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Industrial Lighting – What You Need to Know

2/12/2020



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Industrial Lighting



- LED High Bays are everywhere, but many of them on the market are not designed to last in **true industrial applications**
- Industrial lighting applications are tough! **High Temps, dust, dirt, grime, moisture, chemicals, industrial solvents, bugs, poor power quality, etc!**
- Generic import low-quality LED High Bays such as the “UFO” and the “Ultra-Low Cost Linear” are hitting the market
- While they may seem like a good bargain, there is a **huge amount of risk** with using these types of products – and you might be **replacing all of your lighting** in a very short time period
- Here is what you need to know about **Industrial Lighting**

The ‘UFO’



Low Cost Linear



Industrial Lighting Applications – What To Think About

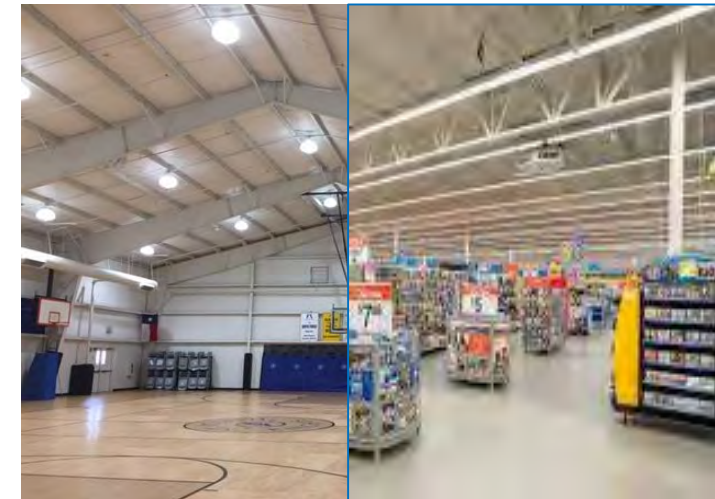
Warehousing



Manufacturing



Education/Commercial



- Warehousing spaces can be hot at the ceiling! Your fixture needs to be properly rated to ambient temps **45C to 55C**. If the fixture does not have a CSA/UL Temp Label, it's not rated for high Temps!
- Power Quality can be a major issue in industrial spaces. Fixtures need a min **ANSI Surge 6kV**
- IP5+ rated optics are a must to keep out bugs, dust, dirt, debris, etc

- Chemicals, solvents, lubricants, etc can react with LED's and plastics. Look for Fixtures with IP65 Sealed Glass Optics for LED Protection
- Power Quality can be a major issue in heavy industrial spaces. Fixtures need a min **ANSI Surge 6kV-10kV**
- Optics and Uplight are important for good uniformity, Vertical Foot Candles, and a comfortable working environment

- Fixture Aesthetics and Uniformity is key here – Smooth optics, diffuse lenses, uplight create spaces people want to be in
- Wireless controls increase usability and energy savings



All Industrial LED Products Are Not The Same

How to evaluate an Industrial LED Fixture

What?	Why You Should Care?
Lumen Maintenance (L-Value)	Tells you how long the fixture will deliver the light level you paid for Varies by operating temperature and lumen package
Driver Life	How long will the driver last? Failed driver = failed fixture
Surge Protection per ANSI standards	LED is more susceptible to power quality events than HID ANSI Standards for Industrial Surge Protection are min 6kV Heavy Industrial is 10kV
Construction	Is the fixture serviceable?
Ambient Temperature Rating	Tells you what ambient temperature fixture can operate in. Fixture needs to have a UL/CSA sticker showing the ambient temperature
Light Output at High Temp	Some fixtures have high temp listings, but have a significant drop in light output at higher temp
Optics	Are they sealed, or will they let in dirt, dust, bugs, chemicals, water?
Controls	Embedded Sensors and wireless controls allows you to save 50% more energy compared to LED alone, and provides additional functionality

Lumen Maintenance



What?	Typical Import LED	Quality Fixture
Lumen Maintenance (L-Value)	L70 @ 50,000 Hours	L88-L90 @ 60,000 Hours

