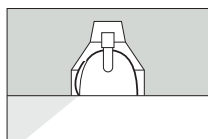
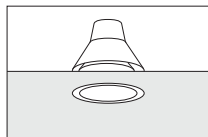
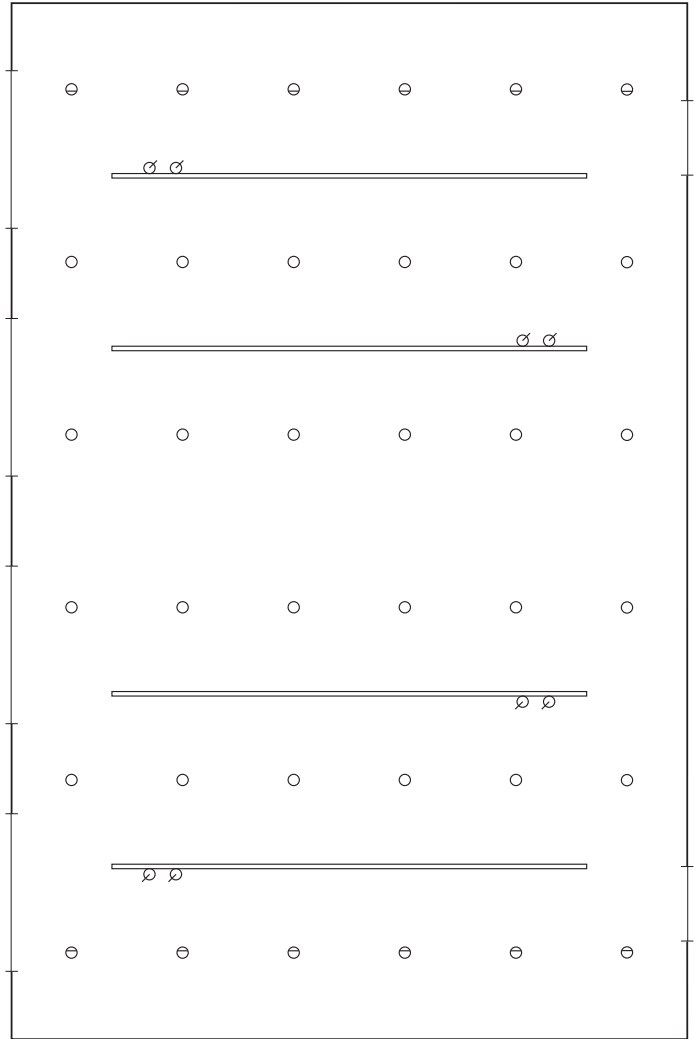
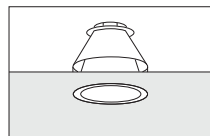


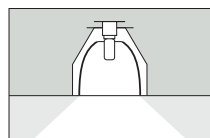
The lighting layout in this multifunctional space is based on a regular grid, with downlights illuminating the centre of the space and washlights arranged along the end walls. The track installed between the rows of luminaires take additional spotlights for accent lighting. The downlights and washlights are equipped with halogen lamps, which makes for a prestigious atmosphere; individual groups of luminaires can be dimmed to allow the lighting to be adjusted to different requirements.



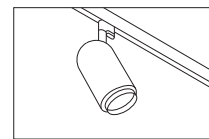
Recessed washlight for halogen lamps.



Recessed downlight for halogen lamps.



Track-mounted spotlights.



4.14 Museums, showcases

In many museums, especially those where archaeological, ethnological or scientific information is presented, the exhibits are primarily displayed in showcases. When developing the lighting design concept the showcases must be treated as the priority. The architectural lighting in this case is of secondary importance. It is important to avoid creating competition to the objects on display by over-accentuating architectural elements in the surroundings.

The first task of the lighting is to illuminate the exhibits in accordance with their particular qualities. It may be the form or structure, the glossy or transparent quality of surfaces or colour that are of particular significance and therefore require purposefully designed lighting – this may involve diffuse or accent lighting, or lighting with especially good colour rendering qualities.

Apart from pure presentation, curatorial aspects also play an essential part in the development of the lighting design concept. Depending on the type of materials that are to be illuminated, choice of lamp, filtering and illuminance control must be investigated carefully so as not to accelerate the damage to the exhibits. Apart from loading damage caused by visible light, ultraviolet and infrared radiation, overheating in showcases due to convection is also an aspect to be considered; in the case of sensitive exhibits it may be necessary to install integral luminaires in a separate compartment of the showcase.

The recommended illuminance for museum lighting is 150 lx. This value refers to the lighting of oil paintings and a large number of other materials. Less sensitive materials, such as stone and metal, can be subjected to higher illuminances; to ensure that the contrast to adjacent spaces that are lit at a lower illuminance level is not too strong, it is advisable to take 300 lx as the limit. In the case of highly sensitive materials, especially books, water-colour paintings or textiles 50 lx should be regarded as the maximum; this requires careful balancing of the exhibition lighting and the ambient lighting, the latter being considerably lower.

When lighting showcases it is especially important to avoid reflected glare on horizontal and vertical glass surfaces. Careful attention must be paid to the positioning and direction of luminaires when illuminating the showcase from the outside. Potential reflected glare through windows should also be taken into account and, if necessary, eliminated by the provision of adequate shielding (e.g. vertical blinds).

High showcases can be illuminated with the aid of lighting components integrated into the case soffit. Transparent materials – e.g. glassware – can be illuminated by lighting integrated into the base of the showcase. As light sources, halogen lamps are generally used for accent lighting and compact fluorescent lamps for wide-area lighting. Fibre optic systems can also be of value if thermal load and danger to exhibits due to lamps inside the cases are to be avoided, or if the showcase dimensions do not allow the installation of conventional luminaires.

In addition to integral showcase lighting separate ambient lighting is invariably required. Depending on the required atmosphere and the illuminance laid down in curatorial stipulations ambient lighting may range from a lighting level just above the level of the showcase lighting down to orientation light produced by spill light from the showcases.

When lighting showcases from the outside, exhibition lighting and the ambient lighting both come from the ceiling. This form of lighting is especially suitable for glass showcases and flat display cases viewed from above, where it is not possible to integrate luminaires inside the cases. Both daylight and general lighting can contribute towards the illumination of exhibits, as can light from spotlights, all requiring consideration in the accentuation of specific objects. The lighting layout must be related to the position of the showcases to avoid reflected glare. Fixed luminaires can only be used in combination with fixed showcases, for example; in spaces where temporary exhibitions are held it is advisable to choose an adjustable lighting system, e.g. track-mounted spotlights.