head, this can make the inspection more time consuming as power will have to be turned off and electrical fitting disconnected and treated. Where such electrical wires penetrate the wall, this can be an access point by which the infestation can spread to adjoining units. Often the bed heads are made of laminated chipboard, which provides numerous harbourages. Such materials should be avoided in a room to limit bed bug infestations. Ideally in a bed bug unfriendly room, bed heads would not be used.

As bed bugs often hide on the seams of mattress, presumably a seamless mattress may be less attractive, such as the foam type. The alternative is to have some sort of seamless mattress cover that can be easily removed for cleaning and several manufacturers produce these. However, such systems have not been tested scientifically for the possibility of reducing the impact of bed bugs and thus it is impossible for the CoP to recommend using such mattresses and covers until further evidence which supports their use is available. All tags, labels and corner protectors should be removed from the mattress to limit harbourage areas.

#### *16.1.6. Room Furnishings & Room Construction*

For the other areas of the room, access for inspection and treatment, and reduction in harbourages should always be the overriding design philosophy for the bed bug unfriendly room. For example, fixed cupboards should be replaced with metal, removable shelves. While these are probably not as aesthetically pleasing, control would be easier as there are fewer places for bed bugs to hide. Many hotels use cane or wicker furniture, especially in seaside and tropical locations. Such furniture is very bed bug friendly, offering numerous harbourages. Likewise, so is open brickwork and sprayed concrete walls. Such walls should be rendered and heavily painted or covered with plasterboard ensuring all joins are well sealed. Carpeted floors provide more harbourages than solid tiles. The latter having the advantage of being easily cleaned via vacuuming or even washed with hot water (or steam). Tiled floors do have

associated noise issues for multi-storeyed dwellings.

#### *16.1.7. Furniture purchases*

There are numerous reports of bed bugs being transmitted via second hand furniture. Hotels should not purchase and use any second hand mattresses, furniture or furnishings.

#### *16.1.8. Ongoing maintenance*

The main aim of ongoing maintenance for preventing bed bugs is the reduction of potential harbourages via sealing any cracks and crevices. Loose wallpaper should be reglued, while paint should not be allowed to deteriorate to the extent that it is flaking from the wall. Decorative plates are often placed over wiring that penetrates into the walls and it is important that a seal such as silicon is placed around the wiring. This is also true for any plumbing pipes.

#### *16.1.9. Pest Inspections*

Ongoing pest inspections by a pest controller or housekeeping staff are essential to reduce the severity of infestations. The frequency of inspections should be dictated by the number of past infestations and modified according to the occurrence of new infestations.

#### *16.1.10. Preventative Pesticide Applications*

The duration of protection afforded by the presently registered insecticides is not currently known. If insecticides are used without the appropriate intelligence pesticide resistance can develop. Due to this lack of information and to the fact that relatively few insecticides are available for bed bug control, this CoP does not recommend that insecticides should be currently used in a preventative program.

#### *16.1.11. Tracking infestations*

Hotels belonging to a chain should advise their head office of any infestation and the possibility of new infestations via guests transferring between hotels.

#### *16.1.12. Risk assessment and management*

Those in the accommodation industry, who are seriously affected by bed bugs, should undertake a risk analysis of past infestations. Rooms afflicted should be analysed to see where the past guests have come from, whether they be from a

local region or from overseas. If clear patterns emerge, then the high risk groups should be kept separately from the low risk groups. This may help to contain infestations to certain rooms and to a certain wing of a facility.

### **16.2. The Traveller**

For the traveller who wants to avoid taking bed bugs home, it is important to check their room for evidence of bed bugs in a hotel room. Ideally, luggage should be initially left outside, or in the centre of the room where there are fewer harbourage areas for bed bugs, and sheets and mattress protectors pulled off the bed. The seams and beading of the bed should be checked for the tell tale signs particularly in the darker areas where the bed meets the wall. It is advisable also to check the areas where luggage is placed. If there is evidence of bed bugs then a new room should be requested. If there are signs of blood spotting, even if no live bed bugs are present and the hotelier states that the room has been treated, it would still be highly advisable to ask for a clean room as it is impossible to know how well the room has been treated and what stage of treatment it is in (such as between the initial treatment and subsequent inspections). On returning home, luggage should be inspected and kept isolated from the bedroom (such as in a garage). All clothing should be hot washed and/or dried on the hot cycle of a clothes dryer. If there is any possibility an infestation may have been acquired, then a pest controller should be consulted.

### **16.3. Second Hand Furniture Retailers**

All mattresses and bed frames should be examined for signs of bed bugs by an appropriately trained inspector. Infested furniture should be treated as outlined in the CoP.

## 17. REFERENCES

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Fletcher MG & Axtell RC. 1993. **Susceptibility of the bed bug, *Cimex lectularius*, to selected insecticides and various treated surfaces.** *Medical and Veterinary Entomology*, 1: 69-72.