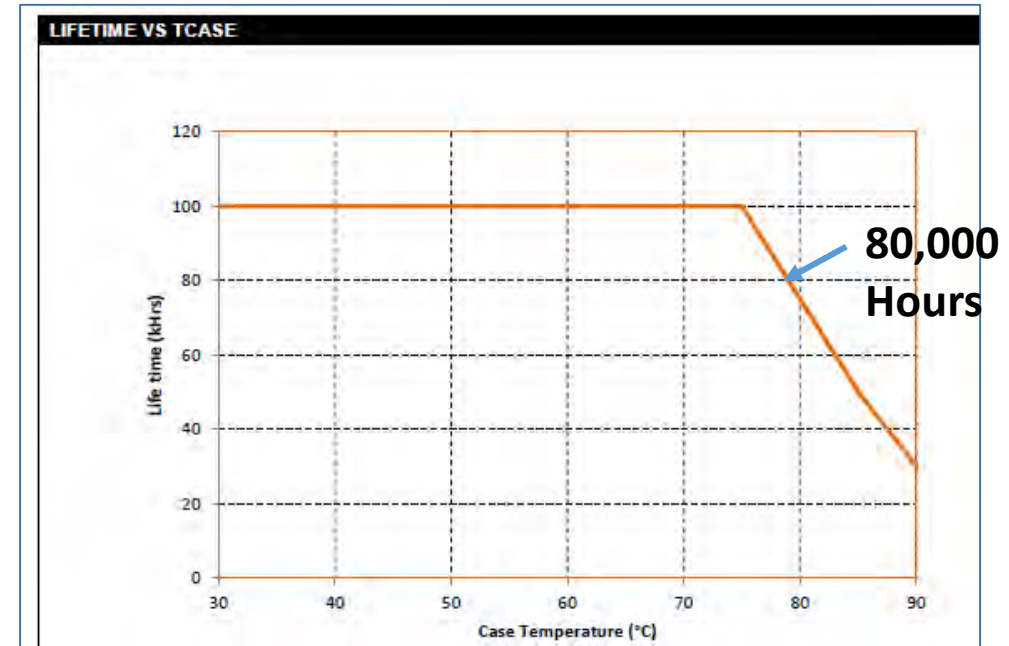
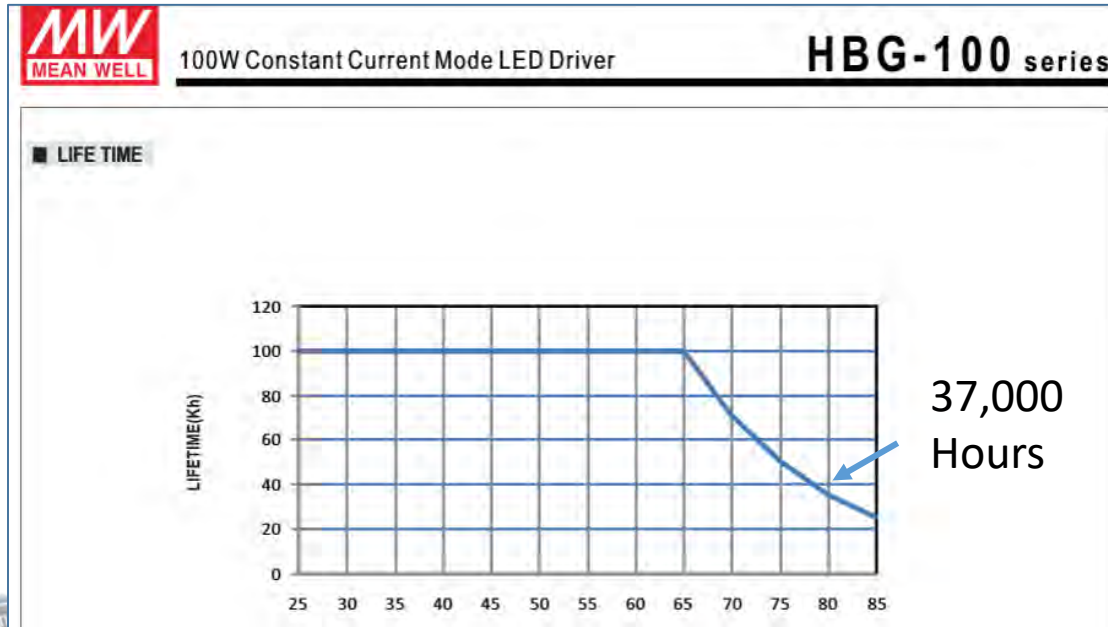
- L70 of 50,000 Hours means you lose **30% of your light within 5 years** at room temp 25C!
- Warehousing/Mfg spaces are hotter than 25C, so timeline is accelerated even faster. 5 Years could = **30-40% loss**
- If you designed your warehouse to 30FC IES Standards, your customer could be seeing 21 FC within a few years, and out of IES compliance.
- Low Lumen maintenance means lowest quality LED's, Drivers, and poor fixture thermals



