STOUCH LIGHTING®
LED LIGHTING SOLUTIONS

INDUSTRIAL LIGHTING

A GUIDE TO HELP YOU CHOOSE
THE BEST LIGHTING AVAILABLE FOR ALL OF YOUR

INDUSTRIAL SPACES

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STOUCH LIGHTING®
LED LIGHTING SOLUTIONS

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WHY LED?

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WHY INDUSTRIAL SPACES **SHOULD HAVE LEDS**

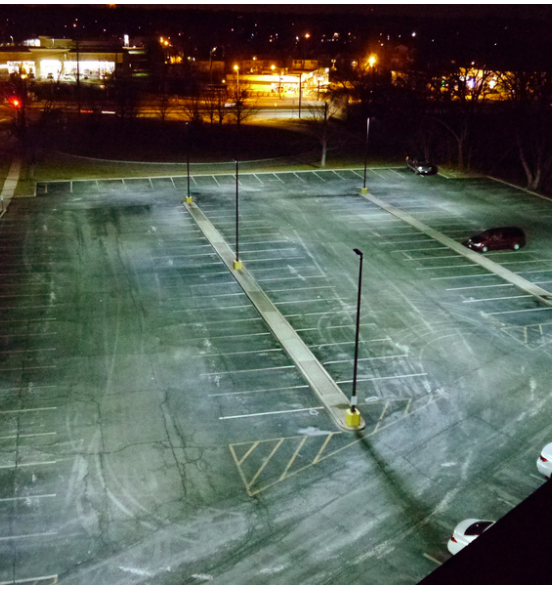
Here are the main **benefits of LED lighting**:

ENERGY SAVINGS

LEDs generally **consume very low amounts of power**. The statistics to look for when comparing the energy efficiency of different lighting solutions are called by one of two terms: **luminous efficacy** or **useful lumens**. These two items essentially describe the amount of light emitted per unit of power (watts) consumed by the bulb. In our experience, most LED lighting retrofit projects **result in a 60-75% improvement in the overall energy efficiency** of the facility's lighting.

MAINTENANCE COST REDUCTION

Because of the way LED lights generate and distribute light, they have a **much longer operating life** than traditional lighting technology. This means you **won't need to change or replace fixtures and lamps as often**, which can require the rental of a bucket truck or lift and reduced operating hours.



BETTER LIGHTING PERFORMANCE

LED lights provide **directional illumination** as opposed to "omnidirectional" lamps that produce light 360 degrees, meaning light isn't wasted pointed at the ceiling or stuck in a fixture housing, and that target areas are more efficiently illuminated. Moreover, high color-rendering index means brighter, whiter light leading to **increased productivity** and **safety**, and **customizable corelated-color temperature** means you get the tone/color you want.

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INDUSTRIAL LIGHTING APPLICATIONS

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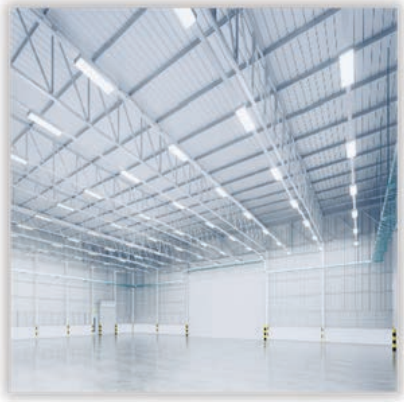
What is Industrial Lighting?

Industrial Lighting applies to a range of unique tasks and environments. Industrial spaces require highly customized lighting solutions to provide a safe and productive work environment. The right lighting can **improve work and safety conditions,** while also **increasing efficiency**, **improving light performance**, and **saving big on energy costs**.

Industries and spaces that require industrial lighting include (but are not limited to):

- Food Processing Plants
- Manufacturing Facilities
- Distribution Centers
- Warehouses
- Cold Storage Facilities
- Railways
- Ports
- Military Facilities
- Telecom & Cyber Centers
- Oil & Gas
- Water Treatment
- Hazardous Location

Indoor Lighting



High Bay & Low Bay Lighting

High bay and **low bay LED lights** are popular in large indoor spaces like factories and distribution facilities, with open space and high ceilings. They are typically mounted via a pendant or chain, or directly to a ceiling or ceiling girder. Industrial spaces require appropriate light levels on the ground and at work stations for **employee visibility**.