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## 18. APPENDIX A – The CoP Working Party.

| Name                                      | Position  | Affiliation   |
|---|---|---|
| Stephen Doggett<br>(National Coordinator) | Medical Entomologist/ Senior Hospital Scientist | Dept of Medical Entomology ICPMR, Westmead Hospital (NSW)                         |
| Peter and Elaine Arnold                   | Pest Managers/Directors                         | Termite Doctors and Pest Management Service (Q'land)                              |
| Brian Langenberg                          | Pest Manager/Director                           | Weststate Pest Control (WA)   |
| Steve Endor                               | Technical Services Manager                      | Amalgamated Pest Control  |
| David Gay                                 | Pest Manager/Director                           | WR Gay and Son (Vic)  |
| Gary Hughes                               | Charter Boat Skipper                            | Whitsunday Charter Boat Industry Association (Qld)                                |
| Gary Jones                                | Operations Manager                              | Eagle Environmental Systems (NSW)   |
| Peter Lamond                              | Field Biologist                                 | Rentokil Initial  |
| Debra Lewis                               | Secretary                                       | Whitsunday Charter Boat Industry Association (Qld)                                |
| Rod McLean                                | Deputy Executive Officer                        | AEPMA   |
| Frank Meek                                | Technical Director                              | Orkin Pest Control (USA)  |
| Greg Mills                                | Pest Manager/Director                           | Allpest (WA)  |
| Dr Chris Orton                            | Director  | Centre for Entomological Research and Insect Technology (CERIT) University of NSW |
| Justin McBeath                            | Technical Manager                               | Bayer Environmental Science   |

## **19. APPENDIX B – Bed Bug Service Checklist for the Client\***

### **Customer Responsibilities**

- Loosen carpet around the perimeter of the room (s) to be treated. Do not remove carpet from room unless instructed to do so.
- Remove any items that are mounted to the walls i.e. pictures, mirrors, light fixtures, but do not remove from the room as these need treatment.
- Remove outlet and switch plate covers.
- Remove linens from bed and ensemble base. These should be bagged and hot washed.
- Remove items from closets.
- Do not remove any items of furniture from the room.

### **For Commercial facilities**

- Make housekeeping carts available for inspection and treatment.
- Make housekeeping rooms available for inspection and treatment.

### **After Treatment**

- Replace all items removed from walls.
- Replace carpet on straight edge or glue back down.
- Re-assemble room for use.

**Signed:** \_\_\_\_\_ **Date:** \_\_\_\_\_

\*This Bed Bug Service Checklist was kindly provided by Mr Frank Meek, Technical Manager, Orkin Pest Control, USA, and includes minor modifications.

**20. APPENDIX C – Bed Bug Service Checklist\***

**Pest Manager**

- Refer to ‘**A Code of Practice for the Control of Bed Bug infestations in Australia - V1**’.
- Respond to calls for bed bug service within 24 hours by phone to schedule the service. Coordinate the service to coincide with preparations by the facility. The pest manager must be on site to direct the preparation. If necessary, preparation must be done on several rooms so it is possible to start service after the first room is prepped.

**Information to client**

- Bed bug service checklist provided.
- Recommended that rooms are to be treated taken out of service for a minimum of 7-10 days.
- Bed bug fact sheets provided, along with details of insecticides to be used.
- Contract and billing details provided, along with schedule of treatment.

**Customer responsibilities completed**

- Carpet loosened at floor / wall junction around the perimeter of the rooms.
- All items attached to the walls removed (e.g. pictures, light fixtures, outlet covers, bed heads, etc.)
- Outlet and switch plate covers removed.
- Linen removed from bed and ensemble base
- Items removed from closets.
- Housekeeping carts (if applicable) available for inspection and treatment.
- Housekeeping rooms (if applicable) available for inspection and treatment.

**Pest Manager:** \_\_\_\_\_

**Sign:** \_\_\_\_\_

**Date:** \_\_\_\_\_



***Non-chemical control - Vacuuming***

- ❑ Vacuum floors using crack and crevice tool along the base of the wall.
- ❑ Remove cloth cover from the bottom of the ensemble base. Save for re-attachment after service.
- ❑ Vacuum the seams and general surface area of the mattress and ensemble base. If sofa contains a fold out sofa bed, it must also be vacuumed and removed from the sofa for treatment.
- ❑ Vacuum the seams and general surface area of all cushions from sofa and chairs. Remove cushions from sofas and recliners. Turn sofas and chairs upside down and place in the middle of the room away from the walls.
- ❑ Remove vacuum cleaner bag and discard outside of the facility immediately.
- ❑ Inspect folding luggage rack for evidence of insects. If found, vacuum out the insects. Do not apply any pesticides to this item.

