**LED FACT SHEET**

**LIGHT EMITTING DIODE PROPERTIES**

- Emits light in a forward direction (unlike incandescent which emits light in all directions)
  - Sophisticated engineering is used to create LED bulbs that shine in all directions
- Low energy consumption & heat generation
- Can produce different colors
- Long life cycle
- Design flexibility - fixtures can be made into interesting shapes and forms that are impossible for socketed fixtures

<table>
<thead>
<tr>
<th>RAW LUMENS</th>
<th>DELIVERED LUMENS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A <strong>CALCULATED VALUE</strong> (e.g., 100 lumens per watt * 5 watts = 500 raw lumens)</td>
<td>A measured value using light measurement tools (always less than raw)</td>
</tr>
<tr>
<td>Does not consider elements that can reduce overall light output, such as diffusers or shades</td>
<td>Considers all elements that reduce the amount of light output, such as diffusers and shades</td>
</tr>
<tr>
<td>Always higher than delivered lumens</td>
<td>A more accurate metric for evaluating the effective light output of a fixture</td>
</tr>
<tr>
<td>One 60W incandescent light bulb emits approximately 800 raw lumens</td>
<td></td>
</tr>
</tbody>
</table>

**INTEGRATED LED**

- Integrated LED fixtures have the LED component built into them and do not require a light bulb
  - Standard fixtures are socketed and require a light bulb
- The LED component is often a strip of diodes or a LED module (sometimes referred to as a LED wafer) and is usually behind a diffuser
- Requires the use of a driver
  - Drivers are not “one size fits all” and are sometimes built into the LED module
  - Drivers have wattage limits (a higher wattage often means a larger driver)
- Drivers can often be easily replaced. The LED component often cannot be easily replaced.
  - Some fixtures are built to allow for easier replacement of the LED component
- If a complete fixture stops working, the problem is likely the driver, not the LED component
- If an individual LED fails, the problem is likely the LED component, not the driver

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CRI – COLOUR RENDERING INDEX

• COLOUR RENDERING: THE EFFECT OF LIGHT ON THE COLOUR APPEARANCE OF AN OBJECT
• A MEASURED VALUE RANGING FROM 0 – 100. A HIGHER NUMBER MEANS THAT COLOURS WILL APPEAR CLOSER TO HOW THEY LOOK UNDER NATURAL LIGHT
• EXAMPLE: THE COLOUR RED WILL APPEAR DIFFERENT UNDER DIFFERENT TYPES OF LIGHTING. RED UNDER CANDLELIGHT LOOKS DIFFERENT THAN THE SAME RED UNDER FLUORESCENT LIGHT
  o INCANDESCENT LIGHTING IS CONSIDERED TO HAVE A CRI OF 100, WHICH MEANS IT RENDERS ALL VISIBLE LIGHT PERFECTLY AS IT WOULD UNDER NATURAL LIGHT
  o CRI OF LED LIGHT USUALLY RANGES FROM 80S TO LOW 90S
• OVER 80 CRI IS STANDARD FOR LEDS, OVER 90 IS VERY GOOD, 100 IS THE SUN OR AN INCANDESCENT LIGHT BULB

CCT – CORRELATED COLOR TEMPERATURE

• A MEASURE OF THE LIGHT SOURCE COLOR APPEARANCE
• MEASURED IN KELVIN (K) I.E., 2700K OR 3000K EMITS A WARMER TEMPERATURE, 4000K-6000K IS MORE BLUE

LED DIMMERS

• DIFFERENT BRANDS LIST LED DIMMERS UNDER DIFFERENT NAMES
• COMMONLY MARKETED AS C•L DIMMER, LED+ DIMMER, CFL/LED DIMMER
• ALL SHOULD BE COMPATABLE WITH A DIMMABLE LED FIXTURE

L70 RATED LIFE (AKA LUMEN MAINTENANCE LIFE OR RATED LIFE)

• THE TIME IT TAKES FOR THE LED TO DEGRADE TO 70% OF ITS ORIGINAL LIGHT OUTPUT
• UNLIKE INCANDESCENT BULBS, LED DEGRADE OVER TIME (SIMILAR TO CFL) RATHER THAN FAIL ALL AT ONCE