



LINEAR LED
P L A T F O R M

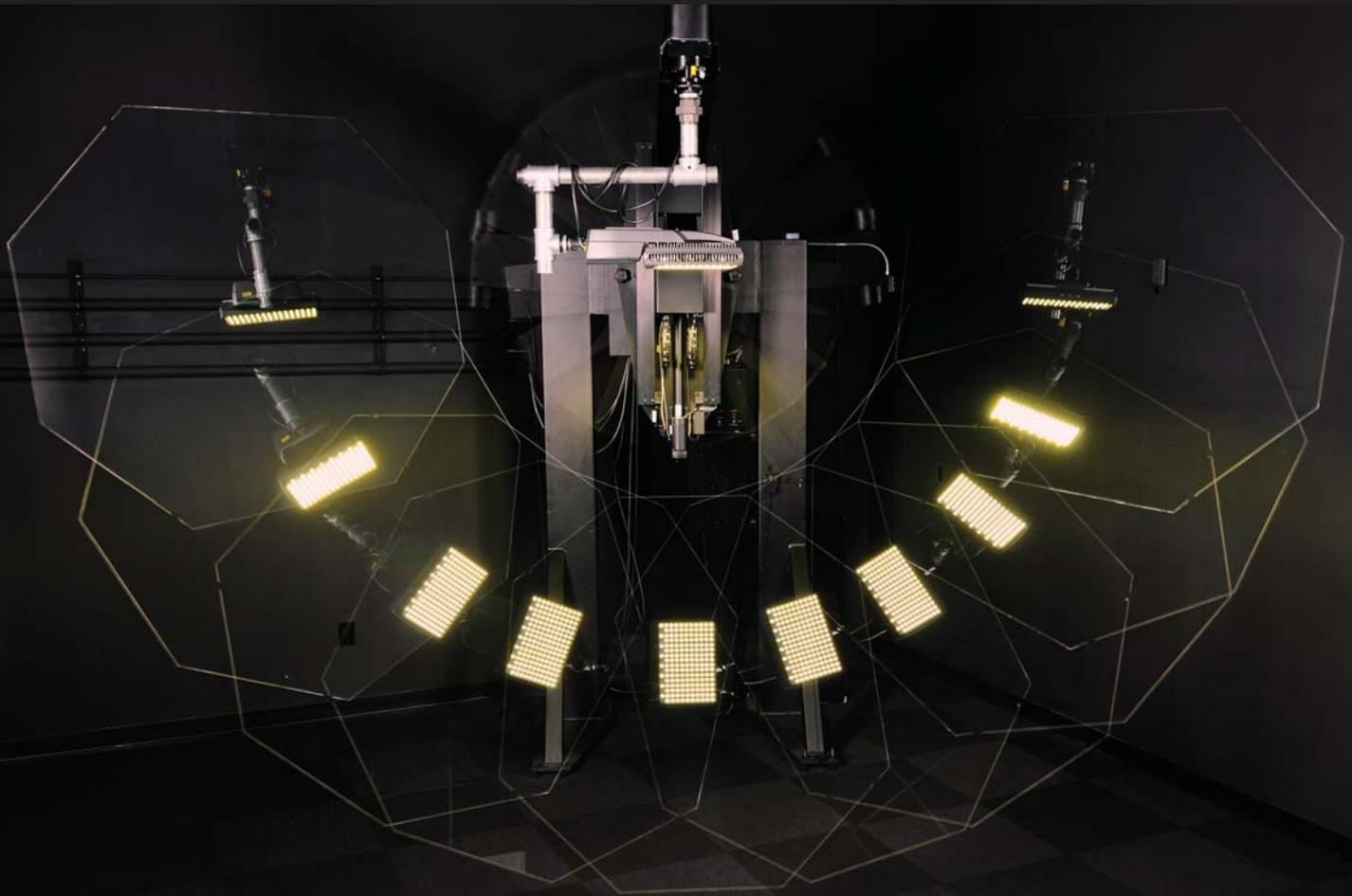
Accord Series LED

Architectural Recessed

LINEAR LED

P L A T F O R M

Technology by **COOPER** Lighting



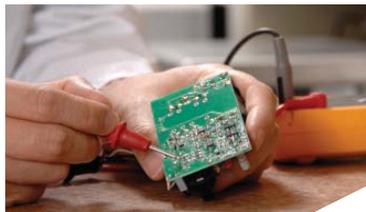
Goniophotometer performing LED module light direction measurement in Cooper Lighting's photometric lab.