***Non-chemical control - Steam***

- ❑ Place nozzle directly onto the surface being treated. The nozzle should be moved along at a rate of only 30cm per every 10-15 seconds.
- ❑ Start treatment with the mattress applying steam to the seams, under labels and handles, and both inside and out of an ensemble base.
- ❑ Cushions of chairs and sofas should be treated, paying particular attention to seams and buttons.
- ❑ Check if the sofa is a sofa bed and if so treat the mattress as above.
- ❑ Treat carpet edges along with the straight edge both above and below.
- ❑ Do not apply steam to electrical fittings.

***Chemical control***

If steam is unavailable treat those areas described above with insecticide, ensuring that all products are used according the label directions.

- ❑ Apply insecticide to the floor wall junction and under the carpet and straight edge.
- ❑ Apply dust to the inside of all electrical junction boxes. (Light switches, outlets, television cable outlets.)
- ❑ Ensure that the cracks and crevices of the ensemble bases and framework of furniture are treated.
- ❑ Ensure items that will be re-attached to the wall are treated.
- ❑ Inspect guide tracks of closet doors for evidence of bed bugs. If insects are found in this area, have the maintenance staff pull the metal track up and treat. Have maintenance re-attach after treatment.
- ❑ Inspect and treat all rooms where housekeeping carts and extra mattresses or furniture are stored.

Rooms are to be treated in blocks in this general pattern.

|  |   |  |
|--|---|--|
|  |   |  |
|  | X |  |
|  |   |  |

X = infested room

All rooms that make contact with the infested room, both above and below, must be treated on the same service.

- ❑ After treatment, re-attach the cloth cover to the bottom of the ensemble base.

***Notify customer to undertake the following if necessary***

- ❑ Repair any loose wallpaper and baseboard covering.
- ❑ Repair any sources of moisture, such as leaky taps and air conditioner condensation lines and pans.
- ❑ After treatment, seal cracks and crevices.

\*This Bed Bug Service Checklist was kindly provided by Mr Frank Meek, Technical Manager, Orkin Pest Control, USA, and includes some modifications.

**21. APPENDIX D – Pesticides registered by the APVMA for bed bug control as of 12/Oct/2005.**

See [www.bedbug.org.au/bedbug\\_cop.htm](http://www.bedbug.org.au/bedbug_cop.htm) for Appendix D

## 21. Appendix D – Pesticides registered by the APVMA for bed bug control as of 12/Oct/2005

Note this is for information only; the APVMA ([www.apvma.gov.au](http://www.apvma.gov.au)) should be consulted for accuracy of information and to obtain a current list of registered products. This list does not distinguish between products available for the home user and the pest manager. The 'Approved Use' is as per instructions as described on the label as appears on the Queensland Department of Primary Industries InfoPest web site. Access to this site was via the link direct from the APVMA site. Note also that just because a product is registered does not necessarily mean that it is still available.

| Product Code          | Product   | Active Ingred.        | Formul. | States Approv. | Critical Comment (where the insecticide can be applied to control Bed Bugs)   |
|-----------------------|---|-----------------------|---------|----------------|---|
| <a href="#">31986</a> | FICAM D INSECTICIDE DUST  | Bendiocarb            | Dust    | All            | Insect hiding places such as electrical areas, ceilings, wall cavities.   |
| <a href="#">31988</a> | FICAM W INSECTICIDE   | Bendiocarb            | WP      | All            | Bed frames, cracks & crevices, not bedding.   |
| <a href="#">32136</a> | BAYGON HOUSEHOLD INSECTICIDE DUST                                       | Propoxur              | Dust    | All            | Bedstead, mattresses, nonporous cover must be placed between mattress & sheets, skirting boards, furniture.   |
| <a href="#">32223</a> | CISLIN RESIDUAL INSECTICIDE   | Deltamethrin          | SC      | All            | Bed frames, walls, skirting boards, cracks & crevices.  |
| <a href="#">32233</a> | BLACK & GOLD SURFACE SPRAY HOUSEHOLD INSECTICIDE CRAWLING INSECT KILLER | Allethrin, permethrin | Aero    | All            | Directly at insects.  |
| <a href="#">32254</a> | DEFENDER HOME GARDEN READY FOR USE SPIDER COCKROACH & ANT INSECTICIDE   | Permethrin            | Liquid  | All            | Directly at insects, carpets, floor areas, under furniture, wardrobes, and skirtings.   |
| <a href="#">32843</a> | COOPEX RESIDUAL INSECTICIDE   | Permethrin            | WP      | All            | Not stated.   |
| <a href="#">33210</a> | COOPEX INSECTICIDAL DUSTING POWDER INDUSTRIAL STRENGTH                  | Permethrin            | Dust    | All            | Bedsteads, bedsprings, mattresses, floor coverings, upholstered furniture, cracks in walls, behind torn wallpaper, joints in woodwork and other cracks and crevices that may provide harbourages. |
| <a href="#">40102</a> | ACTELIC PUBLIC HEALTH INSECTICIDE                                       | Pirimiphos-methyl     | Liquid  | All            | Apply to run-off point.   |

