2012

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Useful information and professional treatment solutions.

Bed Bugs Limited

Prepared by

David Cain

Testing report for the Assured Environments Annihilator bedbug thermal device

Contents

Executive Summary

Once a product goes on sale to the public there is an expectation from customers that it should at least work as described in the sales materials. Failure to ensure that a product performs to specification not only damages a company's reputation but also the reputation of an industry. This is true for lower end of the pest management industry that simply sprays and preys as well as the supply of products.

It is a well-known fact that consumers who have had bad experiences with companies or products tell more people than those who have had good experiences. In the case of customer service industries this can lead to a widespread erosion of trust in the sectors ability to resolve issues.

In the case of the product tested, the Assured Environments bedbug annihilator it is difficult to see how this product could have be launched onto the market had it been thoroughly tested as it clearly fails to perform to the manufacturers specification and procedures.

Furthermore given the lack of communication and desire to resolve issues when they are brought to senior management's attention I doubt a consumer would have had an acceptable experience had they have been dealing with the supplier instead of us. A fact which reflects poorly on the industry as a whole given that senior management within this organisation is supposed to be developing and setting standards that we are expected to follow.

The product design and quality fell well short of the standards I would expect for a $499 product leaving any customer likely to be feeling dissatisfied from the moment it is unpacked. In light of Conair's insistence that the hairdryer should not be used for the continuous run times needed the product may pose a potential fire/failure risk.

We would have expected the product to be withdrawn from sale and recalled until the issue can be worked out but at the time of compiling this report this step had not been taken. Should a consumer realise the failings and raise the issue with the press it is highly likely that this fact will become apparent and thus reflect the industry in an even dimmer light.

We have repeatedly called for quality independent testing of all bedbug related products free from the undue influences of inventors, manufacturers and academics but because of existing financial relationships and endorsements industry thought leaders seem unwilling to support such a step. The consequence of this stance is that consumers and consumer advocates will continue to test and evaluate products that are commercially available in the same way that any good or service is open to public critique.

We again call upon the global industry to set appropriate standards for quality and efficacy for all products in the bedbug arena.

About bedbugs

Bedbugs are blood feeding parasites that preferentially feed on humans. They are a persistent pest and have developed a number of highly evolved abilities to remain close to humans.

They are a pest of exposure and only arrive in your home if you have come into contact with them external to the property or if an adjoining property has a significant infestation.

Close up of an adult bedbug, when fed they become oval in shape but are usually only seen when they are thin and flat.

Close up a juvenile bedbug, the characteristic dark brown colour develops as the bedbug matures and younger samples may appear translucent.

Close up a nesting area showing many of the classic signs of bedbugs, live samples, cast skins and faecal trace signs.

Close up of a bed slat illustrating a build-up of faecal traces and some egg casings close to the joint in the wood.

Bedbugs have been documented as pests since the 17th century although they have been around for much longer and most likely followed man out of the caves millennia ago. Bedbugs were common in the UK prior to World War II, after which time widespread use of synthetic insecticides such as DDT and public education greatly reduced their numbers, at one stage though in the 1930's 30% of all homes in London were infested.

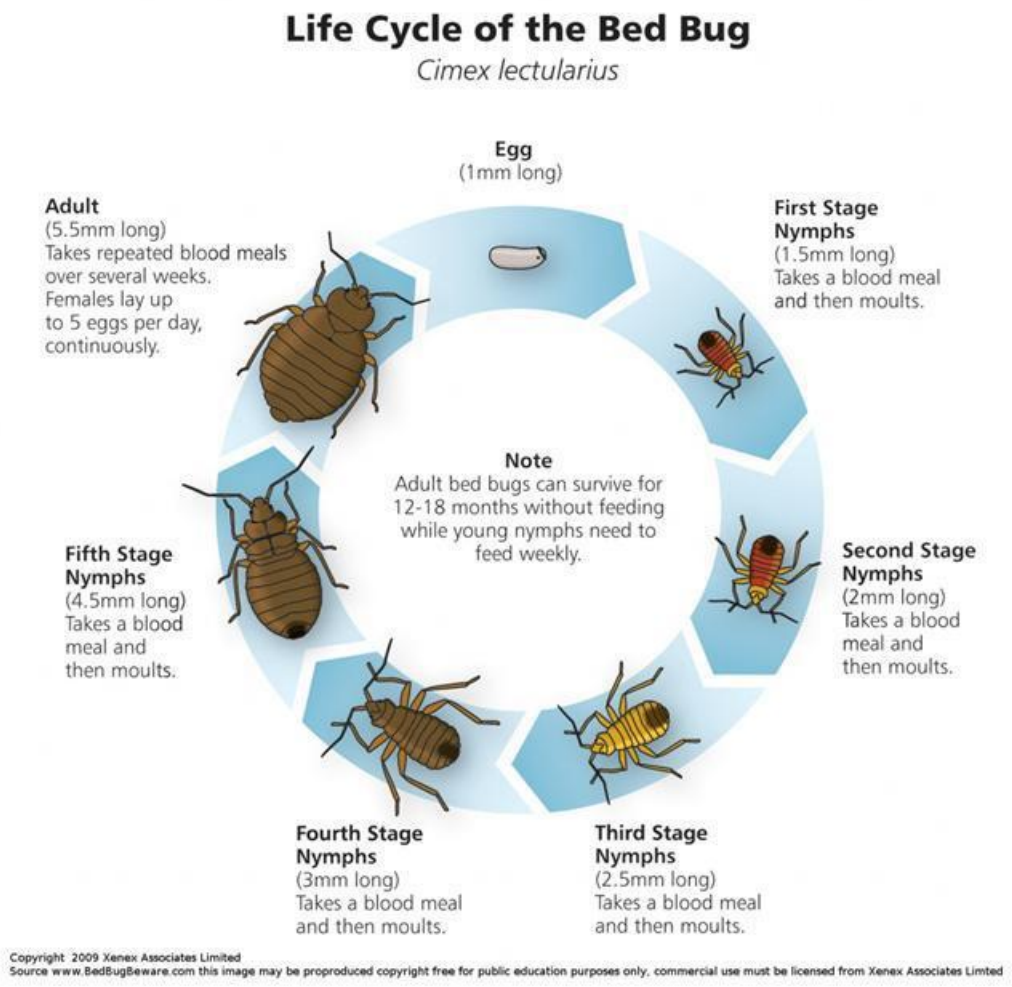
In the past decade, bedbugs have begun making a comeback across the world, although they are not considered to be a major pest or health hazard they can be highly unpleasant to live with and can cause a severe lack of sleep. International travel and commerce are thought to facilitate the spread because eggs, young, and adult bed bugs are readily transported in luggage, clothing, bedding, and furniture. Bedbugs can infest airplanes, ships, trains, and buses, recent cases that we have worked on have been traced back to travel where the source was identified to be the return journey rather than an infested room.

Bedbugs are most frequently found in dwellings with a high rate of occupant turnover, such as hotels, motels, hostels, dormitories, shelters, apartment complexes, tenements, and prisons. Such infestations usually are not a reflection of poor hygiene or bad housekeeping but that a previous occupant had come into contact with them at some stage.

Adult bedbugs are brown to reddish-brown, oval-shaped, flattened, and about 3mm to 5mm long. Their flat shape enables them to readily hide in cracks and crevices. In some cases colonies have been found in places where it is difficult to insert a sheet of paper.

Life Cycle

Female bedbugs lay from one to twelve eggs per day, and the eggs are deposited on rough surfaces or in crack and crevices. The eggs are coated with a sticky substance so they adhere to the substrate. Eggs hatch in around 10 days, and nymphs can immediately begin to feed. They require a blood meal in order to molt and develop into the next stage. Bedbugs reach maturity after five molts. Developmental time (egg to adult) is affected by temperature and takes about 21 days at 30°C to 120 days at 18°C. The nymphal period is greatly prolonged when food is scarce. The adult's lifespan may encompass 12-18 months and they are known to be able to survive for 12 months between feeds although if a source of food is present they will always be active.



Habits

Bedbugs are fast moving insects that tend to be most active at night when we rest; they feed on blood using a piercing mouth part the entry of which is often unnoticed. Nymphs may become engorged with blood within three minutes, whereas a full-grown bedbug usually feeds for ten to fifteen minutes. They then crawl away to a hiding place to digest the meal; a full meal may take 3 or 4 days to digest.

Bedbugs hide during the day in dark protected sites, they prefer fabric, wood, and paper surfaces. They usually occur in fairly close proximity to the host, although they can travel great distances if needed. Bedbugs initially can be found about tufts, seams, and folds of mattresses, later spreading to crevices in the bedstead. In heavier infestations, they also may occupy hiding places further from the bed. They may hide in window and door frames, electrical boxes, floor cracks, baseboards, furniture, and under the tack board of wall-to-wall carpeting. Bedbugs often crawl upward to hide in pictures, wall hangings, drapery pleats, loosened wallpaper, cracks in plaster, and ceiling mouldings.