LED Technology Supported by 175+ Years of Industry Expertise



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 Engineers work hand-in-hand with Industrial Designers, Lab Technicians, and Manufacturing personnel to accelerate the development and commercialization of relevant industry-leading LED solutions.



Design

Cooper has made significant investments in talented personnel, state-of-the-art equipment, and 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.



Electrical & 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.



Quality Testing & 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.



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 are performed.



Reliability & 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.

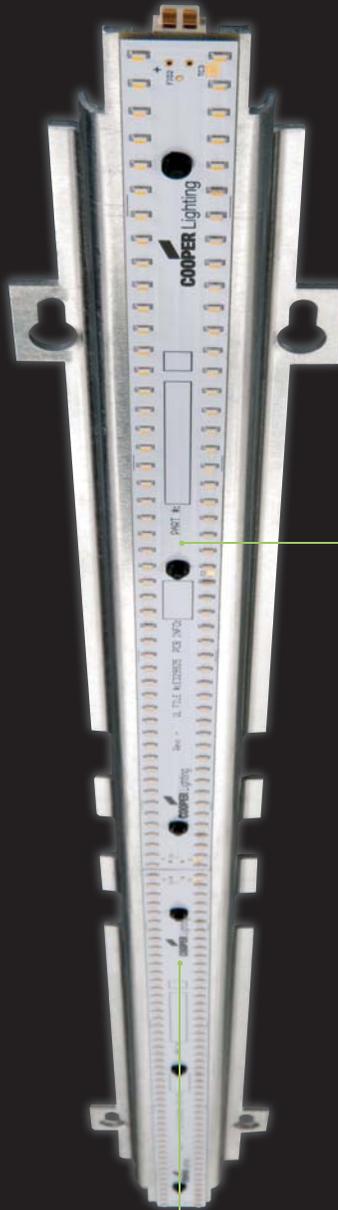
SustainableLEDesign™

Architectural Linear Module

Version 2.0

The ALM 2.0 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.

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 100+ lumens per watt*, which meets or exceeds most fluorescent lumen packages.



- Low-Power 0.25 Watt Discrete LED Array
- 100 - 115 Lumens Per Watt*
- 2 Light Levels (100% / 75%)
- Future Proof Modular Design
- Dimmable 0-10v (15%-100%)
- 3 Color Temperatures
- 85 CRI
- 50,000 Hours Rated Life (L70)
- Virtually No Maintenance
- No Socket Shadows
- Low Brightness, No LED Pixelation
- No Mercury
- 85 - 100 Lumens Per Watt Delivered



3000K 3500K 4000K

Technical Data

Luminous Efficacy: 100-115 lamp ("hot") lumens per watt.*

Compliance: Modules are UL recognized components and indoor luminaires are UL listed for 25°C 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%.

Rated Life: 50,000 hours L70, 70% lumen maintenance over life.

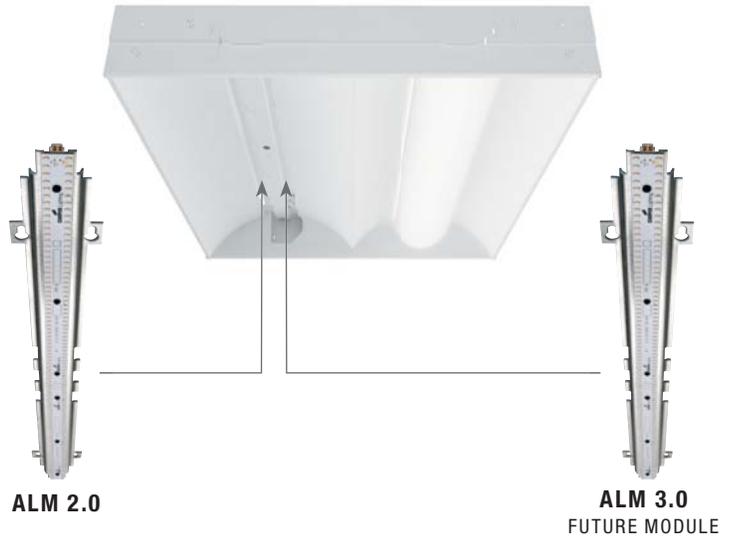
Traceability: During assembly, each module's signature is scanned into a database and matched to a corresponding sales order number to ensure proper color and lumen output match for future replacements.

