

Company Profile

Company Summary



Founded in 2004, Light Emitting Designs is *a leading manufacturer of high quality LED lighting fixtures*. The company's patented technologies and innovative optical design enable reliability and ultra high efficacy, which is revolutionizing the LED lighting industry.

Headquartered in the United States, our marketing and sales offices span across all five continents with direct manufacturing and R&D facilities located in Taiwan and USA.

The company has a *proven track record of projects installed in various demanding environments, such as petrochemical and power plants*, for municipalities and multinational corporations worldwide.

Light Emitting Designs' commitment is *to be the leading provider of sustainable interactive lighting technologies through quality and craftsmanship*.

Manufacturing Facility and R&D

LeD manufacturing plant is an ISO 9001,14001,45001 certified in a 45,000 ft² (4200m²) turnkey facility located in Taichung, Taiwan. The plant includes eight full production assembly lines and an advanced QC center with 24-hour product aging benches. All light fixtures are fully tested prior to shipping to ensure optimal quality control.

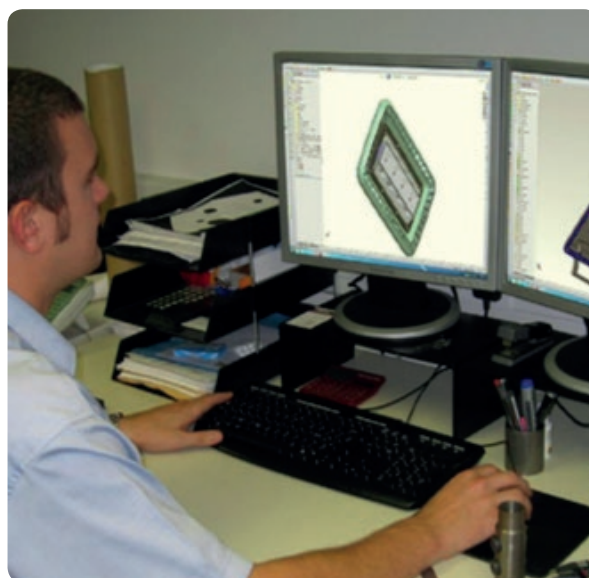
LeD's engineering staff has a combined experience of over 75 years in lighting. Our senior R&D staff were pioneers of the LED automotive industry in the mid 1990s, experts in controlled optics, reflectors and secondary optical systems.



With over 200 mold toolings, Light Emitting Designs has *invested heavily in R&D and advanced molding design, pushing the boundaries of product quality, fixture efficacy and thermal management.* Over time, these advanced tooling designs have saved LeD

substantially on costs of labor and quality control.

Unlike many of its large-scale competitors, Light Emitting Designs' expertise also extends to in-house design, prototyping, and manu-



facture of all electronic control systems and LED drivers. In addition to cost savings and shorter lead times, this enables Light Emitting Designs to have superior quality electronic systems vs. the standard, off-the-shelf units that competitors utilize.

All Light Emitting Designs products go through rigorous engineering evaluation, prototyping phase and real life testing before being launched into the market.

Intellectual Property

**360 ° Halo
Heat Sink System**
US # 11,536,443 B2

- Advanced halo design thermal management with 360° natural convection around the LED light engine & driver control
- Minimizes the junction temperature when used in ambient environments exceeding 75° C (167° F)

**MCPCB
Advanced Technology**
US # 8,661,660

- MCPCB technology enables bonding of the circuitry directly to metal substrates
- Lowers LED junction temperatures by up to 50% enabling cooler operating temperatures

**Passive Air
Cooling System**
US # 8,864,332

- Natural convection via convergence of high and low pressure at different temperatures within the extruded module chamber
- Cools LED temperatures to maximize lifespan and performance

**Advanced Air
Cooling System**
US # 8,757,842 B2

- IP69K (water/vapor/dust-proof) fixture structure enabling 360° high-flow convection spreads heat away from the “hot zone”
- Minimizes the junction temperature when used in environments exceeding 65° C (149° F)

**Advanced Heat
Sink System**
US # 8,272,765 B2

- Advanced thermal technology enables low LED junction temperatures (Tj) for maintenance free long life
- Industry-leading thermal management enables low thermal footprint for longer fixture lifespan

**Side Emitting
Light Assembly**
US # 6,830,364 B2

- Automotive technology applied to industrial applications
- Enables low-profile, thinner fixture design via horizontal reflector and optical system

**IP69K Linear
Lighting Fixture**
US # 10,222,052

- IP69K (water/vapor/dust-proof) modularized linear lighting fixture
- Enables wide angle optics with an all-inclusive IP69K junction wiring box

