The recessed mounting of luminaires into suspended ceilings varies depending on the type of ceiling system.

In the case of flat suspended ceilings, e.g. plasterboard ceilings, the luminaires can almost always be arranged irrespective of the suspended ceiling grid. The luminaires are fixed firmly in the ceiling apertures provided; if necessary, the weight of the luminaire must be carried by additional suspensions fixed onto or in close proximity to the luminaire. If the ceiling is to be plastered, plaster rings are required for the luminaire apertures.

There are various versions of suspended ceilings available made of individual panels. They vary according to the material, grid dimensions and load-bearing capacity. The ceiling grid will automatically determine the possible layout, which is to be taken into account when positioning the luminaires.

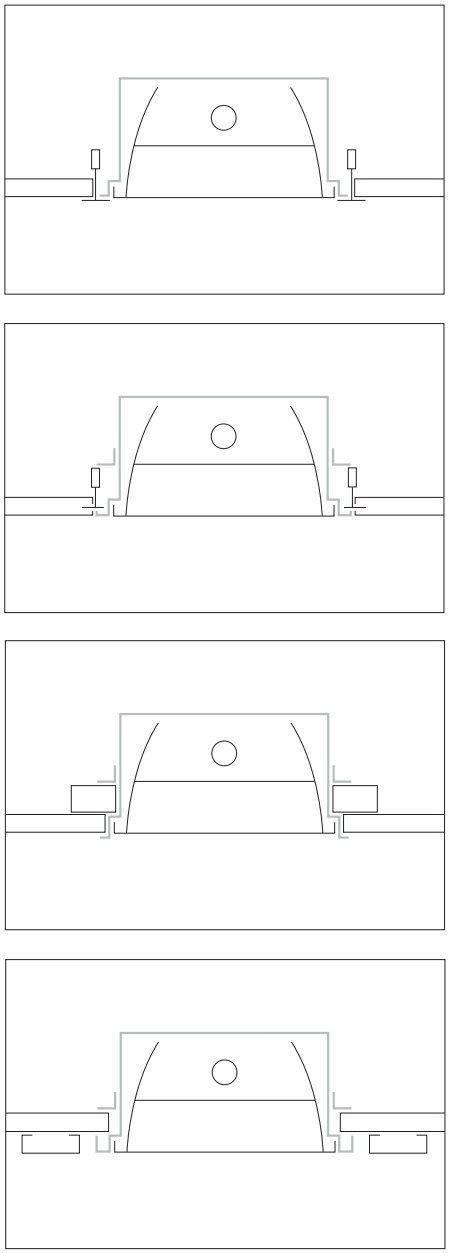
Smaller luminaires, such as downlights, can be installed in ceiling panels, following the same mounting instructions as for flat ceilings. Larger luminaires, especially louvred luminaires, can be installed in place of individual ceiling panels; different modes of installation are required for mounting into different ceiling types. Metal plank ceilings present a special case: luminaires are not only installed between the ceiling panels, but also from the carrier system. Suspended ceilings made of individual panels may require the luminaires to have additional brackets to take the weight of the luminaires.

For open grid ceilings and honeycomb-grid ceilings there are recessed cassettes available complete with suitable apertures for the recessed mounting of downlights. The cassettes are dimensioned to suit the respective ceiling grids. They can replace a ceiling panel or allow the installation of luminaires between ceiling panels which would otherwise not be suitable to take the static load.

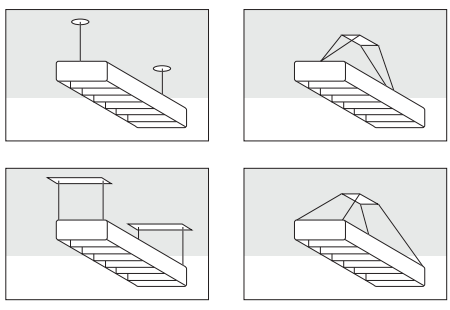
Semi-recessed mounting of luminaires is similar to recessed mounting, with the recessed depth naturally being shallower. Some luminaire types are specifically designed for semi-recessed mounting. With specially developed recess accessories, luminaires for both recessed and surface mounting can be adapted for semi-recessed mounting.

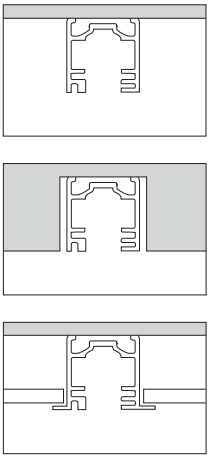
Pendant mounting can be effected in a variety of ways. Light-weight luminaires are usually suspended by the connecting cable. Heavier luminaires require a separate suspension device. This may take the form of a stranded wire cable or a pendant tube, which generally contains the connecting cable.