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 100-115 "lamp" lumens per watt; fixture lumen losses are not factored into this value. See product page for delivered fixture lumens (p10-11).

Future Proof Module Design

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.



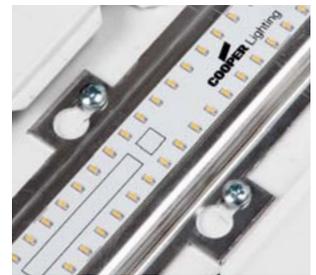
Plug-N-Play Connectors

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



Serialized Module

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



Simple Replacement

Each module has been designed to be easily removed with standard hardware so that any maintenance person can easily service in the field.

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



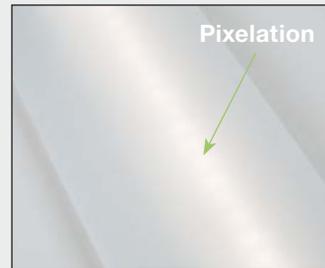
3500K



4000K

Low Power Mitigates "LED" Pixelation

The dense low-powered array delivers crisp white light while carrying excellent light diffusion characteristics. 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.



High-Powered LED Array



Linear LED Module, Low-Powered Array



Accord Series LED



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 deliver 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.

	Accord 2x2 LED* (Light Level 2)	Accord 2x2 Fluorescent (2-24W T5H0)
Lumens Per Watt	86	57
Delivered Lumens	3370	2973
Input Watts	39	52

*Based on IES report # P22086

	Accord 2x4 LED* (Light Level 1)	Accord 2x4 Fluorescent (2-28W T5)
Lumens Per Watt	103	78
Delivered Lumens	4705	4569
Input Watts	46	58

*Based on IES report # P21935



Features

- Standard "Built-in" 0-10V Dimming
- 3 Color Temperatures – 3000K, 3500K, 4000K
- 2 LED Light Levels offered per fixture
- Advanced Refractive Optics Deliver Greater Distribution and Uniformity of Light
- 3 Shielding Options (Smooth Frosted, Square Perf Pattern, Round Perf Pattern)
- Shallow Depth (3 1/4") and Tool-less Design Make for Quick and Easy Installation

Companion LED Product



Accord 2x4 LED



Accord 1x4 LED



Features & Benefits

ALM 2.0

- 100 Lumens Per Watt–9.5 Watts Per Foot
- 0.25W with High Efficacy LEDs
- Low Brightness Array Mitigates "Pixelation"
- Superior Thermal Management Reduces Heat Sink Size
- No Socket Shadows
- Series Parallel Matrix Prevents String Outages
- CRI 85/3000K, 3500K Or 4000K
- L70 @ 50K Hours
- 0–10V Dimming Driver
- Modular Design with Quick Disconnects = Future Proof

Fixture

- Soft white frosted acrylic lens fills the space with even illumination.
- High-reflectance matte white finish blends discreetly into the ceiling, yet is efficient.
- Shallow depth (3-1/4") and structural integrity makes for a quick and easy installation.
- Lamp maintenance is as simple as removing the refractors.
- Evenly distributes light; more pleasing to the eye.
- Dark spots (cave effect) associated with parabolics are eliminated.
- Driver is accessible from below through the removable cover. (No tools required)

LED Environmental Impact

- LED's Provide Up To 75% Energy Savings
- 50,000+Hour Life Is 2X Fluorescent
- Extended Maintenance Cycles
- No Mercury or Lead Content
- Reduce Co₂ Emissions
- Upgradable Light Engines
- 100% Recyclable at End of Life

Product Controls

Accord Series LED is control-friendly, offering compatibility with occupancy & daylight sensors, dimmers and full-scale lighting control systems. Using products from Cooper Controls and others will provide optimal energy savings and extend service life while providing light level flexibility.

• 0–10V Dimmers

Works with Common 0–10V Fluorescent Wallbox Dimmers

• Lighting Control Panels

Integrates with Lighting Control Panels' 0-10V (4-wire) modules

• 120/277V Sensors

Compatible with Typical Commercial Occupancy Sensors

 **COOPER** Controls

 **COOPER** Wiring Devices

The Future of Lighting is Officially Here

Cooper Lighting's 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 but improves upon fluorescent by eliminating unsightly socket shadows, increasing energy savings, providing longer life and delivering more light.



