

SECTION



CHAPTER 20
LIGHT



Light

- Light is energy which is part of the electromagnetic spectrum.
- Light is a range of colours or frequencies which, when combined, join to form what is called white light
- Light can also be split into the various colours using a prism.



Measuring Light

- **Watt: This is the international standard unit of power.** One watt equals one joule per second, and measures the rate of energy conversion, that is the rate at which electrical energy changes to light energy.
- **Lumen: The light given off from a source is called the luminous flux.** It is measured in lumens. The higher the lumens, the brighter the light
- **Lux: This is the measurement of how illuminated an area is** as a result of the light sources working in it. It is calculated as lumens per square metre.



Availability and Quality of Natural Light Factors

- The brightness of the sky
- The external element (direct light and external reflective surfaces)
- The size and position of the fenestration
- The internally reflected element

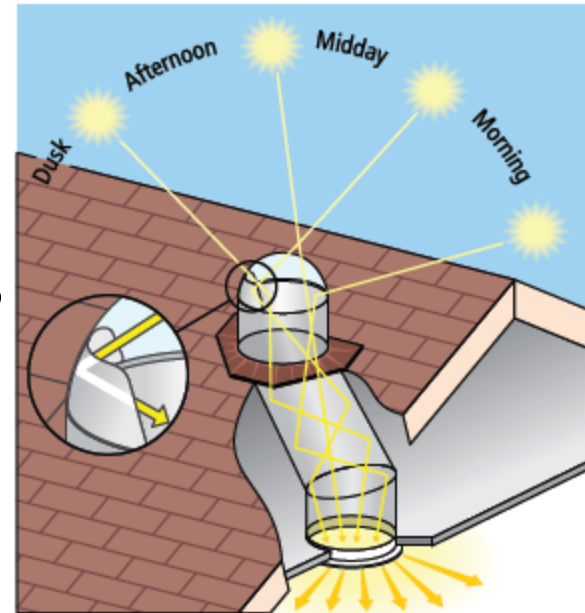
TYPICAL LUX LEVELS

Description	Typical lux levels
Irish sunny day	50,000
Overcast day	5000
Well-lit office	500
Typical roadside lighting	5
Clear night sky	0.3
Moonlit cloudy sky	0.1








Controlling & Harnessing Natural Light

- Simple controls include hanging blinds, net curtains or curtains to block or reduce the amount of sunlight coming through the windows
- More elaborate methods include installing overhangs outside the windows or using brise soleil





Artificial Lighting

		Common names	Normal range	Life expectancy (hours)	Features	Typical lumens per watt ¹	Colour temperature ²
General Lighting Service (GLS) Lamp		Light bulb, common bulb	40–150 watts	1000–2000	General purpose bulb. Comes in a range of colours and shapes.	12–18	2800
Decorative GLS		Candle bulb, globe bulb, ornamental bulb	25–60 watts	1000–2000	Bulb for ornamental use (chandeliers, decorative light fittings).	7–12	2800
Fluorescent Tube		Bar light, tube light	13–125 watts	6000–7000	Provides even and bright illumination. Economical to run. Comes in a range of colour tones.	35–100	2700–6300
Compact Fluorescent Tube		Low energy bulb, energy saver	48–69 watts	6000–8000	Used as a replacement for the common light bulb. Can be fitted with a screw or bayonet fitting.	6–30	2700–6300
Mains-voltage Halogen Lamp			20–50 watts	2000–4000	Popular for size and ease of installation. Popular for wall lights and recessed lighting.	12–16	3050



Artificial Lighting

		Common names	Normal range	Life expectancy (hours)	Features	Typical lumens per watt ¹	Colour temperature ²
Low-voltage Halogen Lamp			10–50 watts	2000–4000	Widely used for recessed ceiling lighting. Reflective internal case to project light forward.	14–19	2900–3000
Light-emitting Diode		LED	Up to 10 watts per light fitting	100,000	Often used for decorative fittings.	30–35	5500

¹ Lumens per watt: the higher the number the greater the efficiency of the bulb (more light output per electrical input).

² Colour temperature (In degrees kelvin): the higher the number the cooler (bluer) the light.