**Snap & Turn
Mounting System**
US # 9,383,084 B2

- Safe and easy system for a single technician to mount the fixture to any surface without the need for complicated tools
- Greater safety for mounting on hard surfaces in earthquake prone areas

LeD Flagship Products



RWL3525 Street Lighting

- High technology LED street light
- IP68 certified (water-, vapor-, dust-proof)
- Up to 175lm/Watt efficacy with smart daylight sensing
- Industry leading 10-year limited warranty



RWL600 Street Lighting

- Budgetary LED street lighting solution with IP66 rating
- Field serviceable cost effective light engine & LED driver
- Up to 180lm/Watt efficacy with smart daylight sensing
- Industry leading 15-year limited warranty



RWLII Street & Walkway Lighting

- LED street light for parks walways
- IP68 certified (water-, vapor-, dust-proof)
- 10 year limited warranty



ILX450 Industrial Lighting

- LED high efficacy industrial lighting
- 10-year limited warranty
- IP69K rated (water-, vapor-, dust-proof)
- Advanced thermal technology enables long lifespan



ILX340 Extreme Corrosive Area Lighting

- LED corrosion proof industrial lighting
- 7-year limited warranty
- IP69K rated high pressure washable
- Sloped surface design prevents residue & bacteria build up



ILX3525 Extreme Application Lighting

- Heavy industrial grade LED fixture
- 10 year limited warranty
- IP69K rated (water, vapor, and dust-proof)
- Snap & Slide spring-loaded mounting system



LX Series Livestock & Food Processing

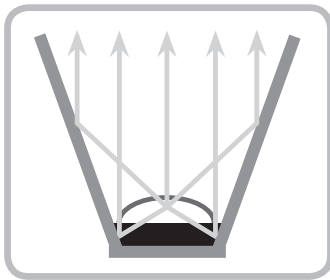
- IP69K, High pressure washable
- High efficacy and durable construction
- Integrated smart dimming circuitry and motion sensor
- Industry leading 7-year limited warranty

Technological Advantages



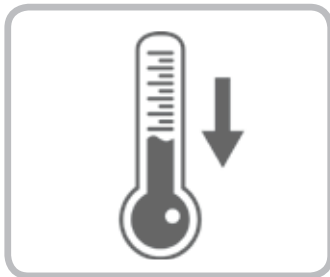
MCPCB Technology

- Globally patented MCPCB technology enables bonding of the circuitry directly to metal substrates, which allows heat to directly flow from LED junction temperature (T_j) / solder points to the heat sink with the lowest thermal resistance in the industry
- Lowers LED junction temperatures by up to 50% enabling cooler operating temperatures therefore increasing the lifespan of all electronic components



Reflector Optics

- LeD's high-efficiency optical reflector system delivers more lumens/watt than any other LED fixtures. Eliminates the need for costly, fragile, and inefficient secondary plastic lenses
- Secondary lenses lead to massive light loss due to diffraction and refraction. Lens failure occurs due to optical thermal shock causing crystallization and cracking of the lens and are also prone to UV and weather degradation
- Reflector based optics has higher light intensity with virtually zero heat caused by optical energy, resulting in cooler LED chip temperatures while reaching >180 lm/w efficacy



Thermal Management

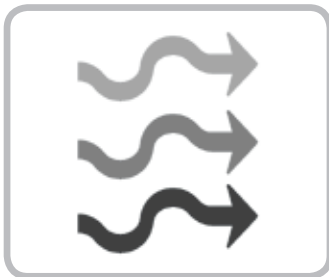
- Patented molding technology enables the use of SI & CU free pure aluminum 98% for superior thermal conductivity
- Patented thermal technology enables low junction temperature (T_j) and ultra high L70 lumen maintenance rating @ $>160,000$ hours or 18 years
- When temperatures rise, the performance and lifespan of the electronic components inversely drop, so thermo-dynamics is the key to LED lighting

Technological Advantages



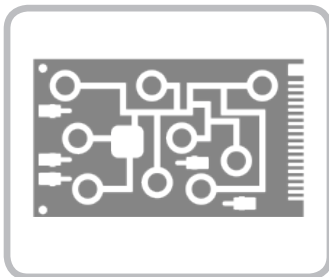
Weatherability

- IP69K Highest ingress protection rating (high pressure washable up to 1800psi)
- All key components including: the LED light engine, optical components, and LED driver are compartmentalized in an IP69K chamber within the housing
- Eliminates all risk of corrosion due to oxidation of solder points in the light engine components and LED driver
- Standard IP65 rated LED fixtures have no protection against vapor, micro dust particles, high pressure steam and corrosive content