Driver Life



What?	Typical Import LED	Quality Fixture
Driver Life	Low Cost Drivers could last as little as 30,000-37,000 Hours!!	Lasts twice as long, up to 100,000 Hours



Surge Protection



What?	Typical Import LED	Quality Fixture
Surge Protection	Most have no ANSI Surge Protection = Completely unprotected	6kV-10kV ANSI Standard Surge Protection Included

- ANSI Surge Stds call for a min **6kV** for Industrial/**10kV** heavy industrial, tested to ANSI Standards and Procedures
- Almost all import high bays are cutting cost, and do not design to meet these requirements
- Industrial spaces create challenging power quality environments- Motors, Machinery, VFD's, Conveyors, etc cause many types of dirty power, that can kill an unprotected fixture quickly
- What happens when you don't meet Surge Standards? Your fixtures could go out like Popcorn [Surge Video!](#)
- **Fixtures with ANSI Surge Protection could last years longer than unprotected fixtures**



Serviceability



What?	Typical Import LED	Quality Fixture
Driver Serviceable?	Almost all UFO's drivers are not serviceable Throw-away if the fixture fails	Serviceable Driver

- If the driver fails because of surge, power quality, heat, etc almost all import UFO drivers cannot be changed
- They are soldered to the optical assembly
- If/When the driver fails, you have to throw the entire fixture away
- This goes against the entire value proposition of long-term-solution LED Lighting!
- A good quality round like the Lithonia JEBL has a serviceable driver– Easily disconnect and reconnect a new one!
- Other quality fixtures have a door or easily access driver channel

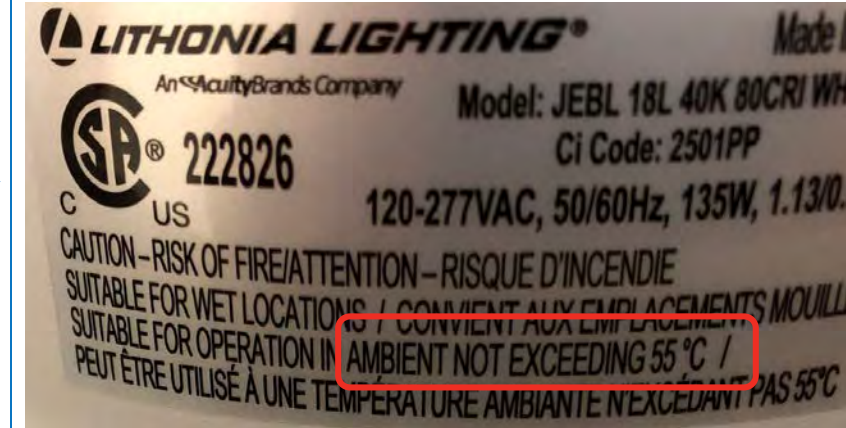


Real Ambient Temp Ratings



What?	Typical Import LED	Quality Fixture
Ambient Temperature	Many claim an "Operating Temp" on the spec sheet, but lack true fixture rating	True Tested/Listed Ambient Temperatures

- Industrial Spaces are hot at the ceiling – The fixture should be CSA/UL **listed** to high temperatures – 45-50C +
- To know what a fixture is listed/tested to, the fixture will have a sticker like this →
- **Many import high bays do not have this sticker, meaning it has not been tested/listed to any elevated ambient**
- **CSA/UL Considers a fixture without an elevated ambient sticker rated to 25C**
- **This is a major risk** – LED's and Drivers could be operating unsafely, and fail



- [Temp Video!](#)



Optics – IP Protection



What?	Typical Import LED	Quality Fixture
Optics	Optics are not IP rated or sealed to dust or debris	Minimum of IP5X Optics to keep dust, dirt, debris

