CRESCENT ELECTRIC SUPPLY COMPANY

March 5, 2019

City of Aurora

44 E Downer Place

Aurora IL, 60507

Good Morning,

Thanks for the opportunity to bid on this LED conversion. Crescent Electric has been partnered with ERM which is a MBE/DBE for the last few conversions in the City of Aurora. ERM is one of several companies within The Will Group which has over 30 years of experience in the lighting and electrical industry. Additionally, both The Will Group and Crescent have over a twenty year relationship with GE Lighting. The Will Group is the exclusive provider of GE Roadway products in Illinois. Both Crescent and GE have teamed up in the past few conversions and ensured delivery of hundreds of fixtures before years end in order to receive the COMED incentives for that year. We have and will continue to provide as many storage units as needed to accommodate the project at no additional cost.

John Wiggins

Crescent Electric Supply Company

517 S River Street

Aurora IL 60506

LED Streetlight Conversion

Bid Number 19-05

REFERENCES

(Please Type)

Organization: City of Aurora Electric Department

Address: 339 Middle Avenue

City, State, Zip: Aurora Illinois 60506

Phone Number: 630-768-6577

Contact Person: Scott Miller

Date of Project: Previous LED conversions in 2017 and 2018

****

Organization: _____

Address: _____

City, State, Zip: _____

Phone Number: _____

Contact Person: _____

Date of Project: _____

****

Organization: _____

Address: _____

City, State, Zip: _____

Phone Number: _____

Contact Person: _____

Date of Project: _____

****

Bidder's Name: John Wiggins

Signature & Date: 3/5/2019

SCHEDULE OF PRICES

LED Streetlight Conversion

Note that the model numbers provided above are for the General Electric fixtures purchased previously for this conversion effort. While GE is the preferred brand for consistency with the LED fixtures installed to date, the City will accept bids for other brand equivalents with comparable performance specifications and recognized level of quality. **All non-GE equivalent fixtures proposed are subject to review and approval by the City as a condition of acceptance and award.**

Proposed Alternative Brand/Model Number (if applicable)	GE Fixture Model Number	LED Wattage	Quantity	Unit Cost	Subtotal
	RL2H18C340DGRAYAGIL	140	27	$540	$14,580
	L2018C340DDKBZAGILR	140	391	$540	$211,140
	EFL1008C340EGRAYI	71	198	$144	$28,512
	EPST02004D30AABLCK	70	34	$695	$23,630
	ERL1005C340EGRAYI	39	880	$138	$121,440

Total	1530		$399,302

Not to exceed anticipated lead time (in days) for delivery of all fixtures priced above:

Lead Time for Fixtures	30 Working	Days

BIDDER'S CERTIFICATION

I/We hereby certify that:

A. A complete set of bid papers, as intended, has been received, and that I/We will abide by the contents and/or information received and/or contained herein.

B. I/We have not entered into any collusion or other unethical practices with any person, firm, or employee of the City which would in any way be construed as unethical business practice.

C. I/We have adopted a written sexual harassment policy which is in accordance with the requirements of Federal, State and local laws, regulations and policies and further certify that I/We are also in compliance with all other equal employment requirements contained in Public Act 87-1257 (effective July 1, 1993) 775 ILCS 5/2-105 (A).

D. I/We are in compliance with the most current "Prevailing Rate" of wages for laborers, mechanics and other workers as required by the City of Aurora Ordinance No. O18-054 (file 18-0493): An Ordinance of the City of Aurora, Illinois, Ascertaining the Prevailing Wage Rate of Wages for Laborers, Mechanics, and other Workers Employed in Public Works Projects.

E. I/We operate a drug free environment and drugs are not allowed in the workplace or satellite locations as well as City of Aurora sites in accordance with the Drug Free Workplace Act of January, 1992.

F. The Bidder is not barred from bidding on the Project, or entering into this contract as a result of a violation of either Section 33E-3 or 33E-4 of the Illinois Criminal Code, or any similar offense of "bid rigging" or "bid rotating" of any state or the United States.

G. I/We will abide by all other Federal, State and local codes, rules, regulations, ordinances and statutes.

COMPANY NAME Crescent Electric Supply Co.

ADDRESS 517 S River Street

CITY/STATE/ZIP CODE Aurora IL 60506

NAME OF CORPORATE/COMPANY OFFICIAL John Wiggins
PLEASE TYPE OR PRINT CLEARLY

TITLE Branch Manager

AUTHORIZED OFFICIAL SIGNATURE

DATE 3/5/19

TELEPHONE (630) 897-8663

FAX No. (630) 897-8356

Subscribed and Sworn to

Before me this 5 day

of March 2019

Notary Public

"OFFICIAL SEAL"
KIMBERLEY A. GUERRIERI
Notary Public, State of Illinois
My Commission Expires 07/25/20

Date: Mar 5, 2019 Quote: ERM19-6579-2

Quote

Electrical Resource Management
5261 W. Harrison Street
Chicago IL 60290
Phone:
Fax:
From: Chris von Kondrat
Quoter Ph: 630-462-0230 x.17
Email: cvonkondrat@thewillgroup.com

Project **CITY OF AURORA - BID # 19-05**
Location Aurora IL
Quote ERM19-6579-2

To: John Wiggins
Crescent/Aurora
517 S. River St.
Aurora IL 60506-5549
Phone: (630) 897-8663
Fax: (630) 897-8356
EMail: John.Wiggins@cesco.com

For
Bid Date Mar 5, 2019
Expires Apr 4, 2019

QTY	Type	MFG	Part	Price	UQ	ExtPrice
27		GELD **Lead Time:** 3-4 Weeks	RL2H18C340DGRAYAGIL	$608.00		$16,416.00
391		GELD **Lead Time:** 3-4 Weeks	L2018C340DDKBZAGILR	$608.00		$237,728.00
198		GELD **Lead Time:** 3-4 Weeks	EFL1008C340EGRAYI	$144.00		$28,512.00
34		GELD **Lead Time:** 3-4 Weeks	EPST02004D30AABLCK	$695.00		$23,630.00
880		GELD **Lead Time:** 3-4 Weeks	ERL1005C340EGRAYI	$138.00		$121,440.00
				Total:		**$427,726.00**

Notes:
PLEASE REFER TO THIS QUOTE # WHEN ORDERING

Terms and conditions of sale:
Add freight for pre-shipment of anchor bolts.
NO labor charge back will be paid without prior authorization from the factory.
Manufacturer's standard freight terms apply.
Freight claims are the responsibility of the customer.
Lamps are not included unless noted.
Subject to manufacturere's published terms and conditions of sale.
Quotation based upon all types and quantites quoted. Any changes will void the quotation.

Mfg Terms:	Freight Allowance	Minimum Order
GELD GE DOT	Freight Allowed	

There is a $50.00 Shipping/Handling fee on all orders under $1000.00.
Freight allowed over $1000.00

THE WILL GROUP

"Where There's A Will, There's A Way."

THE WILL GROUP TODAY

Thirty-two years after our establishment, The Will Group (TWG) owns and presides over several different companies that are prominent within the lighting and electrical industry – Electrical Resource Management (ERM), Lyons View Manufacturing and Supply (LV), Lighting Solutions of Illinois (LSI) and TWiG Technologies (TWiG).

Our companies have superseded their respective roles to go beyond the traditional boundaries of lighting businesses – branding itself as a provider of complete industry solutions that make positive contributions to its clients' bottom line. Operating under the philosophy and mission *"Where There's A Will, There's A Way"*, the corporate culture of The Will Group fosters ingenuity and creativity with every endeavor. Our competitive distinction is our ability to be an encompassing single source provider for our clients' lighting, manufacturing, and sourcing needs. We represent some of the industry's most prominent lighting fixture and pole manufacturers. Our in-house team is fully trained on our infrastructure assessment software and are experts in assembly.

OUR CLIENTS

The Will Group combines its various resources to meet the needs of its customers, which differentiates us from other companies in the local lighting industry. The Will Group serves the following markets and industries:

- Commercial & Hospitality
- Industrial & Institutional
- Private & Public Education
- Municipalities & Roadways
- Utility

TWG's primary focus continues to be to deliver innovative and suitable products, services and, solutions - oriented offerings to our loyal customer base. We service several vertical markets with a portfolio that includes many successful indoor lighting projects, as well as our traditional core outdoor lighting business. It is our mission to provide jobs in the communities we serve.

THE WILL GROUP COMPANIES

PARTNER WITH US

The Will Group is comprised of several companies that contribute to our sustainability and growth in the electrical infrastructure industry. Each company is owned and operated by the descendants of William Edward Davis.

ELECTRICAL RESOURCE MANAGEMENT

ERM is a value-added reseller of lighting-related goods and ancillary electrical products. ERM adds value to its customer base by providing a partner in procurement sourcing for lighting fixtures, poles, anchor bolts, uniduct, and other electrical supplies.

LIGHTING SOLUTIONS OF ILLINOIS

Lighting Solutions of Illinois is a manufacturer's representative for many well recognized names in the lighting industry including GE, LSI Industries, Valmont, and MaxLite.

LYONS VIEW MANUFACTURING & SUPPLY

The Lyons View team assembles streetlights that transform streets throughout the state of Illinois. The team fabricates and assists electrical contractors by packaging and preparing materials to allow for efficient field installation. Outside of lighting, the team also works with and assembles other electrical material, such as, electrical capacitor banks.

TWIG TECHNOLOGIES

TWiG is a customizable web-based software technology that provides clients with critical data before, during, and after infrastructure upgrades. TWiG can be customized to your exact data requirements.

CONTACT US

Partnering with The Will Group
is not transactional, but transformational.

Corporate Location:
401 S. Carlton Avenue, Wheaton, IL 60187 | 630.462.0230

Warehouse Locations:
5261 West Harrison Street, Chicago, IL 60644
29 East 89th Street Chicago, IL 60619

PROJECTS

CITY OF CHICAGO

Chicago Smart Lighting Project

O'HARE AIRPORT

Provided over 1,500 light poles and LED fixtures

CLARK STREET BRIDGE

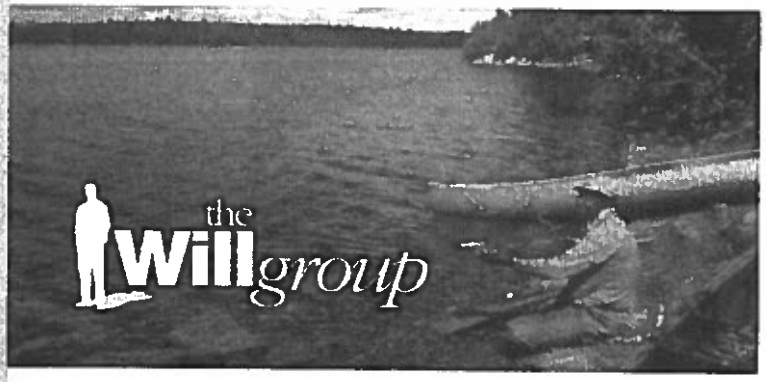
Partnership with GE to improve the ascetics and luminosity

COMED

LED Streetlight Data Management Program and Material Provider

FORT HILL

Naperville Park District's Fort Hill Activity Center's indoor facility lighting

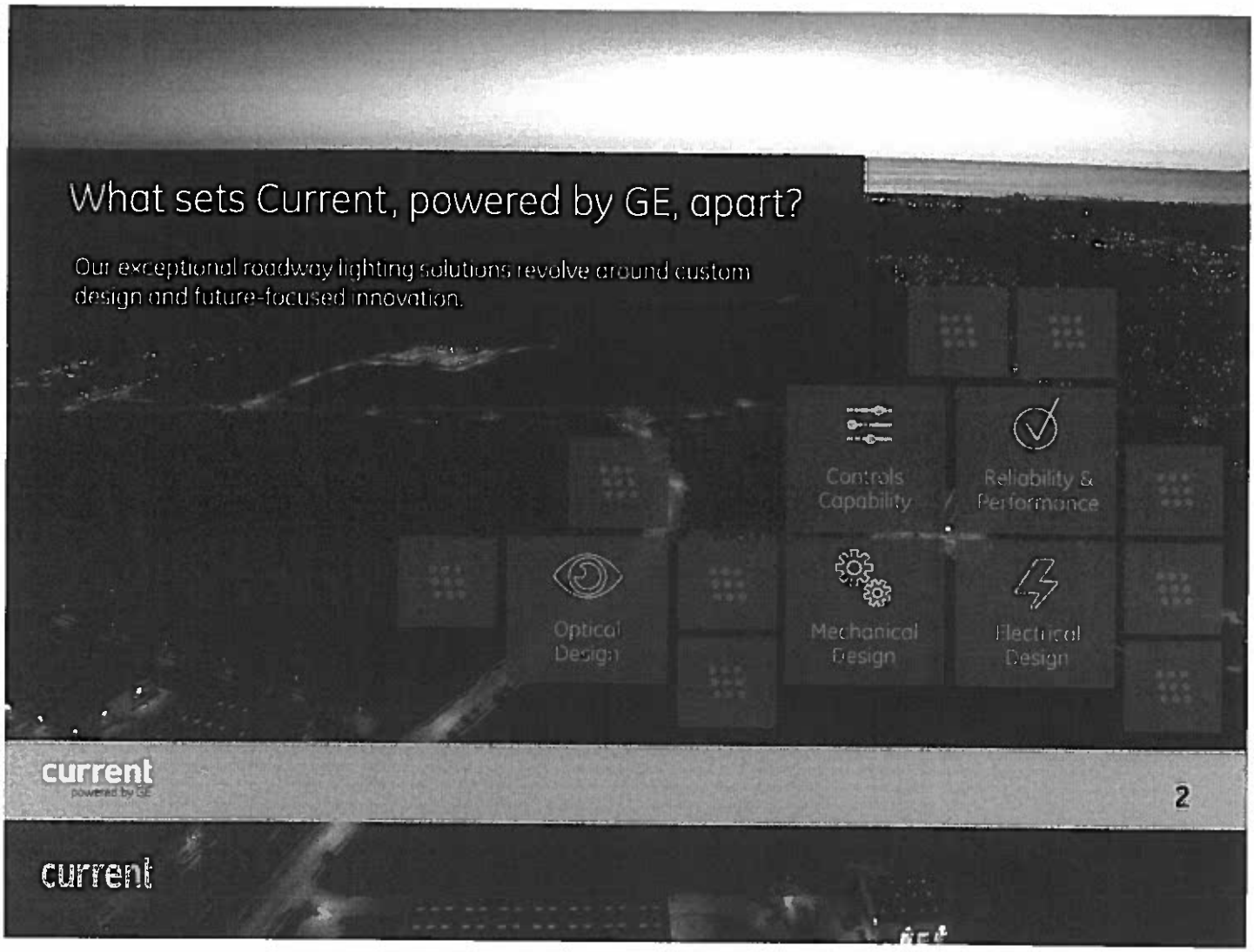


"My father's name was William Edward Davis. Friends and family called him "Will." He lived to the age of 80 and at the time of his death he had worked for the same family in Knoxville, Tennessee, for nearly 65 years. William "Will" Davis was a hero to my six siblings and me. When I started The Will Group, I had a vision of a business that would honor my father and would promote the core values of integrity, pride and hard work he was well known for.

This dynamic business environment could then inspire the development of additional businesses that could be managed by one or more family members, and or key stakeholders who aspire to the same values. Today, my vision has become reality as several companies are now owned and operated by descendants of Will Davis. Although each Will Group company is a separate, distinct and independent entity, all operate with the common philosophy "Where There's a Will, There's a Way." I believe my father would be proud. My family and I thank you for your support."

- Stephen L. Davis, Chairman, The Will Group

www.thewillgroup.com


What sets Current, powered by GE, apart?
Our exceptional roadway lighting solutions revolve around custom design and future-focused innovation.
Controls Capability
Reliability & Performance
Optical Design
Mechanical Design
Electrical Design
current
powered by GE
2
current

optical design

aiming to please

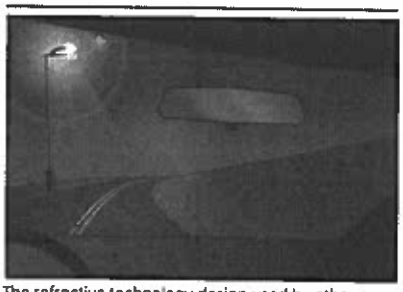
GE uses an advanced reflective optic design that meets RP-8 recommended practices for luminance, illuminance and small target visibility. This unique design ensures that Evolve ERS fixtures will deliver light control with significantly less waste than the other optical technologies used by many of our competitors.

Evolve ERS fixtures have improved ratings for backlight, uplight and glare (BUG ratings) to direct more light on the road and not in neighboring properties or in the eyes of nighttime drivers – meeting tight local ordinances and International Dark-Sky (IDA) requirements.

GE

Our unique reflective technology allows us to focus light where it's needed – on the road – with less glare

COMPETITION



The refractive technology design used by other manufacturers typically results in more wasted light trespass and glare for drivers.

current
powered by GE

optical design

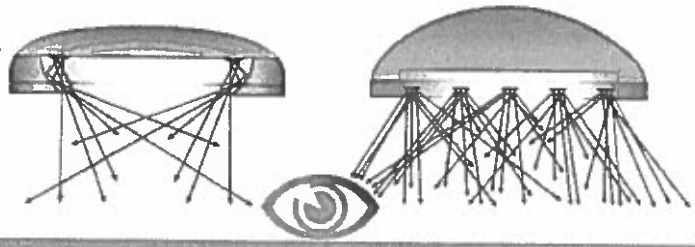
minimizing glare

GE's innovative reflective design only puts light where it is needed and minimizes direct view of the light source with a non-pixilated appearance.

GE design recesses the LED array within the optic (or reflector) to limit visibility of the LEDs from the driver's field of view, minimizing glare. Many competing optical designs use LED arrays with individual optics, making the entire array visible to the driver, resulting in a pixilated appearance with higher levels of glare and increased light trespass.

GE

Minimized visibility to LED light source, creating non-pixilated appearance to driver's field of view

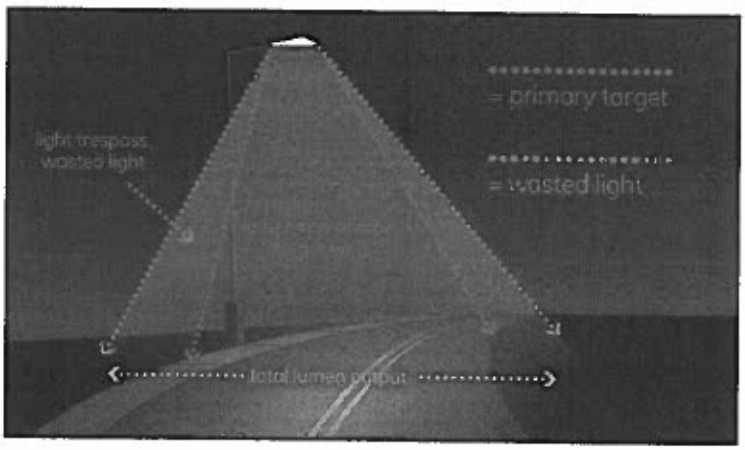


COMPETITION

Visibility to every LED, creating a pixilated appearance and increased glare to driver's field of view

light on target: coefficient of utilization

Excellent light control aims the light directly where you need it.