Injury

The bite is painless at the time but can cause the skin to become irritated and inflamed. Individuals differ greatly in both the extent and timing of their response to a bite. A small, hard, swollen, white welt may develop at the site of each bite which can occur in rows or batches of three or four but also in single reactions. This is often accompanied by severe itching that lasts for several hours to days, in rare cases an allergic reaction may follow, in such cases seek medical attention immediately. The morphology or bites is highly variable and it is almost impossible to diagnose on bites alone.

It is believed that 1 in 10 people show no signs of biting, often leading to the myth that they only attack certain people and about 60% of people do not appear to show signs at the start of an infestation. Cases of extreme reaction seem to be on the increase and affect as many as 2 in 10 people. Given the extent of some of the documented infestation in commercial properties it is clear that waiting for bites to indicate an issue is too unreliable and results in infestations which progress beyond simple and fast control.

Confirming signs

There are only three easily confirmed signs of bedbugs, these are:

- Live samples – although cryptic in nature and small at the nymphal stage they are detectable by those with good eye sight.

- Cast Skins – due to the incomplete metamorphic life cycle of bedbugs they must shed skins between blood meals to develop. This can be a good indication of how long an infestation is present.

- Faecal traces – as bedbugs must defecate after a blood meal and often just before entering a refugia these are the most indicative sign of their presence and can be a good indicator of their locations.

The following are considered to be non-confirming signs:

- Bites – this is because not everyone initially responds to the bites of bedbugs, this fact explains why a hotel can have an undetected infestation for so long and why screening for early detection is such an essential step in an integrated bedbug management systems.

- Blood spots on sheets – an equally variable sign not only due to the different types of blood spots but also due to the fact that no everyone continues to bleed from the puncture wound.

Prevention

In the case of domestic settings prevention can only be achieved through avoidance of this pest. As a pest of exposure bedbugs must always be brought into the home through an introduction event or increasingly through adjoining walls from a neighbouring property. Sources of bedbugs in domestic settings have been traced back to:

- Work locations
- Hotel stays
- Hospital stays
- Public transport
- Second hand items
- Delivered with new items

Domestic prevention is only possible through public education and increased awareness of the need for early detection and avoidance. Although this is a slow process in today's fast media culture it was the only solution in the past and remains an extensively untapped opportunity.

In commercial settings prevention is often not possible beyond regulation and monitoring of the supply chain. However the main source will always be guests and staff who may not even be aware of the unwanted problem they leave behind.

It is therefore even more essential to seek solutions to both early detection and efficient treatment with minimal downtime to organisations. Current solutions often have far reaching costs beyond the treatment processes which can have a significant impact on organisations efficiency.

Do not bring infested items into the home. It is important to carefully inspect clothing and baggage of travellers, being on the lookout for bedbugs and their tell-tale faecal spots. Also, inspect all second-hand beds, bedding, and furniture. Identifying the source is one of the key aspects to controlling an infestation. Unless the source is excluded from the property the stock of bed bugs will be continually replenished and the life cycle will continue.

If adjoining neighbours are suspected then communication of the issue sooner rather than later is essential so that the source of the infestation can be dealt with.

Early detection

If avoidance is not feasible the next viable line of defence in combaiting bedbugs is early detection. The author of this report has had multiyear success in using simple Passive Monitors to facilitate early detection whereby treatment efficiency can be dramatically increased to as low as complete eradication in as little as an hour using both chemical or nonchemical treatment options.

About Assured Environments

Source: www.assuredenvironments.com/about-us/company-history

The History of Assured Environments
Biography of Robert Klein, CEO

At the young age of 22, Robert "Bob" Klein walked through the doors of his father's company, Allied Exterminating, and has never looked back.

Daniel Klein, Bob's father, started Allied Exterminating in 1934, building a thriving pest control company within New York City. In 1964 he asked his eldest son to come aboard and run the company. The two proved to be a dynamic team, acquiring six pest control companies in New York along the way. It was only a matter of time before Bob Klein turned Allied Exterminating into the powerhouse that is Assured Environments.

Unfortunately, with the passing of his father in 1977, Bob Klein was left without the council he had sought for the prior 13 years while running the company, not to mention the last 35 years of his life. But Bob continued to look forward to the day he could do the same for his sons. In 1989, he was able to fulfill that dream when his son Andrew entered the business. In 1994, Andrew Klein took over the role of president, with his father staying on in an advisory position as the CEO. Both Andrew and Bob continue to drive the company in the same direction as Daniel Klein envisioned when he started the company, providing quality service to every customer.

Today, Assured Environments is the oldest, largest, unionized pest solutions provider in the New York region. Employing over 150 office personnel and field technicians, Assured Environments services homes and businesses throughout New York, New Jersey and Connecticut. Assured Environments is also part of a nationwide alliance known as Copesan, through which it offers quality pest control services throughout all of North America. Assured Environments was rated the 21st largest, privately held pest control company in the United States in 2010, and to this day, it has Bob Klein overseeing operations as Chief Executive Officer.

Bob Klein received his Bachelor's degree in business in 1964 from the NYU School of Commerce, currently know as the Stern School of Business. Mr. Klein belonged to Tau Epsilon Pi and was class president during his freshman and senior years. Mr. Klein is currently a visiting professor at New York University teaching classes that focus on entrepreneurship.

Bob Klein has served on the Board of Director's at the Children's Hearing Institute since 2005 and is a distinguished member of the Harmonie Club and Fenway Golf Club. Mr. Klein also attended Harvard Business School's Owner, President, Manager program during the early 1980s.

Bob Klein has been married 47 years to his wife Susan and together they have raised two sons, Andrew and Jeffrey. Andrew is married to his wife Alyssa of 14 years and works with his father each day. Mr. Klein continues to guide his younger son, Jeffrey who lives on the west coast as he builds his hospitality business, which operates out of New York and California. Mr. Klein also enjoys spending time with his four grandchildren: Ellie and Olivia – 10 year-old twins, Harrison who is 5 and 2 year-old Alexandra.

Source: www.assuredenvironments.com/about-us/executive-leadership-team

Assured Environments' Executive Leadership

All groups perform better with effective leadership.
Our executive team helps make us the best pest solution providers in New York and New Jersey!

Andrew Klein

Andrew Klein is the President of Assured Environments, a position he has held since 1994, when the company was still known as Allied Exterminating. Mr. Klein has been a part of Assured Environments' core staff since 1992 when he worked in the sales department. Mr. Klein is responsible for overseeing the day-to-day operations, sales management and services of the New York-based pest control company.

Mr. Klein received a Masters degree in European History from Columbia in 1992 and a Bachelor of Arts degree from Dartmouth College in 1989. In October 2011, Mr. Klein was appointed Chairperson of the National Pest Management Association's Bed Bug Steering Committee.

Barry Beck

Barry Beck is the Chief Operating Officer at Assured Environments and has been serving the company in this capacity since 1992. Mr. Beck is responsible for overseeing the complete operations of the company including accounts receivable, accounts payable, sales, acquisitions, new product development, and renovating service procedures and hiring practices. Mr. Beck's keen eye for innovative strategies has led to the increase of sales volume from $2.2 million when he took on the position of COO, to $26 million in 2010. Before joining Assured Environments, Mr. Beck worked for Exterminating Services Company (ESCO) rising from the position of sales associate to vice president of operations in just 3 short years.

Mr. Beck received a Bachelor of Science degree in Business Administration from Adelphi University. Mr. Beck is also regularly sought after for quotes, appearances and speaking engagements on a national level. His quotes and statements have

appeared in the New York Post, Daily News and the New York Times. Mr. Beck also had a recent appearance on the New Jersey cable show, PetStop.

Marc Popkin

Marc Popkin, CPA, is Assured Environments' Senior Vice President & Chief Financial Officer. Mr. Popkin has been in this position since October 2005. Mr. Popkin is responsible for all accounting and financial planning, management and reporting decisions. Prior to joining Assured, Mr. Popkin was the Controller for Reis, Inc. and PIMS, Inc. Additionally, from 1978 through 1995 Mr. Popkin worked in public accounting, specializing in privately owned entrepreneurial companies.

Mr. Popkin is a member of the American Institute of Certified Public Accountants as well as the NY State Society of Certified Public Accountants.

Andrew Feldstein

Andrew Feldstein is the Vice President of Operations for Assured Environments and has been serving in this role since April of 2000. Mr. Feldstein has worked in the pest management industry since August 1988. Prior to joining Assured Environments, Mr. Feldstein was the New York City Branch Manager for Rentokil, Inc., a Great Britain-based pest management company.

