

# ANOXIC TREATMENT USING OXYGEN SCAVENGERS

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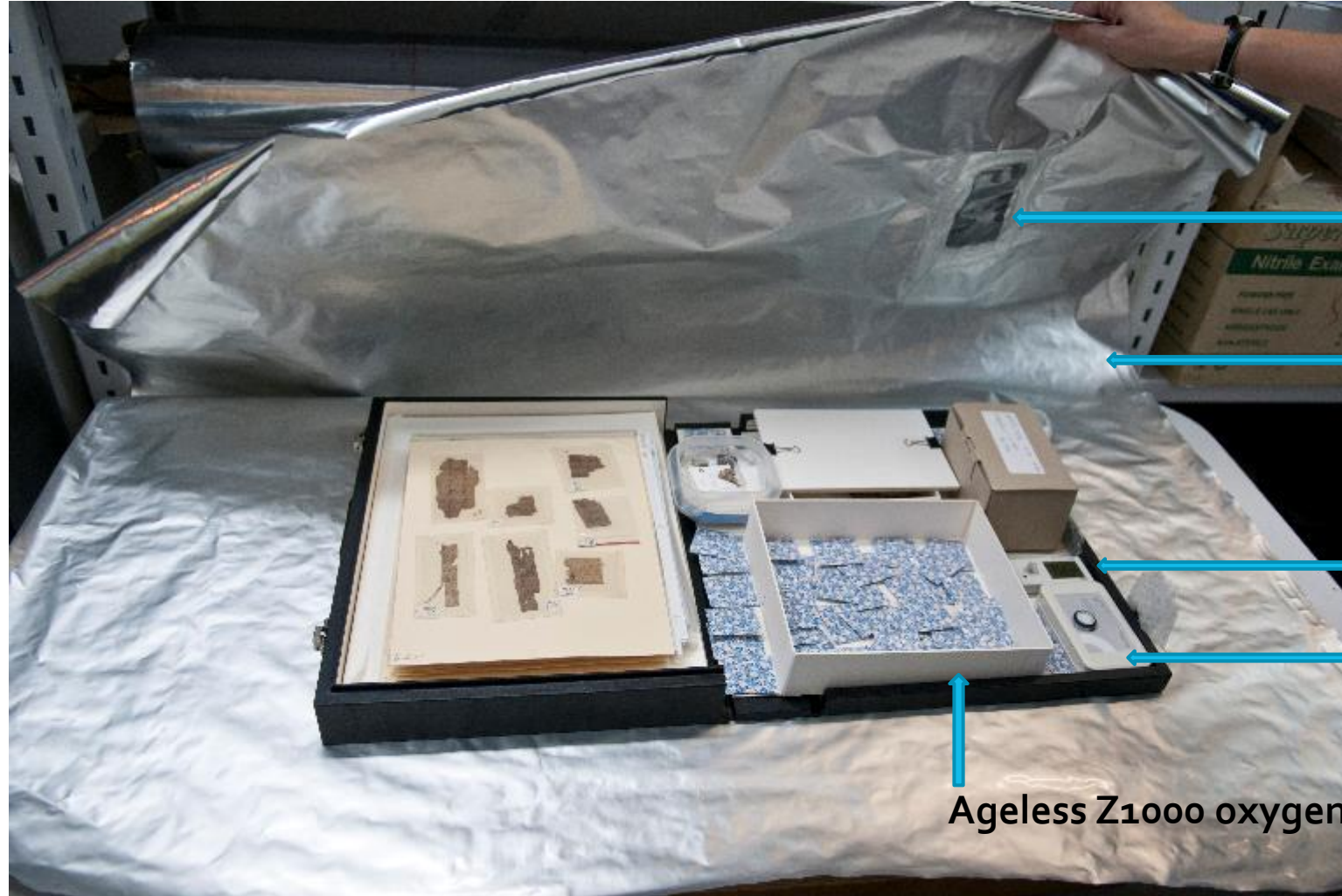
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# Basics of Oxygen Scavenger Anoxic Treatment

- By depleting atmospheric oxygen to very low levels using reactive oxygen scavengers within an impermeable enclosure, a modified atmosphere composed almost entirely of nitrogen can be created.
- All developmental stages of insect pests can be eradicated if atmospheric oxygen levels within such an enclosure are maintained below 0.5% for an appropriate length of time. The time required depends on the target insect.
- Enclosures are constructed from a barrier film such as Marvelseal 360, Marvelseal 470, Escal or Filmpak 1193.
- The volume of air in the enclosure is calculated to determine the quantity of oxygen scavenger required for the treatment
- Oxygen Scavenger packets made from finely divided iron in the elemental state and potassium chloride are placed in the enclosure with the artifacts. Excess air is removed from the enclosure and the packet is heat sealed.