Efficiency in action

- Lumens per Watt (LPW) = Total Lumen Output/Total Watts
- Coefficient of Utilization (CU) = Lumens on Primary Target Area/Total Lumen Output
- Higher the Coefficient of Utilization (CU) = Less Wasted Light

current
powered by GE

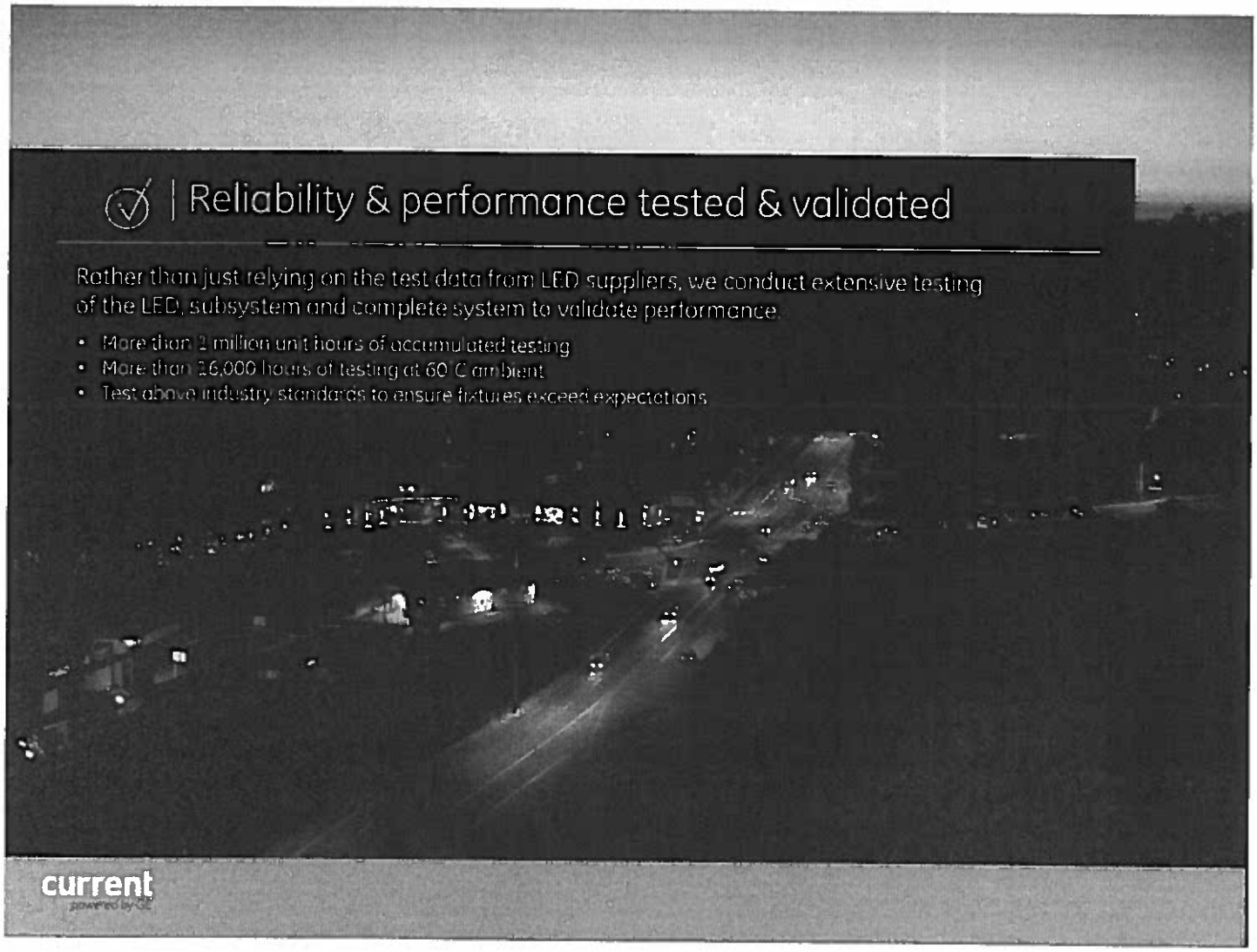
| Flexibility through comprehensive design

With a wide range of roadway lighting solutions, we offer a variety of fixtures designed to stand the test of time and provide consistent light distribution.

- Evolve™ ERS fixture houses the LEDs and reflectors in dirt- and dust-free cavity
- Complete scalable lumen range
- Wide variety of photometric selections
- Optimized wattage choices with drive current options
- Surge suppression options



current


Reliability & performance tested & validated
Rather than just relying on the test data from LED suppliers, we conduct extensive testing of the LED, subsystem and complete system to validate performance.
• More than 1 million unit hours of accumulated testing
• More than 16,000 hours of testing at 60 C ambient
• Test above industry standards to ensure fixtures exceed expectations
current
powered by GE

Summary ....Why GE?

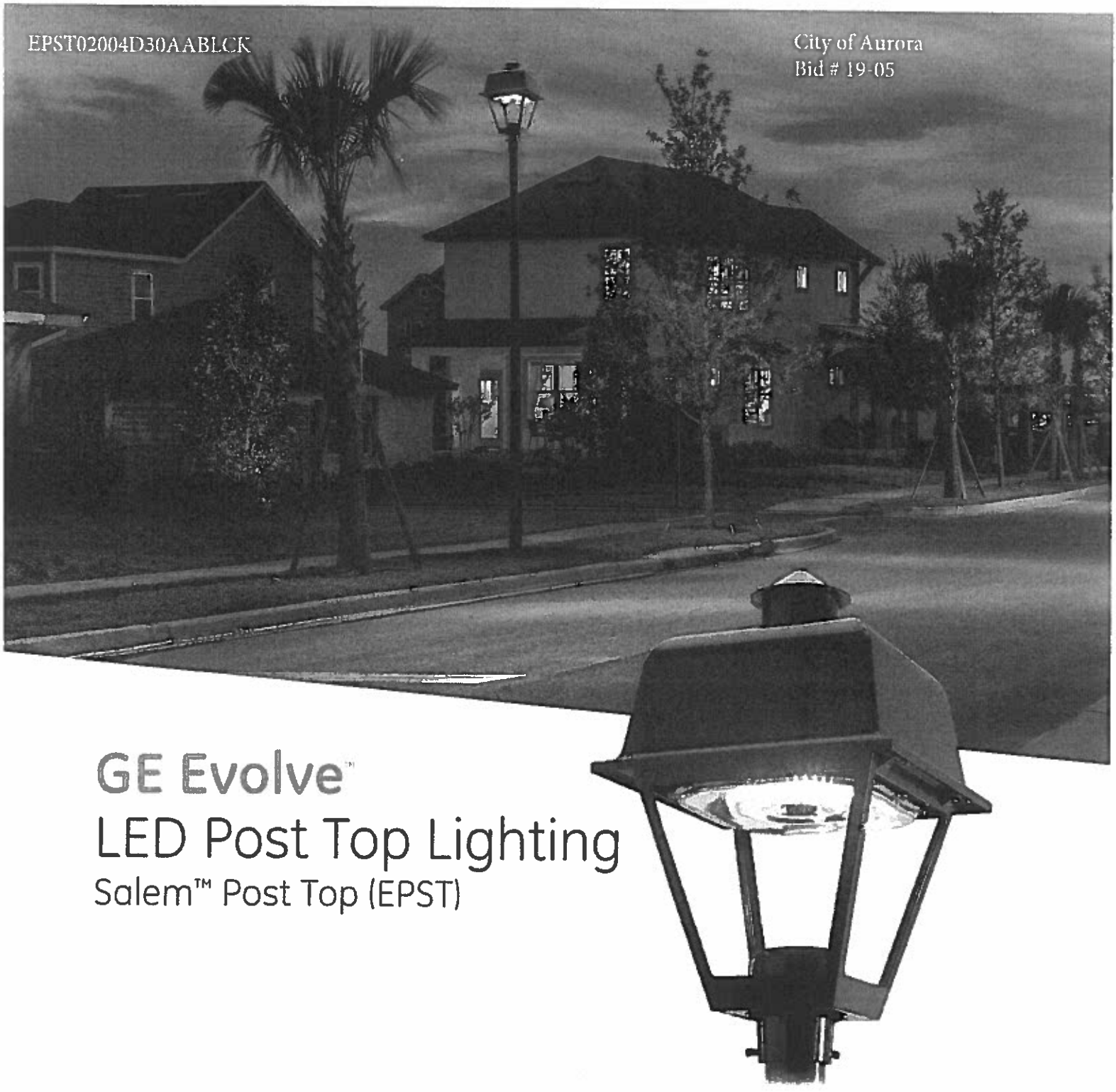
- ✓ Advanced Reflective optics....deliver light control with less waste
- ✓ Improved BUG ratings ...direct more light on the road
- ✓ Minimize Glare ...limited direct view of light source , non pixilated appearance
- ✓ Higher "coefficient of utilization " ....lumens on primary target/total lumens

  Deliver required light levels at reduced watts ..saves energy

- ✓ Less prone to dirt depreciation .....tempered flat lens reduces dirt depreciation

EPST02004D30AABLCK

City of Aurora
Bid # 19-05



GE Evolve™
LED Post Top Lighting
Salem™ Post Top (EPST)

current
powered by GE

GE Evolve
LED Post Top Lighting
Salem™ Post Top (EPST)

The **GE Evolve™ LED Salem™ Post Top** offers energy efficiency and quality of light in a classic, utility carriage look and style. The advanced LED optical system provides improved horizontal and vertical uniformity, reduced glare and improved lighting control. GE's unique optical ring technology effectively aims the light where you need it, while eliminating the unsightly shadow circles commonly seen under other LED post top fixtures.

The Salem post top can yield up to a 60-percent reduction in system energy compared with standard HID systems, depending on applications. This reliable system operates well in cold temperatures and offers more than 20 years of service life to reduce maintenance frequency and expense, based on a 100,000 hour life and 12 hours of operation per day.

Features:

- Optimized photometric distributions.
- **Evolve™** light engine consisting of nested concentric directional reflectors designed to optimize application efficiency and minimize glare.
- 70 CRI at 3000K and 4000K typical
- -40°C to 50°C UL Ambient
- Designed and Assembled in USA

Applications:

- Local Roadways
- Parks and Pathways
- Antique Streetscapes
- University and Business Campuses

To learn more about **GE Evolve EPST Salem Post Top**, go to: **www.currentbyge.com**

GE Evolve
LED Post Top Lighting
Salem™ Post Top (EPST)

Project name _____
Date _____
Type _____

Typical Specifications: EPST

LED & Optical Assembly

- **Output Range:** 2,800 – 8,900 lm
- **Photometric Options:**
  - Symmetric Type V
  - Asymmetric Type III
- **System Efficacy:** 99 - 114 LPW
- **CCT:** 3000K, 4000K; High brightness LEDs @ 70 CRI

Lumen Maintenance Table

- Projected Lxx per IES TM-21 at 25 °C for reference:

SKU	Lxx (10k) @ Hours		
	25,000 hr	50,000 hr	100,000 hr
EPST	L97	L96	L94

Note: Projected Lxx based on LM80 (100,000 hour testing)

Lumen Ambient Temperature Factors:

Ambient Temp (°C)	Initial Flux Factor
10	1.02
20	1.01
25	1.00
30	0.99
40	0.98

Electrical

- **Input Voltage:** 120-277V or 347-480V
- **Input Frequency:** 50/60Hz
- **Power Factor (PF)*:** ≥0.90
- **Total Harmonic Distortion (THD)*:** ≤20%

** System PF and THD specified at rated watts*

Ratings

- **Safety:** UL/cUL listed per UL1598, suitable for wet locations.
- **Intrusion Protection (IP):** IP65 rated optical enclosure per ANSI C136.25-2009.
- **Sound:** Class "A" rating.
- **Surge Protection:** per ANSI C136.2-2015
  (Driver Internal):
  - 6kV/3kA "Basic (40 Strikes)" – Standard
  (Additional Secondary SPD):
  - 10kV/5kA "Enhanced (40 Strikes)" – Option R
- **Environmental:** Complies with the material restrictions of RoHS
- **EMI:** Title 47CFR Part 15 Class A
- **Vibration:** 2.0G per ANSI C136.41-2010
- LM-79 testing in accordance with IESNA standards.
- **Operating Temperature:** -40 °C to + 50 °C

Construction & Finish

- **Housing:**
  - Diecast aluminum housing.
  - Internal heat sink ensuring maximum heat transfer for long LED life.
  - Cupola compatible with C136.10 PE's and Shorting Caps and LightGrid™ 2.0 node.
- **Lensing:** UV resistant polymer lens
- **Paint:** Corrosion resistant polyester powder paint, minimum 2.0 mils thickness.
  - Standard colors: Black, Dark Bronze
  - RAL & custom colors available
- **Weight:** 23 lbs. (10.4 kgs.) – 24 lbs. (10.9 kgs)

Warranty

- **System Warranty:** 5 Year Standard, 10 Year Optional

Controls

(Connected via 7-Pin C136.41 receptacle)

- **Dimming:**
  - Standard 0-10V
  - Optional DALI
- **Sensors:**
  - Photo-electric sensors (PE) available for all voltages
  - LightGrid™ 2.0 compatible

Mounting

- Post top mounting for 3-inch (76mm) OD by 3-inch vertical tenon secured with three square head set screws.

GE Evolve
LED Post Top Lighting
Salem™ Post Top (EPST)

Project name _____
Date _____
Type _____

Ordering Number Logic

EPST	02	0	04	D*	30	A	_ A	BLCK	___

PROD. ID	GENERATION (VERSION)	VOLTAGE	LUMEN OUTPUT	DISTRIBUTION	CCT	CONTROLS ANSI C136.41 7 PIN PE RECEPTACLE	TOP TYPE	COLOR	OPTIONS
E = Evolve P = Post Top S = Salem T = Traditional	02 = GEN 2	0 = 120-277 5 = 480** D = 347** H = 347-480** **Not available for 03 thru 06 lumen codes	03 04 05 06 07 08 09	A = Symmetric Type V B = Asymmetric Type III * lens & distribution to match existing	30 = 3000K 40 = 4000K	1 = None A = PE Receptacle D = PE Receptacle with Shorting Cap E = PE Receptacle with non-dimming PE in box* *Must specify discrete voltage	A = Salem	BLCK = Black DKBZ = Dark Bronze	R = Secondary 10KV/5KA SPD U = DALI* XXX = Special Options * Not available for 5, D, & H voltages

DISTRIBUTION CODE	OPTICAL CODE	TYPICAL INITIAL LUMENS		TYPICAL SYSTEM WATTAGE		BUG RATINGS		IES FILE NUMBERS			
		4000K	3000K	120-277V & 347-480V		4000K	3000K	4000K 120-277V	4000K 347-480V	3000K 120-277V	3000K 347-480V
A Symmetric Type V	03	3000	2800	27	N/A	B2-U2-G1	B2-U1-G1	EPST02_03A40_-120-277VIES		EPST02_03A30_-120-277VIES	
	04	4000	3800	35	N/A	B2-U2-G1	B2-U2-G1	EPST02_04A40_-120-277VIES		EPST02_04A30_-120-277VIES	
	05	4900	4600	43	N/A	B3-U2-G1	B3-U2-G1	EPST02_05A40_-120-277VIES		EPST02_05A30_-120-277VIES	
	06	6100	5700	54	N/A	B3-U2-G1	B3-U2-G1	EPST02_06A40_-120-277VIES		EPST02_06A30_-120-277VIES	
	07	7000	6600	65		B3-U2-G1	B3-U2-G1	EPST02_07A40_IES		EPST02_07A30_IES	
	08	7900	7500	74		B3-U2-G2	B3-U2-G1	EPST02_08A40_IES		EPST02_08A30_IES	
	09	8900	8400	85		B3-U2-G2	B3-U2-G2	EPST02_09A40_IES		EPST02_09A30_IES	
B Asymmetric Type III	03	3000	2800	27	N/A	B1-U2-G1	B1-U1-G1	EPST02_03B40_-120-277VIES		EPST02_03B30_-120-277VIES	
	04	4000	3800	35	N/A	B1-U2-G1	B1-U2-G1	EPST02_04B40_-120-277VIES		EPST02_04B30_-120-277VIES	
	05	4900	4600	43	N/A	B1-U2-G2	B1-U2-G1	EPST02_05B40_-120-277VIES		EPST02_05B30_-120-277VIES	
	06	6100	5700	54	N/A	B1-U2-G2	B1-U2-G2	EPST02_06B40_-120-277VIES		EPST02_06B30_-120-277VIES	
	07	7000	6600	65		B1-U2-G2	B1-U2-G2	EPST02_07B40_IES		EPST02_07B30_IES	
	08	7900	7500	74		B2-U2-G2	B2-U2-G2	EPST02_08B40_IES		EPST02_08B30_IES	
	09	8900	8400	85		B2-U2-G2	B2-U2-G2	EPST02_09B40_IES		EPST02_09B30_IES	

GE Evolve

LED Post Top Lighting

Salem™ Post Top (EPST)

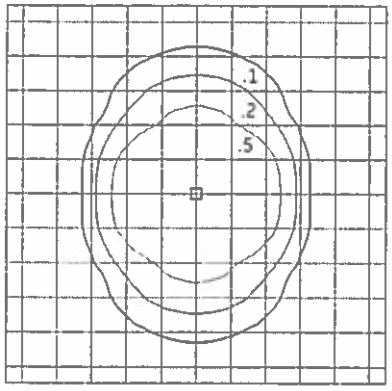
Project name _____

Date _____

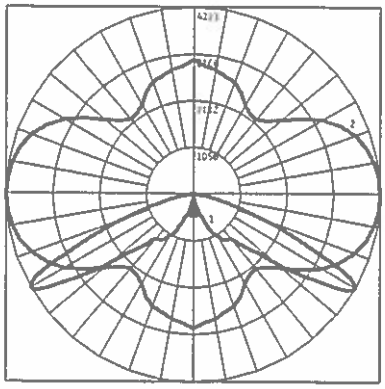
Type _____

Photometrics

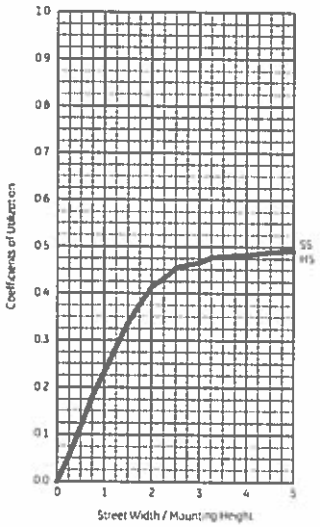
EPST02*A40 – Symmetric (Type V)**
8,900 Lumens, 4000K



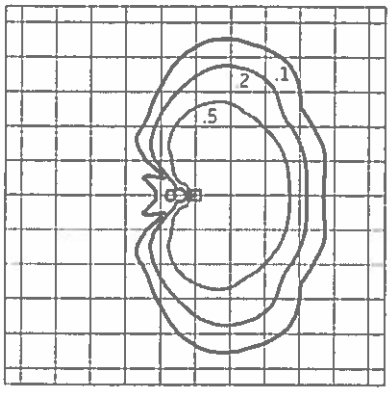
Grid Distance in Units of Mounting Height at 16'
Initial Footcandle Values at Grade



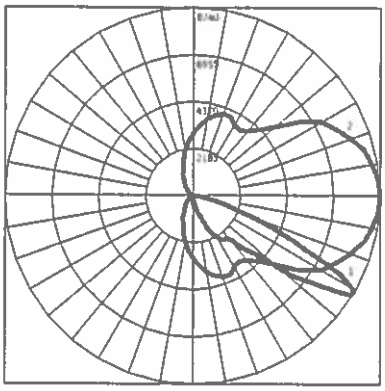
— Vertical plane through horizontal angle of Max. Cd at 0°
— Horizontal cone through vertical angle of Max. Cd at 60°



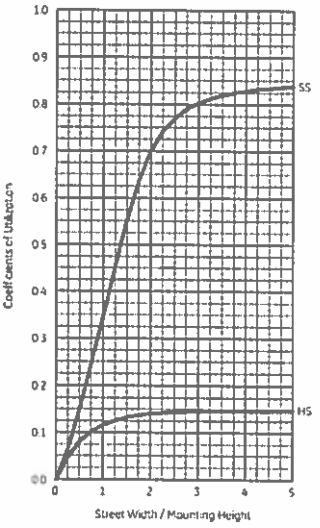
EPST02*B40 – Asymmetric (Type III)**
8,900 Lumens, 4000K