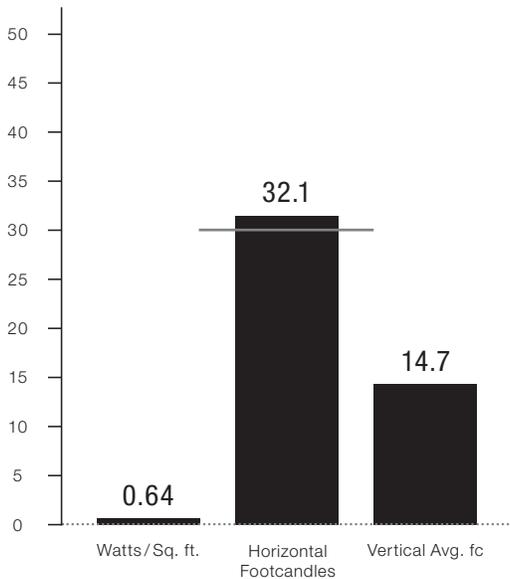
LED Advantage vs. Fluorescent

- Improved Energy Savings
- Higher Efficacy
- Greater Delivered Lumens
- Superior Uniformity & Light Distribution
- Equal or Greater Color (85 CRI)
- Longer Life (L70 at 50K hours)
- Reduced Maintenance Costs
- Simple and Flexible Control Integration

2' x 2' Application Comparison: Fluorescent vs. LED

Accord 2 Lamp, T5HO

(2) 24W T5HO lamps, 120 Fixtures
Electronic Ballast
52 watts per fixture

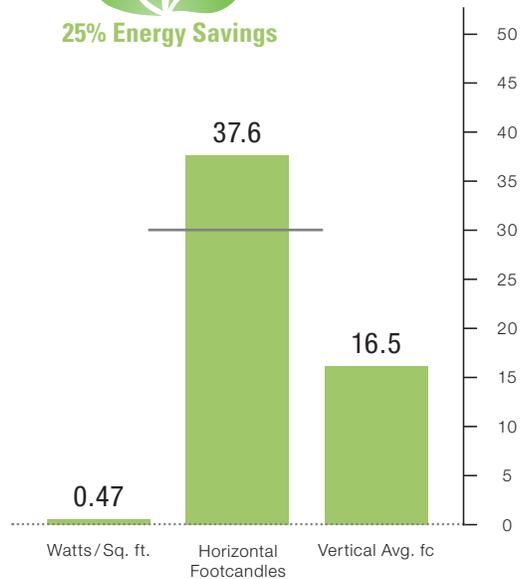


Based on:
Room Size: 100' x 100'
Ceiling Height: 9'
Workplace: 2.5'
Reflectance: 80/50/20
Layout: 8x8 Centers

