Perceptual confusion can occur when the illuminance pattern has a sharp edge so that it could be mistaken for a change in reflectance. The most preferred form of work surface lighting is one that provides a uniform illuminance over the area where the work is to be done (minimum/maximum illuminance ratio > 0.7) and lower illuminances outside that area.

2.6.3 Glare

The presence of a luminance much above the average for the visual field will produce discomfort and is called glare. There are five forms of glare associated with lighting installations.

Saturation glare

This occurs when a large part of the visual field is at a very high luminance for a long time, e.g. sunlight on snow. Saturation glare is painful and the behavioural response is to shield the eyes in some way, e.g. by wearing low transmittance glasses.

Adaptation glare

This occurs when the visual system is exposed to a sudden, large increase in luminance of the whole visual field, e.g. on exiting a long road tunnel into bright sunlight. The perception of glare is due to the visual system being oversensitive. Adaptation glare is temporary in that visual adaptation will soon adjust the visual sensitivity to the new conditions. It can be avoided by providing a transition zone of intermediate luminance, the transition zone being large enough to allow the visual system time to adapt to the new conditions.

Disability glare

This occurs when high luminance is present in a low luminance scene. Light from the source is scattered in the eye thereby forming a luminous veil over the retinal image of parts of the scene adjacent to the source. This luminous veil reduces the luminance contrast and desaturates any colours in the retinal image of the adjacent parts of the scene.

The magnitude of disability glare is quantified by the equivalent veiling luminance. For glare sources within an angular range of 0.1 to 30 degrees, this is given by the equation:

$$L_v = 10 \sum \frac{E_n}{\Theta_n^2}$$

where: L_v = equivalent veiling luminance (cd/m^2)
E_n = illuminance at the eye from the nth glare source (lx)
Θ_n = angle of the nth glare source from the line of sight (degrees)

The effect of the equivalent veiling luminance on the luminance contrast of an object can be estimated by adding it to the luminance of both the object and the immediate background.

Disability glare can be associated with point sources and large area sources. The disability glare formulae can be applied directly to point sources but for large area sources, the area has to be broken into small elements and the overall effect integrated. Disability glare from point sources is experienced most frequently on the roads at night when facing an oncoming vehicle. Disability glare from an extended source can occur when looking at an object on a wall adjacent to a window. The sky seen through the window is the glare source.