Convection Airflow

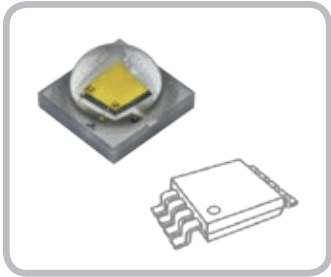
- Dedicated air chamber draws high and low pressure air creating a hurricane-like vortex near the electronic components. This enables cooling without the use of fans or moving parts
- Patented heat sink system dissipates the heat horizontally away from the light engine (hot zone) via radial fins. This allows the heat to spread outward rather than lingering directly above critical components, as with competitors light fixtures
- Maximized cooling effect via 360° air ventilation holes around the light engine (hot zone)



LED Driver Circuitry

- LLC high resonance topology enabling an industry leading efficiency of up to 97% when converting AC to DC
- LED Driver is mounted and potted directly on a dedicated heat sink with a large surface area
- Driver is encapsulated in thermal silicone potting to create a uni-body effect with the heatsink for excellent thermal management
- Other manufacturers pot their drivers in separate housing and then attach externally to a heatsink. This creates layers of resistance to thermal transfer and higher core temperatures

Technological Advantages



LED Chip Components

- Sapphire based flip-chip LED technology made by global leading chip manufacturer Nichia from Japan or Lumileds from Netherlands specifically designed for outdoor and industrial application
- LeD does not use PLCC plastic or resin based LED chips, which have high failure rates and short lifespan due to thermal shock
- MILSPEC German made Infineon driver IC & CoolMOS and American made Texas Instruments diodes
- MILSPEC Japanese made Rubycon electrolytic capacitors rated @ 130°C enabling > 80,000 hours lifespan within our total system.
- MILSPEC Japanese made TDK transformers rated at 165°C; transformers run at about 50% capacity (i.e. 200W driver uses 400W transformers) to improve thermal footprint



High Quality Standards

- In-house aluminum die-casting and plastic injection for quality control and shorter lead times
- Clean room with state-of-the-art SMT robotics line for precision assembly of electronic components.
- ISO9001 rated standard operating procedure (SOP) with implemented QC / QA processes to eliminate virtually all defective fixtures during production
- Advanced QC center with 24-hour product aging facility for all light fixtures prior to shipping to assure optimal quality



Warranty & Reliability

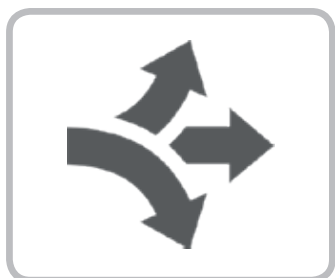
- Patented toolless Snap & Turn Mounting System for quick and simple installation. Enabling lower labor costs and down-time
- Dura-Guard triple layer E-Coating + zinc epoxy + DuPont powder coating with 10-year protection from weather and corrosion
- Industry leading no hassle 10-Year Limited warranty backed by a \$10 million product liability insurance

Technological Advantages



Efficacy (lumens/watt)

- Low-profile, compact design with industry-leading efficacy of up to 180lm/watt
- High Color Rendition Index (CRI > 80) enabling comfortable glare free environment
- LeD's fixtures are up to 25% more efficient than competitors' products with much higher wattages
- Faster Return On Investment (ROI) period with superior energy savings



Product Flexibility

- Flexible design can be used for both indoor & outdoor applications
- Versatile 3-piece body design with 7 choices of mounting and 7 choices of optics options
- Customize the fixture for any application with minimal parts interchanged
- Advanced tooling and molding design minimizes human labor, resulting in lower cost, higher quality control and excellent product reliability
- Streamlined inventory system enables improved production capability, shorter lead times and higher quality end products



Surge Protection

- Smart circuitry with programmable safety threshold enabling long lifespan
- Surge and transient voltage protection of 10kV / 5kA as standard (optional 20kV / 10kA) for lightning strikes and unstable electrical grids
- Over-Voltage protection (OVP), Over-Current protection(OCP), Over-Temperature protection (OTP)

Petrochemical & Explosion-Proof Lighting

The ILX450 and ILX3525 are modern LED lighting platforms, designed with a lean manufacturing philosophy. The wide variety of current and upcoming mounting and accessory options ensures that Light Emitting Designs can *continue to market products that fit and compete for space in nearly any lighting application.*

The fixtures are overbuilt with an IP68 rating and an understanding that they would be used in the harshest lighting applications. In 2022, *newly-made parts will enable the fixtures to be used in the most demanding petrochemical and explosion-proof environments* with the most stringent requirements.