* IES recommends 30-35 footcandles in open office environments

Accord 2 Lamp, LED

(2) LED Modules, 120 Fixtures
Dimming Driver
39 watts per fixture

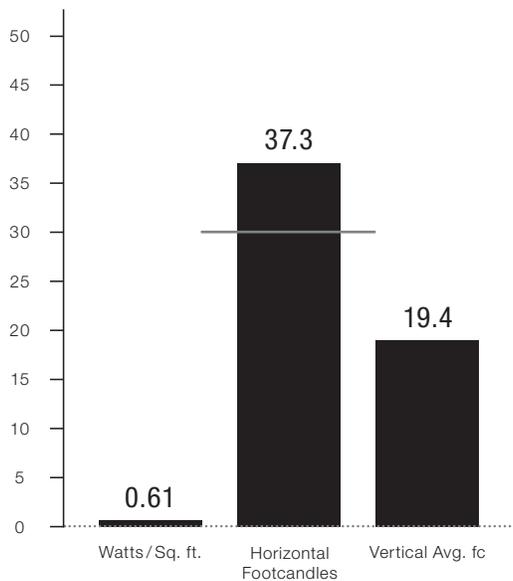




2' x 4' Application Comparison: Fluorescent vs. LED

Accord 2 Lamp, T5

(2) 28W T5 Lamps, 12 Fixtures
Electronic Ballast
58 watts per fixture



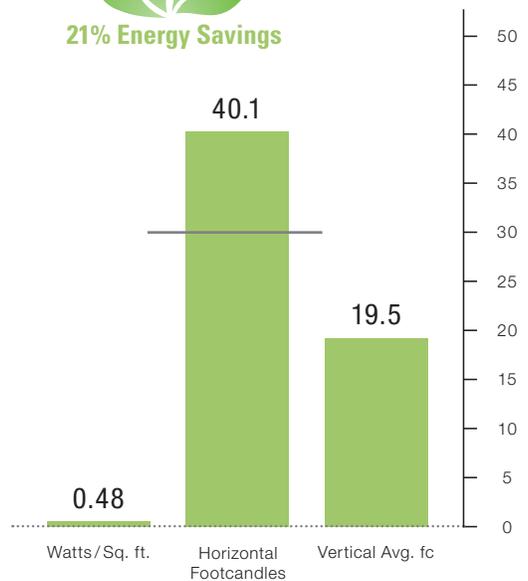
Based on:
Room Size: 26' x 44'
Ceiling Height: 9'
Workplace: 2.5'
Reflectance: 80/50/20
Layout: 8x10 Centers

* IES recommends 30-35 footcandles in open office environments

Accord 2 Lamp, LED

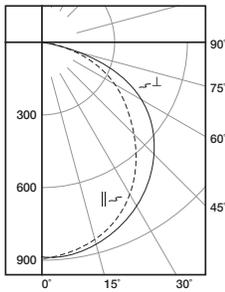
(2) LED Modules, 12 Fixtures
Dimming Driver
46 watts per fixture


21% Energy Savings



Photometrics

2AC-LD2-25-UNV-L835-CD1-U



Coefficients of Utilization

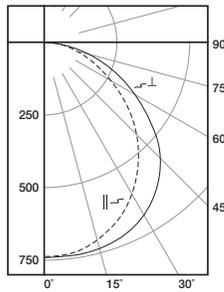
RCR	Effective floor cavity reflectance 20%									
	80%			50%			30%			
rw	70	50	30	10	50	30	10	50	30	10
0	119	119	119	119	111	111	111	106	106	106
1	109	104	100	96	97	94	91	93	91	88
2	99	90	83	78	85	80	75	82	77	73
3	90	79	71	64	75	68	63	72	66	62
4	82	70	61	54	66	59	53	64	58	53
5	76	63	53	47	59	52	46	57	51	45
6	70	56	47	41	53	46	40	52	45	40
7	65	51	42	36	49	41	36	47	40	35
8	60	46	38	32	44	37	32	43	36	31
9	56	43	34	29	41	34	29	40	33	28
10	53	39	31	26	38	31	26	37	30	25

Dimming Driver
Linear LED 3500K
Spacing criterion: (I) 1.2 x mounting height, (L) 1.3 x mounting height
Efficiency = 100%
Test: 2AC-LD2-25-UNV-L835-CD1-U.IES

Zonal Lumen Summary

Zone	Lumens	%Fixture
0-30	692	27.0
0-40	1132	44.2
0-60	2009	78.4
0-90	2563	100.0
0-180	2563	100.0

2AC-LD2-47-UNV-L835-CD1-U



Coefficients of Utilization

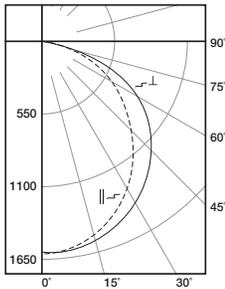
RCR	Effective floor cavity reflectance 20%									
	80%			50%			30%			
rw	70	50	30	10	50	30	10	50	30	10
0	119	119	119	119	111	111	111	106	106	106
1	109	104	99	95	97	94	91	93	91	88
2	99	90	83	77	85	79	75	81	77	73
3	90	79	71	64	74	68	62	72	66	61
4	82	70	61	54	66	59	53	64	57	52
5	75	62	53	46	59	51	46	57	50	45
6	69	56	47	40	53	46	40	51	45	39
7	64	51	42	36	48	41	35	47	40	35
8	60	46	38	32	44	37	31	43	36	31
9	56	42	34	28	41	33	28	40	33	28
10	52	39	31	26	38	30	26	37	30	25

Dimming Driver
Linear LED 3500K
Spacing criterion: (I) 1.2 x mounting height, (L) 1.3 x mounting height
Efficiency = 100%
Test: 2AC-LD2-47-UNV-L835-CD1-U.IES

Zonal Lumen Summary

Zone	Lumens	%Fixture
0-30	1251	26.6
0-40	2053	43.6
0-60	3667	77.9
0-90	4705	100.0
0-180	4705	100.0