|                       |   |                                       |        |     |  |
|-----------------------|---|---------------------------------------|--------|-----|--|
| <a href="#">41698</a> | COUNTRY DIAZINON 800 INSECTICIDE                                    | Diazinon                              | LC     | All | Spray should be applied under beds, along skirting boards and anywhere bed bugs may be able to shelter, as well as lightly to bedding. |
| <a href="#">41760</a> | CLEVELAND PEST GUARD SURFACE SPRAY AND CRAWLING INSECT KILLER       | D-Allethrin, permethrin               | Aero   | All | Not stated.  |
| <a href="#">45907</a> | CRACKDOWN RESIDUAL INSECTICIDE                                      | Pip but, deltamethrin, D-tetramethrin | SC     | All | Cracks & crevices, bed frames.   |
| <a href="#">46237</a> | SOLFAC 50 EW PROFESSIONAL INSECTICIDE                               | Cyfluthrin                            | AC     | All | Mattresses, clothing (wash before reuse), walls, cracks & crevices, skirting & bed frames.   |
| <a href="#">46433</a> | TONIZONE POW SURFACE SPRAY INSECTICIDE                              | Allethrin, permethrin                 | Aero   | All | Not stated.  |
| <a href="#">46465</a> | ACTELIC 900SF SOLVENT FREE LIQUID INSECTICIDE                       | Pirimiphos-methyl                     | Liquid | All | Apply to run-off point.  |
| <a href="#">46589</a> | TARGET DUST TREATMENT FOR INSECT CONTROL                            | Permethrin                            | Dust   | All | Bedsteads, mattresses, springs, floor coverings, upholstered furniture, cracks, torn wallpaper, joints in woodwork.                    |
| <a href="#">46965</a> | HOME BRAND SURFACE SPRAY FOR CRAWLING INSECTS HOUSEHOLD INSECTICIDE | Permethrin, tetramethrin              | Aero   | All | Not stated.  |
| <a href="#">47105</a> | PEA-BEU SURFACE SPRAY HOUSEHOLD INSECTICIDE INSECT KILLER           | Permethrin, tetramethrin              | Aero   | All | Not stated.  |
| <a href="#">47545</a> | BAYGON SURFACE SPRAY HIGH PERFORMANCE                               | Propoxur, cyfluthrin, transfluthrin   | Aero   | All | Not stated.  |
| <a href="#">47546</a> | BAYGON SURFACE SPRAY LOW IRRITANT                                   | Propoxur, cyfluthrin, transfluthrin   | Aero   | All | Not stated.  |
| <a href="#">48234</a> | COMMERCIAL INSECTICIDE ROACH TOX SURFACE SPRAY                      | Allethrin, permethrin                 | Aero   | All | Not stated.  |
| <a href="#">48418</a> | MORTEIN PLUS COCKROACH LURE'N'KILL HIGH PERFORMANCE SURFACE SPRAY   | Imiprothrin, cypermethrin             | Aero   | All | Not stated.  |

|                       |  |   |          |        |  |
|-----------------------|--|---|----------|--------|--|
| <a href="#">48570</a> | OZTEC PERMETHRIN 10 INSECTICIDAL DUSTING POWDER                                      | Permethrin  | Dust     | All    | Not stated.  |
| <a href="#">48607</a> | TUGON 100 WP FLY & LITTER BEETLE INSECTICIDE   | Cyfluthrin  | WP       | All    | Mattresses, clothing (wash before reuse), walls, cracks & crevices, skirting & bed frames.   |
| <a href="#">48789</a> | FARMOZ PERMEX RESIDUAL INSECTICIDE   | Permethrin  | WP       | All    | Not stated.  |
| <a href="#">49051</a> | MORTEIN PLUS ODOURLESS LOW IRRITANT SURFACE SPRAY INSECT KILLER                      | Permethrin, tetramethrin                                  | Aero     | All    | Not stated.  |
| <a href="#">49084</a> | BARMAC PERMETHRIN D PROFESSIONAL INSECTICIDE DUST                                    | Permethrin  | Dust     | All    | Bedroom furniture, mattresses, cracks & crevices, etc.   |
| <a href="#">50007</a> | BARMAC DIAZINON INSECTICIDE  | Diazinon  | EC       | All    | Spray should be applied under beds, along skirting boards and anywhere bed bugs may be able to shelter, as well as lightly to bedding. |
| <a href="#">50347</a> | MICROCARE PRESSURIZED PYRETHRUM CAPSULE SUSPENSION INSECTICIDE                       | N-Octyl Bicycloheptene Dicarboximide, Pip But, pyrethrins | Aero     | All    | Not stated.  |
| <a href="#">50682</a> | BLITZ INSECTICIDE  | Pip but, deltamethrin, Tetramethrin                       | SC       | NSW    | Cracks & crevices, bed frames, adjacent walls.   |
| <a href="#">50918</a> | BAYGON (BAYER) SURFACE SPRAY ODOURLESS WITH NATURAL PYRETHRUM                        | Pip But, Cyfluthrin, pyrethrin                            | Aero     | All    | Lightly spray mattresses, skirting boards and bed frames.  |
| <a href="#">51809</a> | RICHGRO GARDEN PRODUCTS READY TO USE PEST-STOP ANT, SPIDER AND COCKROACH INSECTICIDE | Permethrin  | Emulsion | All    | Spray insect directly, carpet, floor areas under furniture, in and around cupboards, wardrobes, skirting boards, not clothing.         |
| <a href="#">51915</a> | PIF PAF POWER PLUS CRAWLING INSECT KILLER  | Imiprothrin, cypermethrin                                 | Aero     | All    | Not stated.  |
| <a href="#">51916</a> | PIF PAF ODOURLESS SURFACE SPRAY  | Permethrin, tetramethrin                                  | Aero     | All    | Not stated.  |
| <a href="#">51943</a> | INSECTIGONE INSECTICIDE  | Deltamethrin  | SC       | ex Vic | Not stated.  |

