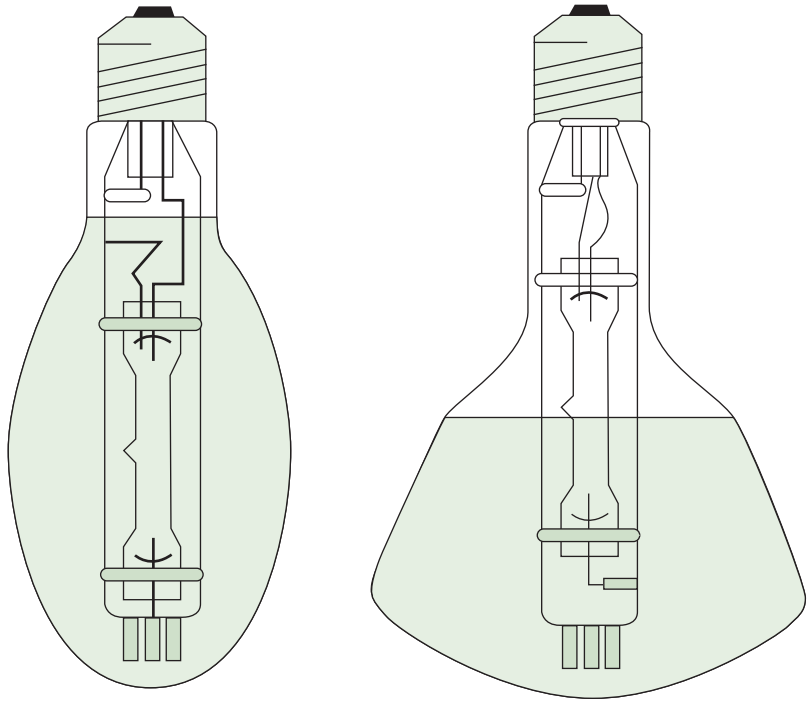

Figure 3.20 Forms of high pressure mercury lamps

The performance of these lamps is not considered to be very good nowadays. Their efficiency is around 40 lumens per watt. Their CIE general colour rendering index is between 40 and 50 and they have a very long life but, because of poor lumen maintenance, it is generally recommended that the lamps are changed after 8,000 to 10,000 hours of use.

Because of their poor performance and the fact that better lamp types are available for almost all of the applications these lamps are being phased out.

3.3.5 Metal halide

Metal halide lamps were developed as a way of improving the performance of high pressure mercury lamps in terms of their colour appearance and light output. They work by introducing the salts of other metals into the arc tube. As each element has its own characteristic spectral line, by adding a mixture of different elements into the discharge it is possible to create a light source with good colour rendering in a variety of colours.

There are a lot of problems with introducing new elements into a discharge. First, the element must be volatile and secondly it should not chemically attack the arc tube. To avoid these problems it has become common practice to introduce metals into the lamp as metal halides. Metal halides are generally more volatile than the metals themselves and the metal halides do not attack the arc tube. The metal halide compound breaks up into the metal and halogen ions at the high temperatures in the centre of the discharge and reforms at the lower temperatures near the wall of the tube.

Many different combinations of elements have been used to make metal halide lamps, Figure 3.21 lists some of the more common combinations of elements together with the spectral output they create.