2AC-LD2-33-UNV-L835-CD1-U



Coefficients of Utilization

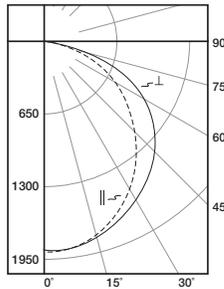
RCR	Effective floor cavity reflectance 20%									
	80%			50%			30%			
rw	70	50	30	10	50	30	10	50	30	10
0	119	119	119	119	111	111	111	106	106	106
1	109	104	100	96	97	94	91	93	91	88
2	99	90	84	78	85	80	75	82	77	73
3	90	79	71	64	75	68	63	72	66	62
4	82	70	61	54	66	59	53	64	58	53
5	76	63	54	47	59	52	46	57	51	46
6	70	56	47	41	54	46	40	52	45	40
7	65	51	42	36	49	41	36	47	40	35
8	60	47	38	32	44	37	32	43	36	32
9	56	43	34	29	41	34	29	40	33	28
10	53	39	31	26	38	31	26	37	30	26

Dimming Driver
Linear LED 3500K
Spacing criterion: (I) 1.2 x mounting height, (L) 1.3 x mounting height
Efficiency = 100%
Test: 2AC-LD2-33-UNV-L835-CD1-U.IES

Zonal Lumen Summary

Zone	Lumens	%Fixture
0-30	912	27.1
0-40	1492	44.3
0-60	2646	78.5
0-90	3370	100.0
0-180	3370	100.0

2AC-LD2-53-UNV-L835-CD2-U



Coefficients of Utilization

RCR	Effective floor cavity reflectance 20%									
	80%			50%			30%			
rw	70	50	30	10	50	30	10	50	30	10
0	119	119	119	119	111	111	111	106	106	106
1	108	104	99	95	97	94	91	93	90	88
2	98	90	83	77	84	79	74	81	77	73
3	89	79	70	64	74	67	62	71	66	61
4	82	70	61	54	66	58	53	63	57	52
5	75	62	53	46	59	51	45	57	50	45
6	69	56	47	40	53	45	40	51	44	39
7	64	50	42	35	48	40	35	47	40	35
8	60	46	37	31	44	36	31	43	36	31
9	56	42	34	28	40	33	28	39	33	28
10	52	39	31	26	37	30	25	36	30	25

Dimming Driver
Linear LED 3500K
Spacing criterion: (I) 1.2 x mounting height, (L) 1.3 x mounting height
Efficiency = 100%
Test: 2AC-LD2-53-UNV-L835-CD2-U.IES

Zonal Lumen Summary

Zone	Lumens	%Fixture
0-30	1416	26.4
0-40	2321	43.2
0-60	4156	77.4
0-90	5368	100.0
0-180	5368	100.0

Offering

ALM 2.0

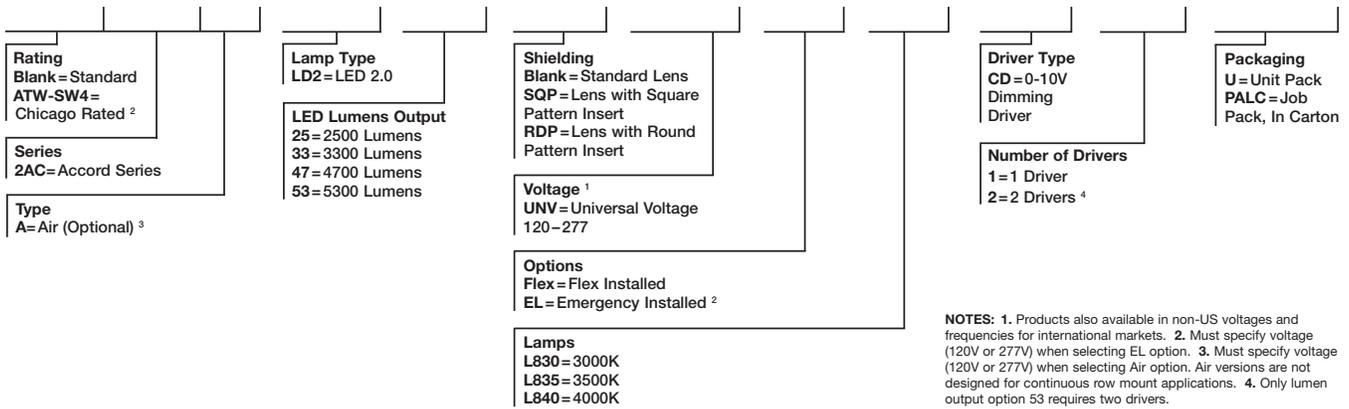
CATALOG NUMBER	LUMENS	WATTS	EFFICACY
AC-LD2-23-UNV-L835-CD1-U	2312	24	97
AC-LD2-32-UNV-L835-CD1-U	3282	35	94
2AC-LD2-25-UNV-L835-CD1-U	2563	28	90
2AC-LD2-33-UNV-L835-CD1-U	3370	39	86
2AC-LD2-47-UNV-L835-CD1-U	4705	46	103
2AC-LD2-53-UNV-L835-CD2-U	5368	54	100
2ACS-LD2-25-UNV-L835-CD1-U	2563	28	90
2ACS-LD2-33-UNV-L835-CD1-U	3370	39	86
2ACS-LD2-47-UNV-L835-CD1-U	4705	46	103
2ACS-LD2-53-UNV-L835-CD1-U	5368	54	100