Mr. Feldstein graduated from The George Washington University in 1987 with a Master's Degree in Business Administration. Mr. Feldstein is also currently the President of the Plainview-Old Bethpage Soccer Club.

Teresa Siebold

Teresa Siebold is currently the Vice President of Internal Operations at Assured Environments. Ms. Siebold has worked at Assured since December 2000, in a variety of capacities. Currently, Ms. Siebold's continuously evolving responsibilities include overseeing general reception and office management, collections, billing and service management. Prior to Assured Environments, Ms. Siebold was the Operations Manager at Bird Barrier America, Inc. for 6 years, where she was responsible for inventory, warehousing, shipping and account processes.

Ms. Siebold attended El Camino College in California and is currently the committee Secretary for Copesan's Technology Advancement Committee (CTAC).

Background information

The instantaneous lethal temperature for bedbugs is 130 ^{o}F in that any bedbug or egg that is exposed to this temperature is killed in a second. Below this temperature bedbugs take varying times to succumb to the effects of heat and can take between 7 hours at 113 ^{o}F and 45 minutes at 120 ^{o}F according to Dr Stephen Kells University of Minnesota.

Therefore the end point of all assays has been set to 130 ^{o}F as regardless of the duration of that this temperature is held at bedbugs and eggs will all be dead. All data that failed to reach the target temperature is considered a fail as it will not be capable of being 100% guaranteed dead.

The temperature was recorded at several locations within the unit for each test to ensure that variances between the air temperature and "core" temperatures were identified. In establishing accurate temperatures it is necessary to use small data loggers as large bulky sensors do not respond quickly enough as the thermal characteristics of an object with a low surface to volume area ratio are not conducive to this type of testing if the aim is accuracy. We have noticed in the past that with some tests this type of device has been used although at the time to publishing this report we can't be certain whether this was done because of a lack of understanding of thermodynamics or as a deliberate attempt to pass a product that would normally fail.

Product specifications

Source: www.assuredenvironments.com/products/bed-bug-annihilator

The Bed Bug Annihilator

A portable, collapsible, heat chamber, The Bed Bug Annihilator™ now makes ridding your belongings of bed bugs as simple as 1-2-3!

The Bed Bug Annihilator is the most effective, portable and convenient heat chamber on the market today! The Bed Bug Annihilator eliminates the need to spend money on dry cleaning, will help eradicate bed bugs and is a great proactive solution for avoiding an infestation.

The Bed Bug Annihilator heats up in a matter of minutes and eliminates bed bugs, in one minute, upon reaching lethal temperatures. And once you are finished using the product, it is completely collapsible and easily stored until needed next.

The Bed Bug Annihilator is safe to use on clothes as well as books, electronics, kitchen appliances and any other items that can fit inside its modest-sized chamber. Its simple design and ease of use makes the Bed Bug Annihilator the perfect solution for any individual or business.

Measurements: 15w x 20d x 54h

Included in package:

- Heat Chamber
- 2 Supportive Racks
- Heating Unit
- Digital Thermometer

Minor assembly required.

Price: $499

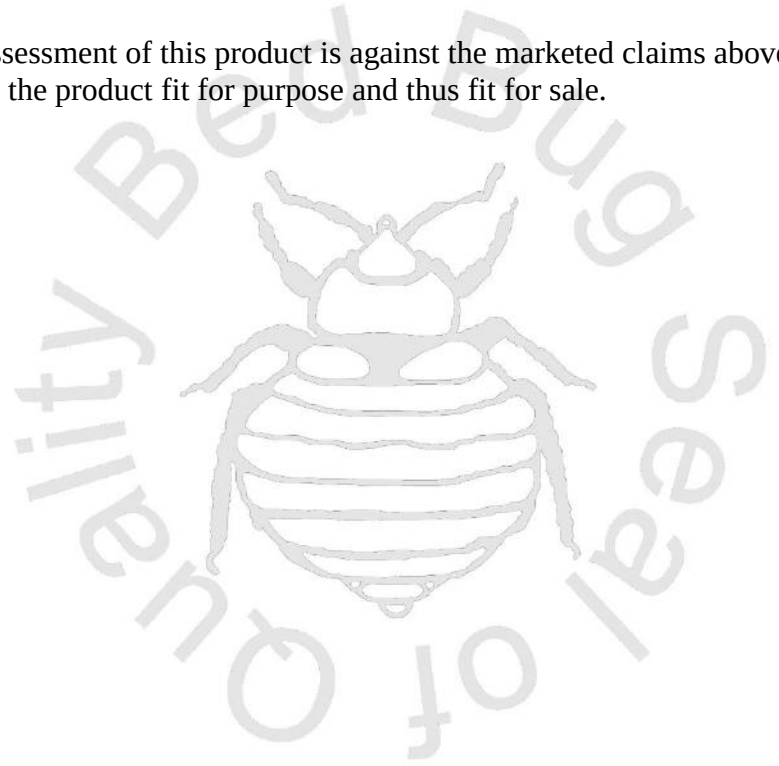
*While our shopping cart and automated checkout process is under construction**, please use the form below to order this product**.*
Or, you can call us at 800-670-7037.

Product claims

From reading the website it is clear that the following are made as product claims:

- Simple
- "…. the most effective, portable and convenient heat chamber on the market today!"
- "…. is a great proactive solution for avoiding an infestation."
- "…. heats up in a matter of minutes and eliminates bed bugs, in one minute, upon reaching lethal temperatures."
- "…easily stored until needed next."
- The Bed Bug Annihilator is safe to use on clothes as well as books, electronics, kitchen appliances and any other items that can fit inside its modest-sized chamber.

Part of the assessment of this product is against the marketed claims above, effectively is the product fit for purpose and thus fit for sale.



Method

Test 1 – Construction ease test

The fully boxed unit was given to the warehouse team for assembling as per the manufacturer's instructions. The only instruction given was that they MUST only follow the manufactures guidelines (included in appendix) and to submit a written report of any issues at the end of the exercise.

Although a semi subjective test we feel that given that the only relevant qualification the warehouse person has is a bicycle repair certificate it would be biased towards the manufacturer.

Test 2 – Thermal profile of empty unit

The annihilator was set up and 8 log tags placed at various locations within the unit.

The unit was started and once 122 °F air temperature was reached a 20 minute count down timer was started. Once the alarm sounded the unit was turned off and left to cool before the log tags were removed and downloaded.

The loggers were purchased from logtag.co.uk in January 2012 (specification in appendix).

Test 3 – Thermal profile of a light load

The annihilator was set up and 10 log tags placed at various locations within the unit and within samples placed within the unit.

The unit was started and run for one hour before it was turned off and left to cool before the log tags were removed and downloaded.

The loggers were purchased from logtag.co.uk in January 2012 (specification in appendix).

Results of testing

Results test 1 – Construction ease test

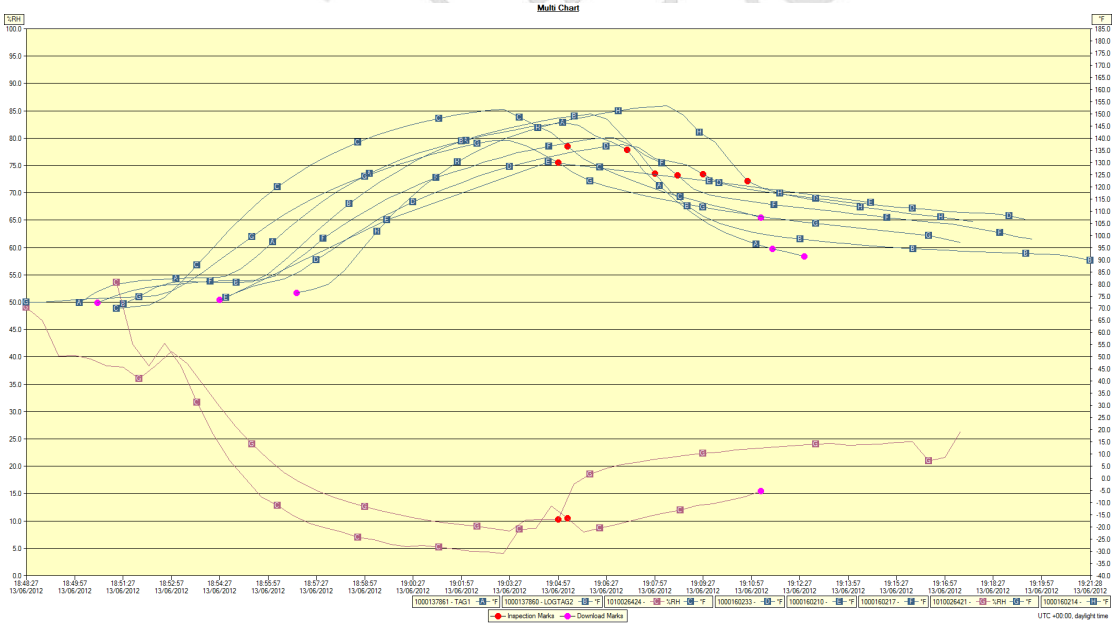
The feedback from construction is as follows:

- Poor clarity of instructions
  - Print too small and images not clear
- Low build quality
  - One of the hangers sheered during construction
  - One of the feet broke off during construction
- Low stability and poor design

Although subjective in nature we did not feel that the product quality, materials and construction justified the $499 price tag especially considering the heating unit (the hair dryer) ships for less than $20 on Amazon.

