Absorption filters are usually made of plastic or glass. They absorb the unwanted wavelengths and thereby raise their temperature. Plastic absorption filters are likely to change their properties if they get too hot. The transmittance of absorption filters is limited. Typical transmittances for different colour filters are blue = 5 percent, red = 20 percent, green = 15 percent, and yellow = 40 percent. Another type of filter is the interference filter. Interference filters are more expensive and more exact than absorption filters and do not absorb the unwanted wavelengths. Rather, they split the light into two beams, one transmitted and one reflected, of two different colours (hence the name dichroic filters).

4.1.4 Efficiency

The efficiency of a luminaire is quantified by its light output ratio (LOR). This is the ratio of the total light output of a luminaire to the total light output of the light sources used in the luminaire when operating outside the luminaire. LOR is sometimes split into upward and downward components. LOR measures the efficiency of the luminaire in the sense that it quantifies how much of the light emitted by the light source escapes from the luminaire. LOR does not measure the efficiency of a lighting installation. However, LOR is an element in determining a lighting installation's compliance with Part L of the Building Regulations. Light output ratio is defined as the ratio of luminous flux emitted by the luminaire divided by the flux emitted by the bare lamps in free air. This means that for temperature sensitive lamps the LOR is a function of the increase in temperature of a lamp within the luminaire as well as the optical efficiency of the luminaire.

4.1.5 Thermal

All luminaires increase in temperature when in operation. The internal temperature of the luminaire can affect the efficiency of some light sources and the associated control gear. These changes in efficiency contribute to the light output ratio of the luminaire. The external surface temperature of a luminaire may also pose a fire hazard if mounted on a flammable surface (see Section 4.3.2). Of course, the external temperature of the luminaire will increase more when it is surrounded by thermal insulation so care should be taken when considering recessing luminaires into confined or insulated spaces.

Air handling luminaires are used to deliver conditioned air to the occupied space or to extract heat from the occupied space and the luminaire. There are three types of air handling system using luminaires; plenum exhaust, single ducted and double ducted.

In a plenum exhaust system conditioned air is supplied through air diffusers, while stale air is extracted through slots in the luminaires into the plenum that acts as a return duct (Figure 4.8a). The plenum exhaust system is only used where the maximum number of air changes per hour is less than six. In a single ducted system, conditioned air is delivered along the plenum and then through air diffusers, and stale air is extracted through the luminaires into a duct (Figure 4.8b). The single ducted system is used for spaces with low ceiling heights. In a double ducted system conditioned air is delivered through air diffusers supplied by a duct, and stale air is extracted through the luminaires and an attached duct (Figure 4.8c). These three systems differ in cost and efficiency. The double ducted system is the most expensive and most efficient.