Maintenance is an important factor to consider when choosing high bay lighting, as these fixtures and bulbs are more difficult to replace given their location and access limitations. That's why many industrial spaces rely on industrial **high bay LED lights**. High bay LED lights are meant to direct light for more precise illumination.

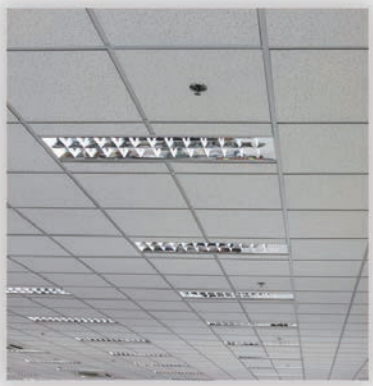
Strip Fixtures

Strip light fixtures are for indoor and outdoor illumination and can be mounted directly to the ceiling or suspended in a variety of ways for general and consistent illumination on the ground. Strip fixtures are **versatile** and used in many spaces. Industrial LED strip lights are often direct replacements for old fluorescent strip lighting. LED strip lights are used to distribute **powerful**, **uniform light** in large areas where light needs to be dispersed. Smaller industrial led strip lights can also be used to illuminate tight or unique spaces.

Vapor Tight Lighting

Vapor tight fixtures are **sealed** and **gasketed luminaires** that provide lighting for environments exposed to water, humidity, and dust is likely to occur. Commonly referred to as “wet location” fixtures, vapor tight lights comes in a variety of sizes and shapes, but **most commonly found in 2ft, 4ft, and 8ft lengths**. They are usually mounted on ceilings, soffits, walls, or in any other building or facility where exposure to water or dust is a concern.

Vapor tight may be a type of hazardous location lighting, which we delve into on page 11.



Troffers/Office

Troffer lighting (aka recessed troffer lighting) is a term used to describe indoor lighting fixtures that are **mounted within a ceiling or ceiling grid**, hence the term “recessed.” Typical fixture sizes include 1x4 troffers, 2x2 troffers, and 2x4 troffers. This type of interior lighting is located lin a range of building types and workplace usage, and is commonly used to provide illumination for industrial and warehouse applications.

Stairwell/Corridor

Stairwell lighting is just as it sounds - lights and fixtures used to illuminate your stairwells and corridors **to keep employees and visitors (as applicable) safe**. According to OSHA, most workplace injuries occur in stairwells, so it's important to keep your stairwells well-lit. Stairwells usually require constant illumination, but switching to LEDs and utilizing sensors (so the lights only turn on when the spaces are occupied) saves big money.

Task Lighting

Task lighting and work lamps are important for industrial settings where detailed tasks, like packaging, food prep, chemical work, parts assembly etc, are required. This lighting is vital to ensure accuracy, adds to general illumination, and affects employee mood and productivity. LEDs are ideal for task lighting, and many LED fixtures have adjustable arms installed at each workspace to give custom lighting to every employee.

Outdoor Lighting

Parking & Area Lighting

Parking lot lights are those pole mounted fixtures used to illuminate parking areas at your facility. LED lighting is ideal for lots used by customers or employees that leave their vehicles for several hours. Remember, it's vital to have **effective parking lot lights** to keep employees safe, especially in many industrial sectors, where employees could be walking to their cars after a second or third shift.

High Mast Lighting

High mast lighting is a type of outdoor site light fixture that is commonly used to **illuminate large areas** from a very high mounting height. For industrial applications, high mast lights would be useful for shipping depots, where large trucks are stored and/or loaded with products and goods, as an example. They're also used instead of or as **parking lot lights** when conventional, lower to the ground parking lot lighting doesn't suffice because the lot is so large and requires that additional illumination.

Road & Tunnel Lighting

Industrial roadway and tunnel lighting is commonly found on physical plant or campus pathways, tunnels, bridges, loading docks, etc. These are frequently pole mounted or tunnel light fixtures that require significant **resistance to vibration and hazardous locations that provide even illumination on the ground**, whether for cars, trains, trucks, or other transport.

