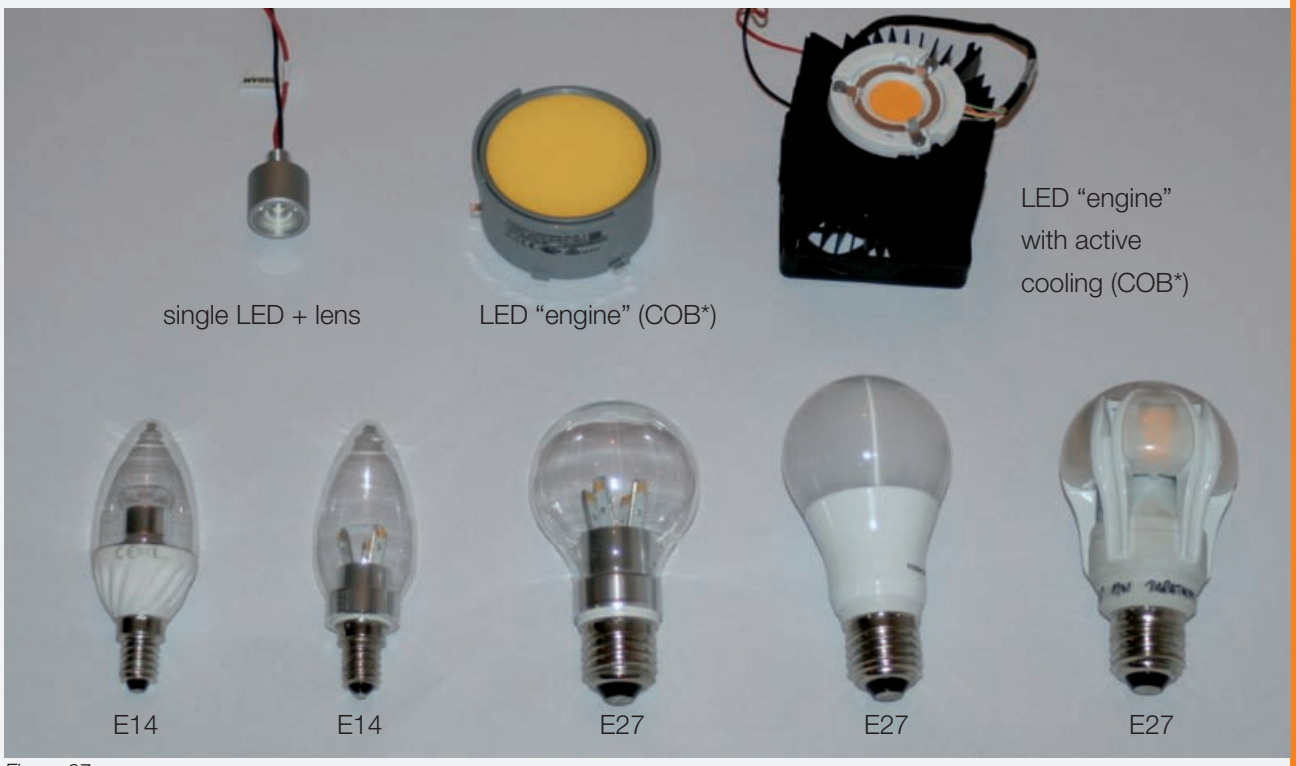

Figure 67
Samples of common use LED lamps and LED engines (professional use). Depending on manufacturer power, shape, size, type, colour and features may vary, some of the require 'active cooling' with additional fan or osculating membranes mounted on the heat-sink (not recommended, especially in exterior use).

NOTE 1 The LED-Engines are now available in different shapes: round, array and special designed ones to fit special applications.

LEDs generally have a long life and may last up to 100,000 hours. LEDs generally emit light in a relatively narrow band so that most LEDs produce light that is a saturated colour. It is possible to make white LEDs by using a blue or ultraviolet chip and putting a phosphor coat around it. White can also be achieved by combining red, green and blue chips through colour mixing.

LEDs have a lot of applications associated with signals and signage. The use of saturated colours in these applications is a real bonus. This coupled with the ease of producing light in a number of small units means that LEDs are replacing a number of other light sources in these areas. It is also possible to make lamps that are a cluster of LEDs of different colours. By controlling the outputs of the different colours it is possible to make a lamp that can produce light in a wide variety of colours. At the time of writing, white LEDs are making fast technical progress but have not yet proved to cover all applications in the area of general lighting. In some cases the common lamps are still achieving better results.

** Footnote: COB - **C**hip **O**n **B**oard type*