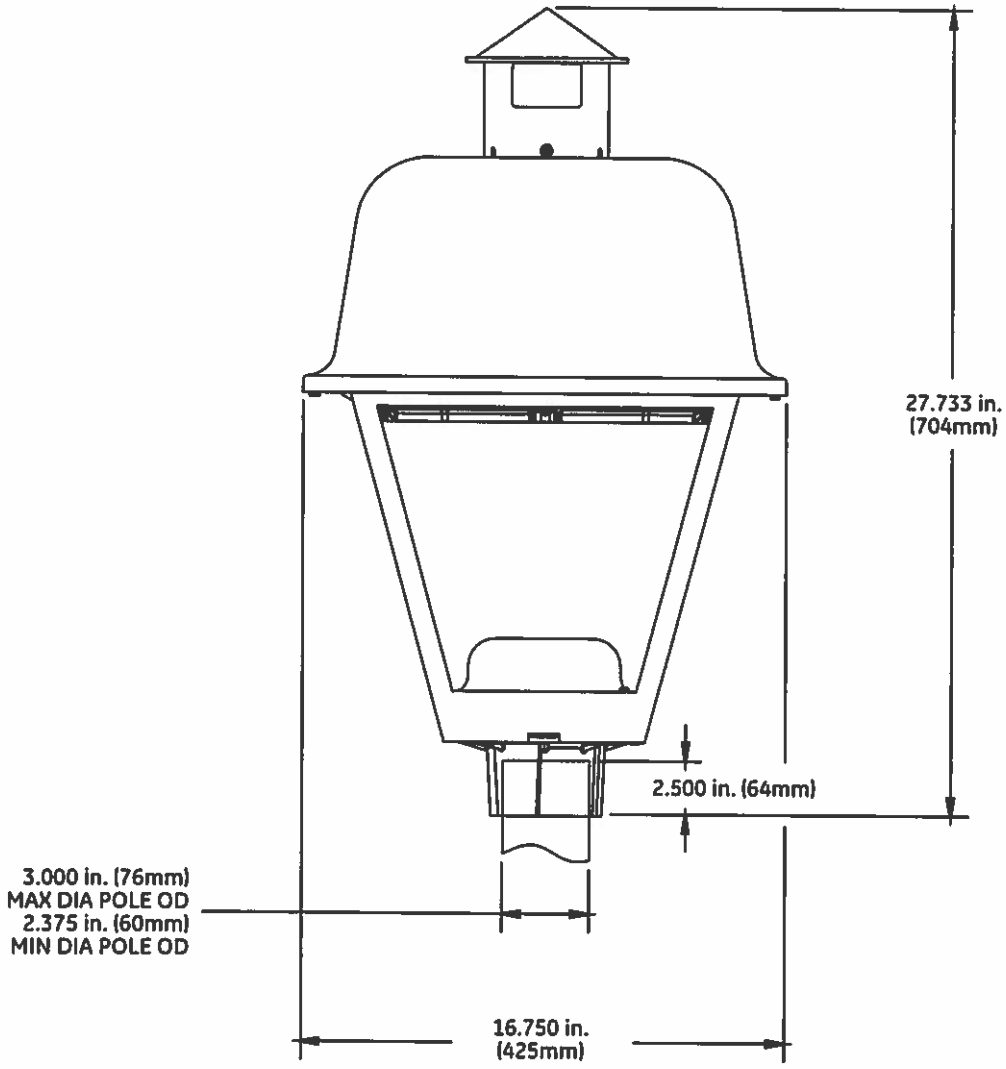
Grid Distance in Units of Mounting Height at 16'
Initial Footcandle Values at Grade



— Vertical plane through horizontal angle of Max. Cd at 0°
— Horizontal cone through vertical angle of Max. Cd at 59°



Product Dimensions



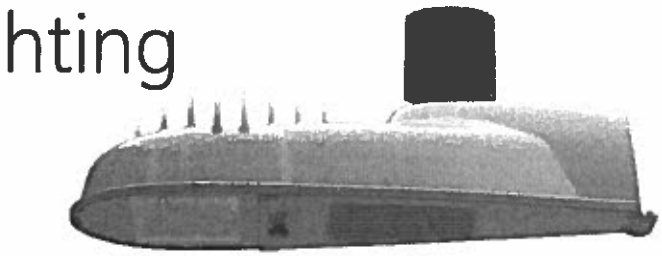
DATA

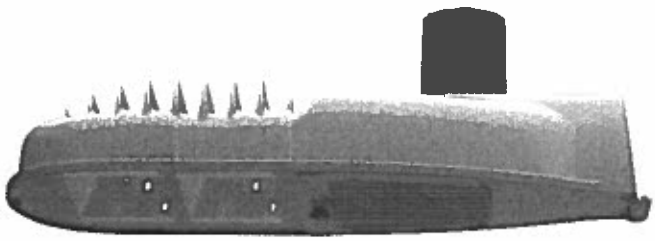
- Approximate Net Weight: 23 lbs (10.4 kgs) - 24 lbs (10.9 kgs)
- Suggested Mounting Height: 8-16 ft max (2.5-5 m)
- Effective Projected Area (EPA): 1.6 sq ft max (0.15 sq m)

Specified & Actual:
ERL1005C340EGRAYI

City of Aurora
Bid # 19-05

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



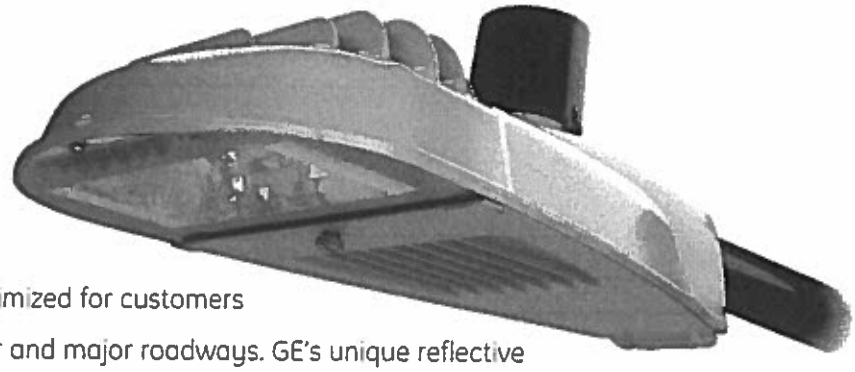


current
powered by GE

GE Evolve™

LED Roadway Lighting

ERL1-ERLH-ERL2



The **Evolve** LED Roadway Luminaire is optimized for customers requiring a LED solution for local, collector and major roadways. GE's unique reflective optics are designed to optimize application efficiency and minimize glare. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life. This reliable unit has a 100,000 hour design life, significantly reducing maintenance needs and expense over the life of the fixture. This efficient solution lowers energy consumption compared to a traditional HID fixture for additional operating cost savings.

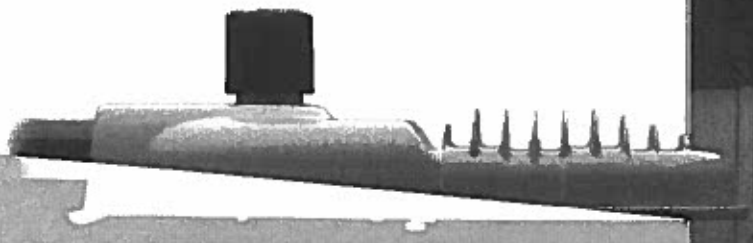
Features:

- Optimized roadway photometric distributions
- **Evolve**™ light engine consisting of reflective technology designed to optimize application efficiency and minimize glare
- 70 CRI at 2700K, 3000K and 4000K typical.
- -40°C to 50°C UL Ambient Typical.
- ULOR = 0 (zero uplight)
- Designed & Assembled in USA

Applications:

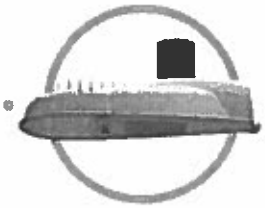
- Local Roadways
- Collector Roadways
- Major Roadway/Streets

Compatible with **LightGrid**™ Outdoor Wireless Control System



To learn more about **GE Evolve LED Roadway Lighting**, go to: **www.currentbyge.com**

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



Project name _____
Date _____
Type _____

Typical Specifications: ERL1-ERLH-ERL2

LED & Optical

- **Output Range:** 1900 – 30000 lm
- **Photometric Options:** Type II Narrow, Type II Wide, Type III, Type IV
- **System Efficacy:** 100 - 145 LPW
- **CCT:** 2700K, 3000K, 4000K; High brightness LEDs @ 70 CRI

Lumen Maintenance Tables

Projected Lxx per IES TM-21 at 25°C for reference:

ERL1 LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	100,000 HR
02,03,04,05,06	L96	L95	L91
07,08,09	L95	L91	L84
10	L89	L80	L64

ERLH LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	100,000 HR
10, 11	L97	L96	L94
13, 14	L95	L93	L86
15, 16	L94	L91	L85

ERL2 LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	100,000 HR
16, 18, 19, 21, 23	L96	L94	L91
25, 27, 28	L95	L93	L88
30	L95	L93	L87

Note: Projected Lxx based on LM80 (10,000 hour testing). DOE Lighting Facts Verification Testing Tolerances apply to initial luminous flux and lumen maintenance measurements

Electrical

- **Input Voltage:** 120-277 volt and 347-480 volt
- **Input Frequency:** 50/60Hz
- **Power Factor (PF)*:** >90%
- **Total Harmonic Distortion (THD)*:** <20%

**Power factor and THD tolerance exceptions: ERL1 "02" Lumen output: PF and THD within tolerances above only at 120 volt. ERL1 "03" Lumen output: @120 volt PF~0.89; @ 480 volt THD~26% ERL1 "04" Lumen output: @480 volt THD~22%*

Ratings

- **Surge Protection:** per ANSI C136.2-2015:
  (Driver Internal):
  - 6kV/3kA "Basic (120 Strikes)" - Standard on ERL1 (02-06)
  - 10kV/5kA "Enhanced: (40 Strikes)" - Standard on ERL1 (07 - 10), ERLH, ERL2

  (Additional Separate Secondary SPD)
  - 10kV/5kA "Enhanced: (40 Strikes) - Option "R"
  - 20kV/10kA "Elevated" (40 Strikes) - Option "T"
- **Safety:** UL/cUL Listed. UL 1598 listed, suitable for wet locations
- **Environmental:** Compliant with the materials restrictions of RoHS
- **EMI:** Title 47 CFR Part 15 Class A
- **Vibration:** 3G per ANSI C136.31-2010
- LM-79 testing in accordance with IESNA Standards
- Std. Optical enclosure rated per ANSI C136.25-2009:
  - ERL1/ERLH/ERL2 = IP65, Optional: IP66
- **Operating Temperature:**

PRODUCT ID	LUMEN OUTPUT	AMBIENT READING
ERL1	02-10	-40°C to 50°C
ERLH	10-11, 13	-40°C to 50°C
ERLH	14-16	-40°C to 45°C
ERL2	16-28	-40°C to 50°C
ERL2	30	-40°C to 45°C

Delayed start may be experienced < -35°C

Construction & Finish

- **Housing:**
  - Die Cast Enclosure
  - Casting-integral heat sink for maximum heat transfer
- **Lensing:** Impact resistant tempered glass, standard
- **Paint:** Corrosion resistant polyester powder painted, minimum 2.0 mil. thickness.
  - Standard Colors: Dark Bronze, Black, & Gray
  - RAL & custom colors available
  - Optional coastal finish available.
- **Weight:** 12.4lbs (5.6kg) – 24lbs (10.9kg)

Warranty

- **System Warranty:** 5 Year Standard, 10 Year Optional

Controls

- **Dimming:**
  - Standard: 0-10V; Optional: DALI (120-277V Only)
- **Sensors:**
  - Photo electric sensors (PE) available.
- LightGrid™ compatible

Mounting

- Slipfitter with +/- 5 degree of adjustment for leveling.
- Integral die cast mounting pipe stop.
- Adjustable for 1.25 in. or 2 in. mounting pipe.

Suggested HID Replacement Lumen Levels

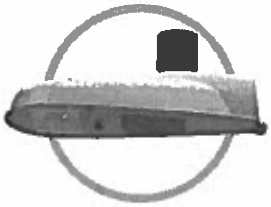
- ~4,000–5,000 lumens to replace 100W HPS Cobra-head
- ~7,000–8,800 lumens to replace 150W HPS Cobra-head
- ~8,500–11,500 lumens to replace 200W HPS Cobra-head
- ~11,500–14,000 lumens to replace 250W HPS Cobra-head
- ~21,000–30,000 lumens to replace 400W HPS Cobra-head

Note: Actual replacement lumens may vary based upon mounting height, pole spacing, design criteria, etc.

CONVERSION FROM PREVIOUS GENERATION OPTICS TO CURRENT GENERATION OPTICS** PREVIOUS	DESCRIPTION	CURRENT	DESCRIPTION
A1, B1	Extra Narrow/Narrow Asymmetric	A3	Type II Narrow
C1, E1	Asymmetric Short/Medium	B3	Type II Wide
D1, G1	Asymmetric Forward/Extra Wide	C3	Type III
F1	Asymmetric Wide	D3	Type IV
		E3	Type II Enhanced Back Light

**The information above is designed to provide a guideline to select the correct luminaire for a roadway application. The best and most accurate way to ensure the proper design is do a lighting layout Utilizing AGI.

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



Project name _____

Date _____

Type _____

E R L 1 — 0 — 05 — C3 — 40 — E — GRAY — I

PROD. ID	VOLTAGE	LUMEN OUTPUT	DISTRIBUTION*	CCT	CONTROLS	COLOR	OPTIONS
E = Evolve **R** = Roadway **L** = Local **1** = Single Module	**0** = 120-277V* **1** = 120 **2** = 208 **3** = 240 **4** = 277 **5** = 480 **D** = 347 **H** = 347-480* * Not available with Fusing. Must choose a discrete voltage with F option.	**02*** **03<** **04<** **05<** **06** **07** **08** **09** **10** See Table *120V only, not compatible with 0-10V dimming. < See Note Under Controls Column	**A3** = Type II Narrow **B3** = Type II Wide **C3** = Type III **D3** = Type IV **E3** = Type II Enhanced Back Light See Table *Nominal IES Type classing subject to typical variation, individual units may differ.	**27** = 2700K<>**30** = 3000K **40** = 4000K <> Select 2700K or 3000K CCT for IDA approved units.	**A** = ANSI C136.41 7-pin **D** = ANSI C136.41 7-pin with Shorting Cap **E** = ANSI C136.41 7-pin with non-Dimming PE Control.* *PE Control Only available for 120-277V or 480V Discrete. Not available for 347-480V or 347V Discrete. < If dimming the 03 - 05 lumen output using a control supplied from a source other than GE call 1-888-694-3533, then select Option 2 at the prompt for assistance. **NOTE:** Dimming controls wired for 0-10V standard unless DALI option "U" requested.	**GRAY** = Gray **BLCK** = Black **DKBZ** = Dark Bronze	**A** = 4 Bolt Slipfitter † **F** = Fusing **G** = Internal Bubble Level **I** = IP66 Optical **L** = Tool-Less Entry **R** = Secondary 10kV/5kA SPD **U** = DALI Programmable +^ **X** = Single Package # **Y** = Coastal Finish * **XXX** = Special Options † Contact manufacturer for Lead-Time. # "X" option provides single pack box per fixture. Std Packaging = 20 units per Magna pak container. * Recommended for installations within 750 ft. from the coast. Contact Factory for Lead-Time. + Compatible with LightGrid 2.0 nodes. ^ Not available on 347V, 480V or 347-480V for Lumen Output Levels 07, 08, 09, and 10

LUMEN OUTPUT	DISTRIBUTION	TYPICAL INITIAL LUMENS 4000K	3000K	2700K	TYPICAL SYSTEM WATTAGE 120-277V	347-480V	BUG RATING 4000K	3000K	2700K	IES FILE NUMBER 4000K 120-277V	4000K 347-480V	3000K 120-277V	3000K 347-480V	2700K 120-277V	2700K 347-480V
02	A3	2000	1900	1900	14	N/A	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02A340_120VIES	N/A	ERL1_02A330_120VIES	N/A	ERL1_02A327_120VIES	N/A
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02B340_120VIES	N/A	ERL1_02B330_120VIES	N/A	ERL1_02B327_120VIES	N/A
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02C340_120VIES	N/A	ERL1_02C330_120VIES	N/A	ERL1_02C327_120VIES	N/A
	D3						B0-U0-G1	B0-U0-G1	B0-U0-G1	ERL1_02D340_120VIES	N/A	ERL1_02D330_120VIES	N/A	ERL1_02D327_120VIES	N/A
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02E340_120VIES	N/A	ERL1_02E330_120VIES	N/A	ERL1_02E327_120VIES	N/A
03	A3	3000	2900	2800	22	26	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03A340_120-277VIES	ERL1_03A340_347-480VIES	ERL1_03A330_120-277VIES	ERL1_03A330_347-480VIES	ERL1_03A327_120-277VIES	ERL1_03A327_347-480VIES
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03B340_120-277VIES	ERL1_03B340_347-480VIES	ERL1_03B330_120-277VIES	ERL1_03B330_347-480VIES	ERL1_03B327_120-277VIES	ERL1_03B327_347-480VIES
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03C340_120-277VIES	ERL1_03C340_347-480VIES	ERL1_03C330_120-277VIES	ERL1_03C330_347-480VIES	ERL1_03C327_120-277VIES	ERL1_03C327_347-480VIES
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03D340_120-277VIES	ERL1_03D340_347-480VIES	ERL1_03D330_120-277VIES	ERL1_03D330_347-480VIES	ERL1_03D327_120-277VIES	ERL1_03D327_347-480VIES
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03E340_120-277VIES	ERL1_03E340_347-480VIES	ERL1_03E330_120-277VIES	ERL1_03E330_347-480VIES	ERL1_03E327_120-277VIES	ERL1_03E327_347-480VIES
04	A3	4000	3900	3800	31	34	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04A340_120-277VIES	ERL1_04A340_347-480VIES	ERL1_04A330_120-277VIES	ERL1_04A330_347-480VIES	ERL1_04A327_120-277VIES	ERL1_04A327_347-480VIES
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04B340_120-277VIES	ERL1_04B340_347-480VIES	ERL1_04B330_120-277VIES	ERL1_04B330_347-480VIES	ERL1_04B327_120-277VIES	ERL1_04B327_347-480VIES
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04C340_120-277VIES	ERL1_04C340_347-480VIES	ERL1_04C330_120-277VIES	ERL1_04C330_347-480VIES	ERL1_04C327_120-277VIES	ERL1_04C327_347-480VIES
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	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04E340_120-277VIES	ERL1_04E340_347-480VIES	ERL1_04E330_120-277VIES	ERL1_04E330_347-480VIES	ERL1_04E327_120-277VIES	ERL1_04E327_347-480VIES
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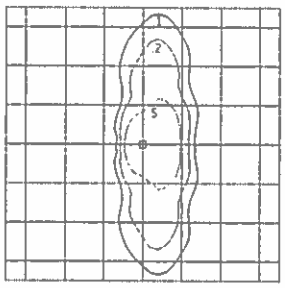
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_05B340_120-277VIES	ERL1_05B340_347-480VIES	ERL1_05B330_120-277VIES	ERL1_05B330_347-480VIES	ERL1_05B327_120-277VIES	ERL1_05B327_347-480VIES
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_05C340_120-277VIES	ERL1_05C340_347-480VIES	ERL1_05C330_120-277VIES	ERL1_05C330_347-480VIES	ERL1_05C327_120-277VIES	ERL1_05C327_347-480VIES
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_05D340_120-277VIES	ERL1_05D340_347-480VIES	ERL1_05D330_120-277VIES	ERL1_05D330_347-480VIES	ERL1_05D327_120-277VIES	ERL1_05D327_347-480VIES
	E3						B2-U0-G2	B1-U0-G1	B1-U0-G1	ERL1_05E340_120-277VIES	ERL1_05E340_347-480VIES	ERL1_05E330_120-277VIES	ERL1_05E330_347-480VIES	ERL1_05E327_120-277VIES	ERL1_05E327_347-480VIES
06	A3	6000	5800	5700	47	52	B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_06A340_120-277VIES	ERL1_06A340_347-480VIES	ERL1_06A330_120-277VIES	ERL1_06A330_347-480VIES	ERL1_06A327_120-277VIES	ERL1_06A327_347-480VIES
	B3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_06B340_120-277VIES	ERL1_06B340_347-480VIES	ERL1_06B330_120-277VIES	ERL1_06B330_347-480VIES	ERL1_06B327_120-277VIES	ERL1_06B327_347-480VIES
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_06C340_120-277VIES	ERL1_06C340_347-480VIES	ERL1_06C330_120-277VIES	ERL1_06C330_347-480VIES	ERL1_06C327_120-277VIES	ERL1_06C327_347-480VIES
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_06D340_120-277VIES	ERL1_06D340_347-480VIES	ERL1_06D330_120-277VIES	ERL1_06D330_347-480VIES	ERL1_06D327_120-277VIES	ERL1_06D327_347-480VIES
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_06E340_120-277VIES	ERL1_06E340_347-480VIES	ERL1_06E330_120-277VIES	ERL1_06E330_347-480VIES	ERL1_06E327_120-277VIES	ERL1_06E327_347-480VIES
07	A3	7000	6800	6600	58		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_07A340___IES		ERL1_07A330___IES		ERL1_07A327___IES	
	B3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_07B340___IES		ERL1_07B330___IES		ERL1_07B327___IES	
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_07C340___IES		ERL1_07C330___IES		ERL1_07C327___IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_07D340___IES		ERL1_07D330___IES		ERL1_07D327___IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_07E340___IES		ERL1_07E330___IES		ERL1_07E327___IES	
08	A3	8000	7800	7600	71		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_08A340___IES		ERL1_08A330___IES		ERL1_08A327___IES	
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_08B340___IES		ERL1_08B330___IES		ERL1_08B327___IES	
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_08C340___IES		ERL1_08C330___IES		ERL1_08C327___IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_08D340___IES		ERL1_08D330___IES		ERL1_08D327___IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_08E340___IES		ERL1_08E330___IES		ERL1_08E327___IES	
09	A3	9000	8800	8500	84		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_09A340___IES		ERL1_09A330___IES		ERL1_09A327___IES	
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_09B340___IES		ERL1_09B330___IES		ERL1_09B327___IES	
	C3						B2-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_09C340___IES		ERL1_09C330___IES		ERL1_09C327___IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_09D340___IES		ERL1_09D330___IES		ERL1_09D327___IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_09E340___IES		ERL1_09E330___IES		ERL1_09E327___IES	
10	A3	9800	9600	9250	97		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10A340___IES		ERL1_10A330___IES		ERL1_10A327___IES	
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10B340___IES		ERL1_10B330___IES		ERL1_10B327___IES	
	C3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10C340___IES		ERL1_10C330___IES		ERL1_10C327___IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_10D340___IES		ERL1_10D330___IES		ERL1_10D327___IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10E340___IES		ERL1_10E330___IES		ERL1_10E327___IES	

