Linear LED
Lighting Technology Platform
The future of lighting is officially here.

Cooper Lighting’s internally developed Linear LED Platform is a beautiful synthesis of technology and design and it revolutionizes the approach to lighting interior work environments. Leading-edge solid state components have been elegantly infused into a wide array of Cooper Lighting’s premier linear fluorescent luminaires to create ultra light carbon footprints through reducing luminaire input watts, improving lumens per watt performance, and vastly improving system life.

The proprietary low-power, low-brightness LED system delivers a soft, diffuse volume of pure white light that carries the general character of a fluorescent source although improves upon fluorescent by eliminating unsightly socket shadows and the hassle of luminaire maintenance with a system life of 50,000 hours. This built-in LED lighting performance remains consistent across the platform in terms of lighting quality, color, serviceability and warranty… and confidence to step into the world of LED can be guaranteed by Cooper Lighting’s 175+ years of lighting and electrical expertise and experience.

Step into the future with confidence… Today.
Cooper Lighting’s internally developed ALM 1.0 LED module offers superior energy performance and lighting quality for interior spaces.
A BREADTH OF LED SOLUTIONS FOR A WIDE ARRAY OF GENERAL AND SURFACE LIGHTING APPLICATIONS

Cooper Lighting’s linear platform was designed with a breadth of offering in mind. One of the key benefits to a low powered dense array of .25 watt LEDs is its cool operating temperature. When LEDs run cool they do not require large heat sinks typical of high powered systems. This allows for a very low profile LED component design which enables the module to easily integrate in to numerous fixture platforms without requiring major mechanical design and/or redesign.

The new Linear LED platform carries the benefits of LED lighting into the following mainstream lighting applications: Recessed General Illumination, Suspended Direct-Indirect General Lighting, High-Abuse, Confinement, Ceiling Surface and Wall Wash.

- 50,000 Hours Rated Life (L70)*
- Virtually No Maintenance
- No Socket Shadows
- Low Brightness, No LED Pixelation
- No Mercury
- 75 Lumens Per Watt Delivered*

*See Corelite and Metalux data on pages 10 and 11
METALUX / Accord
Recessed General Illumination

FAIL-SAFE / HVL
High Abuse General Illumination

COROLITE / RZ Series
Recessed General Illumination

COROLITE / Loft Micro
Suspended General Illumination

NEO-RAY / Straight and Narrow
Recessed, Surface & Suspended General Illumination

AMETRIX / Arrowlinear
Linear Asymmetric Ceiling and Wall Wash
The ALM 1.0 is a proprietary Cooper Lighting LED module assembly designed to integrate into luminaire platforms geared for ambient and surface lighting applications. The beauty of the component lies in its low-power discrete LED configuration that runs exceptionally cool, hence requiring minimal heat-sinking to ensure an easy fit into any fixture platform either new or existing.

The dense low-powered array delivers crisp white light while carrying excellent light diffusion characteristics since the overall light energy is divided into numerous point sources, thus allowing the module to be mounted close to lens surfaces without revealing the LED “pixel” effect.

Finally, low-powered arrays create the ideal condition for delivering high lumens per watt. The ALM’s constant DC current drives each LED to less than half of its maximum rated wattage enabling the achievement of 90 lumens per watt* which meets or exceeds most fluorescent lumen packages.

Key Features:
- Low-power .25 watt discrete LED array
- 90 Lumens Per Watt*
- 2 Light levels (100% / 75%)
- Future proof modular design
- Dimmable 0-10v (15%-100%)
- 3 Color Temperatures
- 85 CRI

Technical Data

- Luminous Efficacy: 90 lamp (“hot”) lumens per watt.*
- Compliance: Modules are UL recognized components and indoor luminares are UL listed for 25ºC ambient environments. RoHS compliant, and LED modules comply with IESNA LM-79 and LM-80 standards.
- Reliability: Each module receives over 4000 hours of reliability testing which includes Thermal Shock, Thermal Cycling, and Humidity Testing.
- End of Line Testing: Each certified Cooper Lighting LED manufacturing facility performs an end-of-line pass/fail test for all components with regard to color temperature, luminous output and wattage.