Wall Pack Lighting

Wall Pack and Building Lighting are outdoor lighting fixtures commonly mounted on the **exterior walls of buildings**. Industrial outdoor wall lights are generally used to provide illumination to areas for vehicles and pedestrian use, as well as for **security purposes**. It is not uncommon to see multiple fixtures mounted on a single building or wall, with the fixture spacing designed to provide lighting at the ground level around the exterior of a building. These lights make the outside of your building safe and visible.

Hazardous Location Lighting

Hazardous classified locations are areas within a facility or property **where the possibility of explosion or fire hazards may exist under abnormal or normal conditions**, due to the presence of combustible, flammable, or ignitable liquids, vapors, gases, dust or fibers.

The hazardous location classification system is defined by the National Fire Protection Association (NFPA) 70®, National Electric Code® (NEC). NFPA 70 NEC Articles 500 through 503 cover the requirements for electrical/electronic equipment and wiring for all voltages in Class I, Divisions 1 and 2; Class II, Divisions 1 and 2; and Class III, Divisions 1 and 2 locations.

OSHA (Occupational Safety and Health Administration) has adopted the hazardous classifications and requires that all equipment used in hazardous locations be marked with the class, group, and operating temperature range for which it is approved. Continue to the next page for a more in-depth look and chart.

Classes

Classes define the type of ignitable or explosive substances that may be present in the surrounding atmosphere:

- Class I, Class II, Class III

Division

Divisions define the likelihood of the hazardous material being present in an explosive or ignitable concentration:

- Division 1 & 2

Group(s)

- Groups are defined by the specific hazardous materials that may be present. Group descriptions are in the chart below.

HAZARDOUS LOCATION CLASSIFICATION CHART

CLASS		DIVISION		GROUP	
Class	Hazardous Material in Surrounding Atmosphere	Division	Presence of Hazardous Materials	Group	Hazardous Material in Surrounding Atmosphere
I	Flammable vapors or gases may be present	1	Ignitable concentrations of hazard exists under normal operating conditions	A	Acetylene
				B	Hydrogen, butadiene, ethylene oxide, propylene oxide & acrolein
				C	Ethylene, cyclopropane & ethyl ether
		2	Ignitable concentrations of hazards exist only under accidental system breakdowns or abnormal operating conditions	D	Acetone, ammonia, benzene, butane, ethanol, gasoline, hexane, methane, methanol, methane, naphtha, natural gas, propane & toluene
II	Combustible dust may be present	1	Ignitable concentrations of hazard exists under normal operating conditions	E	Combustible metal dusts: aluminum, commercial alloys and magnesium
		2	Ignitable concentrations of hazards exist only under accidental system breakdowns or abnormal operating conditions	F	Combustible carbonaceous dusts: carbon black, charcoal, coal and coke dusts
III	Easily ignitable flyings or fibers may be present	1	Ignitable concentrations of hazard exists under normal operating conditions	G	Other combustible dusts: Chemicals, flour, grain, plastic and wood
		2	Ignitable concentrations of hazards exist only under accidental system breakdowns or abnormal operating conditions		Not Applicable

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LIGHTING STANDARDS & SAFETY

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Lighting Standards & Safety

In industrial spaces, lighting often has to comply with certain **safety** and **sanitation standards**. But understanding the different certifying bodies and certifications can be confusing.

On the next pages, we've defined some of the public health organizations (both federal and private) responsible for **regulating lighting** as well as their **specific certifications**.

Note that these won't be relevant for every industrial application.

NEMA® ENCLOSURE RATING

The National Electrical Manufacturers Association (NEMA) provides a rating system for classifying **heavy duty electrical enclosures used in industrial, Commercial, and Municipal lighting applications**. The NEMA rating indicates to what degree an enclosure is protected against a variety of environmental hazards (such as water, gas, oil, and dust, etc.).