Years of extensive R&D has gone into planning, designing, and executing the latest wave of explosion-proof expansions. Currently, the market for explosion proof LED lighting fixtures is extremely limited, with the only offerings being very small with very low output and efficacy. *The ILX Series fixtures will be the first in their respective classes to achieve Class I, Division II status and will open a tremendous variety of untapped lighting markets.*

Some applications in the Petrochemical and Mining industries are listed below:



Land-Based
Exploration



Offshore
Exploration



Pipelines &
Storage



Refining
Facilities



Bucket Wheel
Excavators



Conveyor Belt
Systems



Mineshaft
Lighting



Mineral
Processing

ILX450 Hazardous Area / Explosion-Proof Lighting



3/4" Pendant Mount



25° Stanchion Mount



90° Stanchion Mount



Ceiling Mount



25° Stanchion Wall Mount



90° Stanchion Wall Mount

ILX3525 Hazardous Area / Explosion-Proof Lighting



3/4" Pendant Mount



25° Stanchion Mount



90° Stanchion Mount



Canopy Mount



25° Stanchion Wall Mount



90° Stanchion Wall Mount

Recently Completed Projects

Caterpillar Factory Batam, Indonesia

- Largest Caterpillar facility in SE Asia in a 100,000m² facility next to the ocean
- *Customer requirements:*
 - Invulnerability to high-salinity environment
 - Immediate energy savings
 - Long LED life & no upkeep required



Caterpillar Power Plant¹ Yangon, Myanmar

- New 52-megawatt power plant, built by Caterpillar to generate electricity for Myanmar
- *Customer requirements:*
 - Long LED life and quick ROI
 - High lumen output
 - Invulnerability to corrosive turbine steam



Hitachi Auto. Plant² Queretaro, Mexico

- New 60,000m² automotive equipment facility for Hitachi in Queretaro, Mexico
- *Customer requirements:*
 - High lumen output and efficacy
 - Virtually zero downtime or maintenance
 - CRI of 85 or better



Kuwait Oil Company (KOC) Kuwait

- Kuwait Oil Company's petroleum-refining facility
- *Customer requirements:*
 - IP68-rated fixtures
 - Virtually zero downtime or maintenance
 - Coastal, saline environment protection



Recently Completed Projects

NASA Mars Rocket Test Facility USA

- Defense & Aerospace contractor Orbital ATK selected ILX450-220W as the sole lighting fixture to be used in the rocket booster test facility for slated 2030 Mars mission
- *Customer requirements:*
 - Extreme durability
 - Massive power density and lumen output
 - High heat resistance



Tate & Lyle Sucralose Plant Singapore

- ILX3525 fixtures were used to replace 250W metal halide lamps at a chemical plant on Jurong Island
- *Customer requirements:*
 - Long LED life for sizable ROI
 - High lumen output
 - Invulnerability to corrosive turbine steam



ESKOM Coal-Fired Plants South Africa

- IL450 and IL3525 fixtures were used to replace HPS bulbs in ESKOM's coal-fired power plants
- *Customer requirements:*
 - Heat resistance
 - Long LED life and sizable ROI
 - Set-and-forget installation



ConAgra Food Processing USA

- ILX450 and ILX3525 fixtures were used to replace 400 & 250W metal halide lamps at ConAgra's plant
- *Customer requirements:*
 - Virtually zero downtime or maintenance
 - Invulnerability to cleaning chemicals
 - Long LED life for sizable ROI



Client Portfolio

Light Emitting Designs has evolved into a global leading brand with a strategic client portfolio covering a wide range of diversified market sectors. Our innovative and flexible product line enabled our dedicated Sales and Marketing team to achieve this goal in a very short time. Superior craftsmanship and disciplined corporate culture has ensured excellent quality control with virtually zero failure rate. Light Emitting Designs technologically advanced products meet or exceed military specifications granting access to recognized government contractors such as NASA and Northrop Grumman with an unprecedented 10-year warranty.



Strategic Partnerships

Light Emitting Designs has partnered with leading Tier 1 suppliers of LED chips, electronic components, and raw materials in order to achieve and maintain the highest level of quality in our products.

Our close working relationships with suppliers lead into collaborative ventures, sharing industry experience, and joint development of LED fixtures that establish a new cutting edge in lighting technology.

Furthermore, Light Emitting Designs benefits from improved lead times and pricing, allowing the application of Just-In-Time methodology. This leads to a lean manufacturing operation with shorter lead times, less waste and smaller facilities required.

Tier 1 suppliers are listed below:



LUMILEDS is a global leader in high-powered white LEDs



NICHIA is a global leader in high CRI LEDs



CREE is a global leader in high-powered white LEDs



TEXAS INSTRUMENTS designs leading electronic components



INFINEON designs world-leading electronic components



ON SEMICONDUCTOR is a leader of high-end surface mount (SMT) electronic components



TOSHIBA designs world-leading electronic components



Jotun is the leading powder coating supplier in the world



Mitubishi Chemical, world leading provider of plastic material



Bayer Chemical, world leading provider of plastic material