ANACO Museums Div., Projects Dept: 117 Vouliagmenis Ave., Glyfada 16674, Greece, Tel: +30 210 9600 915, Fax: +30 210 9648 128, email : museums@anaco.gr

A safe environment

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Objects on display may deteriorate if the right conditions are not maintained within the showcase and gallery.

The major causes of damage are:

- Variation and extremes of temperature and humidity
- Chemical pollution
- Inappropriate lighting

Construction Materials and Finishes

Inert materials such as glass, aluminium and steel are suitable for showcase construction.

Timber based products such as MDF may not be suitable for in case use unless treated to prevent the off gassing of formaldehyde and other chemical pollutants. Treatments include the use of acrylic sealants, melinex and aluminium barrier films. These should be applied to zero-formaldehyde MDF

Fabrics - a number of natural and synthetic fabrics are generally suitable for internal case finishes and are bonded using a water based adhesive or are stapled. It can be the dye rather than the fabric which will cause problems and fabric colours should be tested to establish their suitability.

Time must be allowed for testing and the possibility of having to find test alternatives.

Paints - a range of acrylic water based paints are available which can be safely used within the display chamber.

Relative Humidity

Fluctuations in relative humidity can be actively buffered by the use of pre-conditioned Artsorb™ silica gel.

Artsorb™ silica gel buffers the RH within the case which must first be brought to the correct level. Buffering works best where there is minimal air change and the gallery environment is relatively stable and similar to the case.

More difficult gallery conditions may require the use of a humidity control unit which can serve a number of cases sharing the same micro-climate. In this situation the air can be circulated through the cases or a positive pressure applied which leaks air out through the showcase seals.

Heat build up

Showcases should be located away from sources of heat such as sunlight and radiators, additionally heat generating lighting components should be mounted away from the display chamber and ventilation fans used.

Air Contamination

Contaminants in the air and those given off by the objects can be neutralised by incorporating materials such as activated charcoal cloth in the case construction or within the humidity control unit.

Air Change

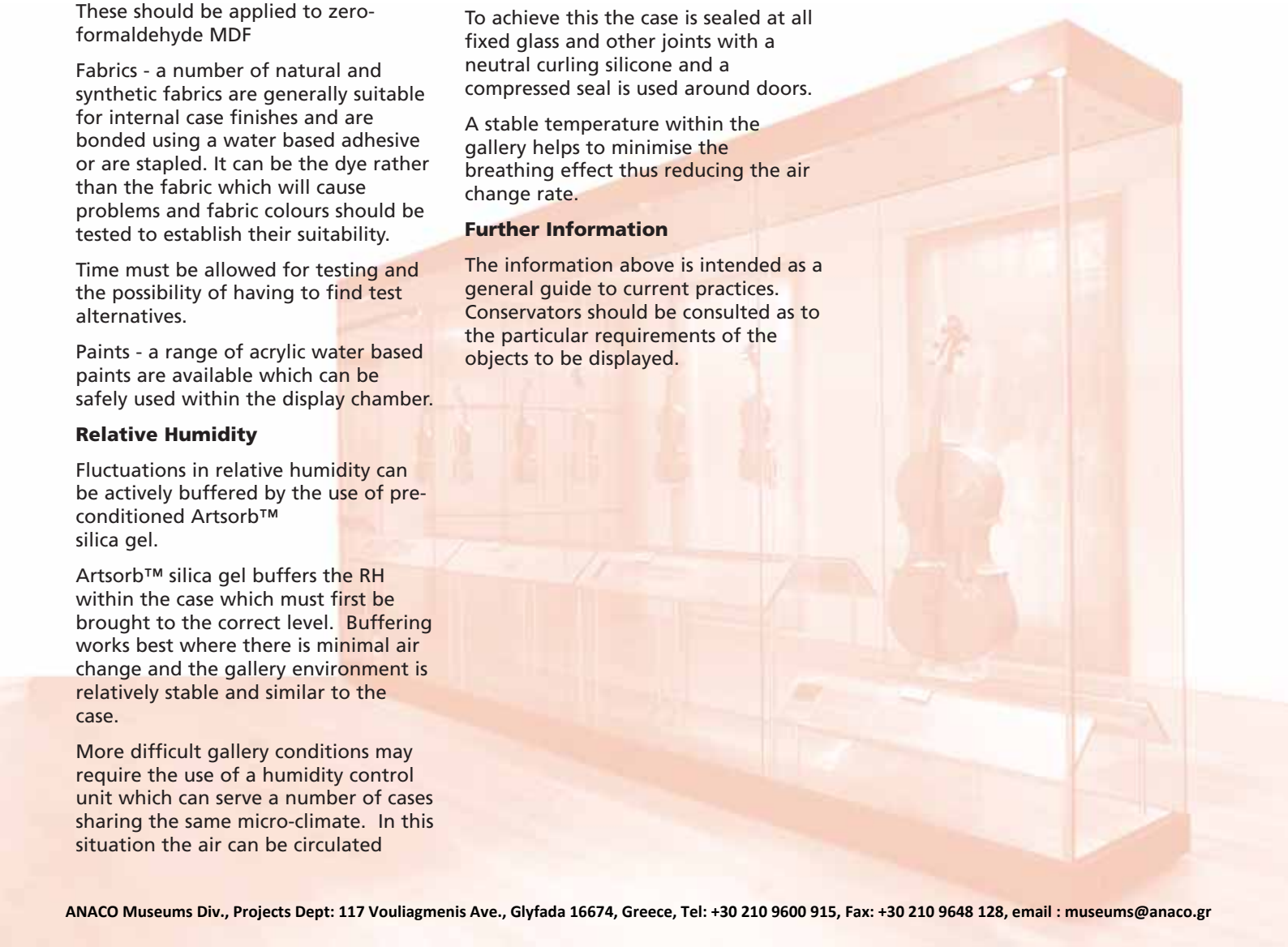
A key factor in maintaining the internal case environment is the rate at which air is exchanged between the case and the gallery. This air change can be beneficial where objects themselves give off harmful substances but for most purposes a minimal air change rate is desirable.

