
Guidance Notes:

Choosing new display cases

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Display cases should provide objects with both physical and environmental protection. Most display cases will provide a degree of physical protection from accidental damage but it can be harder to ensure that environmental protection is provided. Even cases built by museum specialists vary in quality of design, so it is important to know what you need before committing yourself to a case that might not be adequate.

The quality of a case is described in terms of the materials from which it is made and its performance as a sealed, airtight unit. There are four basic kinds of display case, describing quality of construction, which in this note will be referred to as:

- **conservation grade**
- **ventilated case**
- **standard**
- **designer-built**

The features of these cases are described at the end of the sheet.

Steps to choosing the right display case

1. Check if the objects to be displayed **need** to be in a conservation grade case. If they do, then using a different kind of case will be a poor compromise. You can find out about the needs of different kinds of objects in related SMC factsheets, such as *Temperature and Relative Humidity*, or from the Museums & Galleries Commission (now Resource) publications, *Standards in the Care of...* series.
2. Consider where the case is to be located. If you know the environment is unstable, then you may decide to choose a conservation grade case.
3. Even if you don't need a conservation grade case, you may decide to purchase one anyway. This is something to consider if a) you have the funds, b) you want to re-use the case for other exhibitions in the future or c) there is a possibility of your museum borrowing objects from other museums, where it may be part of the requirement of loan.
4. If you have neither the funds nor the need to purchase a conservation grade case, the next step is to decide whether a ventilated case would offer sufficient protection.

5. You can use a ventilated case if the objects are of a type that are not sensitive to fluctuating relative humidity, dust or pollution.
6. A ventilated case is also appropriate for use in a space that is air-conditioned and therefore has controlled humidity and low dust and pollution levels.
7. If you choose a ventilated case, you will need to clean it inside more frequently. This kind of cleaning should only be carried out by someone who has been trained to do so.
8. If there is neither the need nor the funding for a conservation grade case, but the protection offered by a ventilated case is insufficient, the two remaining options are the standard display case and the designer-built case. If you choose either of these cases, you will almost certainly have to add further protection measures. This might include laminate foil barriers or better seals so that relative humidity buffers, such as silica gel, and/or pollution absorbers are effective.

Conservation Grade Case

A conservation grade case has high specifications in terms of both materials and method of construction and should meet the following criteria:

- less than 0.1 air changes per day
- only chemically-stable materials used in construction of the display space
- the possibility of relative humidity control to create micro-climates
- no internal heat sources, for example, lighting

The related SMC factsheet *The Effects of Display and Storage Materials on Museum Objects* goes into some detail about appropriate materials for use in museums. A rule of thumb is to use products known to be chemically stable, such as glass, enamelled metal or aluminium and perspex. Wood and wood products are *not* chemically stable, including MDF (medium density fibre-board), even the zero-formaldehyde MDF (e.g. *Meditex*).

The Scottish Museums Council recommends that cases of conservation grade should **always** be used in the following circumstances:

For the display of **objects that require a tightly-controlled environment**, which cannot be provided by the surrounding display space, for example:

- some metalwork, for example, archaeological iron
- some composite objects
- “weeping” glass
- some very weak or deteriorated objects
- certain organic materials, such as archaeological wood

Where the case is to be placed **in an area where relative humidity and/or pollution are uncontrolled**, for example:

- in a foyer
- in a large city-centre museum where air pollution levels are known to be high

For **the display of chemically unstable objects**, where pollutant absorbers may also need to be used, for example:

- certain plastics, for example cellulose nitrate (celluloid)
- certain geological specimens.

If you are uncertain about the needs of a particular object you intend to display, contact a conservator.

Ventilated case

A ventilated case is able to provide physical protection, but is deliberately unsealed to allow air movement. It may be purchased or museum / designer-built.

The protection principle of this type of case is that airflow through the case is sufficient to prevent the build-up of pollutants inside it. Free airflow requires vents of 2cm in size. Even though the case is ventilated, you should still use the highest quality materials you can afford. This case cannot act as a barrier to dust, so the interiors of cases need to be cleaned more often. This means the collections will need to be handled frequently and so there is a greater risk of physical damage. If you decide to use a ventilated case, you will need to make sure that staff have been trained in object handling.

This type of case is suitable for:

- most indoor environments, where the objects displayed are not sensitive to RH fluctuation, pollution or dust, for example, most glass, ceramics or stone
- display of all objects (except those mentioned in the section on conservation grade display cases) where the indoor environment is RH, pollution and dust controlled

Standard or designer-built display cases

(For the purposes of this sheet it is assumed that a designer-built case will have similar specifications to the standard one.)

