



# Choosing a Lighting Solution for Display Cases

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## Introduction

Museums are increasingly reliant upon display cases to contain objects on display. Historically display cases were provided for containment, physical protection and security. They are more and more being used as a method to provide a microclimate to achieve the tight levels of temperature and humidity control that are becoming increasingly difficult to provide in complete museums or galleries.

The presence of the case inevitably introduces a barrier between the viewer and the object, depriving them of any experience of the object other than through sight. It follows therefore that display case lighting must be of the highest quality to ensure that the viewer can obtain the most from the object displayed.

## Tradition display case lighting

Historically, cases contained taxonomical displays where the number and variety of objects were the principal interest. In modern museums, cases are required to contain entire stories or threads from stories that run through galleries. This substantially increases the challenge for lighting. The old solution to case lighting has been the top box full of fluorescent tubes with a diffuser. Examples of this solution can still be seen in most museums today. Lighting of this nature is rarely appropriate to the objects being displayed and is always unexciting. With the variety of objects in a case required to tell a story, almost inevitably, there will be different materials and colours to consider from a conservation point of view and a hierarchy of objects with one or two creating the focus of the story and other objects providing supporting information. This inevitably requires a lighting approach that can address objects individually or in groups within the case.

## Fibre optic lighting

In the past two decades fibre optic systems have become the favoured solution for case lighting. Utilising the ability of a fibre optic bundle to distribute the light from a single lamp through many fine points is a good way to provide for a lot of detailed lighting of individual objects. This does, however, require considerable thought on how these points need to be distributed within the case to provide the appropriate lighting solution.

With a single sided case one can be reasonably free in locating the individual points and still shield them from view. There is nothing more distracting than seeing a case full of - usually ugly - fibre optic fittings surrounding some delicately displayed object. When designing cases reasonable margins to the sides and

above need to be preserved to locate lighting so that is out of sight to a visitor looking at the case. The next issue is shadowing. Many individual points of light create an equal number of shadows that can lead to a distracting pattern of light on the back and floor of the case. Angles of positioning for the fibre optic heads need to be determined to lose the shadows behind objects and plinths, so that the light appears to stop at the objects. Much of this detailed work can only be accomplished during the final setting up and focus of lighting once the cases are complete and loaded with objects; therefore a system with a good degree of flexibility in positioning of the fittings is essential.

With cases that are viewed from two or more sides the ability to hide the fibre optic fittings becomes more difficult and the tendency is to concentrate lighting from the top of the case. This will only work if there is adequate room in the case to allow for lighting objects on lower shelves. This means fewer objects per case and no stacking of objects one above the other.

Inevitably trying to individually light every object in every case can create an overly busy visual appearance and in case after case can be tiring to look at. Fibre optics can also be used to provide more general lighting through the use of bars with multiple points. A combination of these, with a few individual points to highlight the key objects and deal with shadowing and undercut objects, provides a good solution in the majority of cases. Many fibre optic lens systems provide too small and hard-edged a pool of light. We frequently end up removing lenses and replacing them with diffusing material to soften edges and spread the beam from the fibre ends. Effectively we are using theatrical lighting techniques, treating each case as a miniature theatre set with the objects being the cast of characters and the display material and text being the stage set.

At the other end of the fibres lies the light source. At present low voltage tungsten halogen remains the most suitable option for lamps, providing controllable high colour rendering light and, if you use the correct lamp, a reasonably efficient transfer of light into the fibre optic bundle from the tight point source. Other options are available, including metal halide though these tend to provide poorer colour rendering, colder colour appearance and although the lamp may be more efficient itself the transfer of light energy from the lamp to fibre is much less efficient. This is due to the size of the light source and required size and efficiency of the reflector.

## **The future of case lighting**

We are told that LEDs are the future of lighting, however they are not ideal for use with fibre optics. It is very difficult to get efficient transfer of light into the fibre from the LED itself. If they are such an efficient, low temperature light source why not use them directly inside cases? While they may be low temperature they still create a lot of heat, and in the sealed environment of the modern museum case enough LEDs to provide equivalent lighting as discussed above will cause considerable temperature rise within the body of the case. This is not good if we are using the case microclimate as the principle means of keeping within conservation levels of temperature and humidity change.

As we move towards an exposure based method of considering lighting, the ability to control case lighting becomes more critical. The Victorians knew how damaging light could be and provided simple covers over cases housing sensitive objects that the visitor pulled back to see the objects. We need to consider the possibility of more technological methods of reducing exposure by reducing or eliminating light when the objects are not being viewed. This can be done with manual user switching, presence detection for each case, or for entire galleries. This needs to be designed subtly so that galleries or cases don't look unlit when the visitor approaches. Using controls in this way also provides the optimum method of reducing energy use. At present there are simply no viable methods of just changing lamps that will maintain the quality of the display and reduce energy use.

Cases remain challenging lighting tasks. While most museum case manufacturers have proprietary lighting systems that more or less achieve what is required, it remains necessary to have a performance specification to ensure that they will meet the specific requirements of the gallery design. The final touch of an experienced lighting designer during focussing makes all the difference between a case that is beautifully lit rather than just illuminated.

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