Results test 2 – Thermal profile of empty unit

Graph of temperatures and humidity test 2



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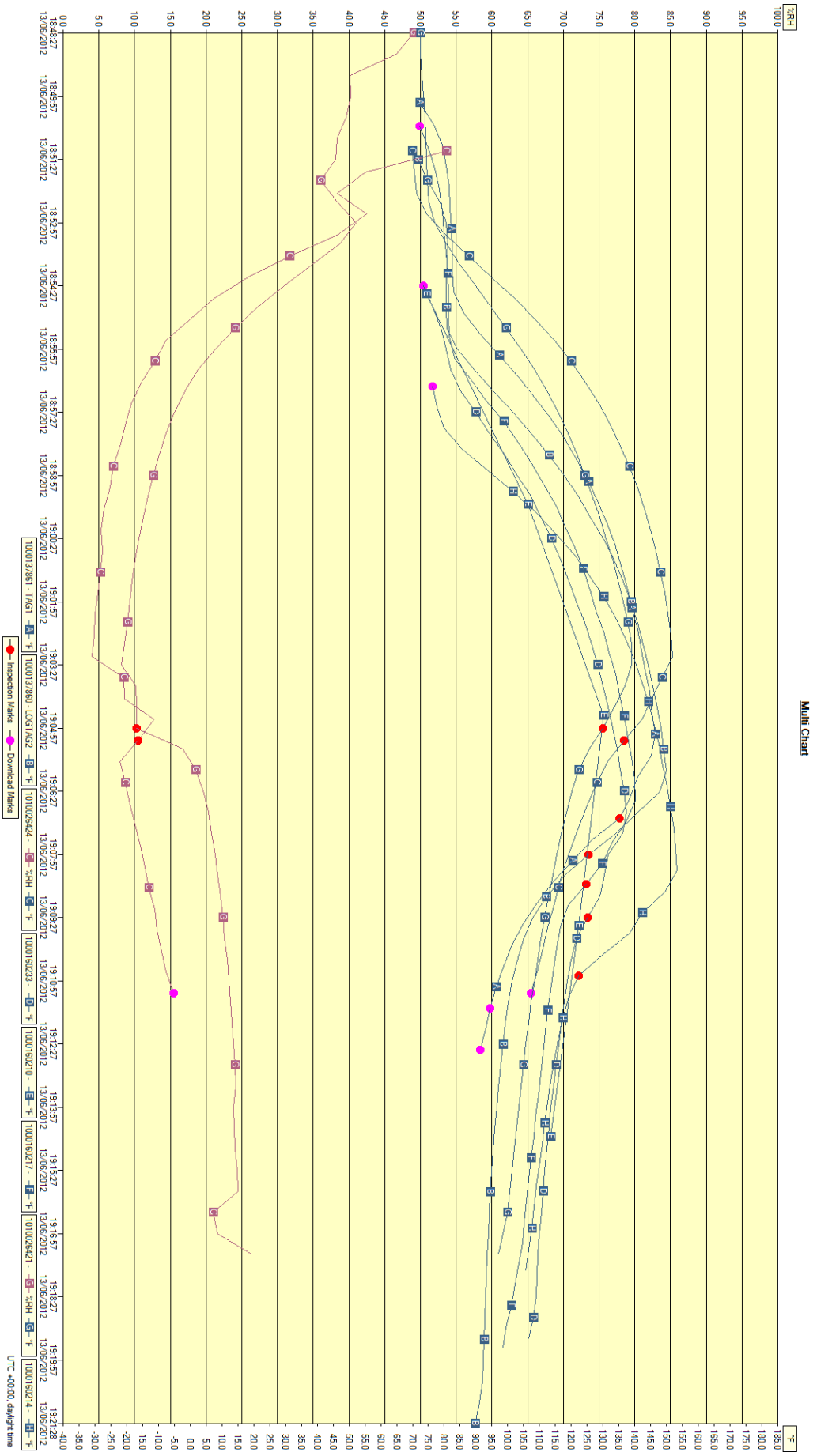


Max Temp and lowest humidity table test 2

ID	Location	Max Temp °F	Lowest humidity
Test1tag1		146.4	
test1tag2		150.1	
Test1tag13		151.9	4.0
Test1tag23		137.3	
test1tag25		130.2	
Test1tag34		140.2	
test1tag34t&h		138.9	8.2
Test1tagmc		153.2	

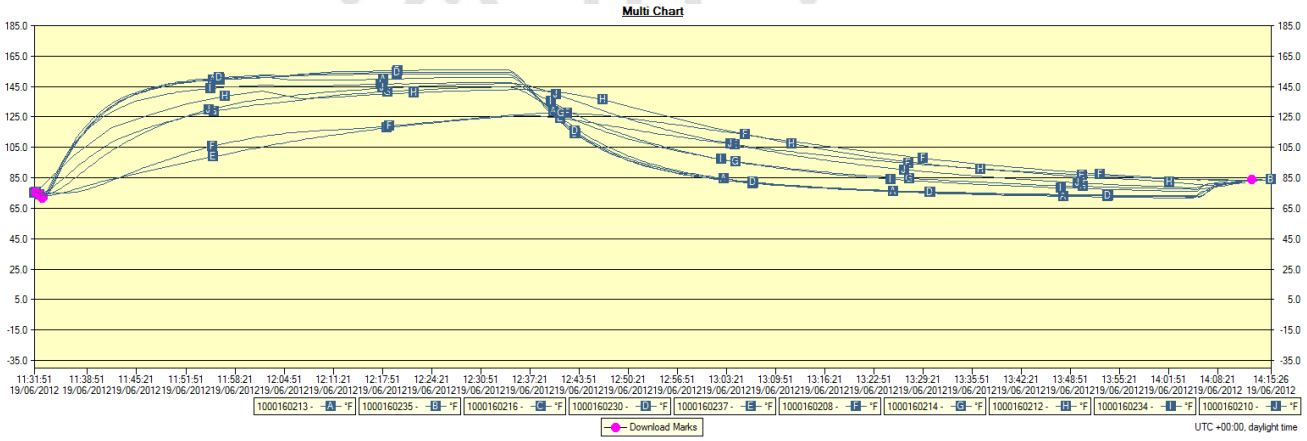
All the log tags reached temperatures above 130 °F which would indicate that the air inside the unit reached the thermal death point for bedbugs and their eggs.

However we also noted that the temperatures did exceed 150°F which is the temperature that the manufacturers advise that he unit should be turned off. As the unit was supervised at all times and appropriate fire equipment was in place it was decided that the unit would not be turned off unless the temperature of any run was recorded above 170 °F at which point the heat would be approaching unsafe levels where combustion or product damage becomes a significant concern.

There is also a significant variance in the maximum temperatures as well as the rate at which they are achieved indicating that the air flow within the system is not uniform and that items lower down appeared to heat more slowly. As bedbugs have the ability to detect even small temperature difference this could allow enough time to migrate to cool spots within the system.

