The reference light source used is an incandescent light source for light sources with a correlated colour temperature below 5000 K and some form of daylight for light sources with correlated colour temperature above 5000 K. The actual calculation involves obtaining the positions of a surface colour in the CIE 1964, U^*, V^*, W^*, colour space under the reference light source and under the light source of interest, correcting for any difference in white point under the two light sources and expressing the difference between the two positions on a scale that gives perfect agreement between the two positions a value of 100. The CIE has fourteen standard test colours. The first eight form a set of pastel colours arranged around the hue circle. Test colours nine to fourteen represent colours of special significance, such as skin tones and vegetation. The result of the calculation for any single colour is called the CIE special colour rendering index, for that colour. The average of the special colour rendering indices for the first eight test colours is called the CIE general colour rendering index (Ra). It is the CIE general colour rendering index that is usually presented in light source manufacturers' catalogues. The CIE general colour rendering index varies widely across light sources (see Section 3.4.10).

1.4.5 Colour gamut

The colour gamut of a light source is obtained by calculating the position of the first eight CIE standard test colours under the light source of interest and plotting them on the CIE 1976 UCS diagram. When the plotted positions are joined together, the colour gamut is formed. The colour gamut can be reduced to a single number by calculating the gamut area. Figure 1.9 shows the colour gamuts for a number of different light sources. A great deal can be learnt from the colour gamut. From a consideration of its shape and the spacing between the positions of the individual test colours, the extent to which the different parts of the hue circle can be discriminated is apparent. From its location on the CIE 1976 UCS diagram, the appearance of colours can be appreciated to some degree. By plotting different light sources on the same diagram it is easy to make comparisons between light sources. Further, by including the colour gamut of an ideal light source, such as daylight, it is possible to evaluate how close to the ideal light source is the light source of interest, as far as colour rendering is concerned.

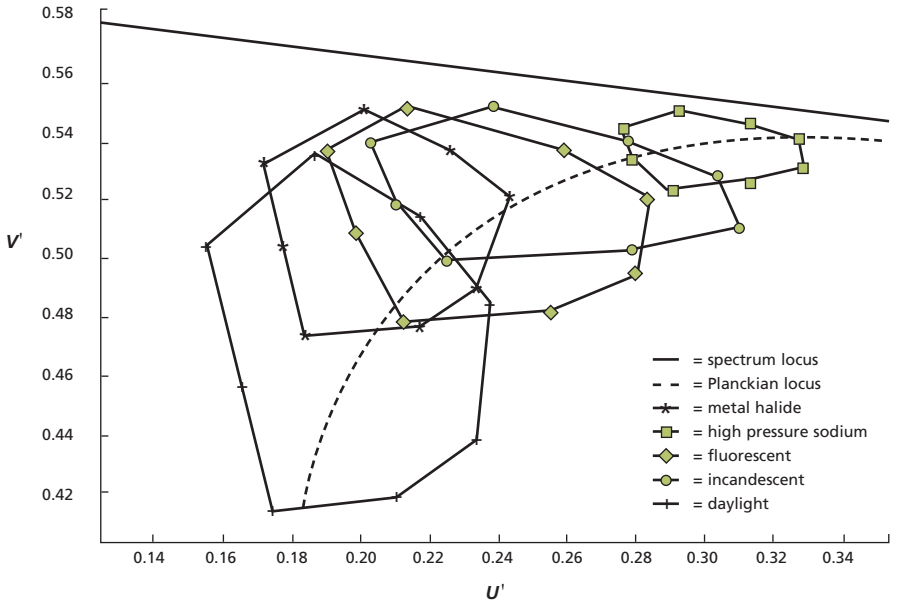

Figure 1.9 The colour gamuts for high pressure sodium, incandescent, fluorescent and metal halide light sources, and for the CIE Standard Illuminant D65, simulating daylight, all plotted on the CIE 1976 uniform chromaticity scale diagram. The dotted curve is the Planckian locus.