AZOTON™

A nitrogen climatic cabinet for the transport and safe storage of organic archaeological finds

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INTRODUCTION

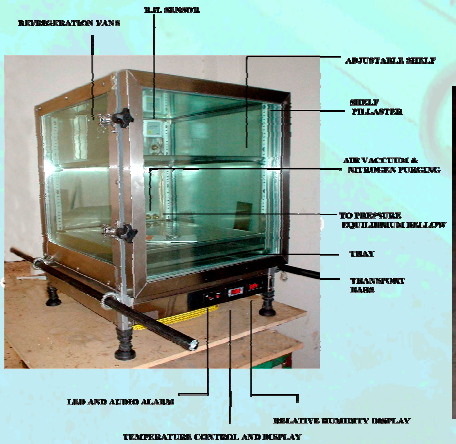
Organic artefacts excavated from wet or damp sites contain excess water which supports a weakened cellular structure. Exposing the artefact to a new environment incurs accelerated rates of deterioration or even immediate collapse. Storage at high Relative Humidity levels, in the presence of oxygen, introduces the danger of microbial growth, while it accelerates the corrosion of metals. Moreover temperature acts as an accelerator.

In Greece, freshly excavated wet or damp organic and composite materials recovered from excavations are consolidated immediately in situ or preventively stored in common household refrigerators. In some cases, a high RH is maintained in the presence of a biological growth inhibitor, with or without refrigeration. Unfortunately very limited data is published while no systematic assessment of past and current practices is available.

At the international level, the Getty Conservation Institute has developed hermetically sealed low oxygen display and storage cases in order to prevent chemical, electrochemical, photochemical and biological degradation due to the presence of oxygen. Inert gases have also been used for the elimination and control of insect infestation and micro organism growth on museum objects.

THE PROJECT

In the present project, that took place in 2005-2006, a combined dynamic / passive, nitrogen / climatic control cabinet was specifically designed and constructed for the transport and storage of freshly excavated wet or damp (not waterlogged) organic and composite (metal/organic) material. The cabinet may also be useful, with or without nitrogen, for the preventive conservation of all kinds of humidity sensitive material and for experimental purposes. A relatively low cost preservation cabinet was constructed and evaluated in its stationary performance for a period of one year in the archaeological museum of Corinth.



General view of AZOTON™. The nitrogen climatic cabinet

AZOTON™. The cabinet in its wooden crate for transport

TECHNICAL CHARACTERISTICS

Design and function

Description of cabinet	A square box with adjustable legs. Permits optical control of interior.
Construction Materials	Triple Glazing Security glass (30mm thick), stainless steel (DIN 304), neutral silicone, Perspex ®
Removable Items	Two adjustable perforated shelves. One bottom tray. Reclined Perspex roof for the prevention of water dripping in case of condensation
Dimensions external	55 cm wide x 55 cm long x 58 cm high
Dimensions internal useful	50 cm x 45.5 cm x 42 cm
Door dimensions	50 cm x 53 cm
Volume	95.55 lt

Control

Temperature	Active	Cooling (refrigeration) Compressor technique	Refrigerating liquid R134a Two independent fans
Relative Humidity	Active Passive	Percolation of nitrogen through two sterilised water containers Humidity buffer	 ArtSorb
Gas	Active Passive	Air pump and introduction of nitrogen Oxygen scavenger	Oxygen Scavenger RP System™ K-Type by Mitsubishi
Vibration		• Separate base plate for cooling mechanism / soft rubber mounts • Considerable high total weight	
Light		Total elimination by PVC cover	
Pressure equilibration		Attached bellow	Heat-sealed ESCAL + Aluminium composite film
Leakage		Triple glazing silicone seal Heavy duty bolts and door locking mechanisms	
Pollution self generated	Passive Pollution sorbent	Inert construction materials	Purafill CP Blend & Chemisorbant

Monitoring

Temperature	Electronic sensor	Eliwell Invensys Controls Italy S.r.l. EWPC 974
Relative Humidity	Electronic sensor	Lae ELECTRONIC LTW15
Gas O_2		Ageless- Eye indicator tablet

Display

Temperature	Direct digital display
Relative Humidity	Digital display optical and sonar alarm

RESULTS & CONCLUSIONS

AZOTON™, although a low budget prototype, proved to be an effective and versatile piece of equipment. Its function may be improved through a series of modifications (inductive cooling, improvement of bellow attachment, replacement of door gasket). Further improvements including working gloves, data loggers, rotating platform, weighing facilities, small opening for removal of samples, although raising its cost, is prescribed to be the next generation of its kind for the needs of an archaeological conservation laboratory in Greece.

Acknowledgements
The project was funded by the Hellenic Ministry of Culture through the 37th Ephorate of Prehistoric & Classical Antiquities in Corinth.