Recessed mounting of louvred luminaires into various ceiling systems (from the top downwards):
recessed mounting into ceilings with exposed and concealed profiles, recessed mounting into flat, suspended ceilings and panelled ceilings.

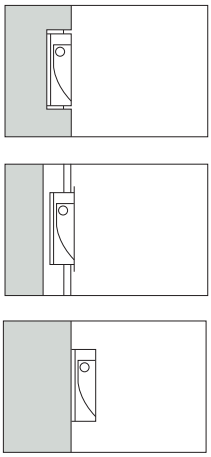


Pendant mounting of louvred luminaires: with two suspension points, four suspension points, two and four suspension cables connected to one ceiling mounting plate.

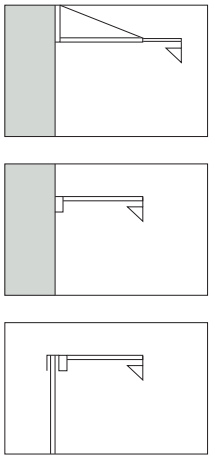




Mounting track (from the top downwards): surface-mounted, for recessed mounting into solid ceilings, suspended flanged track with ceiling panels.



Mounting of wall luminaires (from the top downwards): recessed mounting into masonry, hollow walls, surface-mounting onto walls.



Luminaires mounted on wall brackets (from the top downwards): cantilever bracket, bracket with integral transformer, bracket for partition walls.

3.3.5.2 Wall and floor mounting

Luminaires can be mounted onto wall surfaces or recessed into the wall. The latter can be in either concrete or hollow walls. Installation of floor-mounted luminaires can only be recessed. The luminaire cover must be robust and provide protection against the ingress of moisture.

3.3.5.3 Suspension systems

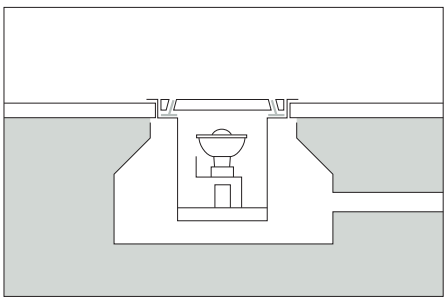
Suspension systems are generally designed for pendant mounting from the ceiling, in the same way as for luminaires using wire cables or pendant tubes. In some cases it is also possible to mount carrier systems onto walls by means of cantilever brackets.

Track can be mounted in a variety of ways. It can be suspended from the ceiling or mounted directly onto walls or ceiling. Recessed mounting into walls or ceiling is also possible in the case of certain versions or it can be used as part of a carrier system in a suspended ceiling.

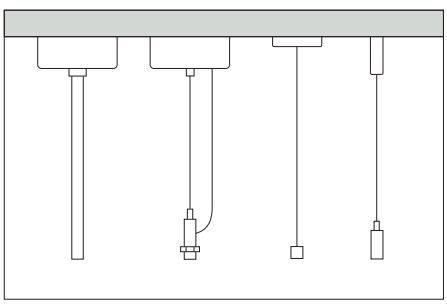
Wide-span carrier systems are a special case. They can be suspended from the ceiling, spanned between two walls or erected as a free-standing structure.

3.3.6 Calculations

When planning a lighting installation it is necessary to perform a series of calculations. In general, these refer to the average illuminance required or exact illuminance levels in specific parts of the space. It may also be of significance to calculate the luminance of specific parts of the space, or different lighting qualities, such as shadow formation and contrast rendition, or the costs for a lighting installation.



Installation of recessed floor-mounted luminaires: the housing is inserted into the floor. The luminaire itself is secured into the housing and is flush with the floor surface.



Pendant mounting of track and structural systems (from left to right): pendant tube with ceiling canopy for electrical connection, wire suspension with ceiling canopy for electrical connection, wire suspension with adjustable height.

3.3.6.1 Utilisation factor method

The utilisation factor method is used to acquire a rough estimation of the dimensioning of a lighting installation; it allows the designer to determine the number of luminaires required to produce the defined illuminance on the working plane, or, vice versa, the illuminance on the working plane produced by a given number of luminaires. This method does not provide exact illuminances at specific points in the space, which means that other methods must be applied to calculate the uniformity of a lighting installation or to determine illuminance levels at specific points. The utilisation factor method is based on the fact that the average horizontal illuminance for a space of a given size can be calculated from the overall luminous flux produced by the luminaires installed, the light output ratio and the utilance. In general terms, it describes