NOTE: Values subject to change. Consult factory for updated performance.

Ordering Information

ACCORD LED: 2' x 2' & 2' x 4'

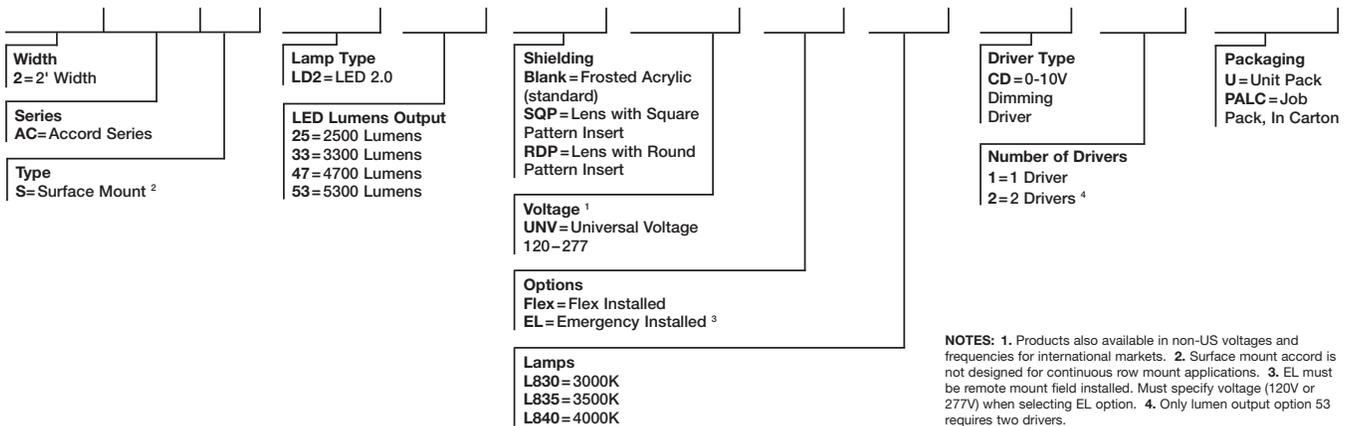
SAMPLE NUMBER: 2AC-LD2-33-UNV-L835-CD1-U



NOTES: 1. Products also available in non-US voltages and frequencies for international markets. 2. Must specify voltage (120V or 277V) when selecting EL option. 3. Must specify voltage (120V or 277V) when selecting Air option. Air versions are not designed for continuous row mount applications. 4. Only lumen output option 53 requires two drivers.