NEMA RATING	DEFINITION
1	Indoor general-purpose. Protects against dust, light, & indirect splashing but is not dust-tight. Primarily prevents contact with live parts & used indoors & under normal atmospheric conditions.
2	Indoor similar to Type 1 but "Drip-Tight". Used to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping & light splashing)
3	Indoor or Outdoor Weather-Resistant; Protects against falling dirt, wind blow dust, & weather hazards such as rain, snow, sleet, & the external formation of ice.
3R	Same as Type 3, but OMITS projection against windblown dust.
3S	Same as Type 3, but remains operational when ice laden.
3X	Same as Type 3, but provides additional level of protection against corrosion
3RX	Same as Type 3R, but provides additional level of protection against corrosion
3SX	Same as Type 3S, but provides additional level of protection against corrosion
4	Indoor or Outdoor Water-Tight. Protects against falling dirt, wind blow dust, & weather hazards such as rain, snow, sleet, the external formation of ice & splashing water, & hose directed water
4X	Indoor or Outdoor Water-Tight with corrosion resistance. Protects against falling dirt, wind blow dust, & weather hazards (rain, snow, sleet, the external formation of ice), splashing water, hose directed water, & an added level of protection against corrosion
5	Indoor Dust-Tight. Protects against falling dirt & settling airborne dust, lint, fibers, & flyings. Also provides a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping &light splashing)
6	Indoor or Outdoor. Temporary Water-Submersion
6P	Indoor or Outdoor. Prolonged Water-Submersion
7	Indoor Hazardous location conditions. Class 1, Groups A, B, C and D.
8	Indoor or Outdoor Hazardous location conditions. Class 1, Groups A, B, C & D.
9	Indoor or Outdoor Hazardous location conditions. Class II, Groups E, F, or G
10	Meets Mine Safety and Health Administration (MSHA) requirements
11	General-purpose. Provides protection against the corrosive effects of liquids & gases
12	Indoor enclosures (without Knockouts). Protects against falling dirt, circulating dust, fibers, flyings & the ingress of water (dripping & light splashing), as well against the dripping of Non-Corrosive liquids
12K	Indoor enclosures (with Knockouts). Protects against falling dirt, circulating dust, fibers, flyings & the ingress of water (dripping & light splashing), as well against the dripping of Non-Corrosive liquids
13	Indoor. Protects against falling dirt, circulating dust, fibers, flyings & the ingress of water (dripping & light splashing), as well against the spraying, splashing, &seepage of oil & non-corrosive coolants

INGRESS PROTECTION RATINGS (IP RATINGS)

The Ingress Protection rating system is classification developed by the IEC that **rates and classifies the degree of projection** that an electrical enclosure has against the intrusion of water and dust.

Although similar to NEMA Enclosure Ratings, IP Ratings were established by a different governing body and are used worldwide, whereas NEMA ratings are mostly utilized in the US and Canada. Also, while IP Rating system is wider in its geographical adoption, it is **limited to measuring the ingress of dust and water**, whereas NEMA ratings account for a much broader range of exposure to corrosive and explosive environments.

See Full Chart on the Next Page

IP RATING CHART

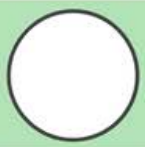
IP Rating stands for **I**ngress **P**rotection Ratings and are comprised of two digits: IP##

IP□□

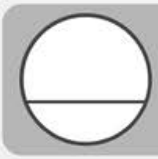
The first digit refers to a light's protection against **solids**, like dust and particles

The second digit refers to **liquids**.

SOLIDS

	**No protection** against entrance of solids **0**
	Protection against solids **larger than 50mm** (ex. hand/large tool) **1**
	Protection against solids **larger than 12.5mm** (ex. finger/small tool) **2**
	Protection against solids **larger than 2.5mm** (ex. wires) **3**
	Protection against solids **larger than 1.0mm** (ex. small wire/strap) **4**
	**Dust protected.** Dust must enter in large amounts for damage to occur **5**
	**Dust Tight.** Dust cannot enter **6**

LIQUIDS

	**No protection** against entrance of water **0**
	Protection against **vertical water droplets** **1**
	Protection against **water drops up to a 15 degree angle** **2**
	Protection against **water spray** up to 60 degree angle (for up to 3 min) **3**
	Protection against **water spray from any angle.** (for up to 10 min) **4**
	Protection against **water jets (4.4 psi) from any direction** (for up to 1 min) **5**
	Protection against **powerful water jets (150 psi) & heavy seas** (for up to 3 mins) **6**
	Protection against **full immersion (up to 3 feet)** (for up to 30 mins) **7**
	Protection against **full immersion (up to 12ft)** (For long periods of time, specified by manufacturer) **8**

EXAMPLE

IP61

NSF CERTIFICATION

NSF International provides a certification system that establishes standards for **food protection** and **sanitation** in regards to the design, materials, construction, fabrication, and performance of lighting fixtures. This applies to both the specific lighting product, as well as the facility in which it was manufactured.

