LIGHTING

Lighting of exhibits on display is critical; like on a stage, lighting can be used to create drama and for storytelling.

COLOUR RENDERING INDEX

The colour rendering index (CRI) is a measure of how well light sources render colours. The test involves lighting eight colour samples with the light source that is being tested, and comparing the appearance of these samples with a reference sample illuminated by calibrated natural light.

In 1995, the International Commission on Illumination (CIE) noted that CRI is not a good visual indicator of colour fidelity. LED lighting systems score badly under CRI testing, and it is not a reliable method of assessing light sources at colour temperatures below 5000K. For this reason, CRI testing is gradually being superseded by Colour Appearance Modelling techniques such as CIECAM02 (created in 2002 by the CIE Technical Committee) and iCAM (published at the IS&T/SID Colour Imaging Conference), which are more faithful to real world conditions, and give much more representative results.

Balancing this with conservation requirements and case aesthetics can be a key challenge on a project.

Lighting should be one of the first things that you discuss with us, with your architect or with your exhibition designer. You may also find it useful to take advice from a specialist display lighting consultant.

FLUORESCENT

Light produced from a fluorescent lamp is relatively evenly distributed straight from the lamp. This means that it is very easy to diffuse it to create an even wash of light. Fluorescent tubes can be supplied in a variety of sizes and colour temperatures - from cool white to warm white.

A fluorescent tube generates high levels of ultraviolet radiation, which can be filtered out by laminated glass diffuser layers or by using UV filtering film.

LOW VOLTAGE HALOGEN

Low voltage lighting systems use incandescent tungsten halogen filament lamps powered through a step-down transformer. They work in a very similar way to a standard domestic lightbulb, but the halogen that surrounds the filament both extends its life and allows it to be driven at a higher temperature - creating very bright white light.

The trouble is, because these lamps run at a very high temperature, they generate a lot of heat. This means that where low-voltage halogen lights are used, they must be sited in a well ventilated enclosure, designed so that the heat that they emit is directed away from the body of the showcase. Also, like fluorescent lamps, low-voltage halogen bulbs emit high levels of ultraviolet radiation and must be filtered in the same way.

The light from low-voltage systems is bright and directional - it creates pools of light rather than diffuse washes - allowing lighting designers to create exciting and dynamic lighting schemes.

FIBRE OPTIC

For a long time, fibre optic systems have been the preferred choice for display cases, and with good reason.

Fibre optic systems have three main components - a light source, the fibre optic harness (flexible filaments of clear glass, usually known as tails) and the light fittings, which sit at the end of the tails. The light source (a projector containing driver electronics, fan cooling and a single high-output lamp) is sited outside the body of the showcase, meaning that the heat and noise associated with high-output lighting systems do not impact on the display.

Fibre optic systems use either tungsten halogen or metal halide

lamps. Tungsten halogen sources are easily dimmed electronically but metal halide sources require more expensive mechanical dimming systems. Metal halide systems run at higher colour temperatures than tungsten halogen lamps, plus they last longer and deliver more luminescence per watt. LED light sources are also beginning to be used in some areas.

Of all the commonly-used display technologies, the light produced by fibre optic lighting is the most versatile, and creates the least detrimental impact on the display area. Light fittings can be positioned inside or outside the display area, giving you tremendous flexibility. The same light source and tails can drive a range of light fittings - some providing pin-point pools of light, and others creating subtle washes. The only real drawback to fibre optics is the high initial cost and the concealment of tails in minimal cases. Once installed, maintenance costs are low.

LED

Light-emitting diodes (LEDs) are solid-state devices. They have a significantly longer life span than other types of lighting. LED lighting is installed in thermally-efficient light bars or fittings, which can be mounted using traditional methods but with the advantage of having minimal cabling requirements.

LED lighting is relatively expensive to buy, though it is cheaper than fibre optics. However, its running costs are negligible - the power consumption is very low, and the heat that LEDs generate is comparable to fluorescent systems.

COLOUR TEMPERATURE

The colour temperature scale extends from 0K to infinity, but most common lighting conditions are between 1700K and 9300K. For simplicity we usually say that colour temperatures of 5000K or more are "cool" and colour temperatures of 3000K and below are "warm".

TOP TIP

DON'T FORGET ABOUT LIGHTING LABELLING AND GRAPHICS

TYPE	USAGE	LAMP TYPE	DIMMING	HEAT	OUTPUT	UV CONTENT	ENERGY CONSUMPTION	LAMP LIFE	CRI *
FLUORESCENT	GENERAL SPREAD OF LIGHT	MERCURY VAPOUR	OPTIONAL	MEDIUM	HIGH TO MEDIUM	HIGH	MEDIUM	MEDIUM	75-82
LOW VOLTAGE	GENERAL AND SPOTLIGHTS	TUNGSTEN HALOGEN	YES - ELECTRICAL	HIGH	HIGH	HIGH	HIGH	LOW	N/A
FIBRE OPTIC	GENERAL, STRIP AND SPOTLIGHTS	TUNGSTEN HALOGEN	YES - ELECTRICAL	LOW WITHIN CASE	MEDIUM TO LOW	NONE	MEDIUM	LOW	86-98
FIBRE OPTIC	GENERAL, STRIP AND SPOTLIGHTS	METAL HALIDE	YES - MECHANICAL	LOW WITHIN CASE	MEDIUM TO LOW	NONE	MEDIUM	MEDIUM	96-100
LED	GENERAL, STRIP AND SPOTLIGHTS	LED	YES - ELECTRICAL	MEDIUM TO LOW	MEDIUM TO LOW	NONE	LOW	HIGH	82-92

* DUE TO THE VAST RANGE OF LAMPS AVAILABLE, IT IS ONLY POSSIBLE TO QUOTE A RANGE