Credit: Thermokil

Code of Best Practice

Heat treatments for the control of invertebrate pests

Version 1: April 2023.

British Pest Control Association Code of Best Practice for Heat treatments

A BPCA Code of Best Practice is a set of written rules which explains how people working in our industry should behave in a particular situation. It encompasses relevant legislation but is not the law in itself.

However, were a member to act outside of the norms outlined in the COBP, they may be subject to disciplinary action or be in breach of legislation. Members must abide by Codes of Best Practice in their day-to-day work. Failure to do so may result in disciplinary action up to and including dismissal from the Association.

Version 1: April 2023.

bpca.org.uk/codes
Driving excellence in pest management

01332 294 288
@britpestcontrol

British Pest Control Association
Code of Best Practice for Heat treatments

Heat treatments for the control of invertebrates are a valuable non-toxic treatment method. They form part of an Integrated Pest Management (IPM) plan and can be used if there is a suspected insecticide resistant population of insects.

Heat will kill all stages of the insect's life cycle (egg, larvae, pupae and adult) unlike an insecticide that cannot penetrate the egg stage.

To use heat effectively, and to ensure success and professionalism, many things need to be considered. This Code provides the reader with the fundamental principles of delivering a professional and effective service.

Definition of a heat treatment

The term "Heat treatment for insect control" excludes explicitly the use against micro-organisms, fungi, and vertebrates but includes treatment against arachnids and nematodes.

Heat treatment is widely used either as a pesticide-free solution or in combination with pesticides in domestic, public health and industrial situations.

It also includes treatments against Stored Product Insects (SPIs), bed bugs, fleas, textile pest moths and beetles, wood boring insects, cockroaches, psocids (booklice), flies and mites.

The crucial element of heat treatment is its ability (along with fumigation but by different means) to penetrate materials by conduction (as opposed to diffusion) to kill all stages of life, including eggs.

This Code of Best Practice covers the following fields:

Heat treatment of whole buildings –
i) Under sheets or tarpaulins
ii) Un-sheeted.

Temporary structures
i) Heat treatment under sheets or tarpaulins
ii) Spot treatments
iii) Heat treatment pods or bubbles
iv) Temporary heat treatment structures.

Fixed structures
i) Kilns
ii) Converted containers
iii) Converted or adapted rooms, eg paint drying bays.

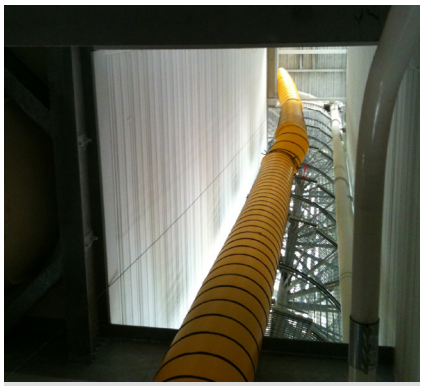
Using:
i) Electric heaters
ii) Indirect burn (heat exchange) oil heaters
iii) Indirect burn (heat exchange) gas heaters
iv) Hydronic heating systems (glycol or water or steam)

To achieve core temperature ranges (on the insect) between 50°C and 60°C, without causing damage to surrounding structures and materials, will typically involve heating surrounding air to between 55°C and 70°C.

Legislation

Health and Safety at Work Act 1974

When planning and carrying out heat treatment, it is important to consider health and safety measures to ensure the technician's wellbeing. There are also requirements to ensure that any other people, such as your customers, do not come to harm when you are working.



Credit: Thermokil

A tricky access route through a building panel. Always consider potential obstacles when moving equipment.

The Management of Health and Safety at Work regulations 1999 require employers to carry out risk assessments where necessary. The recommended areas for consideration are:

- Generic – heat treatments, the process
- Working at Heights Regulations 2005
- Control of Substances Hazardous to Health Regulations 2002
- Management of Health and Safety at Work Regulations 1999
- Manual Handling Operations Regulations.
- Workplace (Health, Safety and Welfare) Regulations.
- Provision and Use of Work Equipment Regulations.

Fundamental professional standards

Heat treatment for insect control may be carried out (following inspection, survey and assessment):

- Against overt insect pest problems
- As a precautionary treatment against potential hidden pests where hidden egg, larval, pupal or nymph stages may not be discoverable.

British Pest Control Association
Code of Best Practice for Heat treatments

Heat treatment should be incorporated into a thought-out Integrated Pest Management (IPM) process, whether done in a major food factory or against bed bugs, fleas or mites in a home or hotel room. In all scenarios, the pest professional must understand the relationship of the infestation to time and its environment.

Thought process
Heat treatments for insect control will always consider the following stages:

1. Where are the target pests now and what is the likely extent of the infestation?

2. How did they get here, if applicable? For example, look at proofing, human carriers, ingredient suppliers, returned goods, animal carriers, etc

3. What other measures can be taken to help mitigate the infestation and prevent development in the future? For example, cleaning, humidity control, temperature control, creating access for cleaning/ pest professionals, etc

4. What other physical control methods can be used alongside (or instead of) heat, eg cleaning, temperature, humidity, etc

5. Is an insecticide going to follow the application of heat?

This information must all be recorded.

Where heat treatment can't be used
There are many situations where heat treatment is NOT appropriate. These include:

- Full shipping containers
- Commodities
- Heavily insulated piles of clothing or other areas where hot air cannot penetrate
- Around water or materials with high volatile water (or other volatile liquid) content
- Where materials with low melting points (eg candles, some glues, vinyl records) cannot be excluded
- Where all electrical items cannot be completely switched off and isolated
- Where high-pressure vessels (eg fire retardant systems, aircraft life jackets) cannot be excluded
- Amongst heat-sensitive machinery or fire detection systems that can't be isolated
- Low-temperature sprinkler systems that can't be isolated/ removed/drained
- Where mammals/birds may be harmed.