Photometrics:

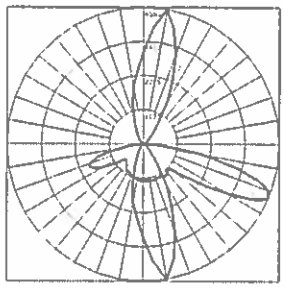
Evolve™ LED Streetlight (ERL1)

ERL1
Type II Narrow
(05A340)

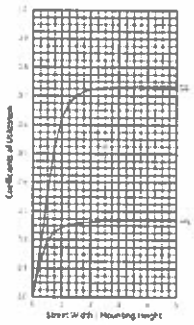
5,000 Lumens
4000K
ERL1_05A340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

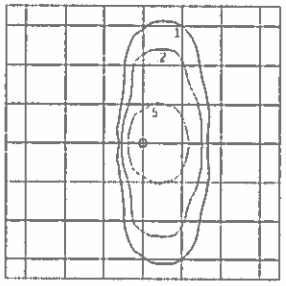


— Vertical plane through horizontal angle of Max. Cd at 80°
— Horizontal cone through vertical angle of Max. Cd at 67°

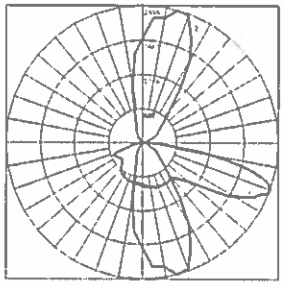


ERL1
Type II Wide
(05B340)

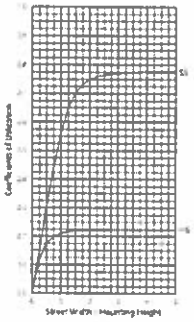
5,000 Lumens
4000K
ERL1_05B340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

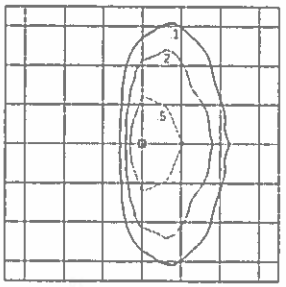


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 69°

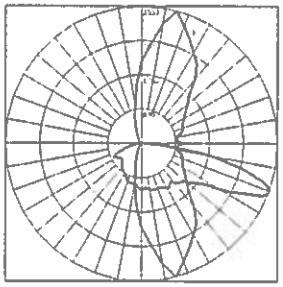


ERL1
Type III
(I05C340)

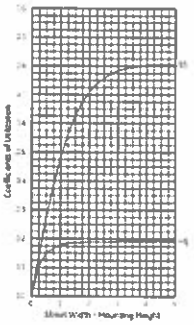
5,000 Lumens
4000K
ERL1_05C340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

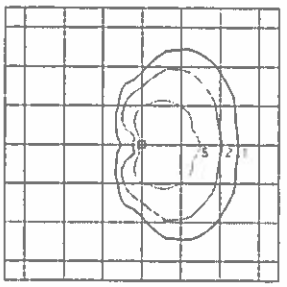


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 70°

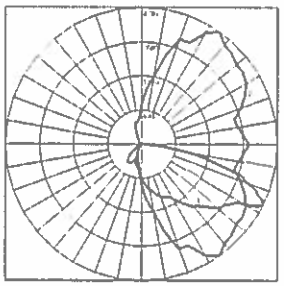


ERL1
Type IV
(05D340)

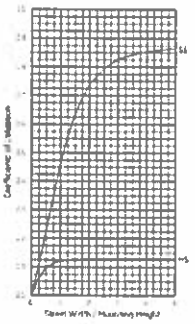
5,000 Lumens
4000K
ERL1_(05D340)___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

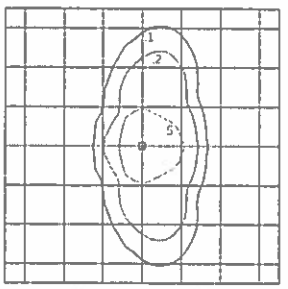


— Vertical plane through horizontal angle of Max. Cd at 55°
— Horizontal cone through vertical angle of Max. Cd at 64°

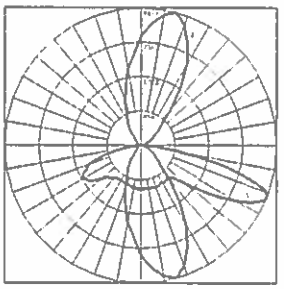


ERL1
Type II Enhanced Back Light
(05E340)

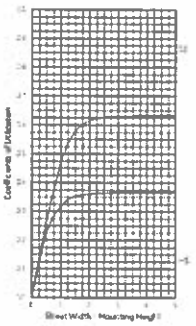
5,000 Lumens
4000K
ERL1_(05E340)___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

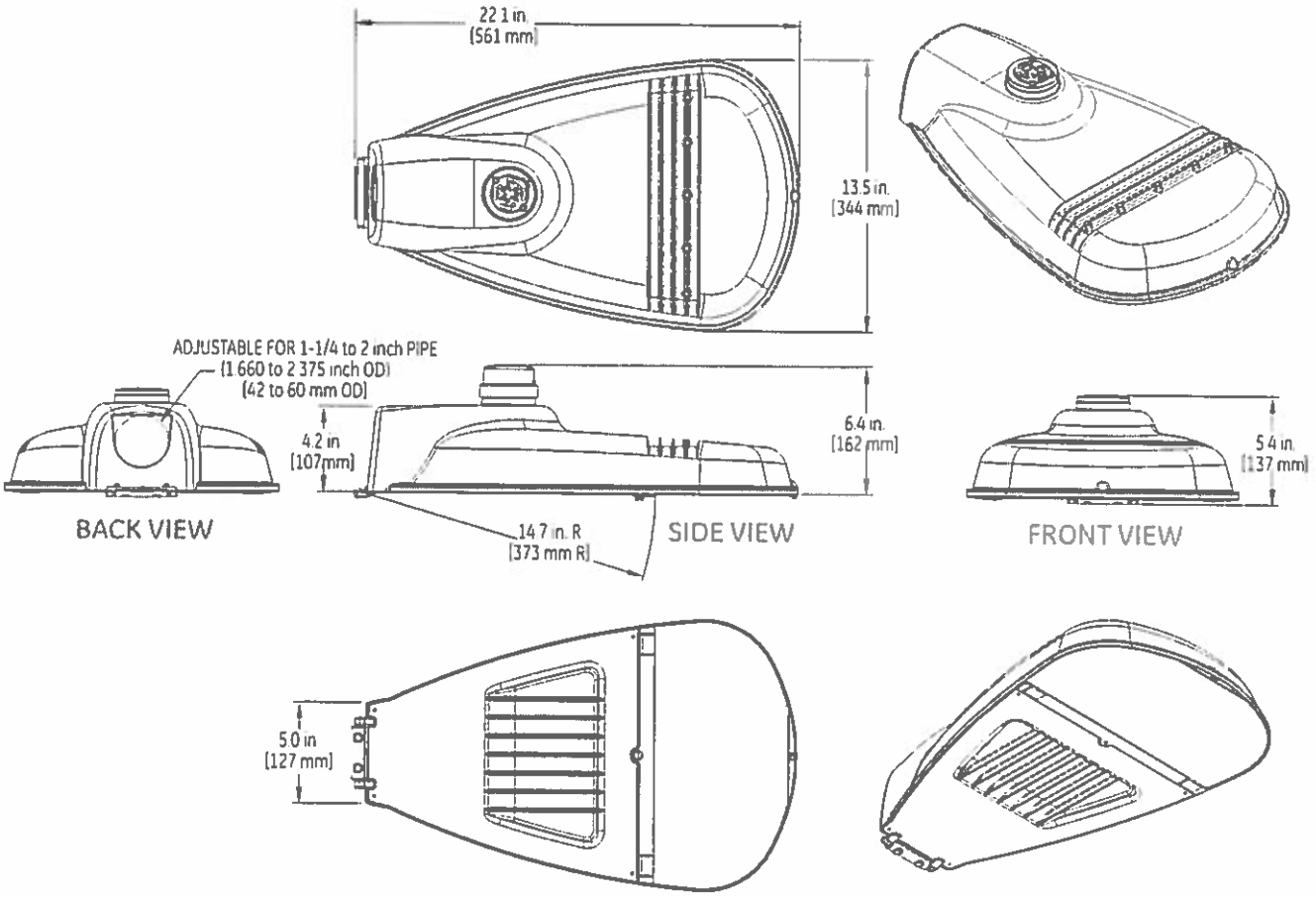


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 67°



GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2

Product Dimensions:
Evolve™ LED Streetlight (ERL1)



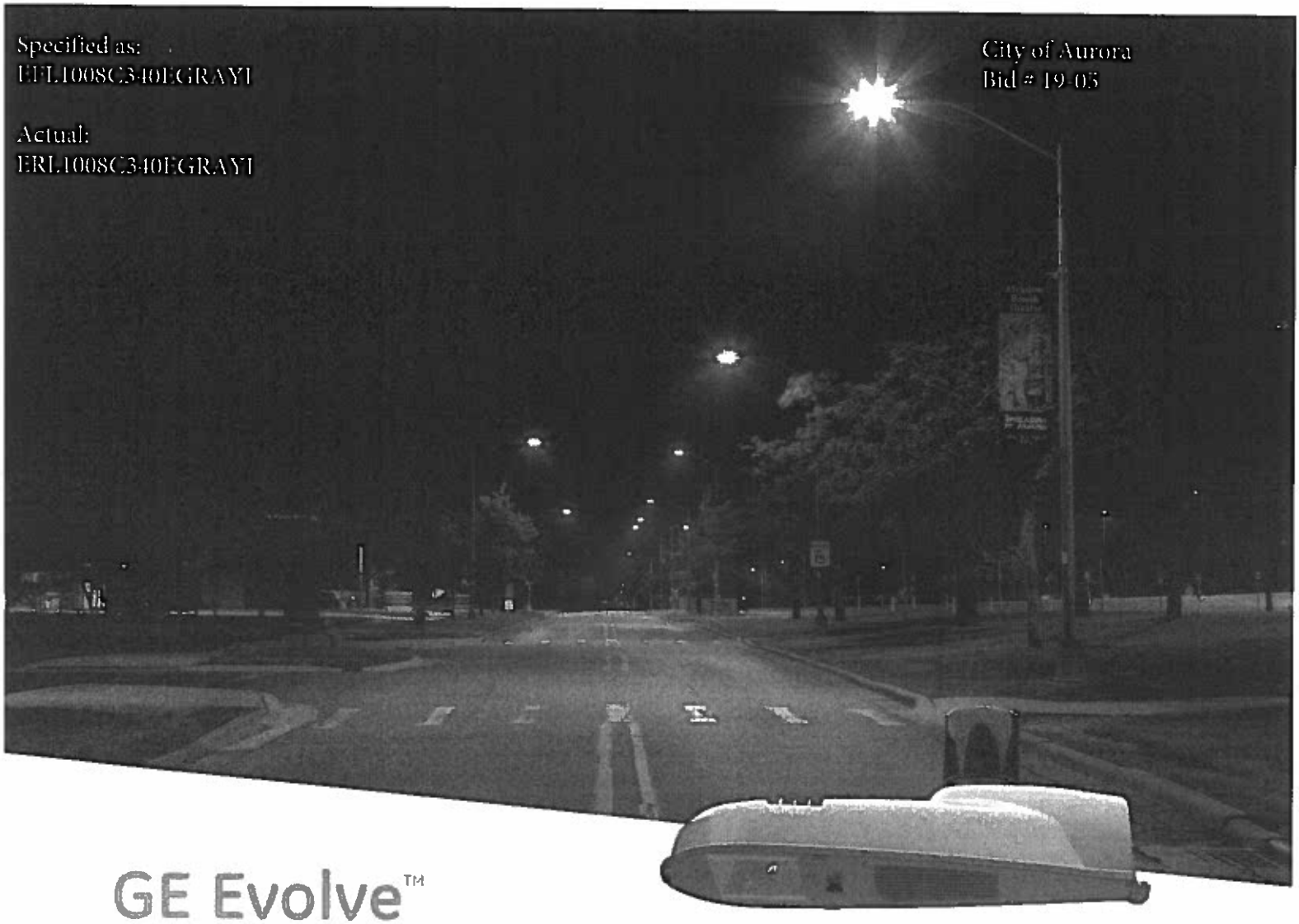
DATA

- Approximate net weight: 12.4 lbs (5.6kgs) -15.5 lbs (7.0kgs) with XFMR
- Effective Projected Area (EPA): 0.5 sq ft max (0.046 sq m)

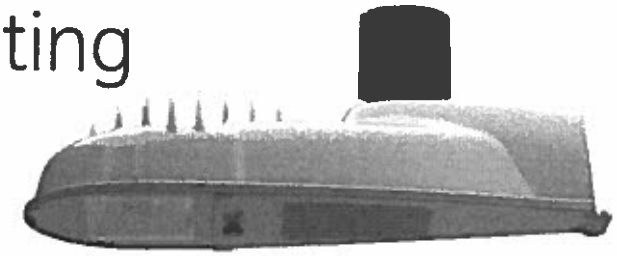
Specified as:
ERL1008C340EGRAYI

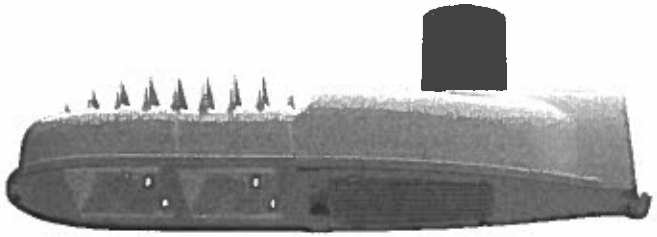
Actual:
ERL1008C340EGRAYI

City of Aurora
Bid # 19-05



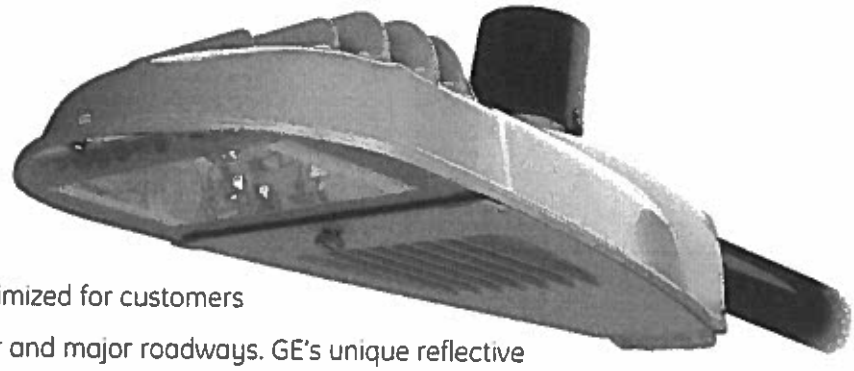
GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2





current
powered by GE

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



The **Evolve** LED Roadway Luminaire is optimized for customers requiring a LED solution for local, collector and major roadways. GE's unique reflective optics are designed to optimize application efficiency and minimize glare. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life. This reliable unit has a 100,000 hour design life, significantly reducing maintenance needs and expense over the life of the fixture. This efficient solution lowers energy consumption compared to a traditional HID fixture for additional operating cost savings.

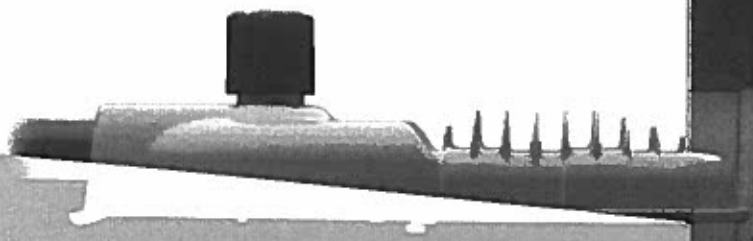
Features:

- Optimized roadway photometric distributions
- **Evolve**™ light engine consisting of reflective technology designed to optimize application efficiency and minimize glare
- 70 CRI at 2700K, 3000K and 4000K typical.
- -40°C to 50°C UL Ambient Typical.
- ULOR = 0 (zero uplight)
- Designed & Assembled in USA

Applications:

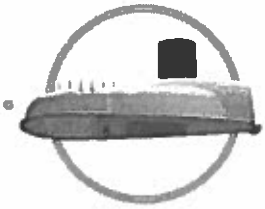
- Local Roadways
- Collector Roadways
- Major Roadway/Streets

Compatible with **LightGrid**™ Outdoor Wireless Control System



To learn more about **GE Evolve LED Roadway Lighting** go to: **www.currentbyge.com**

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



Project name _____
Date _____
Type _____

Typical Specifications: ERL1-ERLH-ERL2

LED & Optical

- **Output Range:** 1900 - 30000 lm
- **Photometric Options:** Type II Narrow, Type II Wide, Type III, Type IV
- **System Efficacy:** 100 - 145 LPW
- **CCT:** 2700K, 3000K, 4000K; High brightness LEDs @ 70 CRI

Lumen Maintenance Tables

Projected Lxx per IES TM-21 at 25°C for reference:

ERL1 LUMEN OUTPUT CODES	Lxx[10K]@HOURS 25,000 HR	50,000 HR	100,000 HR
02,03,04,05,06	L96	L95	L91
07,08,09	L95	L91	L84
10	L89	L80	L64

ERLH LUMEN OUTPUT CODES	Lxx[10K]@HOURS 25,000 HR	50,000 HR	100,000 HR
10, 11	L97	L96	L94
13, 14	L95	L93	L88
15, 16	L94	L91	L85

ERL2 LUMEN OUTPUT CODES	Lxx[10K]@HOURS 25,000 HR	50,000 HR	100,000 HR
16, 18, 19, 21, 23	L96	L94	L91
25, 27, 28	L95	L93	L88
30	L95	L93	L87

Note: Projected Lxx based on LM80 (10,000 hour testing). DOE Lighting Facts Verification Testing Tolerances apply to initial luminous flux and lumen maintenance measurements

Electrical

- **Input Voltage:** 120-277 volt and 347-480 volt
- **Input Frequency:** 50/60Hz
- **Power Factor (PF)*:** >90%
- **Total Harmonic Distortion (THD)*:** <20%

**Power factor and THD tolerance exceptions: ERL1 "02" Lumen output: PF and THD within tolerances above only at 120 volt. ERL1 "03" Lumen output: @120 volt PF~0.89; @ 480 volt THD~26% ERL1 "04" Lumen output: @480 volt THD~22%*

Ratings

- **Surge Protection:** per ANSI C136.2-2015:
  (Driver Internal):
  - 6kV/3kA "Basic: (120 Strikes)" - Standard on ERL1 (02-06)
  - 10kV/5kA "Enhanced: (40 Strikes)" - Standard on ERL1 (07 - 10), ERLH, ERL2

  (Additional Separate Secondary SPD)
  - 10kV/5kA "Enhanced: (40 Strikes) - Option "R"
  - 20kV/10kA "Elevated" (40 Strikes) - Option "T"
- **Safety:** UL/cUL Listed. UL 1598 listed, suitable for wet locations
- **Environmental:** Compliant with the materials restrictions of RoHS
- **EMI:** Title 47 CFR Part 15 Class A
- **Vibration:** 3G per ANSI C136.31-2010
- LM-79 testing in accordance with IESNA Standards
- Std. Optical enclosure rated per ANSI C136.25-2009:
  - ERL1/ERLH/ERL2 = IP65, Optional: IP66
- **Operating Temperature:**

PRODUCT ID	LUMEN OUTPUT	AMBIENT READING
ERL1	02-10	-40°C to 50°C
ERLH	10-11, 13	-40°C to 50°C
ERLH	14-16	-40°C to 45°C
ERL2	16-28	-40°C to 50°C
ERL2	30	-40°C to 45°C

Delayed start may be experienced < -35°C

Construction & Finish

- **Housing:**
  - Die Cast Enclosure
  - Casting-integral heat sink for maximum heat transfer
- **Lensing:** Impact resistant tempered glass, standard
- **Paint:** Corrosion resistant polyester powder painted, minimum 2.0 mil. thickness.
  - Standard Colors: Dark Bronze, Black, & Gray
  - RAL & custom colors available
  - Optional coastal finish available.
- **Weight:** 12.4lbs (5.6kg) - 24lbs (10.9kg)

Warranty

- **System Warranty:** 5 Year Standard, 10 Year Optional

Controls

- **Dimming:**
  - Standard: 0-10V; Optional: DALI (120-277V Only)
- **Sensors:**
  - Photo electric sensors (PE) available.
- LightGrid™ compatible

Mounting

- Slipfitter with +/- 5 degree of adjustment for leveling.
- Integral die cast mounting pipe stop.
- Adjustable for 1.25 in. or 2 in. mounting pipe.