- Using a low cost linear high bay? Most all are not sealed or IP rated and will let in dust, dirt, bugs, and debris
- This reduces light output, hurts aesthetics, and just looks plain bad
- If there is humidity, water, moisture in the air, this could damage LED's and electronics
- Going up to each fixture in a lift and cleaning the lens is a maintenance nightmare
- Fixtures like Lithonia IBG have an **IP5X rating**, which means they are dust resistant
- Fixtures like Lithonia XIB are completely **IP65** sealed to dust, dirt, and water, etc
- IP65 is highly recommended for cold storage, indoor/outdoor, manufacturing

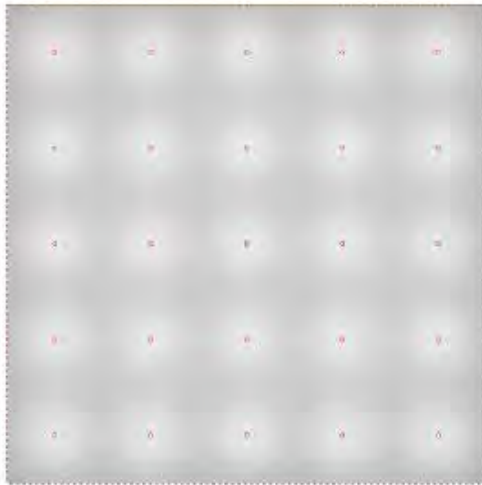


Optics – Light and Glare Control



What?	Typical Import LED	Quality Fixture
Optics	Clear Glass - Spot Lights, High Glare, Poor Uniformity	Prismatic Glass Reflector/Refractors

UFO



Prismatic Optics



Prismatic Optics deliver **70% Better Uniformity** and **10% More Vertical Foot Candles** than a flat Glass UFO

Using a fixture with optics may allow you to use less fixtures and space the fixtures further apart vs clear flat glass

Statistics

Description	Avg	Max	Min	Max/Min	Avg/Min
1 UFO	8.5 fc	14.4 fc	3.6 fc	4.0:1	2.4:1
2 PHZ	6.9 fc	8.5 fc	3.5 fc	2.4:1	2.0:1
3 UFO Wall	3.0 fc	5.4 fc	1.2 fc	4.5:1	2.5:1
4 PHZ Wall	3.3 fc	6.0 fc	1.1 fc	5.5:1	3.0:1