|                       |   |   |      |        |   |
|-----------------------|---|---|------|--------|---|
| <a href="#">52198</a> | RESPONSAR BETA SC INSECTICIDE                             | Betacyfluthrin  | SC   | All    | Mattresses, clothing (wash before reuse), walls, cracks & crevices, skirting & bed frames.  |
| <a href="#">52237</a> | STARRDUST INSECTICIDE DUST                                | Propoxur, triflumuron                                     | Dust | All    | Not stated.   |
| <a href="#">52238</a> | BLATTANEX PROFESSIONAL CRACK & CREVICE AEROSOL            | Pip but, propoxur, Tetramethrin                           | Aero | All    | Lightly spray mattresses, skirting boards and bed frames.   |
| <a href="#">52252</a> | FARMOZ YAHOO RESIDUAL INSECTICIDE                         | Deltamethrin  | SC   | All    | Not stated.   |
| <a href="#">52336</a> | DRAGNET DUST - INSECTICIDAL POWDER INDUSTRIAL STRENGTH    | Permethrin  | Dust | All    | Bedsteads, mattresses, springs, floor coverings, upholstered furniture, cracks, torn wallpaper, joints in woodwork.                   |
| <a href="#">52365</a> | DELTASHIELD 10 RESIDUAL INSECTICIDE                       | Deltamethrin  | SC   | ex Vic | Not stated.   |
| <a href="#">52913</a> | PERMEDUST INSECTICIDAL DUSTING POWDER INDUSTRIAL STRENGTH | Permethrin  | Dust | All    | Bedsteads, mattresses, springs, floor coverings, upholstered furniture, cracks, torn wallpaper, joints in woodwork.                   |
| <a href="#">53094</a> | CROPRO DIAZINON 800 INSECTICIDE                           | Diazinon  | EC   | All    | Spray should be applied under beds, along skirting boards and anywhere bed bugs may be able to shelter as well as lightly to bedding. |
| <a href="#">53210</a> | CREEPY CRAWLEY PRODUCTS DELTA PRO 10 RESIDUAL INSECTICIDE | Deltamethrin  | SC   | All    | Not stated.   |
| <a href="#">53312</a> | PRECLUDE INSECTICIDE                                      | N-Octyl Bicycloheptene Dicarboximide, Pip But, pyrethrins | Aero | All    | Mattresses, bed linen (wash linen and clothing before reuse), walls, cracks & crevices, skirting & bed frames.                        |
| <a href="#">53349</a> | COUNTRY DELTAMETHRIN 10 RESIDUAL INSECTICIDE              | Deltamethrin  | EC   | ex Vic | Not stated.   |
| <a href="#">53522</a> | RELIANCE LOW IRRITANT SURFACE SPRAY                       | Permethrin, tetramethrin                                  | Aero | All    | Not stated.   |
| <a href="#">53534</a> | DAVID GRAYS ANT AND TERMITE SPRAY                         | Permethrin, hydrocarbon solvent                           | EC   | All    | Not stated.   |