Warranty: 5 year warranty on LED components and driver.

Driver: Standard LED drivers are Class 2, 24v DC constant current with standard 0-10v dimming built-in. Dimming range is 15%-100%.

Traceability: During assembly, each module’s signature is scanned into a database and matched to a corresponding sales order number to ensure proper color and lumen output match for future replacements.

Components: 25 watt max discrete LED array configured onto a PCB in a series parallel matrix to avoid string outages. Highly reflective white FR4 PCB composed of flame resistant reinforced woven fiberglass. Connectors located below PCB surface to avoid shadows.

* LED Module plus driver produce greater than 90 “lamp” lumens per watt. Fixture lumen losses are not factored into this value. See product page for delivered fixture lumens (p10-15)
The explosion of performance growth within LED technology guarantees the availability of higher lumens per watt packages in the future. To address future retrofits of higher performing packages, Cooper Lighting has designed critical features into the module design to allow for simple physical replacement of the module.

**FUTURE PROOF MODULE DESIGN**

**Color Temperature Creates Mood**

The ALM module is available in three color temperatures each offering a unique color characteristic that will impact the mood of an environment. Warmer tones tend to evoke feelings of comfort ideal for restaurant, retail and hospitality applications, whereas cooler tones tend to have a stimulating effect and in turn enhance occupant alertness.

- **3000K**
- **3500K**
- **4000K**

**Plug-N-Play Connectors**

Plug-N-Play quick disconnects offer safe and simple snap together wiring for simple service in the field.

**Serialized Modules**

Each module carries a bar code or serial number that offers traceability to every component to ensure an identical color match for future replacements.

**Simple Removal/Replacement**

Each module has been designed to be easily removed with standard hardware so that any maintenance person can easily service in the field.
Goniophotometer performing LED module light direction measurement in Cooper Lighting’s photometric lab.
The Innovation Center

Cooper’s 60,000 square foot Innovation Center opened its doors in 2009. The multi-million dollar facility is home to the research, development, design, validation, and manufacturing of proprietary LED and other advanced lighting technologies. Teams of highly skilled Mechanical, Electrical, Thermal, Optical, and Reliability Design Cooper has made significant investments in talented personnel, state-of-the-art equipment, and in the latest analytical and design software. Our world-class Innovation Center teams execute multiple LED design and performance assessments including visual renderings, thermal simulations, electrical analysis, and optical ray-tracing. Our stringent product development process ensures a highly reliable product every time.

Quality Testing and Assurance

Manufacturing and assembly is a critical and final step in the LED product development process. By involving the Innovation Center operations team throughout the design process utilizing tools like Production Failure Modes and Effects Analysis (PFMEA), we have optimized our manufacturing process and mitigated risk of premature failure.

Our state-of-the-art Pilot Production area incorporates modular and transferable cell construction, a temperature and humidity controlled environment, and ESD protection for a well manufactured fixture each and every time.

Our products are further evaluated and qualified through 100% end-of-line testing for power (wattage), light output, and color temperature. Finally, our products are bar coded and the production data is captured in a manufacturing database to provide system and assembly level traceability and quality control.

Design

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Electrical and Optical Labs

Our highly qualified lab and research development teams take great pride in their active involvement in creating and driving industry standards. Cooper Lighting’s Certified Test Laboratory conducts extensive testing of electrical, optical, and thermal properties for robustness in application and intended performance over rated life. The testing performed is capable of validating products to industry standards such as LM-79, LM-80, ENERGY-STAR® and UL.