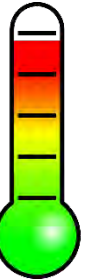
Note

1. Area is 250 x 250
2. MH = 25
3. Spacing = 50 x 50







Chemicals/Solvents/Industrial Fluids can degrade LED's and Plastics

For challenging spaces, make sure you have IP65 and Glass Optics

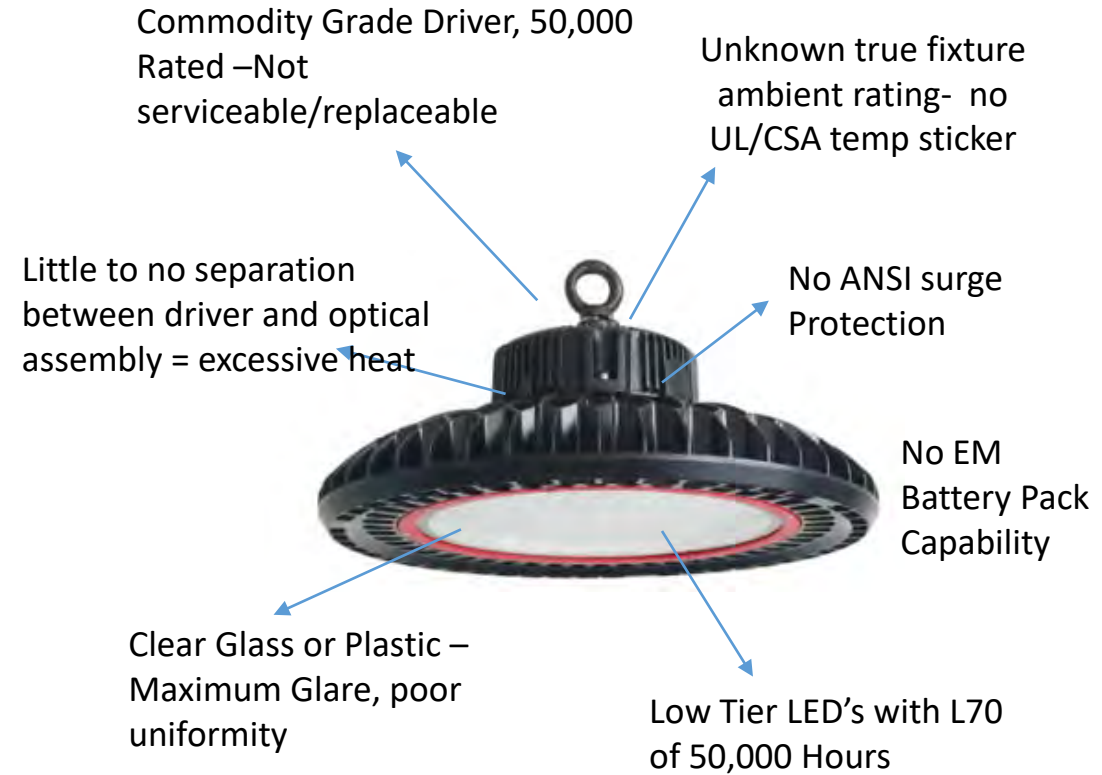
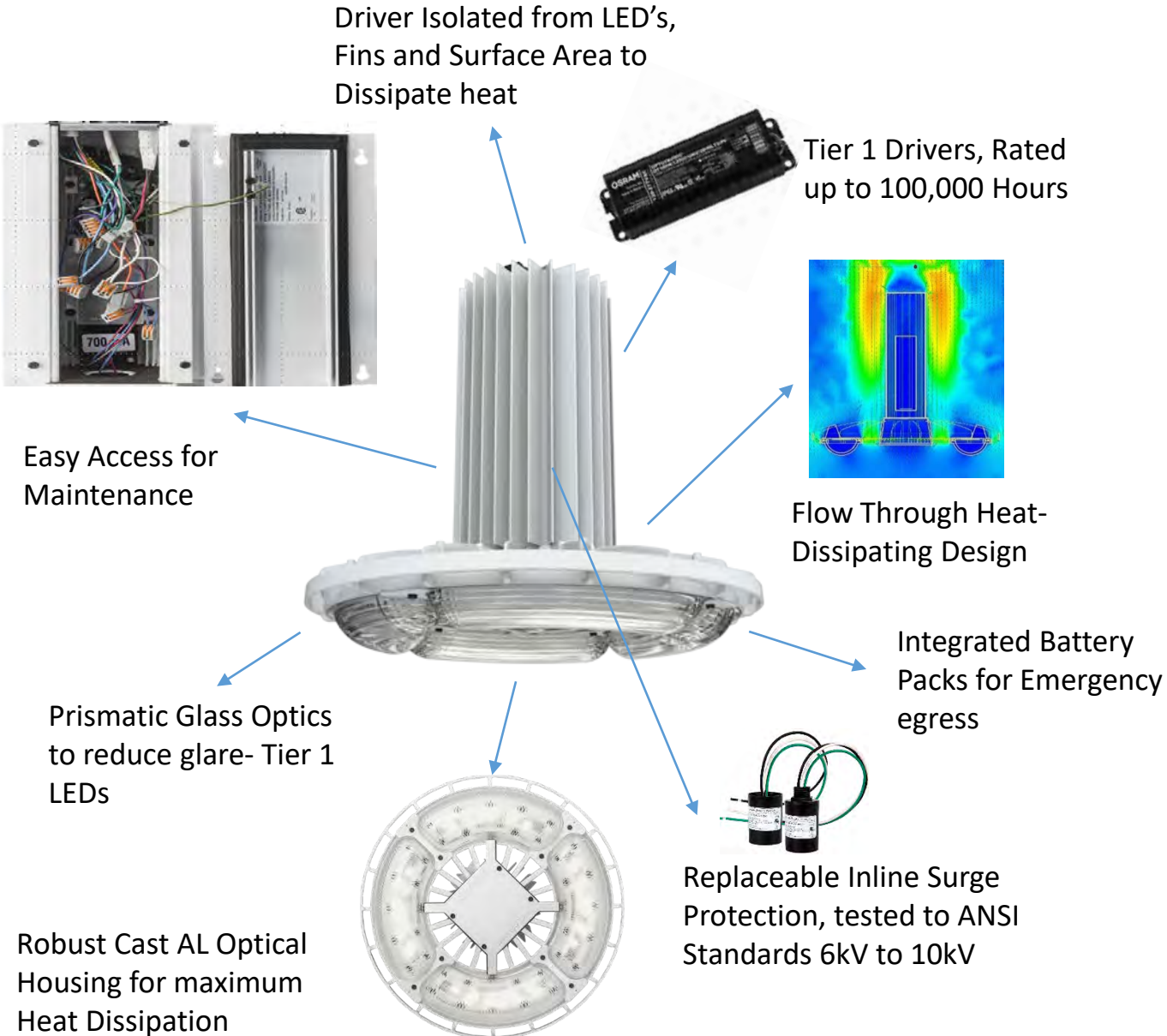
Higher Risk Application



