



Lighting 101

Understanding common
lighting terminology.



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Introduction

Having been involved in the Audio Visual, Communications and Electronics R&D industry since the late 80's I have worked with lighting in various shapes and forms from indicators on equipment to basic lightings systems.

Over the years I have seen many changes in the industry and even more instances where terminology has been used incorrectly or people have simply left off an important piece of information in relation to the naming convention of a lamp.

The following is a collection of information, standards and terminology that I have collated over the years and routinely update as things change. The idea is to assist both contractors and end users make a more informed decision in relation to their lighting and give them the basic knowledge needed to understand what they are looking at.

We will start with connector styles followed by lamps styles then a brief overview of the output of lamps in terms of colour temperature, luminous flux and efficiency.

This is by no means the be all and end all of lighting, as the industry changes as quickly as most that are based on electrical or electronic products. I hope you find this information useful and that it assists you in realising your illumination dreams.

Lamp Connector Standards

The first section of Lighting 101 will cover the most common styles of lamp connectors or end caps. This is a very important topic especially when dealing with Edison Screw as some lighting importers sell ES fixtures designed for the US without realising the slight difference in thread size and pitch compared to the European and Australian version. This is mainly the difference between E26 and E27 the later being the standard adopted in Australia.

The connector type and size is something you need to pay attention too along with lamp shape, size, colour temperature and luminous flux, as these pieces of information will help you select the correct lamp for each application.

Bi-Pin lamps are very common and predominantly used on Halogen or Metal Halide style lamps. Over the past two decades they have been widely adopted in households due to a misconception that low voltage is the same as low power. In most cases these lamps use the same amount of power as traditional incandescent lamps however they are progressively increasing in luminous efficiency, a topic we will cover later in Lighting 101.

Bi-Pin Codes				
Type	Standard	Pin centre to centre	Pin dia.	Usage
G4	IEC 60061-1 (7004-72)	4.0 mm	0.65-0.75 mm	MR11 and other small halogens of 5/10/20 watt and 6/12 volt
GU4	IEC 60061-1 (7004-108)	4.0 mm	0.95-1.05 mm	
GY4	IEC 60061-1 (7004-72A)	4.0 mm	0.65-0.75 mm	
GZ4	IEC 60061-1 (7004-64)	4.0 mm	0.95-1.05 mm	
G5	IEC 60061-1 (7004-52-5)	5 mm		T4 and T5 fluorescent tubes
G5.3	IEC 60061-1 (7004-73)	5.33 mm	1.47-1.65 mm	
G5.3-4.8	IEC 60061-1 (7004-126-1)			
GU5.3	IEC 60061-1 (7004-109)	5.33 mm	1.45-1.6 mm	
GX5.3	IEC 60061-1 (7004-73A)	5.33 mm	1.45-1.6 mm	MR16 and other small halogens of 20/35/50 watt and 12/24 volt
GY5.3	IEC 60061-1 (7004-73B)	5.33 mm		
G6.35	IEC 60061-1 (7004-59)	6.35 mm	0.95-1.05 mm	
GX6.35	IEC 60061-1 (7004-59)	6.35 mm	0.95-1.05 mm	
GY6.35	IEC 60061-1 (7004-59)	6.35 mm	1.2-1.3 mm	halogen 100W 120V
GZ6.35	IEC 60061-1 (7004-59A)	6.35 mm	0.95-1.05 mm	
G8		8.0 mm		halogen 100W 120V
G9	IEC 60061-1 (7004-129)	9.0 mm		halogen 120V (US) / 230V (EU)
G9.5		9.5 mm	3.10-3.25 mm	Common for theatre use, several variants
GU10		10 mm		Twist-lock 120/230-volt MR16 halogen lighting of 35/50 watt
G12		12.0 mm	2.35 mm	Used in theatre and single-end metal halide lamps
G13		12.7 mm		T8 and T12 fluorescent tubes
G23		23 mm	2 mm	
GU24		24 mm		Twist-lock for self-ballasted compact fluorescents
G38		38 mm		Mostly used for high-wattage theatre lamps
GX53		53 mm		Twist-lock for puck-shaped under-cabinet compact fluorescents

Edison Screw lamps are most commonly found in the US, however over several decades and due to the international nature of the large lighting manufacturers the standard is now used in most countries around the world.

Edison or ES Codes				
Type	Volts	Size	Name	IEC
E5	≤18	5 mm	Lilliput Edison Screw (LES)	IEC 60061-1 (7004-25)
E10	≤30	10 mm	Miniature Edison Screw (MES)	IEC 60061-1 (7004-22)
E11	240/120	11 mm	Mini-Candelabra Edison Screw (mini-can)	IEC 60061-1 (7004-6-1)
E12	120	12 mm	Candelabra Edison Screw (CES)	IEC 60061-1 (7004-28)
E14	240	14 mm	Small Edison Screw (SES)	IEC 60061-1 (7004-23)
E17	120	17 mm	Intermediate Edison Screw (IES)	IEC 60061-1 (7004-26)
E26	120	26 mm	[Medium] (one-inch) Edison Screw (ES or MES)	IEC 60061-1 (7004-21A-2)
E27	240	27 mm	[Medium] Edison Screw (ES)	IEC 60061-1 (7004-21)
E39	120	39 mm	(Mogul) Giant Edison Screw (GES)	
E40	240	40 mm	(Mogul) Giant Edison Screw (GES)	IEC 60061-1 (7004-24)

Bayonet Cap lamps were most common in the UK and commonwealth nations and were the predominant lamp connector in Australia until the influx of both ES and BiPin lamps.

Bayonet Codes				
Designation	Alternative designation	Contacts	Dia.	IEC
BA5s		1	5 mm	
BA7s		1	7 mm	
BAX9s		1	9 mm	
BA9s	Miniature bayonet cap (MBC)	1	9 mm	
BA15d	Small bayonet cap (SBC)	2	15 mm	IEC 60061-1 (7004-11)
BAX15s		1	15 mm	
BA15s	Single centre contact (SCC)	1	15 mm	IEC 7004-11 A
BA20s		1	20 mm	
BA20d		2	20 mm	IEC 7004-12
BA21d		2	21 mm	
B21-4			21 mm	
BA22d	Bayonet cap (BC)	2	22 mm	IEC 60061-1 (7004-10)
BC-3	Bayonet cap (BC)	2	22 mm	
B22d-3		2	22 mm	
BX22d		2	22 mm	