Suggested HID Replacement Lumen Levels

- ~4,000-5,000 lumens to replace 100W HPS Cobra-head
- ~7,000-8,800 lumens to replace 150W HPS Cobra-head
- ~8,500-11,500 lumens to replace 200W HPS Cobra-head
- ~11,500-14,000 lumens to replace 250W HPS Cobra-head
- ~21,000-30,000 lumens to replace 400W HPS Cobra-head

Note: Actual replacement lumens may vary based upon mounting height, pole spacing, design criteria, etc.

CONVERSION FROM PREVIOUS GENERATION OPTICS TO CURRENT GENERATION OPTICS** PREVIOUS	DESCRIPTION	CURRENT	DESCRIPTION
A1, B1	Extra Narrow/Narrow Asymmetric	A3	Type I Narrow
C1, E1	Asymmetric Short/Medium	B3	Type II Wide
D1, G1	Asymmetric Forward/Extra Wide	C3	Type III
F1	Asymmetric Wide	D3	Type IV
		E3	Type II Enhanced Back Light

**The information above is designed to provide a guideline to select the correct luminaire for a roadway application. The best and most accurate way to ensure the proper design is do a lighting layout Utilizing AGI

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2

Project name _____

Date _____

Type _____

E R L 1 — — — — 0 — 08 —— C3 —— 40 —— E — GRAY ———— I ———

PROD. ID	VOLTAGE	LUMEN OUTPUT	DISTRIBUTION*	CCT	CONTROLS	COLOR	OPTIONS
E = Evolve R = Roadway L = Local 1 = Single Module	0 = 120-277V* 1 = 120 2 = 208 3 = 240 4 = 277 5 = 480 D = 347 H = 347-480* * Not available with Fusing. Must choose a discrete voltage with F option.	02* 03< 04< 05< 06 07 08 09 10 See Table *120V only, not compatible with 0-10V dimming. < See Note Under Controls Column	A3 = Type II Narrow B3 = Type II Wide C3 = Type III D3 = Type IV E3 = Type II Enhanced Back Light See Table *Nominal IES Type classing subject to typical variation, individual units may differ.	27 = 2700K<> 30 = 3000K 40 = 4000K <> Select 2700K or 3000K CCT for IDA approved units.	A = ANSI C136.41 7-pin D = ANSI C136.41 7-pin with Shorting Cap E = ANSI C136.41 7-pin with non-Dimming PE Control.* *PE Control Only available for 120-277V or 480V Discrete. Not available for 347-480V or 347V Discrete. < If dimming the 03 - 05 lumen output using a control supplied from a source other than GE call 1-888-694-3533, then select Option 2 at the prompt for assistance. **NOTE:** Dimming controls wired for 0-10V standard unless DALI option "U" requested	GRAY = Gray BLCK = Black DKBZ = Dark Bronze	A = 4 Bolt Slipfitter I F = Fusing G = Internal Bubble Level I = IP66 Optical L = Tool-Less Entry R = Secondary 10kV/5kA SPD U = DALI Programmable +^ X = Single Package # Y = Coastal Finish * XXX = Special Options † Contact manufacturer for Lead-Time. # "X" option provides single pack box per fixture. Std Packaging = 20 units per Magna pak container. * Recommended for installations within 750 ft. from the coast. Contact Factory for Lead-Time. + Compatible with LightGrid 2.0 nodes. ^ Not available in 347V, 480V or 347-480V for Lumen Output Levels 07, 08, 09, and 10.

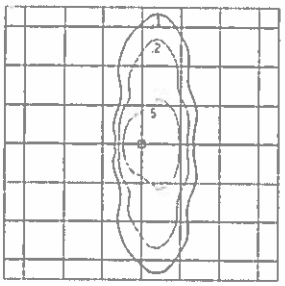
LUMEN OUTPUT	DISTRIBUTION	TYPICAL INITIAL LUMENS 4000K	3000K	2700K	TYPICAL SYSTEM WATTAGE 120-277V	347-480V	BUG RATING 4000K	3000K	2700K	IES FILE NUMBER 4000K 120-277V	4000K 347-480V	3000K 120-277V	3000K 347-480V	2700K 120-277V	2700K 347-480V
02	A3	2000	1900	1900	14	N/A	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02A340_-120VIES	N/A	ERL1_02A330_-120VIES	N/A	ERL1_02A327_-120VIES	N/A
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02B340_-120VIES	N/A	ERL1_02B330_-120V ES	N/A	ERL1_02B327_-120VIES	N/A
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02C340_-120VIES	N/A	ERL1_02C330_-120VIES	N/A	ERL1_02C327_-120VIES	N/A
	D3						B0-U0-G1	B0-U0-G1	B0-U0-G1	ERL1_02D340_-120VIES	N/A	ERL1_02D330_-120VIES	N/A	ERL1_02D327_-120V ES	N/A
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02E340_-120VIES	N/A	ERL1_02E330_-120VIES	N/A	ERL1_02E327_-120VIES	N/A
03	A3	3000	2900	2800	22	26	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03A340_-120-277VIES	ERL1_03A340_347-480VIES	ERL1_03A330_-120-277VIES	ERL1_03A330_347-480VIES	ERL1_03A327_-120-277VIES	ERL1_03A327_347-480VIES
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03B340_-120-277VIES	ERL1_03B340_347-480VIES	ERL1_03B330_-120-277VIES	ERL1_03B330_347-480VIES	ERL1_03B327_-120-277VIES	ERL1_03B327_347-480VIES
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03C340_-120-277VIES	ERL1_03C340_347-480VIES	ERL1_03C330_-120-277V ES	ERL1_03C330_347-480VIES	ERL1_03C327_-120-277VIES	ERL1_03C327_347-480VIES
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03D340_-120-277VIES	ERL1_03D340_347-480VIES	ERL1_03D330_-120-277VIES	ERL1_03D330_347-480VIES	ERL1_03D327_-120-277VIES	ERL1_03D327_347-480VIES
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03E340_-120-277VIES	ERL1_03E340_347-480VIES	ERL1_03E330_-120-277VIES	ERL1_03E330_347-480VIES	ERL1_03E327_-120-277VIES	ERL1_03E327_347-480VIES
04	A3	4000	3900	3800	31	34	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04A340_-120-277VIES	ERL1_04A340_347-480VIES	ERL1_04A330_-120-277VIES	ERL1_04A330_347-480VIES	ERL1_04A327_-120-277VIES	ERL1_04A327_347-480VIES
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04B340_-120-277VIES	ERL1_04B340_347-480VIES	ERL1_04B330_-120-277VIES	ERL1_04B330_347-480V ES	ERL1_04B327_-120-277VIES	ERL1_04B327_347-480VIES
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04C340_-120-277VIES	ERL1_04C340_347-480VIES	ERL1_04C330_-120-277V ES	ERL1_04C330_347-480VIES	ERL1_04C327_-120-277VIES	ERL1_04C327_347-480VIES
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04D340_-120-277VIES	ERL1_04D340_347-480VIES	ERL1_04D330_-120-277VIES	ERL1_04D330_347-480VIES	ERL1_04D327_-120-277VIES	ERL1_04D327_347-480VIES
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04E340_-120-277VIES	ERL1_04E340_347-480VIES	ERL1_04E330_-120-277VIES	ERL1_04E330_347-480VIES	ERL1_04E327_-120-277VIES	ERL1_04E327_347-480VIES
05	A3	5000	4900	4700	39	43	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_05A340_120-277VIES	ERL1_05A340_347-480VIES	ERL1_05A330_-120-277VIES	ERL1_05A330_347-480VIES	ERL1_05A327_-120-277VIES	ERL1_05A327_347-480VIES
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_05B340_120-277VIES	ERL1_05B340_347-480VIES	ERL1_05B330_-120-277VIES	ERL1_05B330_347-480V ES	ERL1_05B327_-120-277VIES	ERL1_05B327_347-480VIES
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_05C340_120-277VIES	ERL1_05C340_347-480VIES	ERL1_05C330_-120-277V ES	ERL1_05C330_347-480VIES	ERL1_05C327_-120-277VIES	ERL1_05C327_347-480VIES
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_05D340_120-277VIES	ERL1_05D340_347-480VIES	ERL1_05D330_-120-277VIES	ERL1_05D330_347-480VIES	ERL1_05D327_-120-277VIES	ERL1_05D327_347-480VIES
	E3						B2-U0-G2	B1-U0-G1	B1-U0-G1	ERL1_05E340_120-277VIES	ERL1_05E340_347-480VIES	ERL1_05E330_-120-277VIES	ERL1_05E330_347-480VIES	ERL1_05E327_-120-277VIES	ERL1_05E327_347-480VIES
06	A3	6000	5800	5700	47	52	B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_06A340_120-277VIES	ERL1_06A340_347-480VIES	ERL1_06A330_-120-277VIES	ERL1_06A330_347-480VIES	ERL1_06A327_-120-277VIES	ERL1_06A327_347-480VIES
	B3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_06B340_120-277VIES	ERL1_06B340_347-480VIES	ERL1_06B330_-120-277VIES	ERL1_06B330_347-480V ES	ERL1_06B327_-120-277VIES	ERL1_06B327_347-480VIES
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_06C340_120-277VIES	ERL1_06C340_347-480VIES	ERL1_06C330_-120-277V ES	ERL1_06C330_347-480VIES	ERL1_06C327_-120-277VIES	ERL1_06C327_347-480VIES
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_06D340_120-277VIES	ERL1_06D340_347-480VIES	ERL1_06D330_-120-277VIES	ERL1_06D330_347-480VIES	ERL1_06D327_-120-277VIES	ERL1_06D327_347-480VIES
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_06E340_120-277VIES	ERL1_06E340_347-480VIES	ERL1_06E330_-120-277VIES	ERL1_06E330_347-480VIES	ERL1_06E327_-120-277VIES	ERL1_06E327_347-480VIES
07	A3	7000	6800	6600	58		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_07A340___IES		ERL1_07A330___IES		ERL1_07A327___IES	
	B3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_07B340___IES		ERL1_07B330___IES		ERL1_07B327___IES	
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_07C340___IES		ERL1_07C330___IES		ERL1_07C327___IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_07D340___IES		ERL1_07D330___IES		ERL1_07D327___IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_07E340___IES		ERL1_07E330___IES		ERL1_07E327___IES	
08	A3	8000	7800	7600	71		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_08A340___IES		ERL1_08A330___IES		ERL1_08A327___IES	
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_08B340___IES		ERL1_08B330___IES		ERL1_08B327___IES	
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_08C340___IES		ERL1_08C330___IES		ERL1_08C327___IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_08D340___IES		ERL1_08D330___IES		ERL1_08D327___IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_08E340___IES		ERL1_08E330___IES		ERL1_08E327___IES	
09	A3	9000	8800	8500	84		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_09A340___ES		ERL1_09A330___IES		ERL1_09A327___IES	
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_09B340___ES		ERL1_09B330___IES		ERL1_09B327___IES	
	C3						B2-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_09C340___IES		ERL1_09C330___IES		ERL1_09C327___IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_09D340___IES		ERL1_09D330___IES		ERL1_09D327___IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_09E340___IES		ERL1_09E330___IES		ERL1_09E327___IES	
10	A3	9800	9600	9250	97		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10A340___ES		ERL1_10A330___IES		ERL1_10A327___IES	
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10B340___ES		ERL1_10B330___IES		ERL1_10B327___IES	
	C3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10C340___IES		ERL1_10C330___IES		ERL1_10C327___IES	
	D3						B2-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_10D340___IES		ERL1_10D330___IES		ERL1_10D327___IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10E340___IES		ERL1_10E330___IES		ERL1_10E327___IES	

Photometrics:

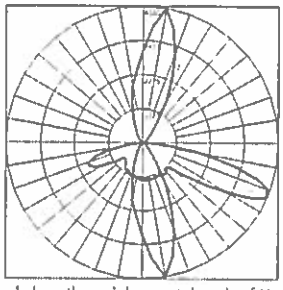
Evolve™ LED Streetlight (ERL1)

ERL1
Type II Narrow
(05A340)

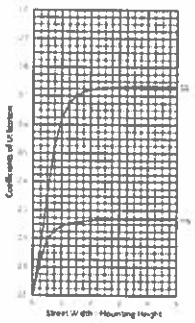
5,000 Lumens
4000K
ERL1_05A340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

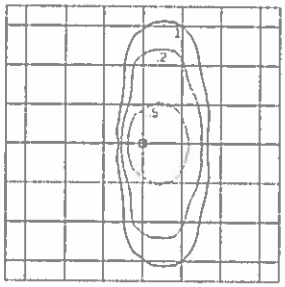


— Vertical plane through horizontal angle of Max. Cd at 80°
— Horizontal cone through vertical angle of Max. Cd at 67°

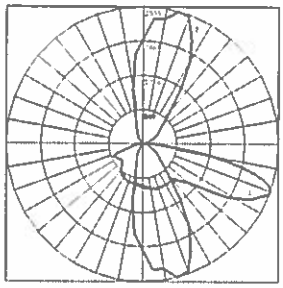


ERL1
Type II Wide
(05B340)

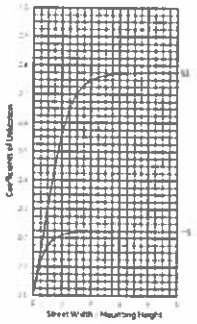
5,000 Lumens
4000K
ERL1_05B340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

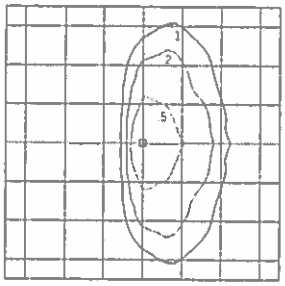


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 69°

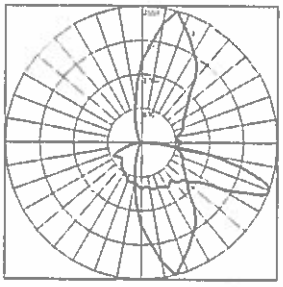


ERL1
Type III
(05C340)

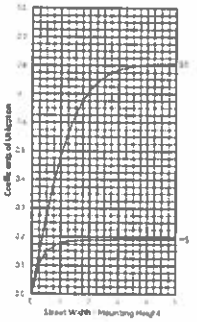
5,000 Lumens
4000K
ERL1_05C340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

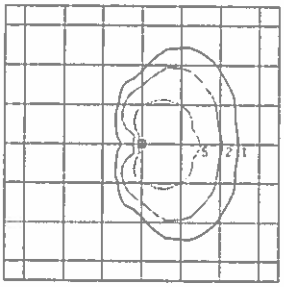


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 70°

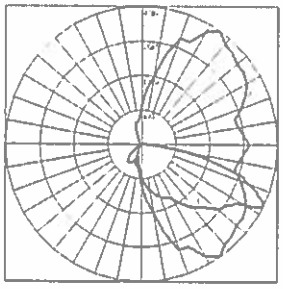


ERL1
Type IV
(05D340)

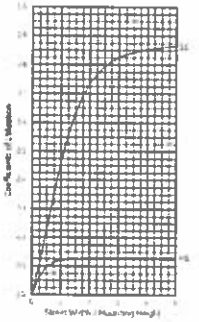
5,000 Lumens
4000K
ERL1_(05D340)___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

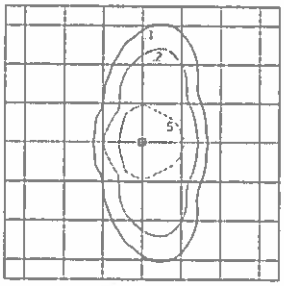


— Vertical plane through horizontal angle of Max. Cd at 55°
— Horizontal cone through vertical angle of Max. Cd at 64°

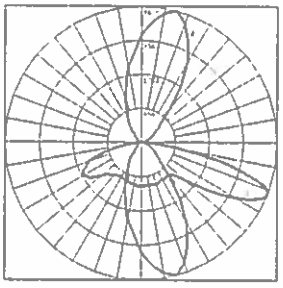


ERL1
Type II Enhanced Back Light
(05E340)

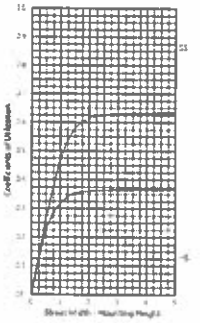
5,000 Lumens
4000K
ERL1_(05E340)___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