Results test 3 – Thermal profile of a light load

Graph of temperatures test 3



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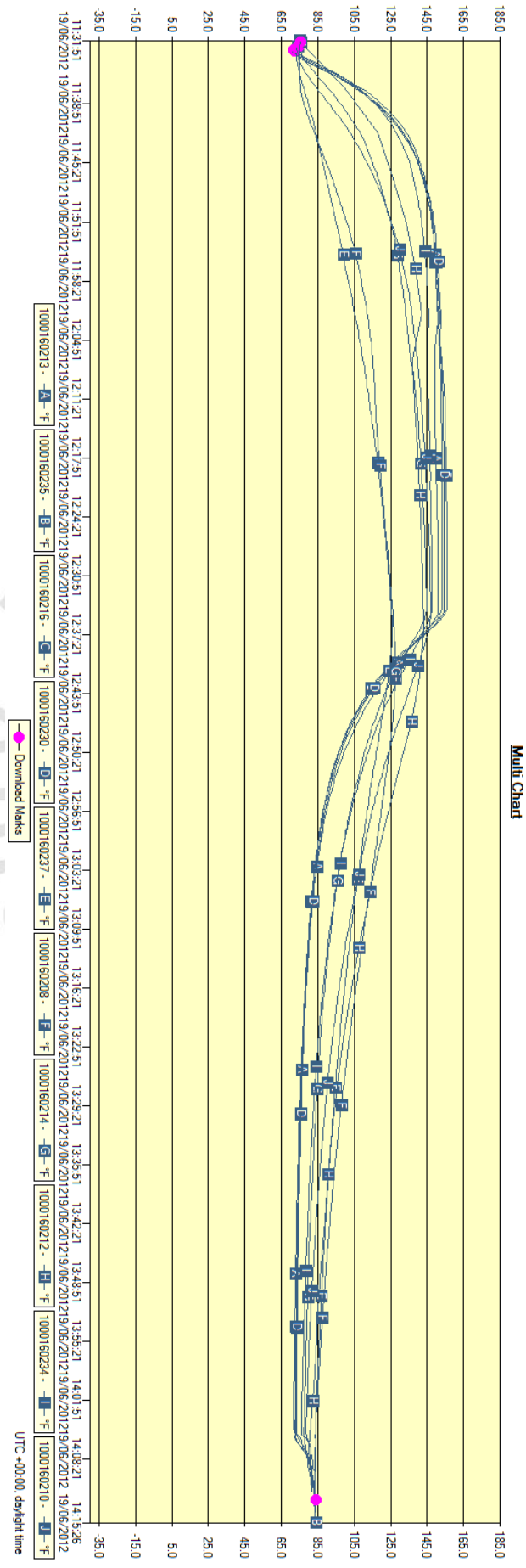
Multi Chart
185.0
165.0
145.0
125.0
105.0
85.0
65.0
45.0
25.0
5.0
-15.0
-35.0
19/06/2012 11:31:51
19/06/2012 11:38:51
19/06/2012 11:45:21
19/06/2012 11:51:51
19/06/2012 11:58:21
19/06/2012 12:04:51
19/06/2012 12:11:21
19/06/2012 12:17:51
19/06/2012 12:24:21
19/06/2012 12:30:51
19/06/2012 12:37:21
19/06/2012 12:43:51
19/06/2012 12:50:21
19/06/2012 12:56:51
19/06/2012 13:03:21
19/06/2012 13:09:51
19/06/2012 13:16:21
19/06/2012 13:22:51
19/06/2012 13:29:21
19/06/2012 13:35:51
19/06/2012 13:42:21
19/06/2012 13:48:51
19/06/2012 13:55:21
19/06/2012 14:01:51
19/06/2012 14:08:21
19/06/2012 14:15:26
1000160213 - A - °F
1000160235 - B - °F
1000160216 - C - °F
1000160230 - D - °F
1000160237 - E - °F
1000160208 - F - °F
1000160214 - G - °F
1000160212 - H - °F
1000160234 - I - °F
1000160210 - J - °F
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UTC +00:00, daylight time

Max Temp and lowest humidity table test 3

Location	Max Temp °F	Lowest humidity
Bottom of unit	150.8	
Hanging from bottom of unit	156.0	
Hanging from middle of unit	153.4	
Hanging from top of unit	154.5	
Middle of folded sheet	125.7	
Underneath folded sheet	147.6	
On top of folded sheet	144.9	
On top of folded shirt in box	143.4	
Middle of folded shirt in box	127.7	
Underneath folded shirt in box	146.9	

All the log tags exposed to the air in open atmosphere reached temperatures above 130 °F which would indicate that the air inside the unit reached the thermal death point for bedbugs and their eggs; however the core temperature of the items inside the unit did not reach the critical death temperature. Although there is a possibility that bedbugs could be exposed to a sub lethal temperature for long enough to kill them given the manufacturer's instructions to turn the unit off after 20 minutes at the correct air temperature this in practice would not happen. At the 20 minutes from the air temperature reaching he target the core temperature was still below 110 °F mark which would have taken over 7 hours to work.

Furthermore if the unit were turned off once the probe reached 150 °F there would certainly not have been enough time for the core temperatures to have reached a level where thermal death could be achieved.

Again a significant variance in the maximum temperatures as well as the rate at which they are achieved was recorded indicating again the air flow within the system is not uniform. It is not clear from this experiment if the rate of air flow is also incorrect creating thermal eddies behind even the most porous of materials.

At this stage rather than progressing towards live sample testing we felt it was advisable to stop testing and contact the manufacturer to express concerns and to find out if there was a chance the unit or process was faulty.

Review of marketing claims

Specific marketing claims have been addressed below:

- Simple

Although the product is simple to operate the installation instructions are far from clear and would pose a significant obstacle for the elderly or anyone without acute eyesight. Aspects of the product such as automatic and safety shut offs are not present and the noise generated from the unit in use means that it is unlikely that anyone could remain close supervising it for the duration of a run.

- "…. the most effective, portable and convenient heat chamber on the market today!"

Clearly this is not true given that the unit failed to achieve a thermal profile necessary to kill bedbugs. I have tested other units which have also failed and I have tested units which have worked. Therefore we can't substantiate this claim and doubt the manufacturer could either.

- "…. is a great proactive solution for avoiding an infestation."

As bedbugs are an exposure pest the only proactive potential of this system would be to decontaminate inbound luggage or items. Given the failure to decontaminate a sheet I very much doubt a suitcase would be successful either, therefore we also feel that this claim cannot be substantiated.

- "…. heats up in a matter of minutes and eliminates bed bugs, in one minute, upon reaching lethal temperatures."

Yes the unit did in fact heat up quickly but the air temperature reaching the critical death temperature for bedbugs at 130 °F does not mean that the core temperatures had also reached the critical death temperature for bedbugs and as much this claim is not substantiated with regards the system as tested.

- "… easily stored until needed next."

Although the unit does collapse down to a smaller size we did not feel that the build quality would enable this to be done many times before metal fatigue resulted in damage.

- The Bed Bug Annihilator is safe to use on clothes as well as books, electronics, kitchen appliances and any other items that can fit inside its modest-sized chamber.

Most electronic appliance manufacturers do not support heating above 160 °F as it is getting close to the melting point of many plastics. Although we were tempted to test a kitchen appliance as they were listed we have yet to date to see an infested kitchen appliance in any property other than the most heavily infested cases. The diffuse

multiyear nature of such cases means that the low capacity of this product renders it immediately useless in such situations.

From our experience we feel that some of the claims are exaggerated at best and complete untruths in some cases. If the product were place on sale in the UK market it is unlikely in its current configuration to pass the Sale of Goods Act 1979 and the requirements of the Advertising Standards Agency.

Additional research

The following additional research and investigation has been conducted in order to completely evaluate this technology:

Review of the technical specifications of the heater

Source phone conversation with Conair technical support:

The maximum advised continuous run time of the product was not disclosed but the manufacturer Conair said “DO NOT RUN IT FOR AN HOUR, DO NOT ATTEMPT TO KILL BEDBUGS WITH OUR PRODUCT”.

Communication of concerns with supplier

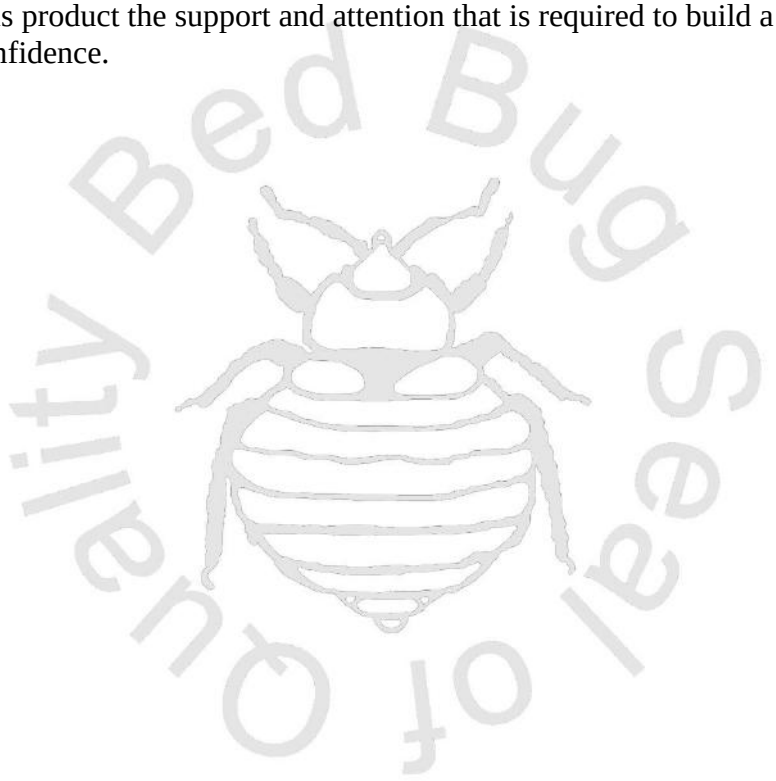
The following issues have been communicated with the manufacturer:

Build quality – to date the issue remains unresolved

Failure to reach core temperature – to date the issue remains unresolved and several emails remain open without replies or acknowledgements

Maximum run time for heat source – the manufacturer has not been able to provide any confirmation of the maximum safe continuous run time for this product

Unfortunately as so many issues and the fact that the unit actually took over 3 months for the order to be processed and arrive I can only conclude that the manufacturer is not giving this product the support and attention that is required to build a brand with consumer confidence.