To achieve this the case is sealed at all fixed glass and other joints with a neutral curling silicone and a compressed seal is used around doors.

A stable temperature within the gallery helps to minimise the breathing effect thus reducing the air change rate.

Further Information

The information above is intended as a general guide to current practices. Conservators should be consulted as to the particular requirements of the objects to be displayed.



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Lighting

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The following may be key requirements for design, security and conservation reason.

- Control of light levels
- Filtration of ultra violet radiation
- Minimal build up of heat within display
- Filtration of infra red light
- Ease of maintenance
- Maintenance external to displays
- Directional control
- Flexible set up for changing displays
- Colour rendering of lamps.

SPECIALIST LIGHTING FOR MUSEUM SHOWCASES.

Fibre Optic Lighting

Fibre optics meet all the key requirements for the safe lighting of museum objects.

Whilst the initial cost may seem high, fibre optics are cheaper to install and have lower maintenance costs than a low voltage system.

System Components

F.O. light source - the light source houses the lamp, dimmer, filters and transformer and requires mains power. As the light source generates heat, it should be mounted away from the display area in an accessible position for maintenance.

The unit should have a built in cooling fan otherwise lamp life may be reduced due to overheating. Two types of source are available, tungsten halogen or metal halide.

The tungsten halogen source is more commonly used due to the colour rendering, lower cost and smaller unit size.

F.O. harness - the common end of the harness fits into the light source and is the junction for a number of tails through which the light passes to the end fittings. Tails are available in a number of sizes and careful planning is required to determine tail length and their route as they cannot make tight bends. Light transmission will be reduced considerably with tail lengths of over 5 metres.

F.O. end fittings - a range of end fittings can be used to provide the desired effect. Fittings should have an adjustable beam angle and also a locking screw so that they do not deflect with the weight of the tail. Fittings should be manufactured from inert materials and should be sealed to prevent dust and pollutants entering the case.

Types of Fitting

F.O. trumpet down lighter - mounted into any part of the case or internal mounts this fitting can be directed within the case to highlight objects. The fitting can also be mounted into a steel bracket for use over a diffuser.

F.O. flush down lighter - a discrete adjustable fitting which can be mounted into any part of the case or internal mounts.

F.O. track fitting - similar in shape to the trumpet head this fitting is track mounted to make it more flexible within changing displays. Shown her shrouded by label rail.

F.O. swan neck - particularly for use in Prism cases with books, textiles and maps.

F.O. gantry - a horizontal tube with concealed fibre optic heads used to provide an even wash of light

Fluorescent Lighting

Fluorescent lighting is ideal where general lighting is required within a case and it can be supplemented with spot lighting if desired

System Components

Control gear - electronic control gear should be used in preference to traditional control gear as it uses less energy, gives longer lamp life and freedom from flicker. It is also possible to specify a dimming facility if required.

Lamps - high frequency fluorescent lamps for the electronic control gear are available in a variety of colour temperatures to give a true colour rendering of objects, paintings and textiles. Lengths from 450mm to 1500mm can be easily installed within the top lighting section of cases.

