LED Lighting in Agriculture

How to avoid costly mistakes
LED’s are Application Specific

Intended Applications
LED’s are Application Specific

Intended Applications

- Wet
- Dusty, Dirty
- Corrosive
- Cold in the Winter
- Hot in the Summer
- Low Clearances
- Subjected to High Abuse
- Cannot Contain Mercury
- Needs to be Easy to Clean
- Must install Easily
- Needs to have good color
- Must be Affordable
Lighting 101

What makes lighting fail?

- Vibration/Shock
- Voltage
- Water
- Heat
HEAT

Typical Max Temp Ratings

- 25/77° C/F
- 25/77° C/F
- 70/158° C/F

www.energyefficient.com
HEAT

Rated Max Ambient Temps

- **10° C (18° F)**
  - Rise over Rating
  - Lose 50% of Advertised Life

- **10° C (18° F)**
  - Rise over Rating
  - Gain 50% in Advertised Life
HEAT

The Math

25/77° C/F
+ 65/149° C/F
+ 35/95° C/F
= 95/203° C/F

Over Temp
70/126° C/F
Life Reduction
.0078 or 1/128th
## Heat

### Applying The Math

<table>
<thead>
<tr>
<th>Type</th>
<th>MAX Temp</th>
<th>Test Temp</th>
<th>Affect On Life</th>
<th>Rated Life</th>
<th>Actual Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFL Screw in</td>
<td>25</td>
<td>95</td>
<td>1/128th</td>
<td>10,000</td>
<td>78 Hrs</td>
</tr>
<tr>
<td>LED Screw in</td>
<td>25</td>
<td>95</td>
<td>1/128th</td>
<td>35,000</td>
<td>273 Hrs</td>
</tr>
<tr>
<td>Agricient LED</td>
<td>70</td>
<td>35</td>
<td>+175%</td>
<td>60,000</td>
<td>135,000 Hrs</td>
</tr>
</tbody>
</table>
## Water

### How to Evaluate

#### IP (Ingress Protection) Ratings Guide

<table>
<thead>
<tr>
<th>SOLIDS</th>
<th>WATER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
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</tr>
<tr>
<td>Protected against a solid object greater than 50 mm such as a hand.</td>
<td>Protected against vertically falling drops of water. Limited ingress permitted.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td><strong>2</strong></td>
</tr>
<tr>
<td>Protected against a solid object greater than 12.5 mm such as a finger.</td>
<td>Protected against vertically falling drops of water with enclosure tilted up to 15 degrees from the vertical. Limited ingress permitted.</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td>Protected against a solid object greater than 2.5 mm such as a screwdriver.</td>
<td>Protected against sprays of water up to 60 degrees from the vertical. Limited ingress permitted for three minutes.</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td><strong>4</strong></td>
</tr>
<tr>
<td>Dust tight. No ingress of dust. Two to eight hours.</td>
<td>Protected against water splashed from all directions. Limited ingress permitted.</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td><strong>5</strong></td>
</tr>
<tr>
<td>Protected against jets of water. Limited ingress permitted.</td>
<td>Protected against the effects of immersion in water between 13 cm and 1 m for 30 minutes.</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td>Protected against the effects of immersion in water under pressure for long periods.</td>
<td>Dust tight. No ingress of dust. Two to eight hours.</td>
</tr>
</tbody>
</table>

**Rating Example:**

```
<table>
<thead>
<tr>
<th>SOLIDS</th>
<th>WATER</th>
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<tr>
<td>6</td>
<td>5</td>
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<tr>
<td>IP65</td>
<td></td>
</tr>
</tbody>
</table>
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**Ingress Protection**
Water
Voltage

Preferences

• Rated Voltage
  ▪ Universal Voltage or Voltage Specific?

• Dimmable?
  ▪ Dimmable even if not used in a dimmable barn
  ▪ Provides more range of usable voltage
Other Considerations

- Ease of Installation?
  - How much trouble will it be to install?

- Safety Tested?
  - UL, ETL, etc

- Energy Star or Design Lights Certified?

- Ratings?
  - Indoor, Outdoor, Wet Location, Damp Location, NEMA 4X

- Durability?
  - Will it take a beating?

- Corrosion Resistance?

- Warranty?
Introducing Agrificent™ LED

Designed for ambient temperatures of up to 70° C (158° F)

- Water/dust-proof
- Unbreakable
- Long lasting
- Easy installation
- Good color
- No Mercury
- Affordable

Dust tight IP68 Water tight

6YR WARRANTY

Color Balanced 5000K Color Balanced

No Hg Mercury

Energy Star
Agricient™ LED

The most rugged, longest-lasting LED in agriculture.