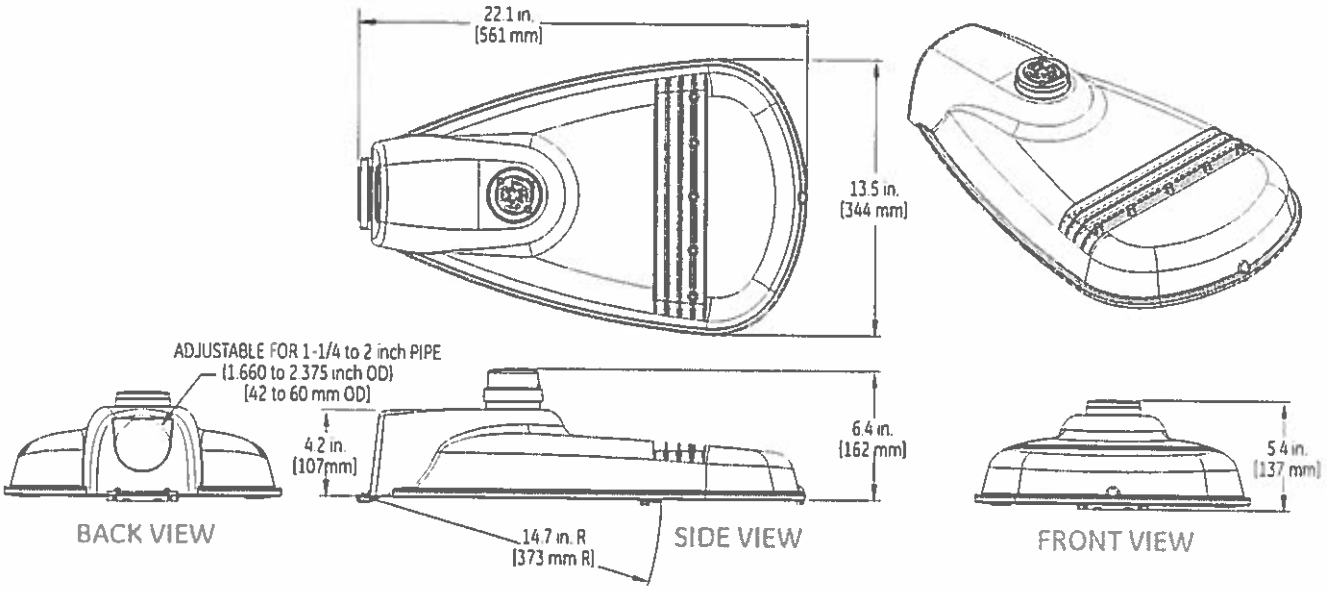


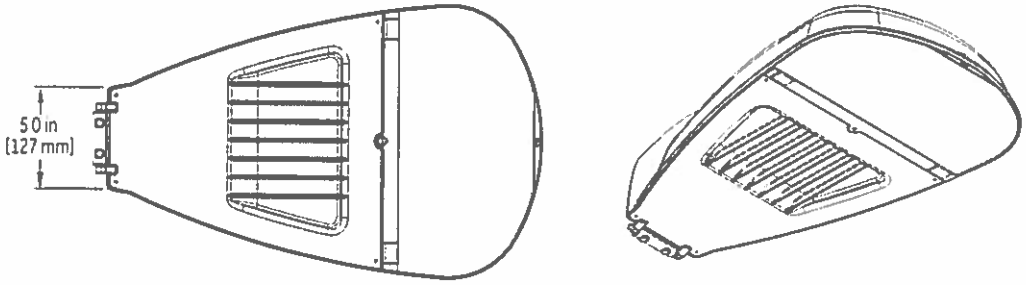
— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 67°



GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2

Product Dimensions:
Evolve™ LED Streetlight (ERL1)





DATA

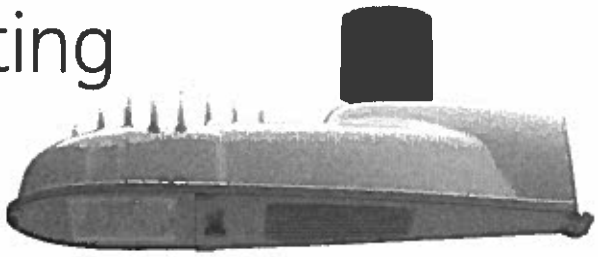
- Approximate net weight: 12.4 lbs (5.6kgs) -15.5 lbs (7.0kgs) with XFMR
- Effective Projected Area (EPA): 0.5 sq ft max (0.046 sq m)

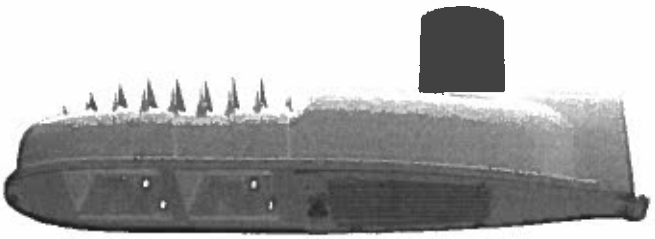
Specified as:
L2018C340DDKBZAGHLR

Actual:
ERL2018C340DDKBZAGHLR

City of Aurora
Bid # 19-05

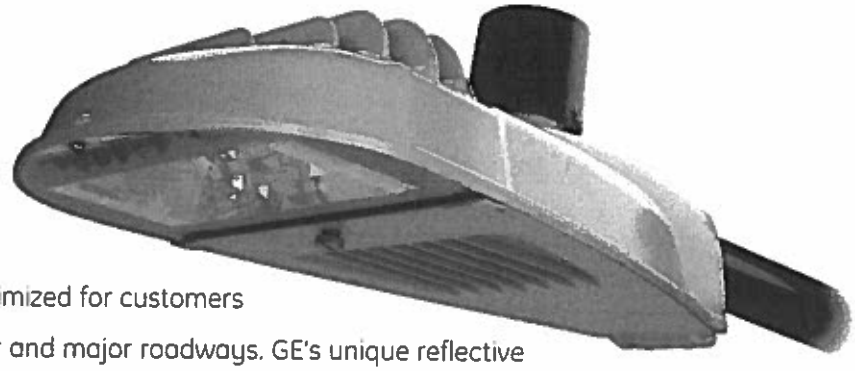
GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2





current
powered by GE

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



The **Evolve** LED Roadway Luminaire is optimized for customers requiring a LED solution for local, collector and major roadways. GE's unique reflective optics are designed to optimize application efficiency and minimize glare. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life. This reliable unit has a 100,000 hour design life, significantly reducing maintenance needs and expense over the life of the fixture. This efficient solution lowers energy consumption compared to a traditional HID fixture for additional operating cost savings.

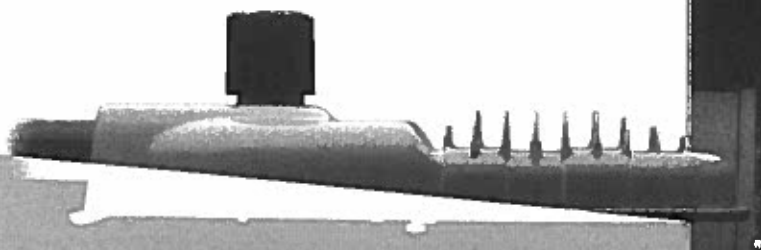
Features:

- Optimized roadway photometric distributions
- **Evolve**™ light engine consisting of reflective technology designed to optimize application efficiency and minimize glare
- 70 CRI at 2700K, 3000K and 4000K typical.
- -40°C to 50°C UL Ambient Typical.
- ULOR = 0 (zero uplight)
- Designed & Assembled in USA

Applications:

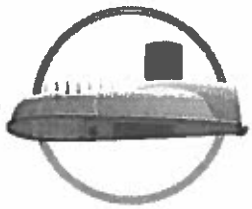
- Local Roadways
- Collector Roadways
- Major Roadway/Streets

Compatible with **LightGrid**™ Outdoor Wireless Control System



To learn more about **GE Evolve LED Roadway Lighting** go to: **www.currentbyge.com**

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



Project name _____
Date _____
Type _____

Typical Specifications: ERL1-ERLH-ERL2

LED & Optical

- **Output Range:** 1900 - 30000 lm
- **Photometric Options:** Type II Narrow, Type II Wide, Type III, Type IV
- **System Efficacy:** 100 - 145 LPW
- **CCT:** 2700K, 3000K, 4000K; High brightness LEDs @ 70 CRI

Lumen Maintenance Tables

Projected Lxx per IES TM-21 at 25°C for reference:

ERL1 LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	100,000 HR
02,03,04,05,06	L96	L95	L91
07,08,09	L95	L91	L84
10	L89	L80	L64

ERLH LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	100,000 HR
10, 11	L97	L96	L94
13, 14	L95	L93	L88
15, 16	L94	L91	L85

ERL2 LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	100,000 HR
16, 18, 19, 21, 23	L96	L94	L91
25, 27, 28	L95	L93	L88
30	L95	L93	L87

Note: Projected Lxx based on LM80 (10,000 hour testing) DOE Lighting Facts Verification Testing Tolerances apply to initial luminous flux and lumen maintenance measurements

Electrical

- **Input Voltage:** 120-277 volt and 347-480 volt
- **Input Frequency:** 50/60Hz
- **Power Factor (PF)*:** >90%
- **Total Harmonic Distortion (THD)*:** <20%

**Power factor and THD tolerance exceptions: ERL1 "02" Lumen output: PF and THD within tolerances above only at 120 volt. ERL1 "03" Lumen output: @120 volt PF~0.89; @ 480 volt THD~26% ERL1 "04" Lumen output: @480 volt THD~22%*

Ratings

- **Surge Protection:** per ANSI C136.2-2015:
  (Driver Internal):
  - 6kV/3kA "Basic: (120 Strikes)" - Standard on ERL1 (02-06)
  - 10kV/5kA "Enhanced: (40 Strikes)" - Standard on ERL1 (07 - 10), ERLH, ERL2

  (Additional Separate Secondary SPD)
  - 10kV/5kA "Enhanced: (40 Strikes) - Option "R"
  - 20kV/10kA "Elevated" (40 Strikes) - Option "T"
- **Safety:** UL/cUL Listed. UL 1598 listed, suitable for wet locations
- **Environmental:** Compliant with the materials restrictions of RoHS
- **EMI:** Title 47 CFR Part 15 Class A
- **Vibration:** 3G per ANSI C136.31-2010
- LM-79 testing in accordance with IESNA Standards
- Std. Optical enclosure rated per ANSI C136.25-2009:
  - ERL1/ERLH/ERL2 = IP65, Optional IP66
- **Operating Temperature:**

PRODUCT ID	LUMEN OUTPUT	AMBIENT READING
ERL1	02-10	-40°C to 50°C
ERLH	10-11, 13	-40°C to 50°C
ERLH	14-16	-40°C to 45°C
ERL2	16-28	-40°C to 50°C
ERL2	30	-40°C to 45°C

Delayed start may be experienced < -35°C

Construction & Finish

- **Housing:**
  - Die Cast Enclosure
  - Casting-integral heat sink for maximum heat transfer
- **Lensing:** Impact resistant tempered glass, standard
- **Paint:** Corrosion resistant polyester powder painted, minimum 2.0 mil. thickness.
  - Standard Colors: Dark Bronze, Black, & Gray
  - RAL & custom colors available
  - Optional coastal finish available.
- **Weight:** 12.4lbs (5.6kg) - 24lbs (10.9kg)

Warranty

- **System Warranty:** 5 Year Standard, 10 Year Optional

Controls

- **Dimming:**
  - Standard: 0-10V; Optional: DALI (120-277V Only)
- **Sensors:**
  - Photo electric sensors (PE) available.
- LightGrid™ compatible

Mounting

- Slipfitter with +/- 5 degree of adjustment for leveling.
- Integral die cast mounting pipe stop.
- Adjustable for 1.25 in. or 2 in. mounting pipe.

Suggested HID Replacement Lumen Levels

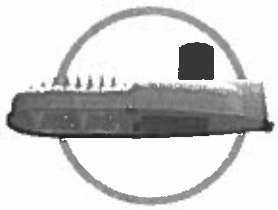
- ~4,000-5,000 lumens to replace 100W HPS Cobra-head
- ~7,000-8,800 lumens to replace 150W HPS Cobra-head
- ~8,500-11,500 lumens to replace 200W HPS Cobra-head
- ~11,500-14,000 lumens to replace 250W HPS Cobra-head
- ~21,000-30,000 lumens to replace 400W HPS Cobra-head

Note: Actual replacement lumens may vary based upon mounting height, pole spacing, design criteria, etc.

CONVERSION FROM PREVIOUS GENERATION OPTICS TO CURRENT GENERATION OPTICS** PREVIOUS	DESCRIPTION	CURRENT	DESCRIPTION
A1, B1	Extra Narrow/Narrow Asymmetric	A3	Type II Narrow
C1, E1	Asymmetric Short/Medium	B3	Type II Wide
D1, G1	Asymmetric Forward/Extra Wide	C3	Type III
F1	Asymmetric Wide	D3	Type IV
		E3	Type II Enhanced Back Light

**The information above is designed to provide a guideline to select the correct luminaire for a roadway application. The best and most accurate way to ensure the proper design is do a lighting layout Utilizing AGI

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



Project name _____
Date _____
Type _____

E R L 2 — 0 — 18 — C3 — 40 — E — GRAY — AGIL

PROD. ID	VOLTAGE	LUMEN OUTPUT	DISTRIBUTION*	CCT	CONTROLS	COLOR	OPTIONS
E = Evolve R = Roadway L = Local 2 = Double Module	0 = 120-277V* 1 = 120 2 = 208 3 = 240 4 = 277 5 = 480 D = 347 H = 347-480* * Not available with Fusing. Must choose a discrete voltage with F option	16 18 19 21 23 25 27 28 30 See Table	**A3** = Type II Narrow **B3** = Type II Wide **C3** = Type III **D3** = Type IV **E3** = Type II Enhanced Back Light See Table *Nominal IES Type classing subject to typical variation, individual units may differ	**30** = 3000K ◇ **40** = 4000K ◇ Select 3000K CCT for IDA approved units.	**A** = ANSI C136.41 7 pin **D** = ANSI C136.41 7-pin with Shorting Cap **E** = ANSI C136.41 7-pin with non-Dimming PE Control.* *PE Control Only available for 120-277V or 480V Discrete. Not available for 347-480V or 347V Discrete. **NOTE:** Dimming controls wired for 0-10V standard unless DALI option "U" requested.	**GRAY** = Gray **BLCK** = Black **DKBZ** = Dark Bronze	**A** = 4 Bolt Slipfitter † **F** = Fusing **G** = Internal Bubble Level **I** = IP66 Optical **L** = Tool-Less Entry **R** = Secondary 10kV/5kA SPD **U** = DALI Programmable ^ **Y** = Coastal Finish * **XXX** = Special Options † Contact manufacturer for Lead-Time. * Recommended for installations within 750 ft. from the coast. Contact Factory for Lead-Time. + Compatible with LightGrid 2.0 nodes ^ Not available in 347V, 480V or 347-480V.

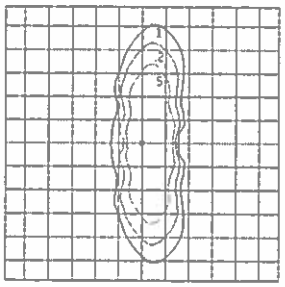
LUMEN OUTPUT	DISTRIBUTION	TYPICAL INITIAL LUMENS 4000K	TYPICAL INITIAL LUMENS 3000K	TYPICAL SYSTEM WATTAGE 120-277V	TYPICAL SYSTEM WATTAGE 347-480V	BUG RATING 4000K	BUG RATING 3000K	IES FILE NUMBER 4000K 120-277V	IES FILE NUMBER 4000K 347-480V	IES FILE NUMBER 3000K 120-277V	IES FILE NUMBER 3000K 347-480V
16	A3	16000	15300	120	120	B3-U0-G3	B3-U0-G3	ERL2_16A340_IES			
	B3					B3-U0-G3	B3-U0-G3	ERL2_16B340_IES			
	C3					B2-U0-G3	B2-U0-G3	ERL2_16C340_IES			
	D3					B2-U0-G3	B2-U0-G3	ERL2_16D340_IES			
	E3					B3-U0-G3	B3-U0-G3	ERL2_16E340_IES			
18	A3	18000	17300	140	140	B3-U0-G3	B3-U0-G3	ERL2_18A340_IES			
	B3					B3-U0-G3	B3-U0-G3	ERL2_18B340_IES			
	C3					B2-U0-G3	B2-U0-G3	ERL2_18C340_IES			
	D3					B2-U0-G3	B2-U0-G3	ERL2_18D340_IES			
	E3					B3-U0-G3	B3-U0-G3	ERL2_18E340_IES			
19	A3	19000	18200	149	149	B3-U0-G3	B3-U0-G3	ERL2_19A340_IES			
	B3					B3-U0-G3	B3-U0-G3	ERL2_19B340_IES			
	C3					B3-U0-G3	B2-U0-G3	ERL2_19C340_IES			
	D3					B2-U0-G3	B2-U0-G3	ERL2_19D340_IES			
	E3					B3-U0-G3	B3-U0-G3	ERL2_19E340_IES			
21	A3	21000	20100	174	177	B3-U0-G3	B3-U0-G3	ERL2_21A340_-120-277VIES	ERL2_21A340_-347-480VIES		
	B3					B3-U0-G3	B3-U0-G3	ERL2_21B340_-120-277VIES	ERL2_21B340_-347-480VIES		
	C3					B3-U0-G4	B3-U0-G3	ERL2_21C340_-120-277V ES	ERL2_21C340_-347-480VIES		
	D3					B2-U0-G3	B2-U0-G3	ERL2_21D340_-120-277VIES	ERL2_21D340_-347-480VIES		
	E3					B3-U0-G3	B3-U0-G3	ERL2_21E340_-120-277VIES	ERL2_21E340_-347-480VIES		
23	A3	23000	22100	194	196	B3-U0-G3	B3-U0-G3	ERL2_23A340_-120-277VIES	ERL2_23A340_-347-480VIES		
	B3					B3-U0-G3	B3-U0-G3	ERL2_23B340_-120-277VIES	ERL2_23B340_-347-480VIES		
	C3					B3-U0-G4	B3-U0-G4	ERL2_23C340_-120-277V ES	ERL2_23C340_-347-480VIES		
	D3					B2-U0-G4	B2-U0-G4	ERL2_23D340_-120-277VIES	ERL2_23D340_-347-480VIES		
	E3					B4-U0-G4	B3-U0-G3	ERL2_23E340_-120-277VIES	ERL2_23E340_-347-480VIES		
25	A3	25000	24000	214	214	B3-U0-G3	B3-U0-G3	ERL2_25A340_IES			
	B3					B3-U0-G3	B3-U0-G3	ERL2_25B340_IES			
	C3					B3-U0-G4	B3-U0-G4	ERL2_25C340_IES			
	D3					B2-U0-G4	B2-U0-G4	ERL2_25D340_IES			
	E3					B4-U0-G4	B4-U0-G4	ERL2_25E340_IES			
27	A3	27000	25900	237	237	B3-U0-G3	B3-U0-G3	ERL2_27A340_IES			
	B3					B3-U0-G4	B3-U0-G4	ERL2_27B340_IES			
	C3					B3-U0-G4	B3-U0-G4	ERL2_27C340_IES			
	D3					B2-U0-G4	B2-U0-G4	ERL2_27D340_IES			
	E3					B4-U0-G4	B4-U0-G4	ERL2_27E340_IES			
28	A3	28000	26900	251	251	B3-U0-G3	B3-U0-G3	ERL2_28A340_IES			
	B3					B3-U0-G4	B3-U0-G4	ERL2_28B340_IES			
	C3					B3-U0-G4	B3-U0-G4	ERL2_28C340_IES			
	D3					B2-U0-G4	B2-U0-G4	ERL2_28D340_IES			
	E3					B4-U0-G4	B4-U0-G4	ERL2_28E340_IES		E3	
30	A3	30000	28800	278	278	B4-U0-G4	B4-U0-G4	ERL2_30A340_IES			
	B3					B3-U0-G4	B3-U0-G4	ERL2_30B340_IES			
	C3					B3-U0-G4	B3-U0-G4	ERL2_30C340_IES			
	D3					B2-U0-G4	B2-U0-G4	ERL2_30D340_IES			
	E3					B4-U0-G4	B4-U0-G4	ERL2_30E340_IES			

Photometrics:

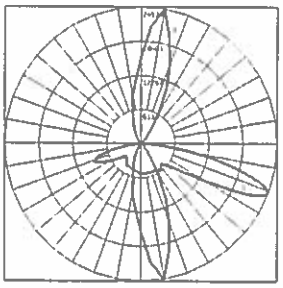
Evolve™ LED Streetlight (ERL2)

ERL2
Type II Narrow
(23A340)

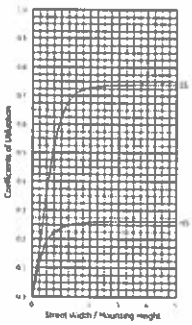
23,000 Lumens
4000K
ERL2_23A340___.IES



Grid Distance in Units of Mounting He ght at 30'
Initial Footcandle Values at Grade

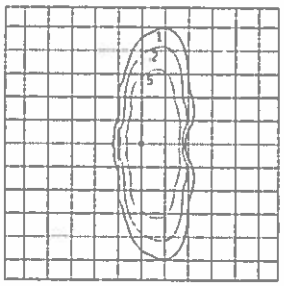


— Vertical plane through horizontal angle of Max. Cd at 80°
— Horizontal cone through vertical angle of Max. Cd at 69°