Prototyping

The Research and Development Prototyping area houses world-class rapid prototype equipment and lean manufacturing workcell development capabilities to reliably deploy new advanced lighting technologies. The modernized rapid prototyping lab includes the latest milling and Computer Numeric Control (CNC) equipment and an advanced quality lab for layout and validation. In addition, operations such as painting, welding, and fused deposition modeling (FDM) are performed.

Reliability and Thermal Testing

Reliability is one of the most important elements of LED lighting. Cooper’s Reliability and Thermal Laboratory is vital to ensure our LED luminaires meet their stated performance over the lifetime of the product. Our experts use the most advanced environmental and thermal mapping test equipment along with a rigorous testing protocol and statistical analysis tools to ensure long-term performance of LED components, systems, and finished luminaires.
Accord Series LED
2x2 Recessed / General Illumination

Metalux’s Accord® Series LED marries its optimal illumination design and contemporary styling with the technology of Cooper Lighting’s Linear LED Platform. Accord’s high performance LED system, advanced light distribution and attractive appearance delivers unprecedented energy savings, comfort and aesthetics. The results below clearly demonstrate that Cooper Lighting’s LED technology outperforms fluorescent in many cases and officially makes LED a vehicle for achieving best case watts per square foot scenarios.

Features

• Standard “Built-in” 0-10V Dimming
• 2 Color Temperatures – 3500K, 4000K
• 2 LED Light Levels (45W – 3400 Lumens / 33W – 2600 Lumens)*
• Advanced refractive optics delivers greater distribution and uniformity of light
• 3 Shielding Options (Smooth Frosted, Square Perf Pattern, Round Perf Pattern)
• Shallow depth and tool less design makes for quick and easy installation

*Approximate lumen values. Consult factory for more info.

Accord 2x2 LED* (Light Level 2) Accord 2x2 Fluorescent (2-24W T5HO)

<table>
<thead>
<tr>
<th></th>
<th>Accord 2x2 LED*</th>
<th>Accord 2x2 Fluorescent</th>
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<tbody>
<tr>
<td>Lumens Per Watt</td>
<td>3493</td>
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<tr>
<td>Delivered Lumens</td>
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<td>Input Watts</td>
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<td>52</td>
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*Based on IES report # P21047

Companion LED Products and Options

Accord 2x4 LED Accord 1x4 LED
RZ Series LED
2x2 Recessed / General Illumination

Corelite’s RZ Series LED combines the technology of Cooper Lighting’s LED Platform with its signature low brightness, fully luminous design. RZ’s innovative optical system efficiently delivers light to architectural surfaces and work environments, ensuring high visual comfort for modern office tasks while maintaining an ultra-light carbon footprint with the energy and maintenance benefits of LED. The comparison results below clearly demonstrate that Cooper Lighting’s LED technology outperforms fluorescent in many cases and officially makes LED a vehicle for achieving best case watts per square foot scenarios.

Features

• 5 Center Shielding Options
  (Round Perf, Rectangular Perf, Micro-Baffle, Frosted Prismatic, Nano Prism)

• 2 Shielding Styles: Class R- radiused, RZ Series-planar

• 2 LED Light levels (45W-3400 Lumens / 33W 2600 Lumens)*

• Standard “Built-In” 0-10v Dimming

• 3 Color Temperatures- 3000K, 3500K, 4000K

• Low Brightness shielding delivers soft vertical footcandles

*Approximate lumen values. Consult factory for more info.

Companion LED Products and Options

Visit www.corelite.com to learn more

<table>
<thead>
<tr>
<th>Class R3 Recessed LED</th>
<th>Class R3 Surface LED</th>
<th>RZ Series - Zmini LED</th>
<th>Loft Micro LED</th>
<th>Loft Micro Wall Mount LED</th>
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<tr>
<td>Z3 2x2 LED* (Light Level 2)</td>
<td>Z3 2x2 Fluorescent (2-24W T5HO)</td>
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<tr>
<td>Lumens Per Watt</td>
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<td>Delivered Lumens</td>
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<tr>
<td>Input Watts</td>
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*Based on E3 report # ITL67078
22 Series LED
Linear Recessed, Surface & Suspended / General Illumination

Neo-Ray’s most popular Straight and Narrow family of products now includes a dynamic LED offering. Slender lines of continuous light provide a uniform glow in an architectural environment. Our series 22 family includes complementary recessed, suspended, surface and wall mounted luminaires. Complete as both individual and continuous run fixtures to the nearest foot. A fully extruded aluminum housing for precise in line appearance and enhanced rigidity. Flush high transmission frosted acrylic lay in lens for a clean look and easy maintenance.