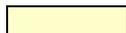
|                       |  |                                 |                           |     |  |
|-----------------------|--|---------------------------------|---------------------------|-----|--|
| <a href="#">53596</a> | ATLAS CRAWLING INSECT SURFACE SPRAY                                      | Imiprothrin, cypermethrin       | Aero                      | All | Not stated.  |
| <a href="#">53625</a> | FARMOZ PERMEX EC RESIDUAL INSECTICIDE                                    | Permethrin, hydrocarbon solvent | EC                        | All | Not stated.  |
| <a href="#">53632</a> | DRAGNET HOUSEHOLD READY-TO-USE DUSTING POWDER                            | Permethrin                      | Dust                      | All | Not stated.  |
| <a href="#">53794</a> | DAVID GRAYS PERMETHRIN ANT DUST  | Permethrin                      | Dust                      | All | Bedsteads, mattresses, springs, floor coverings, upholstered furniture, cracks, torn wallpaper, joints in woodwork.  |
| <a href="#">53946</a> | BI-LO LOW IRRITANT SURFACE SPRAY   | Permethrin, tetramethrin        | Aero                      | All | Not stated.  |
| <a href="#">53975</a> | RICHGRO PERMETHRIN ANT, SPIDER & ROACH KILLER FOR INDOOR AND OUTDOOR USE | Permethrin, hydrocarbon solvent | EC                        | All | Spray at insects, carpets, floor areas and furniture. Avoid treated area for several hours. Spray in and around book shelves, cupboards, wardrobes, skirting boards. Do not apply to clothing. |
| <a href="#">54134</a> | TEMPO RESIDUAL INSECTICIDE   | Betacyfluthrin                  | SC                        | All | Bed frames, walls, cracks & crevices near beds.  |
| <a href="#">54146</a> | MORTEIN LOW IRRITANT SURFACE SPRAY KILLS COCKROACHES FAST                | Permethrin, tetramethrin        | Aero                      | All | Not stated.  |
| <a href="#">54192</a> | MORTEIN HIGH PERFORMANCE SURFACE SPRAY KILLS COCKROACHES FAST            | Imiprothrin, cypermethrin       | Aero                      | All | Not stated.  |
| <a href="#">54224</a> | MITRE 10 READY TO USE ANT, SPIDER & COCKROACH SPRAY                      | Permethrin                      | Emulsion                  | All | Spray insect directly, carpet, floor areas, under furniture, in and around cupboards, wardrobes, skirting boards, not clothing.  |
| <a href="#">54276</a> | CRAWLEY CRUNCHER HOUSEHOLD INSECTICIDE/SURFACE SPRAY                     | Permethrin                      | Liquid                    | All | Not stated.  |
| <a href="#">54456</a> | CISLIN WG RESIDUAL INSECTICIDE   | Deltamethrin                    | Water Dispersible Granule | All | Bed frames, walls, skirting boards, cracks & crevices near beds.   |
| <a href="#">54535</a> | IGA FATAL LOW IRRITANT SURFACE SPRAY                                     | Permethrin, tetramethrin        | Aero                      | All | Apply to bed frame and around sleeping areas.  |
| <a href="#">54626</a> | MORTEIN ODOURLESS SURFACE SPRAY KILLS COCKROACHES FAST                   | Imiprothrin, permethrin         | Aero                      | All | Not stated.  |

|                       |  |                                       |        |     |   |
|-----------------------|--|---------------------------------------|--------|-----|---|
| <a href="#">54682</a> | COUNTRY DELTRA RESIDUAL INSECTICIDE                                      | Pip but, deltamethrin, D-tetramethrin | SC     | All | Cracks & crevices, bed frames, adjacent walls.  |
| <a href="#">54701</a> | PERMATEK DELTA INSECTICIDE   | Deltamethrin                          | SC     | All | Not stated.   |
| <a href="#">54934</a> | YATES ANT, ROACH & SPIDER KILLER   | Permethrin, hydrocarbon solvent       | EC     | All | Spray at insects, carpets, floor areas and furniture. Avoid treated area for several hours. Spray in and around book shelves, cupboards, wardrobes, skirting boards. Do not apply to clothing or bed linen. |
| <a href="#">55091</a> | COUNTRY PERMETHRIN 25:75 INSECTICIDAL DUSTING POWDER INDUSTRIAL STRENGTH | Permethrin                            | Dust   | All | Bedsteads, mattresses, springs, floor coverings, upholstered furniture, cracks, torn wallpaper, joints in woodwork.   |
| <a href="#">55137</a> | HOVEX PERMETHRIN ANT KILLER  | Permethrin                            | Dust   | All | Bedsteads, mattresses, springs, floor coverings, upholstered furniture, cracks, torn wallpaper, joints in woodwork.   |
| <a href="#">55217</a> | MORTEIN EASY REACH SURFACE SPRAY KILLS COCKROACHES FAST                  | Imiprothrin, cypermethrin             | Aero   | All | Not stated.   |
| <a href="#">55221</a> | SUPERWAY DELTA-M RESIDUAL INSECTICIDE                                    | Deltamethrin                          | SC     | All | Not stated.   |
| <a href="#">55329</a> | CHEMRECO TERMINANT ANT, TERMITE AND SPIDER SPRAY                         | Permethrin, hydrocarbon solvent       | EC     | All | Spray at insects, carpets, floor areas and furniture. Avoid treated area for several hours. Spray in and around book shelves, cupboards, wardrobes, skirting boards. Do not apply to clothing or bed linen. |
| <a href="#">55416</a> | BAYGON HIGH PERFORMANCE SURFACE SPRAY                                    | Propoxur, cyfluthrin, transfluthrin   | Aero   | All | Lightly spray mattresses, skirting boards and bed frames.   |
| <a href="#">55420</a> | BAYGON LOW IRRITANT SURFACE SPRAY  | Propoxur, cyfluthrin, transfluthrin   | Aero   | All | Lightly spray mattresses, skirting boards and bed frames.   |
| <a href="#">55421</a> | BAYGON SENSITIVE SURFACE SPRAY ODOURLESS                                 | Pip But, Cyfluthrin, pyrethrin        | Aero   | All | Not stated.   |
| <a href="#">55426</a> | RICHGRO GARDEN PRODUCTS PERMETHRIN ANT KILLER FOR INDOOR AND OUTDOOR USE | Permethrin                            | Powder | All | Not stated.   |