NSF CERTIFICATION ZONES FOR LIGHTING

Non-Food Zone	✓ Lighting in areas where direct contact with food products would *not normally exist* ✓ Equipment is located outside the normal washdown area. ✓ There is a concern that the fixture will add contamination to the protected space or food product (e.g. will the finish withstand cleaning, chipping paint, deteriorating paints or finishes, lens impact resistance, lamp glass breakage, etc.)	**kitchens, freezers, cold-storage facilities, dry process areas - no drip possibility**
Splash Zone	✓ Lighting in areas where direct contact with food products *would not normally exist*, however fixtures may be exposed to liquids used for cleaning or disinfection procedures may spill or splash onto the surface of the light fixture ✓ Fixture must be tested to withstand high pressure hose washdown ✓ The concerns of Non-Food Zone also apply.	**food processing facilities, wet or damp process areas, high pressure purging and/or decontamination used in the process; areas using hose washdown**
Food Zone	✓ Areas where direct contact with food products is normally expected and surfaces from which the food may drip, drain, or splash back onto surfaces normally in contact with food. ✓ Equipment other than lighting fixtures typically require this certification (e.g. work tables, cutting boards, other direct contact equipment)	**Category not typically used for lighting**

VANDAL RESISTANT LIGHTING

Vandal-Resistant lighting is a description of the type of light fixtures that have an **increased ability to withstand impacts, prying, tampering, shattering,** and **severe weather**. Other terms used to describe Vandal-Resistance are Vandal-Proof, Tamper-proof, and High Abuse.

What separates Vandal-Resistant lighting fixtures from standard fixtures for the same applications are additional feature such as *tamper-proof screws*, *aluminum* or *steel housings*, and *polycarbonate lenses*.

There is not an independent certifying body that validates vandal resistance (such as NEMA or UL), so it is up to the individual product manufacturers to state what features exist on a given product that make it vandal or tamper proof.

UNDERWRITES LABORATORIES

UL is a global not-for-profit independent safety analysis company that tests products for safety before they are marketed to businesses or consumers.

UL is one of several OSHA approved organizations approved to perform safety testing in the US. These OSHA approved organizations are all Nationally Recognized Testing Laboratories.

While the most common safety “Mark”, there are several other safety testing organizations that provide equivalent safety verification, such as CE, FCC, CSA:

DESIGN LIGHTS CONSORTIUM

Design Lights Consortium is a non-profit organization that **establishes minimum product specifications** commonly used by utility companies and other entities that offer rebates to their power customers.

There are (**3**) primary product performance areas in which DLC established compliance requirements:

- **CCT** (Light Color)
- **Distribution** (light patterns)
- **Product Lifetimes** (L70 & TM-21)

DLC provides and maintains a Qualified Products List (QPL) of LED products that have met pre-defined lighting category requirements. These categories include LED Luminaires, linear replacement lamps, and retrofit kits.

5

UV-C LIGHTING

5

Germicidal UV-C Light

All industries need ways to keep bacteria and other pathogens at bay to both protect goods and products, but also to protect employees, and it can accomplish both with the right UV-C light fixtures in place.

What is germicidal UV light?

Germicidal ultraviolet (UV) light produces shortwave UV-C emissions that disrupt DNA pairing leading to the **inactivation of germs**. This type of lighting is being used in hospitals, schools, wastewater treatment plants, food processing, and so much more (learn more about all of its uses here).

The UV-C lighting we provide is over 99% effective at killing these pathogens.

UV Light to Protect Employees:

Disinfecting your Air and Surfaces

In the midst of the coronavirus pandemic, germicidal UV-C lighting has seen an uptick in popularity because it can inactivate many of the pathogens responsible for viruses and infections. You can utilize UV-C mobile units or mounted fixtures to kill these kinds of illness-causing pathogens on high touch surfaces and in the air to help keep your employees from getting sick. In an industry that can't shutdown or work from home, this is vital.