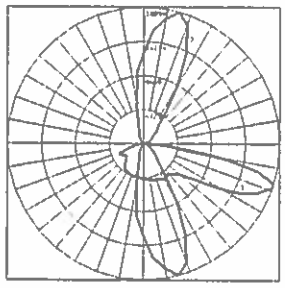


ERL2
Type II Wide
(23B340)

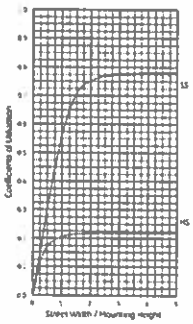
23,000 Lumens
4000K
ERL2_23B340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

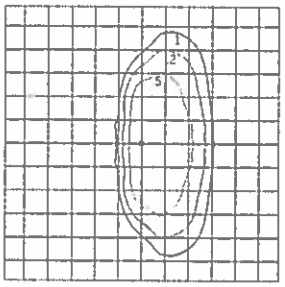


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 72°

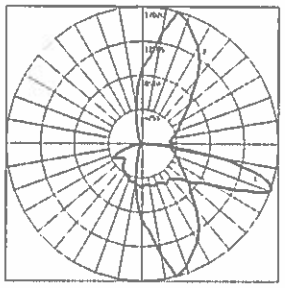


ERL2
Type III
(23C340)

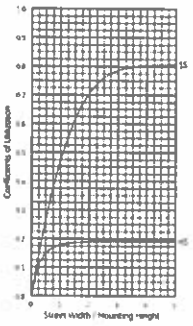
23,000 Lumens
4000K
ERL2_23C340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

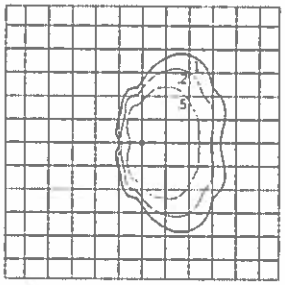


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 71°

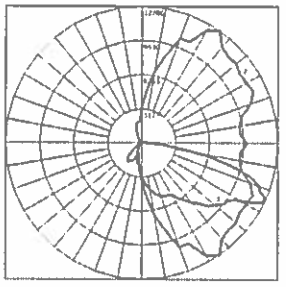


ERL2
Type IV
(23D340)

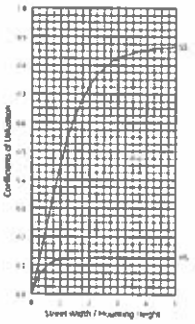
23,000 Lumens
4000K
ERL2_23D340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

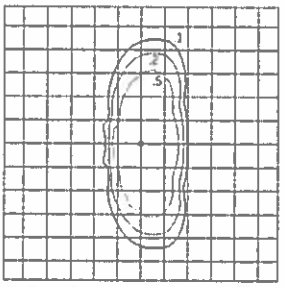


— Vertical plane through horizontal angle of Max. Cd at 55°
— Horizontal cone through vertical angle of Max. Cd at 65°

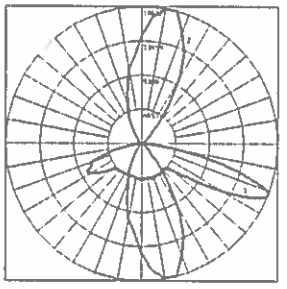


ERL2
Type II Enhanced Back Light
(23E340)

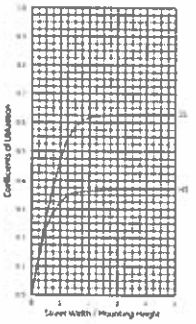
23,000 Lumens
4000K
ERL2_23E340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

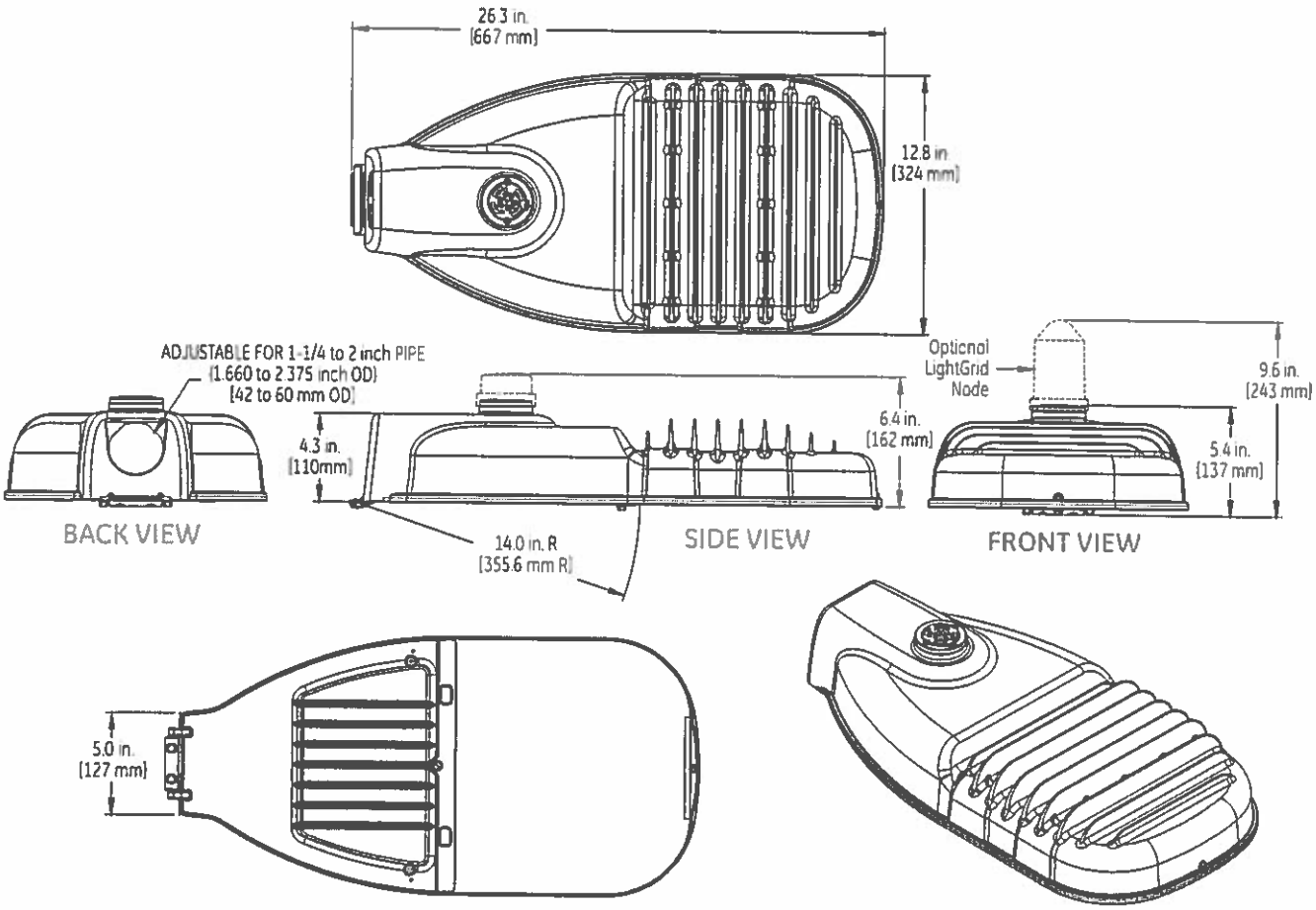


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 69°



GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2

Product Dimensions:
Evolve™ LED Streetlight (ERL2)



DATA

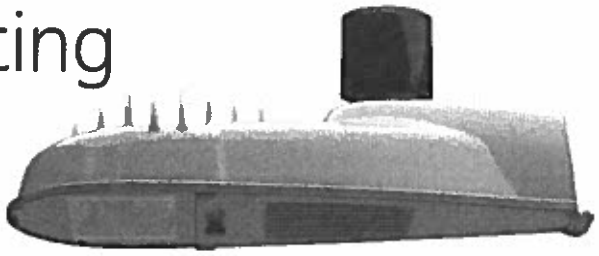
- Approximate net weight: 24.0 lbs (10.9 kgs)
  Contact manufacturer for specific configuration weight.
- Effective Projected Area (EPA): 0.57 sq ft max (0.053 sq m)

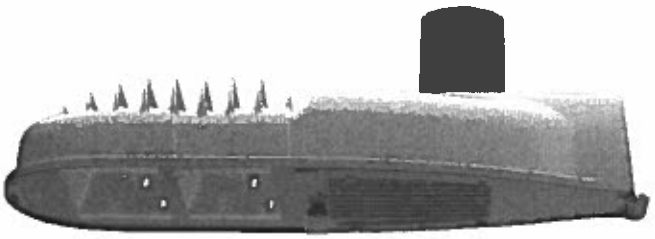
Specified as:
RL2H18C340DGRAYAGIL

Actual:
ERL2018C340DGRAYAGILR

City of Aurora
Bid # 19-05

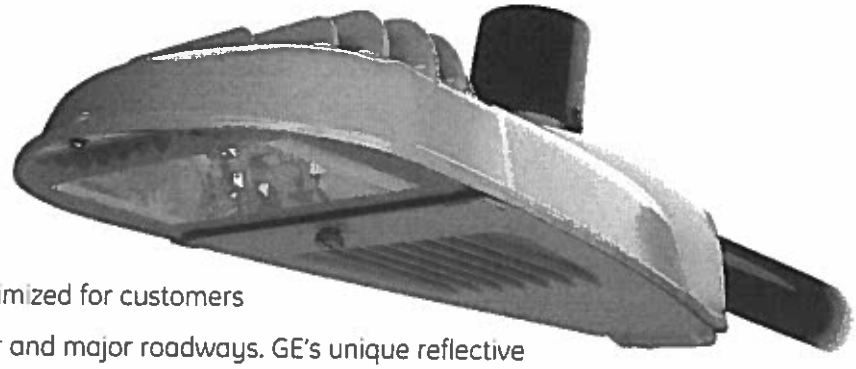
GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2





current
powered by GE

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



The **Evolve** LED Roadway Luminaire is optimized for customers requiring a LED solution for local, collector and major roadways. GE's unique reflective optics are designed to optimize application efficiency and minimize glare. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life. This reliable unit has a 100,000 hour design life, significantly reducing maintenance needs and expense over the life of the fixture. This efficient solution lowers energy consumption compared to a traditional HID fixture for additional operating cost savings.

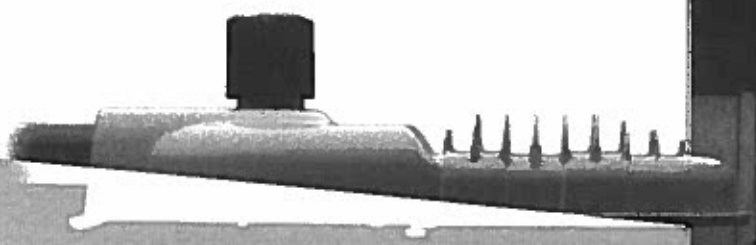
Features:

- Optimized roadway photometric distributions
- **Evolve**™ light engine consisting of reflective technology designed to optimize application efficiency and minimize glare
- 70 CRI at 2700K, 3000K and 4000K typical.
- -40°C to 50°C UL Ambient Typical.
- ULOR = 0 (zero uplight)
- Designed & Assembled in USA

Applications:

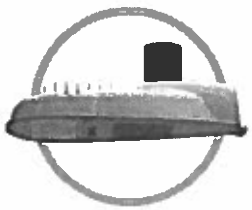
- Local Roadways
- Collector Roadways
- Major Roadway/Streets

Compatible with **LightGrid**™ Outdoor Wireless Control System



To learn more about **GE Evolve LED Roadway Lighting**, go to: **www.currentbyge.com**

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



Project name _____
Date _____
Type _____

Typical Specifications: ERL1-ERLH-ERL2

LED & Optical

- **Output Range:** 1900 – 30000 lm
- **Photometric Options:** Type II Narrow, Type II Wide, Type III, Type IV
- **System Efficacy:** 100 - 145 LPW
- **CCT:** 2700K, 3000K, 4000K; High brightness LEDs @ 70 CRI

Lumen Maintenance Tables

Projected Lxx per IES TM-21 at 25°C for reference:

ERL1 LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	100,000 HR
02,03,04,05,06	L96	L95	L91
07,08,09	L95	L91	L84
10	L89	L80	L64

ERLH LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	100,000 HR
10, 11	L97	L96	L94
13, 14	L95	L93	L88
15, 16	L94	L91	L85

ERL2 LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	100,000 HR
16, 18, 19, 21, 23	L96	L94	L91
25, 27, 28	L95	L93	L88
30	L95	L93	L87

Note: Projected Lxx based on LM80 (10,000 hour testing). DOE Lighting Facts Verification Testing Tolerances apply to initial luminous flux and lumen maintenance measurements

Electrical

- **Input Voltage:** 120-277 volt and 347-480 volt
- **Input Frequency:** 50/60Hz
- **Power Factor (PF)*:** >90%
- **Total Harmonic Distortion (THD)*:** <20%

**Power factor and THD tolerance exceptions. ERL1 "02" Lumen output: PF and THD within tolerances above only at 120 volt. ERL1 "03" Lumen output: @120 volt PF~0.89; @ 480 volt THD~26% ERL1 "04" Lumen output: @480 volt THD~22%*

Ratings

- **Surge Protection:** per ANSI C136.2-2015:
  (Driver Internal):
  - 6kV/3kA "Basic: (120 Strikes)" - Standard on ERL1 (02-06)
  - 10kV/5kA "Enhanced: (40 Strikes)" - Standard on ERL1 (07 - 10), ERLH, ERL2

  (Additional Separate Secondary SPD)
  - 10kV/5kA "Enhanced: (40 Strikes) - Option "R"
  - 20kV/10kA "Elevated" (40 Strikes) - Option "T"
- **Safety:** UL/cUL Listed. UL 1598 listed, suitable for wet locations
- **Environmental:** Compliant with the materials restrictions of RoHS
- **EMI:** Title 47 CFR Part 15 Class A
- **Vibration:** 3G per ANSI C136.31-2010
- LM-79 testing in accordance with IESNA Standards
- Std. Optical enclosure rated per ANSI C136.25-2009:
  - ERL1/ERLH/ERL2 = IP65, Optional: IP66
- **Operating Temperature:**

PRODUCT ID	LUMEN OUTPUT	AMBIENT READING
ERL1	02-10	-40°C to 50°C
ERLH	10-11, 13	-40°C to 50°C
ERLH	14-16	-40°C to 45°C
ERL2	16-28	-40°C to 50°C
ERL2	30	-40°C to 45°C

Delayed start may be experienced < -35°C

Construction & Finish

- **Housing:**
  - Die Cast Enclosure
  - Casting-integral heat sink for maximum heat transfer
- **Lensing:** Impact resistant tempered glass, standard
- **Paint:** Corrosion resistant polyester powder painted, minimum 2.0 mil. thickness.
  - Standard Colors: Dark Bronze, Black, & Gray
  - RAL & custom colors available
  - Optional coastal finish available.
- **Weight:** 12.4lbs (5.6kg) - 24lbs (10.9kg)

Warranty

- **System Warranty:** 5 Year Standard, 10 Year Optional

Controls

- **Dimming:**
  - Standard: 0-10V; Optional: DALI (120-277V Only)
- **Sensors:**
  - Photo electric sensors (PE) available.
- LightGrid™ compatible

Mounting

- Slipfitter with +/- 5 degree of adjustment for leveling.
- Integral die cast mounting pipe stop.
- Adjustable for 1.25 in. or 2 in. mounting pipe.

Suggested HID Replacement Lumen Levels

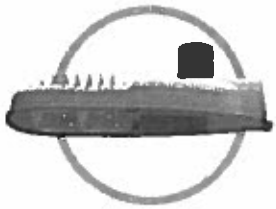
- ~4,000-5,000 lumens to replace 100W HPS Cobra-head
- ~7,000-8,800 lumens to replace 150W HPS Cobra-head
- ~8,500-11,500 lumens to replace 200W HPS Cobra-head
- ~11,500-14,000 lumens to replace 250W HPS Cobra-head
- ~21,000-30,000 lumens to replace 400W HPS Cobra-head

Note: Actual replacement lumens may vary based upon mounting height, pole spacing, design criteria, etc.

CONVERSION FROM PREVIOUS GENERATION OPTICS TO CURRENT GENERATION OPTICS** PREVIOUS	DESCRIPTION	CURRENT	DESCRIPTION
A1, B1	Extra Narrow/Narrow Asymmetric	A3	Type II Narrow
C1, E1	Asymmetric Short/Medium	B3	Type II Wide
D1, G1	Asymmetric Forward/Extra Wide	C3	Type III
F1	Asymmetric Wide	D3	Type IV
		E3	Type II Enhanced Back Light

**The information above is designed to provide a guideline to select the correct luminaire for a roadway application. The best and most accurate way to ensure the proper design is do a lighting layout Utilizing AGI

GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2



Project name _____

Date _____

Type _____

ERL2	0	18	C3	40	E	GRAY	AGIL
____	_	__	__	__	_	____	___

PROD. ID	VOLTAGE	LUMEN OUTPUT	DISTRIBUTION*	CCT	CONTROLS	COLOR	OPTIONS
E = Evolve **R** = Roadway **L** = Local **2** = Double Module	**0** = 120-277V* **1** = 120 **2** = 208 **3** = 240 **4** = 277 **5** = 480 **D** = 347 **H** = 347-480* * Not available with Fusing. Must choose a discrete voltage with F option	**16** **18** **19** **21** **23** **25** **27** **28** **30** See Table	**A3** = Type II Narrow **B3** = Type II Wide **C3** = Type III **D3** = Type IV **E3** = Type II Enhanced Back Light See Table *Nominal IES Type classing subject to typical variation, individual units may differ	**30** = 3000K◇ **40** = 4000K ◇ Select 3000K CCT for IDA approved units.	**A** = ANSI C136.41 7 pin **D** = ANSI C136.41 7-pin with Shorting Cap **E** = ANSI C136.41 7-pin with non-Dimming PE Control.* *PE Control Only available for 120-277V or 480V Discrete. Not available for 347-480V or 347V Discrete **NOTE:** Dimming controls wired for 0-10V standard unless DALI option "U" requested.	**GRAY** = Gray **BLCK** = Black **DKBZ** = Dark Bronze	**A** = 4 Bolt Slipfitter † **F** = Fusing **G** = Internal Bubble Level **I** = IP66 Optical **L** = Tool-Less Entry **R** = Secondary 10kV/5kA SPD **U** = DALI Programmable ^ **Y** = Coastal Finish * **XXX** = Special Options † Contact manufacturer for Lead-Time. * Recommended for installations within 750 ft. from the coast. Contact Factory for Lead-Time. ◇ Compatible with LightGrid 2.0 nodes. ^ Not available in 347V, 480V or 347-480V