Standard display cases are the ones most commonly used in museums. They are less likely to have either the air-tightness or the chemical stability of the conservation grade case. They should be used with a degree of caution, as sometimes a standard display case will provide a worse environment than a ventilated one. This is because a standard display case can be made from low-grade materials, including wood products, but will often be sufficiently well sealed to trap pollutants inside. A ventilated case will have free airflow and will not allow a build-up of gases inside.

Materials safe for use in display case construction:

- metal, preferably baked enamel on steel or aluminium
- glass
- perspex
- neoprene (for case seals)

Materials that may be used with *conservation advice*:

- some woods, e.g. yellow pine, spruce, walnut, elm or magnolia
- acrylic latex emulsions and epoxy resins
- hot melt glues (ethylene / vinyl acetate copolymer types)
- some new polymer boards, tested for stability by independent laboratories

Materials that should be *avoided* for use in constructing display cases:

- Some woods: oak, sweet chestnut, Western red cedar, Douglas fir and teak
- Most composites, such as plywood, particle board, chipboard and MDF
- Adhesives and sealants containing acetic acid or formaldehyde

You can improve the performance of both the standard and the designer-built display case with a few simple measures (discussed below). With improvements, they may be used for a wide variety of displays, excepting those mentioned in the section on conservation grade cases.

Improving display cases

You can seal out damaging materials, like organic acids and formaldehyde, with the use of a laminate foil. In standard or designer-built cases, all wood products should be sealed like this. Many lacquers and paints have been tested as sealants and have proved to be virtually ineffective. They should not be used as a substitute for laminate foil. Other products for use in case construction, such as some rigid polymer boards, are being developed and tested.

Light sources should be exterior to the case. Any light sources inside a case, even low power ones, will heat up the air inside. This leads to two main problems:

- Since temperature and relative humidity are inter-related, an increase in temperature in a closed space will make the relative humidity drop. In the small air space of a display case this can be disastrous. It can lead to fluctuating relative humidity that can cause damage in many types of object.
- When temperature rises and falls inside a case it causes pressure differences

between the air inside and outside. This increases the rate of air exchange and results in increased amounts of dust entering the case.

If interior case lighting has to be used, make sure that it is separated from the main body of the case with a glass or chemically stable plastic barrier. All light sources should be accessible without the need to enter the display space: they could be housed in a separate compartment above the top of the case, or fibre-optic lighting could be used. Fibre-optic lighting carries light from an external source into the case, resulting in cool internal lighting.

You can improve the environmental stability of a case by using relative humidity buffers and pollution absorbers. Many standard cases are designed with this in mind, but be careful: most standard cases have high air exchange rates, making buffers and absorbers ineffective. Improving case seals is a necessary first step before buffers are used.

Do not be tempted to use pollution absorbers in place of a foil laminate in a case made from poor quality materials. Most pollution absorbers, for example, activated carbon, act like a sponge and are ineffective once they are saturated with pollutants. Saturation will occur quickly in a case that has a lot of internal pollution and most absorbers do not indicate when they have become ineffective. It is therefore only wise to use absorbers of this type in a case that is stable.

Summary of methods to improve case stability

- Seal ALL wood products with a foil laminat
- Try to ensure that all light sources are exterior to the case
- If in-case lighting is used, make sure that access for maintenance is not through the display space and that any heat is vented away
- Use RH buffers and pollution absorbers where necessary, remembering to upgrade the seals of the case to improve performance

Further information and advice

This is one of a series of factsheets, advice sheets and guidance notes produced by SMC. For more details, signposting to further sources of advice or information on how to contact a conservator, see our website at: www.scottishmuseums.org.uk

Selected reading

Museum Practice

A series of practical guides with case studies, published quarterly by the Museums Association. While the guides cover all aspects of museum work, many relate to collections care. A useful and extensive check-list for museum staff to use when purchasing display cases can be found in *Museum Practice* 2 - 1996, pp 54-57.

A series of publications published by MGC on ***Standards in the Care of Collections*** is available from MLA, including the following titles:

- Archaeological Collections - 1992
- Biological Collections - 1992
- Geological Collections - 1993
- Larger and Working Objects - 1994
- Musical Instruments - 1995
- Touring Exhibitions - 1995
- Photographic Collections - 1996
- Costume and Textile Collections - 1998

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