

ZerO₂ Pest Control

Eliminate insect pests from artefacts with cost effective, easy to use atmospheric control

A common problem within museums comes from irreversible damage to wood, textiles and other furnishings mostly caused by insect pests. Most commonly seen insect pests found to be devastating to museum artefacts and valuable art collections include: **Anobium Punctatum**, generally known as the common furniture beetle or 'woodworm', has been perceived to be the main cause of damage to timber in the UK over the last 100 years. **Carpet Beetle Larvae** chew holes in textiles including wool, fur, silk and leather. They can also feed on human hair, feathers, book bindings and bone. The humble **clothes moth** is thought to be the number one insect pest in museums throughout the world. It is capable of destroying huge amounts of animal-based material. **Silverfish** feed on materials containing starches, and may feed on starched fabric.

Infested collections had been at risk not only from the infested pests but also from the remedial treatments themselves, which often involved the use of residual pesticides, such as malathion and permethrin and harmful gases such as methyl bromide and phosphine. Hanwell have teamed up with Colin Smith Conservation Ltd to produce a product that can eradicate damaging insect pests from artefacts and valuable collections, without an expensive chemical treatment in sight. The treatment process is simple and effective; simply place the applicable artefact into the relevant container; flexicube, flexiart bag or flexitube.

The oxygen scavenger sachets are placed into the container before sealing to reduce the level of oxygen within the bag over time, thus killing all insect pests within it. If there is no need to remove the artefact from the bag after the treatment is complete, the artefact is safe to leave within the bag and can be left for storage, protecting it further from other environmental parameters including light and UV damage.



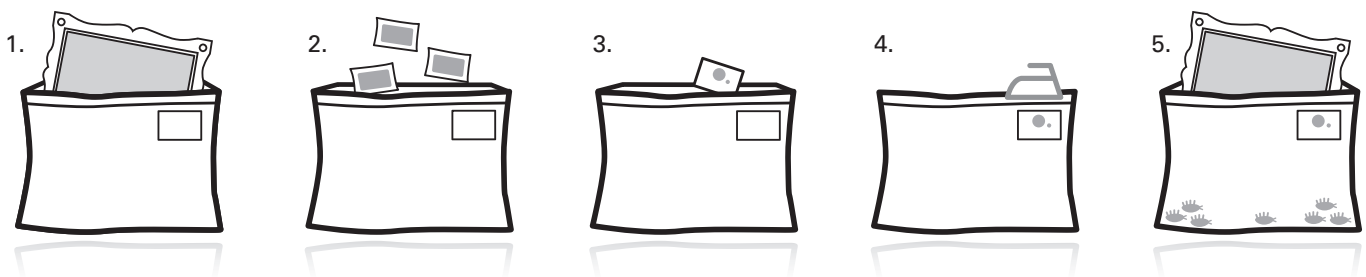
Not only is this system chemical free, but also hugely cost effective in comparison to all other pest control treatments. Over the past twenty years many valuable collections around the world have been saved by this method.

To complement the process and ensure successful execution Hanwell has designed the ZerO₂ Alert which gives a visual indication of a low oxygen environment through a special viewing window designed into the containers.

There is also a radio version which will enable users to receive transmitted data directly to a PC, with the additional options of temperature and humidity sensing within the same device.

Diagram below

1. Put your artefact into the relevant container
2. Insert the relevant amount of oxygen scavengers and optional RH Stabilisers
3. Insert ZerO₂ Alert device into allocated window
4. Seal the bag with hand held sealer or domestic iron
5. After the relevant amount of treatment time, either open the bag and discard the dead insect pests or put the artefact straight into storage (still in bag)





1. Choose your container

Each container has a purpose built internal window for the Hanwell ZerO₂ Alert device to sit in.

Flexicubes

Ideal for larger objects e.g. furniture. Boxes are available in 1, 3 and 5 cubic metre sizes.

T487	1cu.m – 1m x 1m x 1m (h)	1 scavenger
T488	3cu.m – 1.5m x 1.5m x 1.3m (h)	3 scavengers
T489	5cu.m – 2m x 2m x 1.25m (h)	5 scavengers

Flexiart

Designed for smaller, flat items e.g. paintings. Bags are available in 1, 2 and 3 square metre.

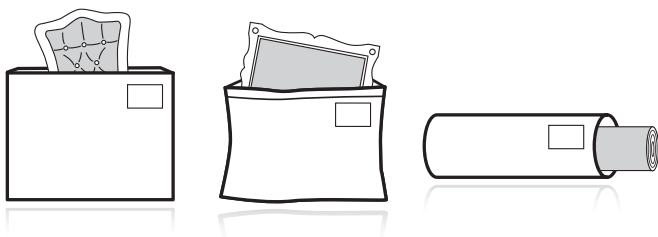
T484	1sq.m – 1m x 1m	1 scavenger
T485	2sq.m – 2m x 1m	1 scavenger
T486	3sq.m – 3m x 1m	1 scavenger

Flexitube

Intended for fabrics e.g. Rolled carpets. Tubes are available in 2.5 and 4.5 metre lengths (500mm in diameter).

T482	2.5m – 2.5m x 0.5m diameter (0.5cu.m volume)	1 scavenger
T483	4.5m – 4.5m x 0.5m diameter (0.8cu.m volume)	2 scavengers

Flexicubes, Flexiart and Flexitubes are also available, made to measure.