Lower Risk Application

Fixture	Protection level	Warehouse	General Area	Assembly area with no chemicals	Cold Storage	Welding	Heavy Mfg	Machine Shop	Maint/service Bay
	Non-Sealed Lens	Green	Green	Green	Yellow	Yellow	Red	Red	Red
	Full IP65 Flat Glass Lens	Green	Green	Green	Green	Green	Green	Green	Green
	Dust Resistant Lens	Green	Green	Green	Light Green	Light Green	Yellow	Yellow	Yellow
	IP65 Glass Lens	Green	Green	Green	Green	Green	Light Green	Light Green	Light Green
	Full IP65 Optics	Green	Green	Green	Green	Green	Green	Green	Green
	Full IP65 Prismatic Glass Optics	Green	Green	Green	Green	Green	Green	Green	Green

Overall Construction Comparison - Round



Overall Construction Comparison - Linear

[Video Link](#)

Lithonia XIB

Typical Import

Fixture does not carry
CSA Temp Label =
25C rated Fixture

Full Sealed **IP65** =
Protected Electronics
and LEDs

CSA listed true
55C rating
Matching CSA
Temp Label

NSF Listed
Smooth/Clean back,
reduced debris
collection

Debris &
moisture collects
on or enters
fixture from back

No ANSI Surge
Protection

No IP Rating
Holes/Vents

Sturdy **Cast
Aluminum**

Flimsy Sheet
Metal

**Sealed Acrylic and
Glass** Optics –
Keeps optics/LEDs
clean/protected

Commodity Grade
Drivers/LEDs
L70 50K Hours
Drivers lasting 50K
hours or less

Non-Sealed Plastic
Optics, prone to
collecting dust/debris

ANSI 10kV Surge
Standard

Tier 1 Drivers and LEDs
Drivers lasting up to
100K hours, **L91 @
60,000 Hours**



All Industrial LED Products Are Not The Same

What?	Why You Should Care?	What to Look for?
Lumen Maint. (L-Value)	Tells you how long the fixture will deliver the light level you paid for	L70>100 hours, per TM-21 Guidelines. If your fixture is going into Elevated Temperatures, make sure there is a chart that shows lumen Maint vs Temperature. The L70 hours can drop significantly at temps above 25C!
Driver Life	Some fixtures use unknown, unproven manufacturers, lasting <25,000 hrs	A Tier 1 driver from a reputable supplier, with a driver life of up to 50-000 – 100,000 Hours.
Surge Protection per ANSI	LED is more sensitive to power quality events than HID, and surge protection is crucial for long term operation	All Fixtures tested to ANSI Standards and Guidelines: <ul style="list-style-type: none">• Commercial = 2.5kV• Industrial = 6kV• Outdoor (use for Heavy Industrial) = 10kV
Light Output at High Temp	Heat will kill your LED. Some luminaires have elevated temp listings, but have a significant drop in light output at higher temp	For elevated temperature applications, make sure your fixture has a chart showing Lumen output vs temperature. If the luminaire has a temp rating on the spec sheet, make sure the label on the fixture matches!!
Optics	Uniformity and vertical foot candles are key to good lighting in Industrial spaces. Without optics, you have a glare bomb, and spot lights	Diffuse and prismatic optics, distributions to spread the light out , and protect the LED's. Glass is ideal in manufacturing to keep out airborne chemicals and contaminants
Controls	Embedded Sensors and wireless controls allows you to save 50% more energy compared to LED alone, and provides additional functionality	Bluetooth-Programmable Sensors like Sensor Switch Haleon and app-based wireless controls like nLight Air . These are A+ certified and fully interoperability tested