Additional Information provided by supplier

Following communication with Assured Environments the PDF BBA Test Univar.pdf was sent to us as independent testing data by Barry Beck (see appendix). Aside from the obvious formatting error where the readings at the bottom of the unit appear to be negative temperatures this test clearly only records air temperatures which we know to be a poor indicator of the actual "core" temperature.

The document falls short of the extensive validation report which is was presented as for numerous reasons and further illustrates the need for independent testing of products free from undue influences of inventors, manufacturers and the supply chain.

Unless the testing lab has experience of looking for flaws and failures in the systems under test a faulty product design can easily be missed.

Subsequent correspondence

Although there has still been no acknowledgement of this report by Assured Envrionments we did however receive a letter from lawyers on behalf of Univar a copy of which can be seen in appendix A of this report.

The letter specifically raised the following issues:

- Bedbugs limited was infringing the trade mark of Univar by using documentation that claimed Univar was the supplier of a product or that information was provided by Univar as part of the report.

Now I am sure it is clear to anyone who has read this report that I have made no claims that Univar are the supplier, for the avoidance of doubt I am clear that this is Assured Envrionments but I did feel the claim that the report was not official needed some investigation.

I specifically sought clarification of the legitimacy of the report submitted and was given verbal assurances that it was not in fact legitimate.

Sadly further investigations have shown that he report was in fact provided by a field entomologist in the employ of Univar. I have offered to communicate the name of this individual to the legal team who provided me with the letter but despite several emails and voicemails they have declined to get back in touch.

The information provided in testing this product was all supplied in the same way that a consumer could expect to obtain them direct from the supplier and as such this report is a consumer testing report which could have been conducted by anyone with appropriate knowledge and recording equipment. In the same way that a film producer can't take action against a reviewer for a critical review the industry must learn that consumers have a right to test products and provide feedback and that if legal action is to be threatened you need to be 100% sure of your facts before taking it as the last time I looked threatening people was also illegal all over the world.

Conclusions

Although the unit reaches the required air temperature to cause immediate death of bedbugs the heat is not delivered in a fashion which will ensure that the core temperatures of items placed inside the system will necessarily reach the required temperatures.

Although with some modification to both the unit and the instructions we feel that these issues could be overcome it does not detract from the fact that it is currently being sold to consumers in a format that may not be able to deliver the solution that is promised.

It may be capable of heating one of two items that are hung up at the top of the unit but this minimal throughput is not what the product promises to deliver in its marketing claims. The heater manufacturer has confirmed that the hairdryer should not be run continuously for the length of time needed for the core temperature to reach the critical death temperature. This also highlights the worrying concern that they may not have been contacted to check of the product is fit for specification. If a fire did occur this is almost certainly grounds to invalidate the insurance policy as the item was being used for a purpose that it is not recommended for by the manufacturers.

We are frankly shocked that such a product was released without thorough testing and validation by a knowledgeable third party. To later be presented with an evaluation report which was presented as an independent testing report further confirmed our suspicion that Assured Envrionments have to date failed to take this product seriously.

We can only conclude that at present and as per the manufacturers guidelines this product is a fail as it will not give reliable results.

Recommendations

We have no choice but the recommend the immediate recall of this product to ensure that consumers are not inadvertently exposed to bedbugs through the systems failure. Only when it has been thoroughly tested and will work to the guidelines provided and this has been independently verified should this go back on sale to the public.

Given that an executive of the company is the current chair of the NPMA Bedbug task force this failing does little to support consumer confidence in the abilities of the professional pest management industry in the USA.

This further highlights the need for clear consumer focused standards for product testing in relation to bedbug products which are free from the undue influences of inventors, manufacturers and the supply and distribution chain. The author of this report has been calling for this for many years and to date from within some key international markets this request appears to be falling on deaf ears.

As the manufacturer has been aware of the issue since 19th June 2012 and the product has remained on sale I would also confer that it is highly unlikely that their insurance providers would honour any claim under public liability.

It is not clear that the industry need to focus on clear testing standards for all bedbug related products and also to have an agreed standard for consumer recalls should such issues happen again. Without these controls and safe guards being put in place there is a significant risk of damage to the industries long term reputation particularly in relation to consumer confidence.

Without addressing these issues as a professional pest industry there is absolutely no differentiation in the consumer's eye between "professional" products and the raft of EPA exempt and "bodge" products that we are starting to see promoted online. In some respects the reputation in the consumers' minds has already been dented through an over reliance on poorly tested chemical based products and the "band wagon" protocol based approaches we have seen to date.

About Bed Bugs Limited

Bed-Bugs.co.uk was established by David Cain in 2005, primarily as an information portal for the exchange of ideas and information about bedbugs. With his scientific background and professional training, David was interested in the increasing spread of bedbugs and what scientific advances were being brought to bear on the problem. Surprisingly, the “scientific” answer was 'not a lot'.

The sheer volume of enquiries and, more specifically, direct requests for effective help in tackling infestations demonstrated very clearly that existing methods of controlling bedbugs were proving increasingly ineffective. A radical new approach was needed and led David to set up Bed Bugs Limited, a company dedicated solely to the control and eradication of this pest.

From the outset, the company has done things differently, with a firm emphasis on research and investigation in order to develop a treatment process which actually works. A few years down the road, with successful treatment of infestations far higher than general pest controllers, the results show that we are very definitely on the right track and can rightfully claim to be the UK's leading company when it comes to bedbugs.

As bedbugs have become a global issue the company continues to develop new applications, methods and technologies to the extent that in 2012 they launched a green service which is even more effective than the traditional chemical based treatments in gaining immediate control and is based on years of field experience offering rapid detection and control procedures for hotels and hostels.

The author of the first consumer’s guide to bedbugs of modern times David has continued to develop an international reputation for knowing “too much” about bedbugs having personally tackled some of the most extensive infestations in terms of both sheer numbers and dispersal throughout buildings and structures. Known for being an outspoken advocate of technologies that work and a consumer advocate keeps him at the centre of the ever expanding bedbug universe.

Disclaimer

In accordance with the FTC and good business ethics we felt it was important to ensure full disclosure of the fact that the author of this document is also the inventor of the Passive Monitoring technology mentioned as part of this document.

Appendix

Pictures - construction

Components of the system minus the outer “bag”

Details of the internal racking

Illustration of one of the structural failures that occurred when the system was assembled