|                       |   |                                     |                  |     |   |
|-----------------------|---|-------------------------------------|------------------|-----|---|
| <a href="#">55438</a> | BAYGON HIGH PERFORMANCE SURFACE SPRAY WITH FRESH CLEAN SCENT                          | Propoxur, cyfluthrin, transfluthrin | Aero             | All | Lightly spray mattresses, skirting boards and bed frames.   |
| <a href="#">55656</a> | RENTOKIL CHEK-PEST RESIDUAL INSECTICIDE   | Permethrin, hydrocarbon solvent     | EC               | All | Cracks & crevices, bed frames, adjacent walls, mattresses.  |
| <a href="#">55787</a> | LOW ODOUR GET-IT FLY SPRAY WATER-BASED INSECTICIDE SPRAY READY TO USE                 | Permethrin                          | Emulsion         | All | Spray insect directly, carpet, floor areas, under furniture, in and around cupboards, wardrobes, skirting boards, not clothing. |
| <a href="#">55790</a> | LOW ODOUR GET-IT BUG SPRAY HOME AND GARDEN SURFACE AND INSECTICIDE SPRAY READY TO USE | Permethrin                          | Emulsion         | All | Spray insect directly, carpet, floor areas, under furniture, in and around cupboards, wardrobes, skirting boards, not clothing. |
| <a href="#">55916</a> | BASICS SURFACE SPRAY HOUSEHOLD INSECTICIDE FOR CRAWLING INSCETS                       | Allethrin, permethrin               | Aero             | All | Not stated.   |
| <a href="#">55992</a> | K-O TAB WT RESIDUAL INSECTICIDE TABLET  | Deltamethrin                        | Tablet           | All | Bed frames and walls, cracks, crevices and skirting boards in the vicinity of the bed. Do not apply to bedding.                 |
| <a href="#">56294</a> | TOTAL PEST CONTROL RESIDUAL INSECTICIDE   | Deltamethrin                        | EC               | All | Not stated.   |
| <a href="#">56496</a> | KONK-EM-D READY TO USE INSECTICIDE SPRAY  | Permethrin                          | EC               | All | Not stated.   |
| <a href="#">56576</a> | BLACK & GOLD LOW IRRITANT SURFACE SPRAY CRAWLING INSECT KILLER                        | Permethrin, tetramethrin            | Aero             | All | Not stated.   |
| <a href="#">56578</a> | SIGNATURE RANGE CRAWLING INSECT KILLER SURFACE SPRAY                                  | Allethrin, permethrin               | Aero             | All | Not stated.   |
| <a href="#">56765</a> | PEST EXTERMINATOR, READY TO USE, COCKROACH, SPIDER & ANT SPRAY                        | Permethrin                          | Emulsion         | All | Spray insect directly, carpet, floor areas, under furniture, in and around cupboards, wardrobes, skirting boards, not clothing. |
| <a href="#">56840</a> | FARMOZ PERMEX 100 RESIDUAL INSECTICIDE  | Permethrin                          | EC               | All | Not stated  |
| <a href="#">57006</a> | BRUNNINGS ANT & TERMITE SPIDER, COCKROACH KILLER                                      | Permethrin, hydrocarbon solvent     | EC               | All | Not stated.   |
| <a href="#">57333</a> | AUSSIECARE NO BUGS BORAFUME FUMIGATOR   | Cyphenothrin                        | Vapour releasing | All | Not stated.   |