Fittings - standard fittings can be bought which incorporate the control gear and lamp within one unit for ease of installation, or, the control gear can be mounted remotely to the lamps to reduce heat build up within the case.

Low Voltage Lighting

Low voltage lighting is very versatile for use in showcases and there is a wide range of fittings and lamp types available.

System Components

L.V. Light Fittings

L.V. eyeball down lighter - mounted into a soffit this fitting can be adjusted within the case to highlight objects.

L.V. skeleton bracket - this fitting fits on a diffuser and can be positioned and angled to suit. Once positioned the fitting locks in place to prevent disturbance of the lighting set up during maintenance.

L.V. spotlight - a fully adjustable spotlight can be used within cases where the objects are not heat sensitive.

Low voltage lights must not be used directly over plastic which may melt or burn.

Lamp - a range of wattages and beam angles are available to suit most display situations. These should be glass fronted with minimal spillage through the back of the reflector. Care should be taken to replace lamps with the same wattage and beam angle as the original.

Transformer - electronic transformers with dimmers are ideal for use with low voltage showcase lighting as they are compact in size and can be adjusted to give the correct lux levels on sensitive objects.

Diffusers

The diffuser provides a barrier between the display area and the top lighting section and is formed from several layers.

A range of cellular, glass, solid, louvre and filtering materials can be incorporated within the diffuser layer to meet performance requirements.

A cellular material provides structural support, diffuses light and conceals fittings.

Stippled laminated glass provides a dust seal, diffuses light, absorbs heat and laminated interlayer provides a UV filter.

Laminated glass provides a dust seal, security barrier and absorbs both heat and 97% of UV radiation between 320 & 380 nanometres.

Whilst we are able to provide and install a wide range of lighting systems we recommend that the advice of a specialist lighting designer be sought.

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Designed to protect

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The showcase security requirements should take into account the nature and intrinsic value of the objects to be displayed as well as the overall building and staff security arrangements.

Showcases should provide the following inherent security characteristics:

* Deter attempted theft or vandalism
* Prevent casual theft
* Protect objects from accidental damage
* Protect objects form vandalism
* Alert staff in the event of an assault
* Delay entry in a determined attack

The following elements form the basis of showcase security.

Framework

The case framework should be made from aluminium or steel and securely fixed with all glass and structural panels located within a channel.

Glass

Standard float glass should not be considered for use in museum showcases. It affords little protection to objects and is a significant health and safety risk to staff and public if broken.

Toughened glass (BS 6206A) should be regarded as the minimum specification for museum showcases as it provides increased resistance to breakage. As a safety glass it forms small dull-edged pieces when broken, protecting staff and public from serious injury.

Toughened glass is also used where there is a structural support requirement.

The disadvantage of toughened is that it is vulnerable on corners and edges and can disintegrate unexpectedly. This risk is reduced where the glass is in a channel or fitted with an edging strip.

Laminated glass (BS 5544) is formed by sandwiching a tough plastic interlayer between glass sheets. It is the most appropriate type of glass for use in museum showcases.

When broken the glass retains its structural integrity providing a physical barrier to theft, preventing broken glass damaging objects and reducing the potential danger to staff and public.

High levels of security can be achieved by the use of multi-layer laminates with polycarbonate interlayers. However the cost of these can be prohibitive and the weight of the cases may exceed safe flooring loadings.

Bonding of Glass

Where glass is not bonded into a system channel it is important to use an appropriate secure adhesive rather than a silicone which can be cut.

Structural Panels and baseboards

Timber structural panels and baseboards should incorporate a reinforcing steel lining to prevent access being cut through.

Diffusers

The diffuser should contain the same specification of glass as the main showcase panels and this should be retained within a system channel.

Locks

A high security lock such as the Abloy Disklock Pro(tm) should be used on cases. Locks should be mounted within the system channel rather than the glass and all components should be steel.

Most Netherfield cases combine mechanical and keyed locking. Abloy CL291 removable cartridge locks are used to conceal and protect a mechanical locking system.

The keying arrangements for a gallery are an important consideration and a wide range of suiting choices are available.

Alarms

Should a showcase come under attack it is essential that security staff are immediately made aware, to enable them to implement further building security measures.

Various alarm sensors such as magnetic contacts, vibration detectors, passive infra red and double knock sensors are used.

Responsibility for the installation and maintenance of showcase alarms should remain with the system operator, but Netherfield are pleased to advise on installation within our cases.

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