2. Oxygen Scavengers

1, 1 kg scavenger is sufficient for each 1 cu m of air.
T490 – ZerO₂ Scavengers



3. RH Stabilisers

When treating very delicate items or where there is a specific need for lower Relative Humidity, we recommend adding ZerO₂ Humidity stabilizers (4 per cu m)



4. Continued on the next page...

Typical Applications

- Museum
- Galleries
- Storage
- Pest control
- Artefact preservation

Benefits

- Cost effective and reliable
- Safe, long-term storage protection
- Artefacts stored in bags are protected from long-term infestation and UV
- Stress-free method
- Artefacts never leave protection of your own building
- A fraction of the cost of other methods
- Easy to follow method.



4. ZerO₂ Alert

As explained in section 1, each container has been purpose built with an internal window to fit a ZerO₂ Alert device, required to notify users that a low oxygen environment has been achieved and is being maintained.

This device can be either an indicator only or a radio transmitter with optional temperature and humidity sensors. See below to select a suitable option.

Option 1: ZerO₂ Alert Indicator Only

O2-AI – Indicator only

The indicator has an oxygen sensor that is activated when inserted into the device. The LED on the ZerO₂ Alert will flash red until the container is sealed. When the container has been sealed the LED should in due course flash green to indicate that the scavengers have decreased the oxygen levels enough for treatment to commence.

Option 2: ZerO₂ Alert transmitter only*

O2-434.700 – Transmitter only

The ZerO₂ radio transmitter acts as per the indicator, however enables users to store away artefacts while being treated and receive data via radio transmission to a local PC. Artefacts can then be stored and out of site, but data viewed on the PC will confirm that the containers have maintained the required oxygen levels. This option will require the ZerO₂ Translator, to the right.

Option 3: ZerO₂ Alert RH/T Transmitter*

O2-RHT-434.700 – RH/T and radio transmitter

The ZerO₂ RH/T radio transmitter acts as per the ZerO₂ Alert transmitter option, however with additional temperature and relative humidity sensors. This enables users to monitor not only the pest control treatment while artefacts are in storage, but also their temperature and relative humidity conditions. This option will require the ZerO₂ Translator, to the right.

*ZerO₂ Translator

O2-RX-PX*-TX-XXX. XXX**

*P4 = UK, P5 = EU, P6 = US

**Frequency to match existing system.

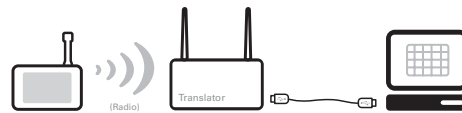
Otherwise use 434.075

If you have a ZerO₂ transmitter option, then you will also require a Translator unit. The ZerO₂ Translator serves two functions:

1. Live Display of Data

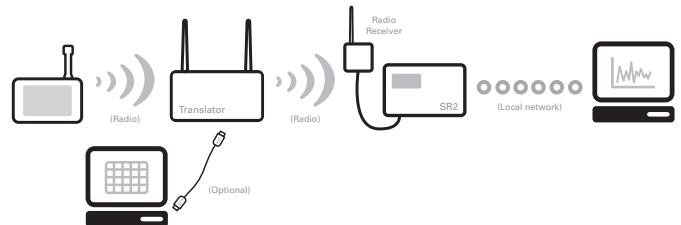
The interface can be connected via a USB connection to a local PC which will then show a live view of the situation in all ZerO₂ environments within radio range.

The radio range of the ZerO₂ Devices is limited to approx 300m and no logging will be performed on the PC. The unit is identified via its serial number which is sent with each message. The O₂ status is always sent, as will be Temperature and RH data if that option has been chosen.



2. Translation to a Radiolog system

The device can also translate the messages to standard Hanwell format and transmit them on to a Radiolog system. This will then allow full logging and alarming features to be available for the devices.



5. Sealing your container for treatment

You can use a domestic iron (on its highest setting) or purchase a purpose designed heat sealer from Hanwell. Code: Z135 – Heat Sealer HZ HotSeal.



Technical Specifications

ZerO₂ Alert Instrument

Dimensions: 105 x 65 x 19 mm (excluding aerial and RH/T sensor options)
Weight: Approx 100 grams without battery
Case Material: ABS
Power Supply: 2 x AAA Alkaline Battery
Battery Life: 3 years (basic unit only, no radio)
Sensor: Oxygen cell
O ₂ Level temperature sensitivity: 0.2% signal/C
O ₂ Level pressure sensitivity: <0.02% Signal/mBar
RH (option) accuracy +/-3%RH
Temperature (option) accuracy +/- 0.3C
Radio transmitter (option)
Frequency: 434.700MHz
Radio Range: 300 metres over open ground

Translator Instrument

Dimensions: 197 x 106 x 60 mm
Weight: 300 grams
Power Supply: External 12 volt DC
Case Material: ABS
Power Consumption: 0.6 Watts
PC connection: USB
Receiver: 434.700MHz
Transmitter:
Fixed frequency modules 434.075 MHz (EU), 433.920 MHz (EU)
Synthesised modules 433.875 to 434.650 MHz (EU) in 25 KHz increments, 458.650MHz (US)
Radio Power: 10 mW
Radio Range: 3 km over open ground

N.B. Instrument operating range 5°C to +40°C in a 0 to 95% non-condensing RH environment

Communications and Software

Radio transmitters communicate to a dedicated receiver to show live values. Alternatively the receiver can resubmit the data to an existing Hanwell RadioLog system.

Disclaimer

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