|                       |  |                                       |      |     |   |
|-----------------------|--|---------------------------------------|------|-----|---|
| <a href="#">57779</a> | BAYGON ADVANCED HIGH PERFORMANCE SURFACE SPRAY WITH FRESH FRAGRANCE  | Imiprothrin, cypermethrin             | Aero | All | Lightly spray mattresses, skirting boards and bed frames.   |
| <a href="#">57816</a> | COOPEX EC RESIDUAL INSECTICIDE   | Permethrin, hydrocarbon solvent       | EC   | All | Cracks & crevices, bed frames, adjacent walls, mattresses.  |
| <a href="#">57990</a> | HOME BRAND ODOURLESS SURFACE SPRAY MONEY BACK GUARANTEED SMART CHOICE QUALITY ASSURED LOW PRICE PRODUCT OF AUSTRALIA | Permethrin, tetramethrin              | Aero | All | Not stated.   |
| <a href="#">58044</a> | BARMAC DELTA FORCE INSECTICIDE   | Deltamethrin                          | EC   | All | Bed frames, walls, cracks & crevices near beds.   |
| <a href="#">58223</a> | PALM GUARD INSECTICIDE   | Deltamethrin                          | SC   | All | Not stated.   |
| <a href="#">58267</a> | FRANKLINS NO FRILLS SURFACE SPRAY HOUSEHOLD INSECTICIDE FOR CRAWLING INSECTS   | Allethrin, permethrin                 | Aero | All | Not stated.   |
| <a href="#">58347</a> | MAKHTESHIM-AGAN DIAZOL 800 EC INSECTICIDE  | Diazinon                              | EC   | All | Not stated.   |
| <a href="#">58423</a> | TRADEWYNS DELTRA RESIDUAL INSECTICIDE  | Pip but, deltamethrin, D-tetramethrin | SC   | All | Not stated.   |
| <a href="#">58460</a> | PROLONG FLY AND LITTER BEETLE INSECTICIDE  | Cyfluthrin                            | WP   | All | Fumigate all mattresses or clothing. Wash sheets and clothing before re-use. Apply Prolong to walls, cracks and crevices, skirting boards and bed frames. |
| <a href="#">58499</a> | DELTATHOR PLUS INSECTICIDE   | Pip but, deltamethrin, tetramethrin-R | SC   | All | Cracks and crevices in bed frames and adjacent walls.   |
| <a href="#">58505</a> | DAVID GRAYS DIAZINON 800 INSECTICIDE   | Diazinon                              | EC   | All | Spray should be applied under beds, along skirting boards and anywhere bed bugs may be able to shelter, as well as lightly to bedding.                    |
| <a href="#">58600</a> | BAYGON GERMKILL CRAWLING INSECT SPRAY ANTIBACTERIAL  | Imiprothrin, cypermethrin             | Aero | All | Not available.  |
| <a href="#">58629</a> | BAYGON HIGH PERFORMANCE EGG KILL CRAWLING INSECT SPRAY   | Propoxur, cyfluthrin, transfluthrin   | Aero | All | Lightly spray mattresses, skirting boards and bed frames.   |

|                       |  |                                       |        |     |   |
|-----------------------|--|---------------------------------------|--------|-----|---|
| <a href="#">58630</a> | BAYGON FAST KILL CRAWLING INSECT SPRAY                 | Imiprothrin, cypermethrin             | Aero   | All | Lightly spray mattresses, skirting boards and bed frames  |
| <a href="#">58632</a> | BAYGON LOW IRRITANT CRAWLING INSECT SPRAY              | Propoxur, cyfluthrin, transfluthrin   | Aero   | All | Lightly spray mattresses, skirting boards and bed frames.   |
| <a href="#">58723</a> | DELTATHOR INSECTICIDE                                  | Deltamethrin                          | SC     | All | Cracks and crevices in bed frames and adjacent walls.   |
| <a href="#">58783</a> | ATLAS CRAWLING INSECT SURFACE SPRAY FOR HOME USE       | Imiprothrin, permethrin               | Aero   | All | Not stated.   |
| <a href="#">58904</a> | BARMAC DELTA FORCE PLUS INSECTICIDE                    | Pip but, deltamethrin, D-tetramethrin | SC     | All | Cracks and crevices in bed frames and adjacent walls.   |
| <a href="#">59005</a> | PERMETHOR INSECTICIDAL DUST                            | Permethrin                            | Dust   | All | Bedsteads, bedsprings, mattresses, floor coverings, upholstered furniture, cracks in walls, behind torn wallpaper, joints in woodwork and other harbourages.                  |
| <a href="#">59412</a> | YATES INSECT CONTROL BLITZEM ANT, ROACH & SPIDER SPRAY | Permethrin                            | EC     | All | Not stated.   |
| <a href="#">59424</a> | SOLFAC PRO RESIDUAL INSECTICIDE                        | Betacyfluthrin                        | SC     | All | Not stated.   |
| <a href="#">59707</a> | FARMOZ DIAZOL 800 INSECTICIDE                          | Diazinon                              | EC     | All | Spray should be applied under beds, along skirting boards and anywhere bed bugs may be able to shelter, as well as lightly to bedding.  |
| <a href="#">59710</a> | ACTELIC 900 SOLVENT FREE LIQUID INSECTICIDE            | Pirimiphos-methyl                     | Liquid | All | Not stated.   |
| <a href="#">59945</a> | GARDEN PRO ANT KILLER                                  | Permethrin                            | Dust   | All | Apply powder to bedsteads, bed springs, mattresses, floor coverings, upholstered furniture, cracks in walls, behind torn wallpaper, joints in woodwork and other harbourages. |

 Approved for use upon mattresses

AC = Aqueous Concentrate, Aero = Aerosol, EC = Emulsifiable Concentrate, LC = Liquid Concentrate, SC = Suspension concentrate, WP = Wettable Powder