Pictures – test 3

Log tag placed in box beneath shirt

Log tag placed in the middle of the shirt

Shirt placed inside the box

Log tag placed on top of the shirt in the box

Box with the lid placed on top

Log tag placed inside sheet

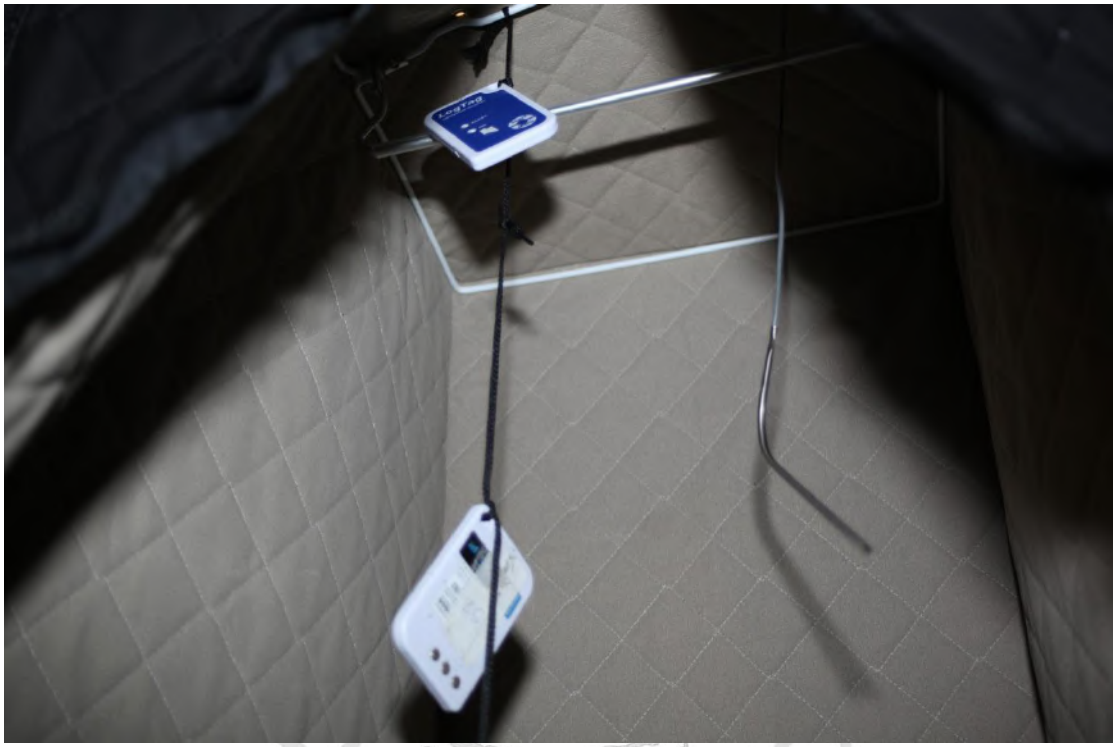
Sheet folded over on top of log tag

Log tag placed on lower rack

Log tags placed inside the unit

Sheet loaded inside the unit

Log tag placed on top of sheet inside the unit



Log tags hanging inside the unit

Log tag hanging low in the unit

Instruction manuals

Temperature Monitoring

IMPORTANT: Scientific studies report the lethal temperature for bed bugs as 113°F (adults) and 120°F (all life stages). Monitor the temperature of the items being treated to ensure that the internal temperature of all items being treated reaches 122°F and holds that temperature for 1 minute per the National Pest Management Association's Best Practices guidelines. We recommend 5 minutes.

PERSONAL ITEMS: Heating of personal items in the unit varies greatly depending on the number and types of items you are treating. Treatment times will range from 15 to 45 minutes.

For all items, it is recommended that treatment be terminated (regardless of the treatment time) if the temperature reaches 150°F.

The thermometer provided is a standard digital thermometer.

Care and Maintenance

- Always unplug the unit before cleaning.
- Lightly run a vacuum cleaner nozzle over the heating unit, support rack, and bag interior to remove any dust or dirt that may have accumulated.
- Always be cautious near the heating unit.
- **Do not** use abrasive or flammable solvents to clean any part of the unit.
- Rear filter in heater is removable to allow for vacuum cleaning.
- Store unit in its original carton in a cool, dry location.

Customer Service

If you have any questions, comments, or concerns, please contact us at: 800-942-7123.

Lifetime Warranty

Lifetime warranty on chamber, zipper, and fabric, provided they are not abused, mutilated, or punctured.

1-year warranty on heater, digital thermometer, and metal parts from manufacturer.

Bed Bug Annihilator™

Congratulations on your purchase of the Bed Bug Annihilator™! The Bed Bug Annihilator™ is a portable, collapsible heat chamber that makes ridding your belongings of bed bugs as simple as 1-2-3! The Bed Bug Annihilator™ is the most effective and convenient heat chamber on the market today! The Bed Bug Annihilator™ eliminates the need to spend money on dry cleaning, will help eradicate bed bugs and is a great proactive approach for avoiding an infestation.

The Bed Bug Annihilator™ heats up in a matter of minutes and eliminates all stages of bed bugs in one minute upon reaching lethal temperatures. And once you're finished using the unit, it's completely collapsible and easily stored until needed next.

The Bed Bug Annihilator™ is safe to use on clothes as well as books, electronics, kitchen appliances, and any other items that can fit inside the chamber. Its simple design and ease of use make the Bed Bug Annihilator™ the perfect solution for any individual or business.

IMPORTANT: Before using the Bed Bug Annihilator™, read all warnings, cautions, and instructions here and included with the digital thermometer and heater.

*Patent Pending

Warnings

- Review all instructions carefully before using this product.
- Keep combustible/flammable materials away from device.
- Use caution when operating this device around children and pets.
- **Do not** leave the device unattended while in operation.
- Always leave the device unplugged when not in use.
- **Do not** operate the device if it is damaged or if you suspect damage, especially to the cord or plug. Contact customer service if the device is damaged or not working properly.
- The device should not be used outdoors.
- **Do not** use the device in locations where it may come into contact with water.
- **Do not** insert or allow foreign objects to enter any ventilation or exhaust openings in the heating unit, as this may cause damage to the unit or cause an electric shock or fire.
- **Do not** place damp or wet items in the device.
- If an extension cord is used, ensure that it is rated 16 gauge at minimum.
- **Do not** put anything that may melt into the chamber (e.g., crayons, cosmetics, pharmaceuticals, paintings, candles, pens, ink products, etc.).
- **Do not** put anything living into the chamber (e.g., people, pets, plants, etc.).

Items Included

- Heat Chamber
- 2 Support Racks
- Spray Bottle
- Heating Unit
- Digital Thermometer
- Rubber Sleeve

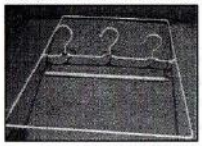
Specifications

MEASUREMENTS: 15"d x 20"w x 54"h

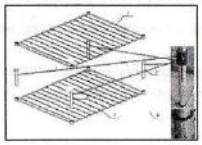
*Minor assembly required.

Assembly Instructions

1. Insert top rack into heating chamber with indentations facing up through brass grommets, being careful not to force or bend the metal hooks.



2. Hang heat chamber in closet on closet rod. If the heater touches the floor, place a dinner plate under the heater's filter to avoid dust and debris clogging the unit.
3. Assemble internal bottom rack by fitting brackets into designated holes.



4. Insert bottom rack assembly into bottom of heat chamber; it will fit snugly.
5. 2-AAA batteries are included in the thermometer. There is a strip under the battery cover to prevent battery drain in shipping. Remove the strip before continuing. If unit does not turn on, remove battery door and ensure batteries are installed correctly. If battery replacement is needed, refer to the instructions included with the thermometer.
6. Install **thermometer** (device has a magnetic back and can be hung on the metal clothing rod). Position the metal probe approximately 2-3 feet down from top of unit and 3 inches in from the side. Turn on the thermometer, and set temperature alert to ON.
7. Plug in probe on side of thermometer and install through front with the wire at top of zipper.
8. Insert rubber grommet from the outside of the fabric into the hole at the bottom of the chamber.
9. Insert heater into rubber grommet until snug. On the inside of the chamber, attach diffuser to heater; it will make a snapping sound once in place. Diffuser should be in line with zipper.

Operation Instructions

NOTE: For increased speed in heating the chamber, use the spray bottle included to spray a light mist of water (two sprays per panel) on the upper inside walls of the chamber prior to inserting your items. Please note that this method should only be used with items that will not be harmed by water or moisture damage.

1. Place items that you wish to eradicate bed bugs from into the heat chamber. Do not over-pack; heat must be able to circulate freely.
2. Plug in the heating unit. Make sure it is not blocked and is receiving direct air. If unit is resting on carpet, use a dinner plate to ensure dust and debris do not clog heater.
3. The thermometer unit is preset to 122°F. The chamber will take up to 30 minutes to reach 122°F. Once the unit reaches 122°F, an alarm will sound on the thermometer.
4. Let unit run for an additional five minutes after alarm sounds to ensure heat of at least 122°F reaches all items in the chamber.
5. Wait 10 minutes for chamber to cool off before touching zipper, metal pieces, metal hangers, etc.

Documents submitted by supplier

UNIVAR

Bed Bug Annihilator Test

Product Information:

- Single Bed Bug Annihilator
- Produced at : 614 n. June Street Los Angeles, CA 90003
- Distributed by: Assured Environments 45 Broadways New York, NY 10006
- Measurements: 15w x 20d x 52 h (inches)
- Chamber is made from fire resistant fabric
- Heater: Model 070B/Conair Turbo 1815 Watt
- Thermometer: Model 070B/Taylor Digital Thermometer with probe

Experiment Information:

- All degrees in Fahrenheit
- Starting Temperature: 78 degrees Fahrenheit
- At time of test the chamber contained 11 shirts and 2 heavy-duty work pants

Method: Strategically installed 4 probes in areas of chamber to determine temperature distribution throughout the chamber

1. Bottom of chamber: (2 inches above lower rack)
   -122 degrees in 3:04 min
   -158 degrees in 26 min
2. Top of chamber: (2 inches down from top rod)
   a. 122 degrees in 3:39 min
   b. 172 degrees in 26 min
3. Shirt pocket in chamber: (18 inches down from the top)
   a. 122 degrees in 3:39 min
   b. 183 degrees in 26 min
4. Pants pocket in chamber: (2 inches in, 2 inches deep, 24 inches from top)
   a. 122 degrees in 21:05 min
   b. 130 degrees in 26 min

Results after unit was stopped at 27 minutes into test:

Time After Stop	Thermometer 1	Thermometer 2	Thermometer 3	Thermometer 4
10 minutes	101 degrees	138 degrees	148 degrees	134 degrees
20 minutes	89 degrees	123 degrees	123 degrees	127 degrees

Raw Logtag data

The raw log tag data has been removed from the executive summary of this report to make it easier to read.