Professional considerations

The following stages must be considered when planning, and Risk Assessment and Method Statement (RAMS) must be done for every heat treatment.

Customer expectations

1

Manage customer expectations regarding guarantees and cost by agreeing with each client, in writing, the level of insect control that is realistic and achievable.

2

Always provide the customer with a quotation, taking into consideration all eventualities.

Credit: Thermokil

Heat treatment being performed in the third story of a building. Always consider access for heavy equipment, that includes parking, finding a route through a complex and upstairs tower blocks.

Pre-treatment

3

Ensure the customer carries out pre-treatment tasks. For example, pre-cleaning is essential for food sites and empty silos, to remove the risk of thick residues of insulating material like flour that insects could survive in. For bed bugs, clothing and curtains may need hot washing above 60°C. Clutter may need tidying up and separating out to allow heat penetration.

Environmental conditions

4

Consider the weather conditions and how that may affect your application of heat.

British Pest Control Association
Code of Best Practice for Heat treatments

Access

5

Determine the best choice of equipment most suited to the task. Deploying a big powerful heater to a small job may well cause damage and deploying too small an ensemble of heaters for a large job may well lead to failure.

6

Consider access for heavy equipment. This may include anything like parking, finding a route through a complex food factory for mobile heaters, getting equipment upstairs in tower blocks.

7

Ensure you have access to an appropriate power supply.

Credit: Thermokil

Heat treatments under sheets/ tarpaulins need constant management in case of damage caused by exessive heat build up. Pest controllers are not experts on building management and can't guarantee damage won't be caused.

Safety

8

Ensure proper ventilation from oil or gas burners.

9

All heat treatment equipment must be identified and serviced regularly with PAT testing and calibration (if required).

Damage

10

Identify and manage any risk items. Pest professionals are not experts on building contents and can never guarantee that there will be no damage. The technician can agree with the client on a maximum temperature that will not be exceeded anywhere during the heat treatment and decide on the location of safety sensors as part of the temperature control systems during the treatment.

11

A disclaimer should be signed by the customer, which gives a list of examples of materials that may be damaged by excessive use of heat and what should be removed etc.

Monitoring

12

For all non-kiln/fixed chamber heat treatments, the operative should use real-time temperature logging devices during every heat treatment. This can give the operative information about how heat energy is behaving within the heat treatment area, so that active control measures can be taken immediately to rectify any issues, such as hot spots that can cause damage or cold spots that can allow insect survival. It is not acceptable to rely on infrared meters or cameras that do not log temperatures. However, they can be helpful adjuncts to treatment in helping the operative get a visual picture of heat/energy movement within the heat treatment area.

13

All first-time heat treatments in buildings or under sheets/tarpaulins require active management, to prevent excessive heat building up and causing damage, and identify cold spots that may lead to treatment failure.

14

The use of large numbers of temperature sensors which can be wired or wireless, that give a real-time graph allowing the operator to control the heat treatment and produce a final graph/report for the customer, is compulsory.

It is not sufficient to record air temperatures – these are irrelevant to the success of a treatment which can only be determined by the placing of core sensors in the coldest parts of the treatment area, eg on the thickest piece of metal or drilled into the middle of the thickest portion of timber in the coldest part of the kiln, as defined by ISPM15. Safety sensors, placed on agreed risk items which must not go above a specific temperature, allow the operator to control the risks of damage.

British Pest Control Association
Code of Best Practice for Heat treatments

Reporting

15

On completion of the treatment (as well as any additional elements to the treatment), a report must be produced for the customer that includes the graph from the logging equipment.

16

Adhere to the BPCA Code of Best Practice for Treatment Reports **bpca.org.uk/codes**

17

Post-treatment advice is crucial in treatments against damp-loving pests (eg booklice, fungus beetles, plaster beetle), like techniques for keeping relative humidity down.

18

Food industry post-treatment advice will naturally form part of your planning of the heat treatment as part of the IPM program, eg change suppliers if they are sending infested ingredients, carry out proofing etc.

Further reading

Heat treatment for Insect Control – Developments and Applications by David Hammond, Woodhead Publishing Series in Food, Technology and Nutrition **sciencedirect.com/book/9780857097767/heat-treatment-for-insect-control**

Operations Manual for heaters

Thermolog operating instructions

List of Material Specific Heat Capacities **engineeringtoolbox.com/specific-heat-capacity-d_391.html**

Health and Safety at Work etc. Act 1974

The control of stored product insects and mites with extreme temperatures" - Paul G Fields J.Stored Prod. Res Vol 28 no 2 pp 89-118, 1992. **sciencedirect.com/science/article/abs/pii/0022474X9290018L**

The British Pest Control Association requires that its members meet a range of criteria including strict abidance to all of our Codes of Best Practice. You can search for our members on the BPCA website bpca.org.uk/find

BPCA makes strenuous efforts to ensure the accuracy and current relevance of its publications, which are intended for use by technically competent persons. However, this does not remove the need for technical and managerial judgement in practical situations. Nor do they confer any immunity or exemption from relevant legal requirements, including by-laws.

If you suspect something in this document is incorrect or out of date, please report it to **technical@bpca.org.uk** so we can review it.

Version 1: April 2023.