Food processing facilities, particularly meat processing, a segment of industrial, are a hotbed for COVID-19, but foods are in high demand as everyone's stocking up for long periods at home. Keep your plant from permanent closure by keeping employees healthy.

UV Light to Protect Food and Beverages:

A Chemical-Free Irradiation Option

Did you know that UV lighting has been used in food processing for hundreds of years for food irradiation? It kills common food-borne bacteria like E. coli, Salmonella, and Listeria that can cause serious illnesses and even death. UV-C lighting has been tested so it can effectively prevent food contamination and also extend food shelf life.

The lighting technology can not only prevent mold, sprouts, insects, etc. from growing and thriving directly on food, it can also treat food packaging and other foodstuff. This includes conveyors and other equipment to transport the food and working surfaces (as discussed above).

Another high growth area for UV-C lighting is specifically for beverages, dairy, and other pasteurized products. UV-C has already been used to sanitize water in municipalities and also bottled water in factories for decades, but it also has potential to replace pasteurization of juices, milk, and more.

Pasteurization is known to kill the good along with the bad, lessening vitamin and mineral levels in important products. UV-C light would eliminate this issue as it does not change the chemical makeup of foods and beverages it treats.

Moreover, as chemical disinfectants, preservatives, and other irradiation methods for food come under increased scrutiny and more and more are banned (citing claims of cancer and birth defects), irradiation options like UV-C lighting are a great alternative. All food manufacturers and distributors struggle with keeping pathogens at bay and muddle through bacterial outbreaks, which cause significant loss to these food and beverage manufacturers. Take the peanut butter Salmonella outbreak of 2009, which started in their processing plant- that company, PCA, is now bankrupt. Stave off these bacteria with UV-C technology.

A Note on Using UV Light for Organic Food

UV-C light can be used on organic foods in most states unlike chemical disinfectants, which is great as organic food demand skyrockets. It's seen an even bigger increase due to COVID-19 too. Organic food cannot legally be irradiated, so UV-C lighting provides a sterilization option here too.

Effectiveness

UV-C lighting is proven to reduce or eliminate many food-borne pathogens, but its effectiveness requires the right exposure time and intensity of irradiation appropriate for each product. With our help placing the right products, this isn't an issue.

Safety

UV-C lighting is safe, and much safer than chemical alternatives or alternatives that alter the density and healthfulness of our foods. But don't just take our word. Here are some sources that cite the safety of UV-C for your reference:

UVC Safely Eliminates Bacteria

Is UV Light Safe For Pathogen Reduction In Food Processing?

Ultraviolet Light Can Kill Bacteria in Fruits, Finds Study

Moreover, germicidal UV-C lighting that protects your employees from sickness is safe too. Here's our take on safety FAQs when it comes to UV technology.

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NEXT STEPS

6

Choose LED Solutions

The first step is to speak with an **LED lighting solutions provider that is manufacturer-neutral**.

Why choose this approach as opposed to the company you may have been using for the past several years?

Unless that company has a focus on providing LED solutions, it is unlikely that they will have the performance-focused mentality that is required to obtain the desired results of an LED lighting project for your unique (and often regulated) location lighting applications.

A crucial step in any LED project is understanding that LED lighting is NOT a commodity

Prior decades consisted of building facility managers and building owners evaluating product options purely on cost, assuming that all of the options in consideration were equal in quality - this is not case with LED lighting.

A solution-focused supplier will ask you about your project objectives.

Do you have...Budget constraints? Return On Investment Criteria? Energy Reduction Targets? Lighting Performance Requirements? Safety Standards?

The appropriate partner will want to get an understanding of your desired outcome, not just what specific products they can sell you. Not all LED products are created equal. There are various levels of value from different manufacturers for different applications, and by working with a company that has the **product expertise to recommend a solution that meets your project priorities**, you will ultimately achieve the best results. We'd love to know more about your upcoming lighting project!

Check out our contact info on the next page.

Contact Us

Thank you for downloading and reading our guide to industrial lighting! We hope you enjoyed the content.

We understand the complexity of Industrial Lighting projects and would love to hear about yours! Head to the website below to fill out a form and one of our LED specialists will get back to you shortly!

Tell Us About Your Lighting Needs

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