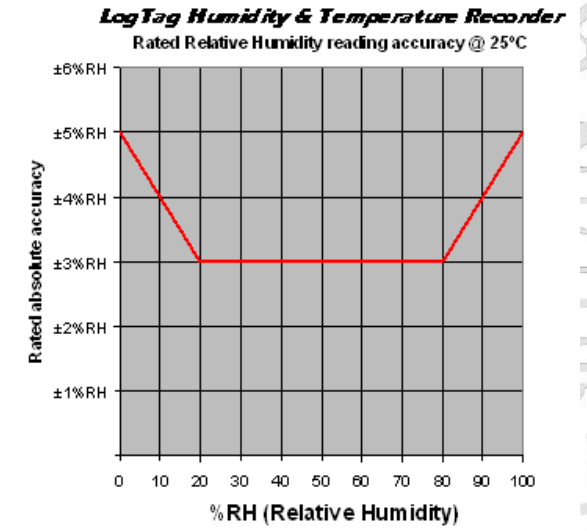
Full copies of this report including the raw data are available for inspection to receive information about getting access please email info@Bed-Bugs.co.uk .

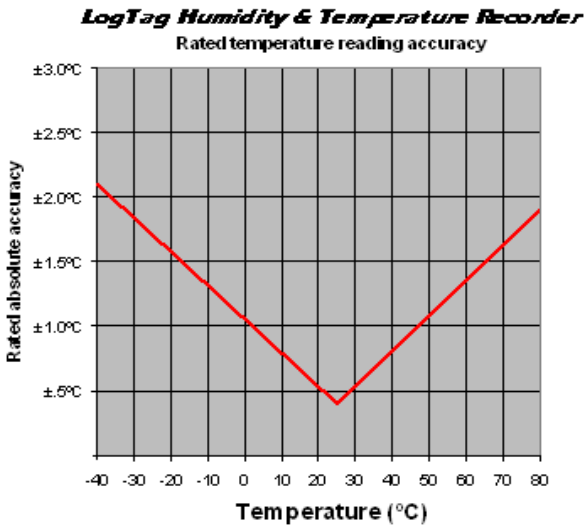
Technical specifications for log tags

Model TRIX-8
Measurement Range -40°C ~ +85°C (-40°F ~ +185°F)
Resolution < 0.1°C for -40°C ~ +40°C,
< 0.2°C for +40°C ~+80°C
Accuracy better than ±0.5°C for -20°C~ +40°C.
better than ±0.7°C for -20°C~ -30°C & +40°C~+60°C
better than ±0.8°C for -30°C~ -40°C & +60°C~+80°C
Sensor reaction time typically less than 5 minutes(*T90*) in moving air (1m/s).
Capacity 8032 readings (16K bytes memory)
Sampling frequency adjustable, 30 sec to several hours
Logging start options Push button start or specific date & time.

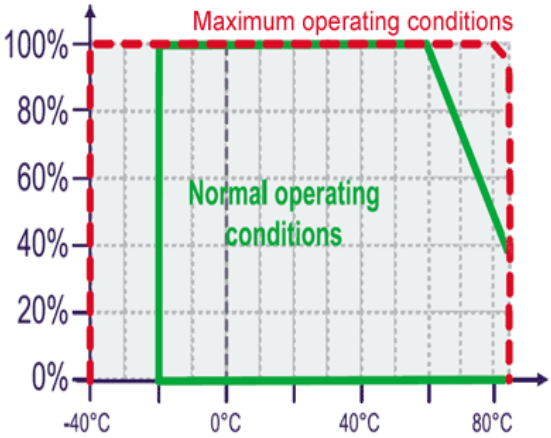
Model HAXO-8
Humidity Measurement Range 0 ~ 100%RH but with limitations as detailed in Humidity Measurement Operating and Storage conditions below
Temperature Measurement Range -40 ~ +85°C (-40 ~ +185°F)
Resolution 0.1%RH & 0.1°C/°F

Rated Accuracy





Humidity and temperature normal and maximum operating and storage conditions



This chart shows the normal recommended operating range of the humidity sensor. Conditions outside the normal recommended range may temporarily offset the RH signal up to ±3 %RH. After return to normal conditions it will slowly return towards calibration state by itself. Applying a "Reconditioning Procedure" may accelerate this process.
Prolonged exposure to extreme conditions may

Davis Wright Tremaine LLP

Suite 2200
1201 Third Avenue
Seattle, WA 98101-3045

Cindy L. Caditz
206.757.8097 tel
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cindycaditz@dwt.com

August 2, 2012

VIA EMAIL
Confirmation Copy via Federal Express

David Cain
Managing Director
Bed-Bugs.co.uk
Bed Bugs Ltd. (Company Number 5905112)
Unit 30, Sleaford Street Industrial Estate
Sleaford Street
Battersea SW8 5AB United Kingdom
info@bed-bugs.co.uk

Re: Trademark Infringement
Our Reference: 85510-806

Dear Mr. Cain:

We are writing to you as intellectual property counsel for Univar Inc. of Redmond, Washington in the United States of America. For many decades, Univar has been well-known and well-regarded as a global distributor of chemicals including pest control products and pest control services. Univar provides products and services throughout the world including throughout the United Kingdom. Customers look for the name and mark Univar and the Univar Hexagon (shown below) as indications and assurances that the goods and services provided and promoted therewith originate from my client.

We have recently learned that Bed Bugs Ltd. is displaying the Univar name and mark and the Hexagon logo at a website promoting a product sold as the "Bed Bug Annihilator". Specifically the infringing use is made at the website Bed-Bugs.co.uk. Bed Bugs Ltd. is using the Univar name and mark and the distinctive Hexagon logo on documentation that suggests that Univar is the source of the product and also to report information purportedly provided by Univar,

including certain testing of the product. This representation and the provision of the information purportedly from Univar is illegal and fraudulent. Univar is not the manufacturer of the "Bed Bug Annihilator" and Univar did not provide the information shown by the brochure distributed by Bed Bugs Ltd. A copy of the full brochure and a separate copy of the relevant page showing the misrepresentations are attached to this letter for your convenient reference.

These misrepresentations and uses of the Univar name and mark and the Univar Hexagon logo are deceptive, false, and constitute passing off in violation of UK law, U.S. law, and International treaties.

Although it is quite clear that Univar could recover compensatory and punitive damages based on the actions taken by Bed Bugs Ltd. we believe that the egregious nature of your use of the Univar name and mark and the Univar Hexagon indicate that a substantial misunderstanding or serious errors have been made by Bed Bugs Ltd. Because we have no current reason to believe that Bed Bugs Ltd. had or has any malicious or devious intention we will recommend that Univar agree to refrain from seeking such damages if Bed Bugs Ltd. cooperates by immediately taking the following steps.

Please advise us in writing that you agree to the following terms:

1. Immediately stop all use of Univar and the Univar Hexagon.

2. Provide us with an accounting of the products and/or services with which the name and mark UNIVAR trademark or the Univar Hexagon have been used and an identification of the websites, retail stores and/or other locations through which products and/or services have been offered for sale or promoted by Bed-Bugs Ltd. or its agents in association with UNIVAR or the Univar Hexagon.

3. Refrain in the future from use or registration of any names or marks that include UNIVAR or the Univar Hexagon or any confusingly similar variation thereof.

Please provide your written response and comply with our demands by no later than **August 9, 2012**, so that further action concerning this matter can be avoided. We look forward to hearing from you.

Very truly yours,

Davis Wright Tremaine LLP

Cindy L. Caditz

CLC:rer

Enclosures:
Full brochure
Page 38 of Brochure

cc: Univar Inc.

Declaration

This report has been compiled based on the analysis of the raw data provided during testing as well as the experience and commercial understanding of bedbugs. Every effort has been made to ensure that it is as accurate as possible and provides a clear and accurate account of our findings in conducting the test.

The analysis of the data has been free from any undue influence from the supplier or any third parties with interest in the product.

The author is happy to answer any specific questions about this report and stands by its content.

Signed: _____

Date: _____

David Cain BSc (Hons), PgCert, ESQ