# Overview - Custom Chambers



Escal window to read monitors

MarvelSeal 360 or other barrier film

Onset Hobo datalogger to monitor Temp/RH

Anoxibug oxygen monitor

Ageless Z1000 oxygen scavenger sachets

# Setup



The material to be treated is laid out on the film. In this example the artifacts were treated in their storage box to provide protection during treatment



A small window can be created using Escal to allow for reading the oxygen and temp/RH monitors



Sharp corners are padded out to prevent them from piercing the barrier film while under vacuum.



# Calculating the amount of oxygen absorber:



- The numbers assigned to different sizes of Ageless® sachets represent the amount of oxygen they will absorb, NOT the total amount of air to be treated.
- One sachet of Ageless® Z1000 will absorb 1.0 L (1000 ml) of oxygen. As 20% of the air is oxygen, this is the amount of oxygen contained in 5.0 L (5000 ml) of air.
- FORMULA: Volume of bag in centimeters (LxWxH) minus (weight of object in grams) divided by 5 = mL of O<sub>2</sub> in bag
- In practice, it is common to use as much as 30% more Ageless® than is actually needed.

# Sealing the Chamber



Start sealing the film using an iron, tacking tool or crimper. Leave space for the vacuum hose or nozzle.



Use the vacuum to draw out oxygen before fully sealing the bag



Withdraw the vacuum nozzle and seal the bag





**Waiting!**

# Overview - Anoxibug®

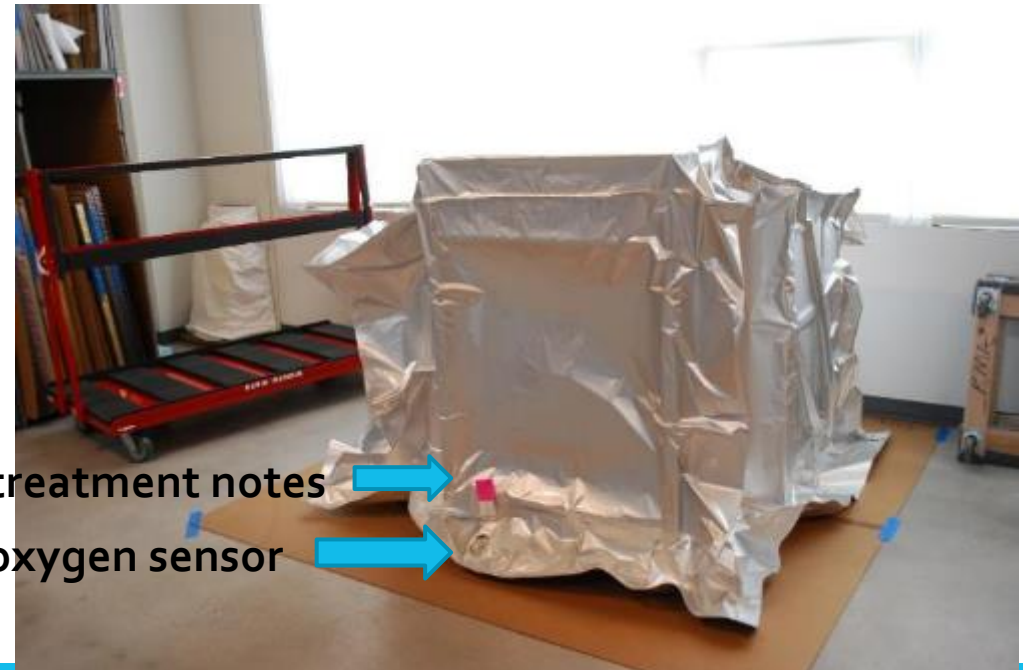


Cube cover





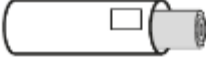
Exterior pocket for treatment notes

Window for oxygen sensor





# System components

	<p><b>Option 1 – FlexiArt</b> Designed for smaller, flat items e.g. paintings. Bags are available in 1, 2 and 3 square meters.</p>
	<p><b>Option 2 – FlexiCube</b> Ideal for larger objects e.g. furniture. Boxes are available in 1, 3 and 5 cubic metre sizes.</p>
	<p><b>Option 3 – Flexitube</b> Intended for fabrics e.g. Rolled carpets. Tubes are available in 2.5 and 4.5 metre lengths (500mm in diameter).</p>

Choose your ready-made chamber based on the size of the material to be treated



Calibrate your oxygen monitor



Place material in the chamber leaving adequate room for the scavenger packs

The scavenger comes in a barrier film bag containing two packs of scavenger each sealed into an inner (chartreuse-colored) bag. Inside each bag is one scavenger pack for each 1.0 meter cubed of air.





Remember to pad out sharp corners that might pierce the film. As with the custom chambers, begin to seal the edges, leaving room for the vacuum nozzle. Vacuum out as much oxygen as possible





# Waiting and monitoring!



The oxygen monitor will flash red until oxygen drops below the required level (may take up to 72 hours)

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