ACCORD LED: 2' x 2' & 2' x 4' SURFACE

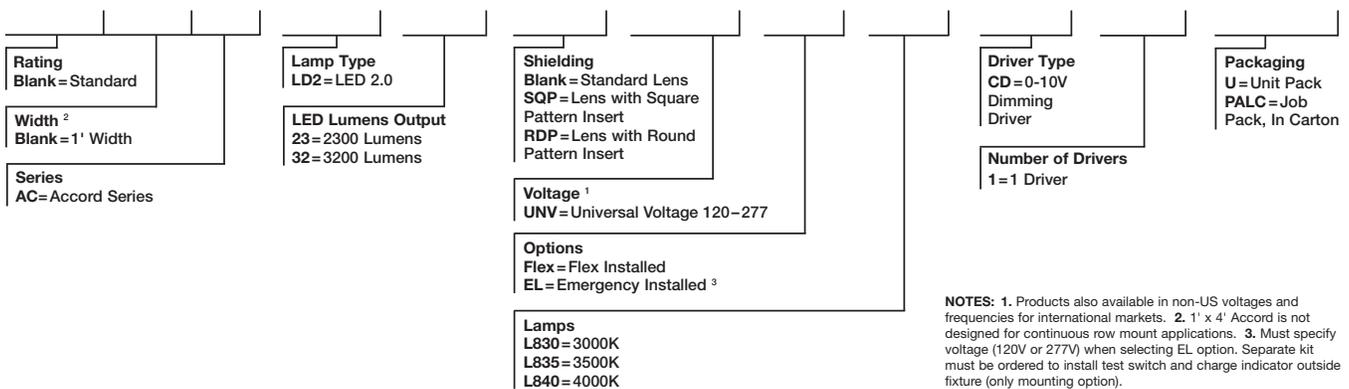
SAMPLE NUMBER: 2ACS-LD2-33-UNV-L835-CD1-U



NOTES: 1. Products also available in non-US voltages and frequencies for international markets. 2. Surface mount accord is not designed for continuous row mount applications. 3. EL must be remote mount field installed. Must specify voltage (120V or 277V) when selecting EL option. 4. Only lumen output option 53 requires two drivers.

ACCORD LED: 1' x 4'

SAMPLE NUMBER: AC-LD2-32-UNV-L835-CD1-U



NOTES: 1. Products also available in non-US voltages and frequencies for international markets. 2. 1' x 4' Accord is not designed for continuous row mount applications. 3. Must specify voltage (120V or 277V) when selecting EL option. Separate kit must be ordered to install test switch and charge indicator outside fixture (only mounting option).

Diffuser Options



Smooth Design (standard)



Round Perf Design (RPD)



Square Perf Design (SQP)

Surface Mount



Air Return Option

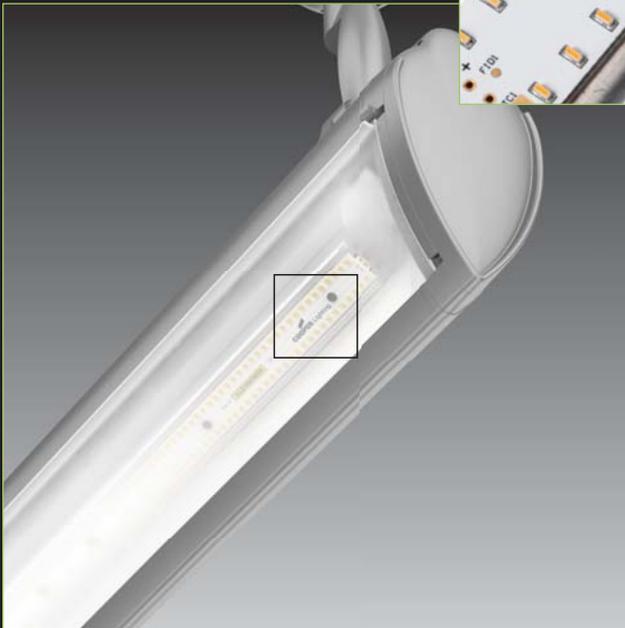




CORELITE / RZ Series
Recessed General Illumination



NEORAY / Straight and Narrow
Recessed General Illumination



AMETRIX / Arrowlinear
Linear Asymmetric Illumination



FAIL SAFE / HVL
Surface General Illumination

*Fail-Safe LED Module

LED Breadth of Line

Indoor, Outdoor & Specialty Lighting Solutions

It's time to redefine expectations and embrace a new generation of outdoor and indoor luminaires that allow for meaningful energy reductions and improved maintenance cycles. With the introduction of Cooper Lighting's patent-pending Linear LED Platform, we have created a beautiful synthesis of technology and design and revolutionized 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 catapult LED into the mainstream by providing leading performance, energy, maintenance, and environmental benefits.



Ambient



Wall Mount



Decorative



Area / Site



Canopy



Recessed



Track



Specialty



Exit



Pathway



Landscape



Accent

Cooper Lighting, LLC.

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Peachtree City, GA 30269

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The Cooper Lighting Family

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Metalux
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Sure-Lites
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Corelite
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Domestic Facilities

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Elk Grove Village, Illinois
Irving, Texas
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Canadian Facility

Calgary, Alberta T2E 7V9
Mississauga, Ontario L5R 1B8



25% PCRf

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