Thanks!

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FOOTCANDLE - (a 1900)

It was in the early days of electric lighting that users began to ask how much light they needed. The measurement unit of the “footcandle” was developed as a measure of 'illumination'. 
FOOTCANDLE - (a 1900)

DEFINITION - A footcandle (fc) is the unit of illumination on a surface, one square foot in area, on which there is a uniformly distributed flux of one lumen.
LUX (luminous flux)

The International (metric) unit of illumination is the 'lux'. It is the illumination produced on a surface one square meter in area at a distance of one meter from a uniform point source.

The LUX of a light source indicates how much useful light the source emits.
LUMEN

A lumen is a way of measuring how much of the light put out by a light source, whether it is the sun or a desk lamp, is visible to the human eye.
FOOTCANDLE (and LUX) - (a 1900)

Lux / Footcandle conversions:

\[
FC = LUX \times 0.0929 \quad \text{Example 1: } 500 \ LUX \times 0.0929 = 46.5 \ FC
\]

\[
LUX = FC \times 10.76 \quad \text{Example 2: } 50 \ FC \times 10.76 = 538 \ LUX
\]

Generally you may multiple FC by 10 to obtain LUX - or, divide LUX by 10 to obtain FC.
## LUX CHART

<table>
<thead>
<tr>
<th>Iluminance (lux)</th>
<th>Surfaces illuminated by</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0001</td>
<td>Moonless, overcast night sky</td>
</tr>
<tr>
<td>0.002</td>
<td>Moonless clear night sky</td>
</tr>
<tr>
<td>0.05–0.3</td>
<td>Full moon on a clear night</td>
</tr>
<tr>
<td>3.4</td>
<td>Dark limit of civil twilight under a clear sky</td>
</tr>
<tr>
<td>20–50</td>
<td>Public areas with dark surroundings</td>
</tr>
<tr>
<td>50</td>
<td>Family living room lights)</td>
</tr>
<tr>
<td>60</td>
<td>Office building hallway lighting</td>
</tr>
<tr>
<td>100</td>
<td>Very dark overcast day</td>
</tr>
<tr>
<td>150</td>
<td>Train station platforms</td>
</tr>
<tr>
<td>320–500</td>
<td>Office lighting</td>
</tr>
<tr>
<td>400</td>
<td>Sunrise or sunset on a clear day.</td>
</tr>
<tr>
<td>1000</td>
<td>Overcast day; typical TV studio lighting</td>
</tr>
<tr>
<td>10,000–25,000</td>
<td>Full daylight (not direct sun)</td>
</tr>
<tr>
<td>32,000–100,000</td>
<td>Direct daylight</td>
</tr>
</tbody>
</table>
Color Rendering Index (CRI) is the measurement of how colors look under a light source when compared with sunlight. The index is measured from 0-100, with a perfect 100 indicating that colors under the light source appear the same as they would under natural sunlight. This index is very often used in evaluating LED lighting fixtures. Better lights have a CRI of at least 93.
Color Temperature

Color temperature refers to a characterization of the spectral properties of a light source.

Low color temperature is the warmer, more yellow to red light while high color temperature is the colder, more blue light.

Daylight, for example, has a lower color temperature near dawn and a higher one during the day.

The standard unit of measurement for color temperature is Kelvin (K).
<table>
<thead>
<tr>
<th>Condition</th>
<th>Color Temperature (K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunrise &amp; Sunset</td>
<td>2500-2800K</td>
</tr>
<tr>
<td>Indoors</td>
<td>2800-4000K</td>
</tr>
<tr>
<td>Moonlight</td>
<td>4000-5500K</td>
</tr>
<tr>
<td>Daylight</td>
<td>5500-6200K</td>
</tr>
<tr>
<td>Overcast</td>
<td>6200-7000K</td>
</tr>
<tr>
<td>Shade</td>
<td>7000-9000K</td>
</tr>
<tr>
<td>Dark Shade</td>
<td>9000K+</td>
</tr>
</tbody>
</table>

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Dynamic Range Comparison
(Approximately, in f-stops)

- Human Eye: 30+
- Film & Digital Cinema Cameras: 11-14
- High Definition: 7-11
- Professional DV: 5-7
- Analog / Consumer DV: 4-5
A simple and fast lighting set-up for interviews
A typical lighting set-up for blue/green screen
INVERSE-SQUARE LAW

In physics, an **inverse-square law** is any physical law stating that a specified physical quantity or intensity is inversely proportional to the square of the distance from the source of that physical quantity.
THE MIKE KURTZ INVERSE-SQUARE LAW

Light falls off inversely proportional to the square of the distance from the source.

SO...

An object (like your background) that is twice the distance from a light will receive a quarter \((1/4)\) of the illumination – or two stops less light. An object that is three times the distance receives one ninth \((1/9)\) the illumination – or three stops less light. An object that is four times the distance receives one sixteenth \((1/16)\) the illumination – or four stops less light, etc..
You can break video lighting equipment down into several different categories:

**Sources of Light** (such as lamps and reflectors)

**Light quality modifiers** (such as diffusion material to make light softer)

**Light reducers** (such as scrims, neutral density and dimming)

**Light controllers** (such as barn doors and other accessories that help control the light direction)

**Light color modifiers** (filtration and on-board color choice)
Fresnel lights –

These are highly directional lights that give you the ability to focus the light beam. Great for back lights, hair lights, background lights, accent lights, etc...
Broad or open-face lights –

These can be good for casting a wide beam of light from a short distance. They can blow out white backgrounds, or just to bring up the ambient light.
Soft Fluorescent Lights –

The first game changer in lighting because these instruments drew far less power and generated almost no heat compared to fresnels and open face lights. Plus, the lamps themselves could be swapped between for DAYLIGHT or TUNGSTEN color temperatures.
LED lights –

These are very popular and in fact are fast becoming the defacto lighting instrument. They last for thousands of hours and generate FAR less electricity and heat compared to conventional lighting methods. The multi-point versions can be trickier to control with barn doors but are very lightweight and a great choice for run-and-gun production as they can often be run on small batteries as well as AC.
RGB LED lights –

RGB LED means red, blue and green LEDs. RGB LED products combine these three colors to produce over 16 million hues of light. ... Some colors are “outside” the triangle formed by the RGB LEDs. Pigment colors such as brown or pink are difficult to achieve.
RGB+ LED lights –

RGB+ use the same process as RGB LED lights but add a dedicated LED that features a certain color. For instance:

- RGBW (white), RGBWW (warm white)
- RGBCW (cool white), RGBA (amber)

These enhanced RGB LEDs give the user far more control over the coloring possibilities of their instrument.
Other lighting magic -

VisionSmith makes LED lamp replacements for many older fresnel lamps made by Arri, DeSisti, Colortran, Strand, and Mole Richardson.

Quasar makes LED/RGB+ lamp replacements for many florescent instruments like KinoFlo, as well as stand alone versions of their lamps.

Companies like Fillex and Generay make LED fresnel lights, allowing focusable LED instruments.