Our LED offering includes two light levels equivalent to T5 and T5HO output, three color temperature options (3000K, 3500K, 4000K) and an integral driver. Fixture efficiency, efficacy and delivered lumens per watt are greater than fluorescent, and provide for an overall energy savings.

Features

- 2 LED light levels (45W-2700 Lumens, 33W-2100 Lumens)*
- Standard “Built-In” 0-10v Dimming
- 3 Color Temperatures- 3000K, 3500K, 4000K
- Low Brightness shielding delivers soft vertical footcandles

*Approximate lumen values. Consult factory for more info.

<table>
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<tr>
<th>22 Series LED* (Light Level 2)</th>
<th>22 Series Fluorescent (1-54W T5HO)</th>
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<td>Lumens Per Watt</td>
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<td>Delivered Lumens</td>
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<tr>
<td>Input Watts</td>
<td>45</td>
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*Based on IES report # P21069

Companion LED Products and Options

Visit www.neoray-lighting.com to learn more
NEO-RAY
22 Series LED
HVL8 LED
High Abuse Surface / General Illumination

The Fail-Safe Harmony VR Linear provides exceptional aesthetics with remarkable strength. Fail-Safe’s LED linear model options and connection configurations offer unmatched versatility for a wide range of applications. Die-Cast end caps, heavy extruded aluminum body provides strength and rigidity for complex environments while an extruded linear ribbed polycarbonate lens obscures the lamp image and spreads light evenly. The Harmony VR Linear is ideal for areas where the need for aesthetics and protection from vandalism are critical. Perfect for schools, hospitals, corridors, dormitories, public restrooms, common areas, and transit stations.

Features

• Heavy-duty aluminum extruded door
• UV stabilized polycarbonate lens
• Concealed center pin reject Torx screws
• UL Listed for wet locations
• Available in 2 color temperatures (4000K, and 5000K)
• 75 CRI (Fail-Safe Linear LED Module)

Companion LED Products and Options

FMSLP Surface Mount LED  FCC Corner Mount LED  FMR Recessed LED  FMB Wall Mount LED

Visit www.failsafe-lighting.com to learn more
The Ametrix Arrowlinear™ LED series provides performance, versatility and energy efficiency in a rugged, yet sleek product profile. Combined with Cooper Lighting’s linear LED platform, Arrowlinear LED delivers uniform asymmetric illumination to the target surface with lumen output, color temperature and color rendering that meets or exceeds T5HO – but with fewer lumens per watt. All models include integral LED driver and can be mounted individually or in continuous rows. Models include 1’, 2’, 3’, 4’, 6’, 8’ and 12’ units. An extensive range of mounting options and value-added features are standard.

Features
• Asymmetric distribution
• 1’, 2’, 3’, 4’, 6’, 8’ and 12’ lengths
• Individual fixtures or continuous row mounting
• Wall, ceiling, base or pendant mounting
• PointGrab2™ lockable aiming system
• Indoor or outdoor models

Arrowlinear LED
Linear Asymmetric

Visit www.ametrixlighting.com to learn more

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<th>Arrowlinear LED* (Light Level 2)</th>
<th>Arrowlinear Fluorescent (1-54W T5HO)</th>
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<tr>
<td>Lumens Per Watt</td>
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<td>Delivered Lumens</td>
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<td>Input Watts</td>
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*Based on IES report # ITL67064