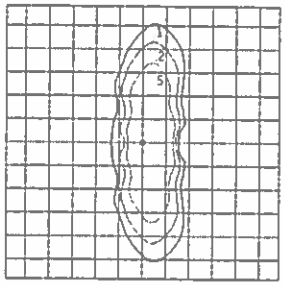
LUMEN OUTPUT	DISTRIBUTION	TYPICAL INITIAL LUMENS 4000K	TYPICAL INITIAL LUMENS 3000K	TYPICAL SYSTEM WATTAGE 120-277V	TYPICAL SYSTEM WATTAGE 347-480V	BUG RATING 4000K	BUG RATING 3000K	IES FILE NUMBER 4000K 120-277V	IES FILE NUMBER 4000K 347-480V	IES FILE NUMBER 3000K 120-277V	IES FILE NUMBER 3000K 347-480V
16	A3	16000	15300	120	120	B3-U0-G3	B3-U0-G3	ERL2_16A340_IES		ERL2_16A330_IES	
	B3					B3-U0-G3	B3-U0-G3	ERL2_16B340_IES		ERL2_16B330_IES	
	C3					B2-U0-G3	B2-U0-G3	ERL2_16C340_IES		ERL2_16C330_IES	
	D3					B2-U0-G3	B2-U0-G3	ERL2_16D340_IES		ERL2_16D330_IES	
	E3					B3-U0-G3	B3-U0-G3	ERL2_16E340_IES		ERL2_16E330_IES	
18	A3	18000	17300	140	140	B3-U0-G3	B3-U0-G3	ERL2_18A340_IES		ERL2_18A330_IES	
	B3					B3-U0-G3	B3-U0-G3	ERL2_18B340_IES		ERL2_18B330_IES	
	C3					B2-U0-G3	B2-U0-G3	ERL2_18C340_IES		ERL2_18C330_IES	
	D3					B2-U0-G3	B2-U0-G3	ERL2_18D340_IES		ERL2_18D330_IES	
	E3					B3-U0-G3	B3-U0-G3	ERL2_18E340_IES		ERL2_18E330_IES	
19	A3	19000	18200	149	149	B3-U0-G3	B3-U0-G3	ERL2_19A340_IES		ERL2_19A330_IES	
	B3					B3-U0-G3	B3-U0-G3	ERL2_19B340_IES		ERL2_19B330_IES	
	C3					B3-U0-G3	B2-U0-G3	ERL2_19C340_IES		ERL2_19C330_IES	
	D3					B2-U0-G3	B2-U0-G3	ERL2_19D340_IES		ERL2_19D330_IES	
	E3					B3-U0-G3	B3-U0-G3	ERL2_19E340_IES		ERL2_19E330_IES	
21	A3	21000	20100	174	177	B3-U0-G3	B3-U0-G3	ERL2_21A340_120-277VIES	ERL2_21A340_347-480VIES	ERL2_21A330_120-277VIES	ERL2_21A330_347-480VIES
	B3					B3-U0-G3	B3-U0-G3	ERL2_21B340_120-277VIES	ERL2_21B340_347-480VIES	ERL2_21B330_120-277VIES	ERL2_21B330_347-480V ES
	C3					B3-U0-G4	B3-U0-G3	ERL2_21C340_120-277V ES	ERL2_21C340_347-480VIES	ERL2_21C330_120-277VIES	ERL2_21C330_347-480VIES
	D3					B2-U0-G3	B2-U0-G3	ERL2_21D340_120-277VIES	ERL2_21D340_347-480VIES	ERL2_21D330_120-277VIES	ERL2_21D330_347-480VIES
	E3					B3-U0-G3	B3-U0-G3	ERL2_21E340_120-277VIES	ERL2_21E340_347-480VIES	ERL2_21E330_120-277VIES	ERL2_21E330_347-480VIES
23	A3	23000	22100	194	196	B3-U0-G3	B3-U0-G3	ERL2_23A340_120-277VIES	ERL2_23A340_347-480VIES	ERL2_23A330_120-277VIES	ERL2_23A330_347-480VIES
	B3					B3-U0-G3	B3-U0-G3	ERL2_23B340_120-277VIES	ERL2_23B340_347-480VIES	ERL2_23B330_120-277VIES	ERL2_23B330_347-480V ES
	C3					B3-U0-G4	B3-U0-G4	ERL2_23C340_120-277V ES	ERL2_23C340_347-480VIES	ERL2_23C330_120-277VIES	ERL2_23C330_347-480VIES
	D3					B2-U0-G4	B2-U0-G4	ERL2_23D340_120-277VIES	ERL2_23D340_347-480VIES	ERL2_23D330_120-277VIES	ERL2_23D330_347-480VIES
	E3					B4-U0-G4	B3-U0-G3	ERL2_23E340_120-277VIES	ERL2_23E340_347-480VIES	ERL2_23E330_120-277VIES	ERL2_23E330_347-480VIES
25	A3	25000	24000	214	214	B3-U0-G3	B3-U0-G3	ERL2_25A340_IES		ERL2_25A330_IES	
	B3					B3-U0-G3	B3-U0-G3	ERL2_25B340_IES		ERL2_25B330_IES	
	C3					B3-U0-G4	B3-U0-G4	ERL2_25C340_IES		ERL2_25C330_IES	
	D3					B2-U0-G4	B2-U0-G4	ERL2_25D340_IES		ERL2_25D330_IES	
	E3					B4-U0-G4	B4-U0-G4	ERL2_25E340_IES		ERL2_25E330_IES	
27	A3	27000	25900	237	237	B3-U0-G3	B3-U0-G3	ERL2_27A340_IES		ERL2_27A330_IES	
	B3					B3-U0-G4	B3-U0-G4	ERL2_27B340_IES		ERL2_27B330_IES	
	C3					B3-U0-G4	B3-U0-G4	ERL2_27C340_IES		ERL2_27C330_IES	
	D3					B2-U0-G4	B2-U0-G4	ERL2_27D340_IES		ERL2_27D330_IES	
	E3					B4-U0-G4	B4-U0-G4	ERL2_27E340_IES		ERL2_27E330_IES	
28	A3	28000	26900	251	251	B3-U0-G3	B3-U0-G3	ERL2_28A340_IES		ERL2_28A330_IES	
	B3					B3-U0-G4	B3-U0-G4	ERL2_28B340_IES		ERL2_28B330_IES	
	C3					B3-U0-G4	B3-U0-G4	ERL2_28C340_IES		ERL2_28C330_IES	
	D3					B2-U0-G4	B2-U0-G4	ERL2_28D340_IES		ERL2_28D330_IES	
	E3					B4-U0-G4	B4-U0-G4	ERL2_28E340_IES		ERL2_28E330_IES	
30	A3	30000	28800	278	278	B4-U0-G4	B4-U0-G4	ERL2_30A340_IES		ERL2_30A330_IES	
	B3					B3-U0-G4	B3-U0-G4	ERL2_30B340_IES		ERL2_30B330_IES	
	C3					B3-U0-G4	B3-U0-G4	ERL2_30C340_IES		ERL2_30C330_IES	
	D3					B2-U0-G4	B2-U0-G4	ERL2_30D340_IES		ERL2_30D330_IES	
	E3					B4-U0-G4	B4-U0-G4	ERL2_30E340_IES		ERL2_30E330_IES	

Photometrics:

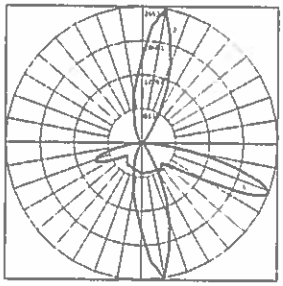
Evolve™ LED Streetlight (ERL2)

ERL2
Type II Narrow
(23A340)

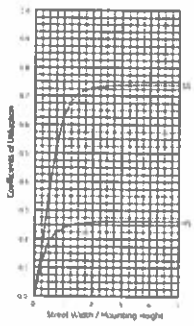
23,000 Lumens
4000K
ERL2_23A340___.IES



Grid Distance in Units of Mounting He ght at 30'
Initial Footcandle Values at Grade

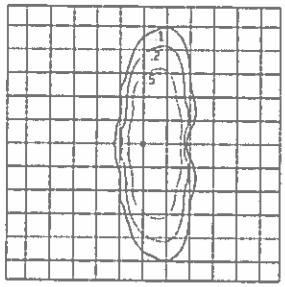


— Vertical plane through horizontal angle of Max. Cd at 80°
— Horizontal cone through vertical angle of Max. Cd at 69°

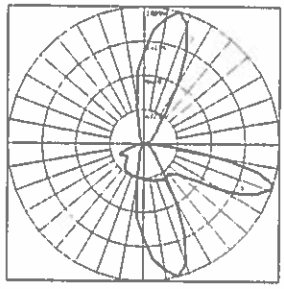


ERL2
Type II Wide
(23B340)

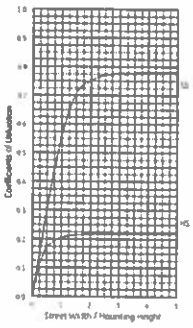
23,000 Lumens
4000K
ERL2_23B340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

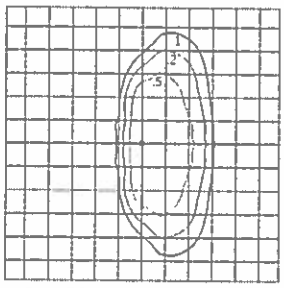


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 72°

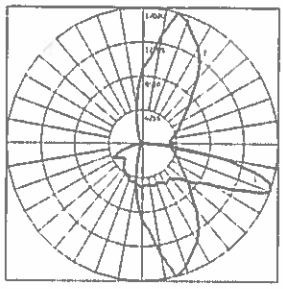


ERL2
Type III
(23C340)

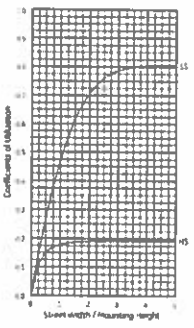
23,000 Lumens
4000K
ERL2_23C340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

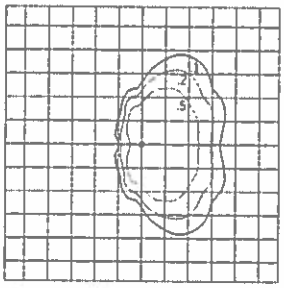


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 71°

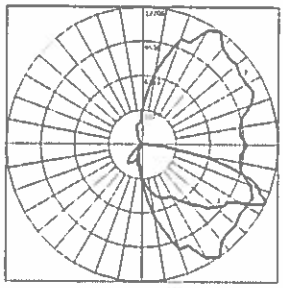


ERL2
Type IV
(23D340)

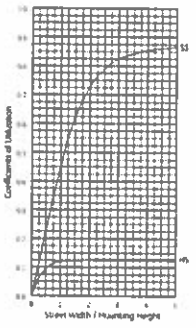
23,000 Lumens
4000K
ERL2_23D340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

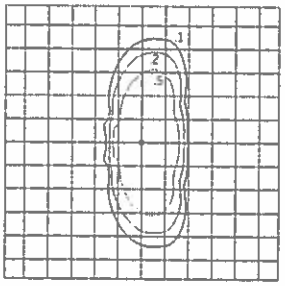


— Vertical plane through horizontal angle of Max. Cd at 55°
— Horizontal cone through vertical angle of Max. Cd at 65°

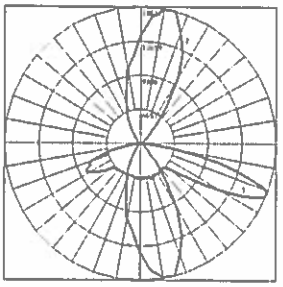


ERL2
Type II Enhanced Back Light
(23E340)

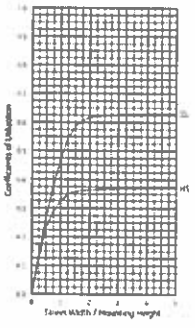
23,000 Lumens
4000K
ERL2_23E340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

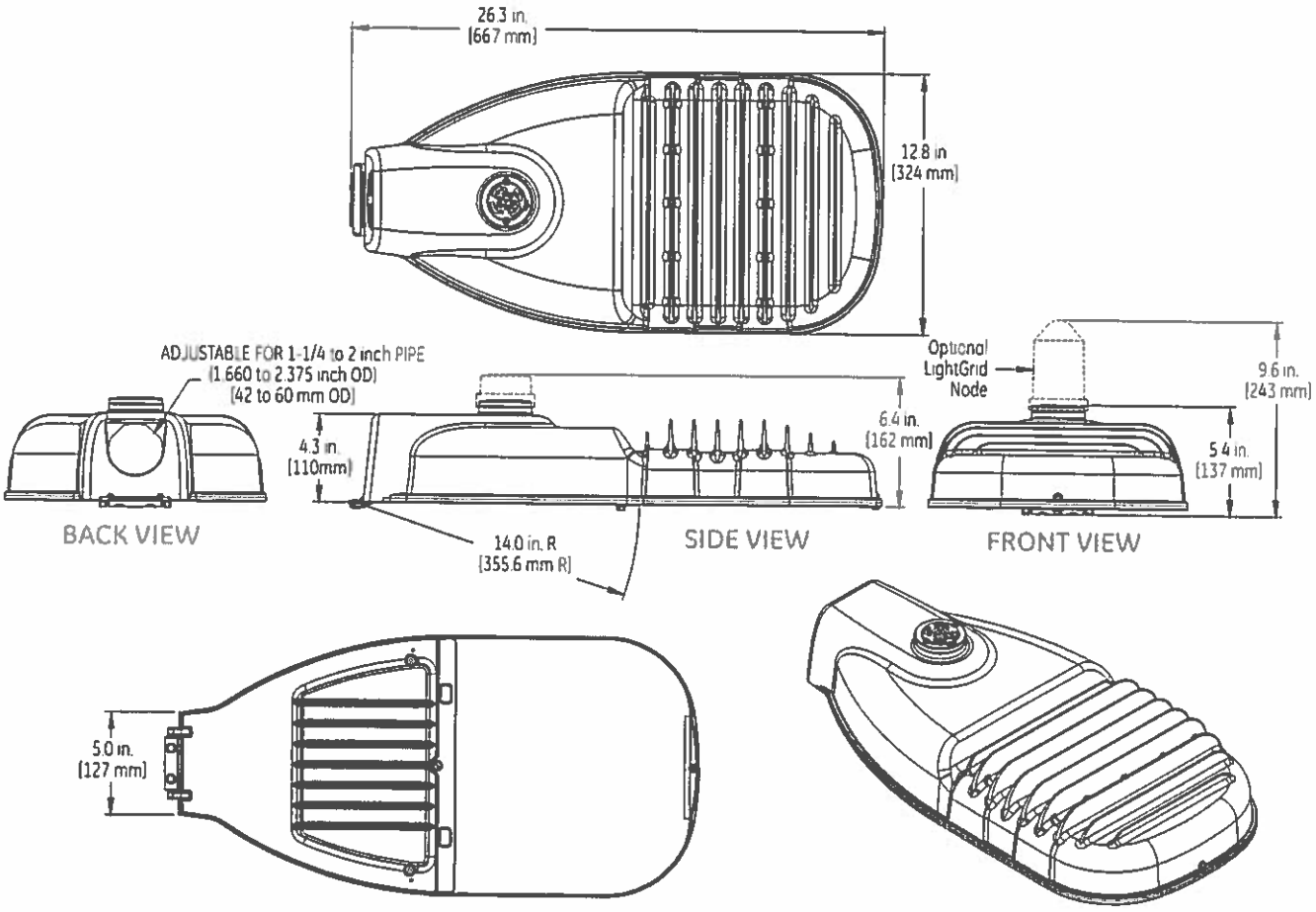


— Vertical plane through horizontal angle of Max. Cd at 75°
— Horizontal cone through vertical angle of Max. Cd at 69°



GE Evolve™
LED Roadway Lighting
ERL1-ERLH-ERL2

Product Dimensions:
Evolve™ LED Streetlight (ERL2)



DATA

- Approximate net weight: 24.0 lbs (10.9 kgs)
  Contact manufacturer for specific configuration weight.
- Effective Projected Area (EPA): 0.57 sq ft max (0.053 sq m)

Advancements in LED Technology

Advancements in LED (Light Emitting Diode) technology have made this source an attractive alternative to traditional light sources in a variety of applications. One such application is outdoor fixtures. This segment includes roadway and decorative street lighting, as well as general area lighting traditionally occupied by discharge light sources. In comparison to historic technologies (such as high pressure sodium and metal halide), today's outdoor LED lighting fixtures can provide significant energy savings over their useful life.

Another advantage is the long lifetime of today's LED fixtures. Overall system reliability is comprised of several key subsystems and their components: the electrical subsystem, the optical subsystem and the outer enclosure. A simplified block diagram is shown below as an example to illustrate the relationship between these subsystems and their corresponding components.

This paper addresses the reliability of GE's outdoor LED lighting systems through examples of rigorous testing and reliability modeling, resulting from GE's deep technical experience as one of the world's largest LED systems companies.

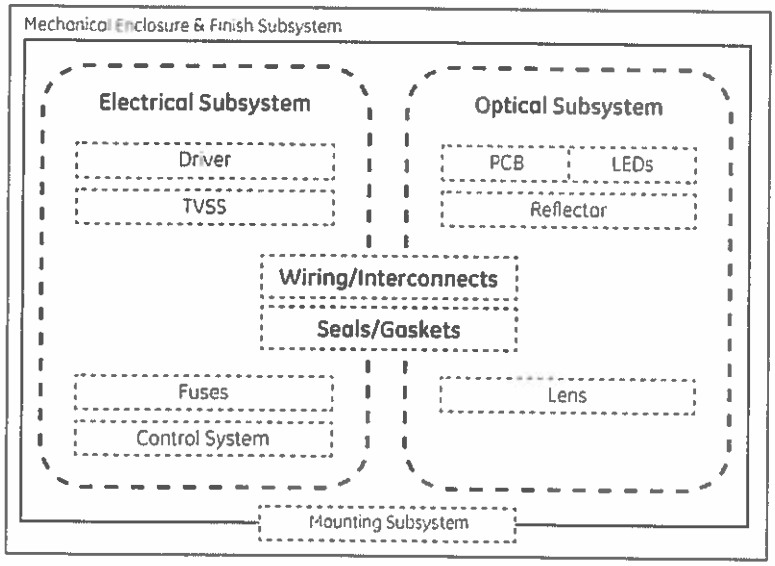


Figure 1: Simplified block diagram of outdoor LED system

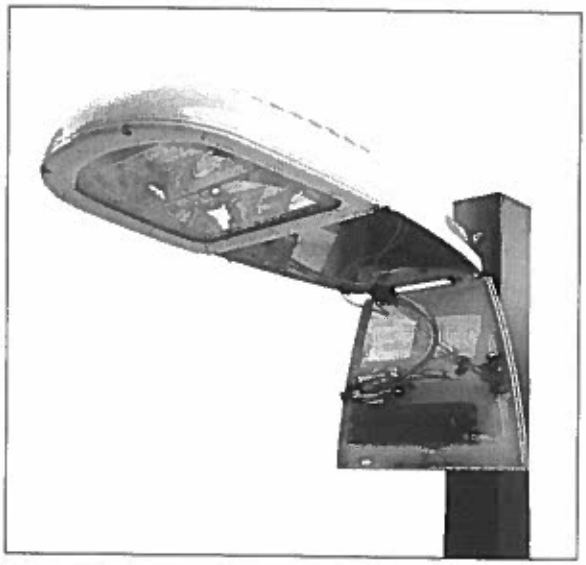


Figure 2: Open view of roadway fixture

Reliability definitions

The reliability bathtub curve is often used to depict the expected failure rate of a family of products over time. This model is comprised of three segments: infant mortality, useful life and wearout, as illustrated in Figure 3.

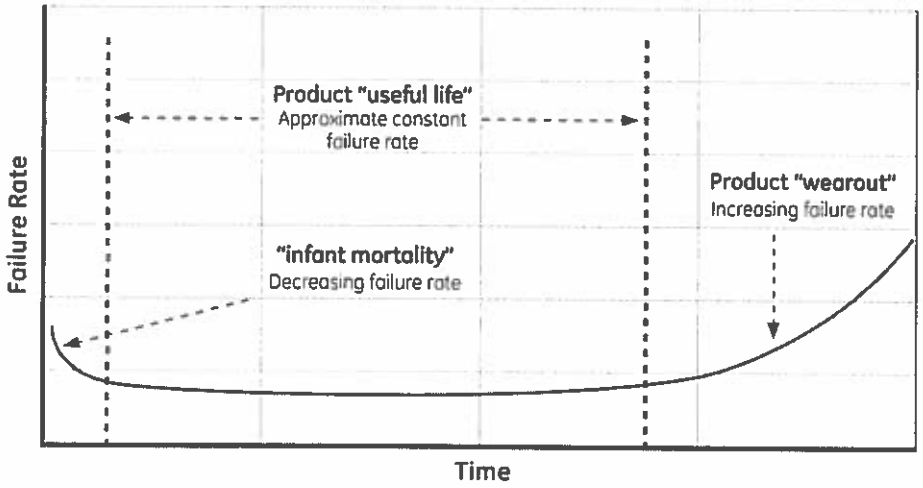


Figure 3: Example of reliability bathtub curve

Infant mortality is an initial period of failures usually resulting from manufacturing defects or quality excursions, and has a decreasing failure rate over a relatively short time frame. Product useful life is shown as the bottom portion of the bathtub curve. It is a period of random failures with a nearly constant failure rate. The weakest component in any system will determine the duration of this portion of the curve. At the end of useful life, wearout failure modes, such as fatigue and material depletion, will cause the failure rate to increase with time. This final segment of the curve is called wearout.

Reliability during useful life is often a focus when considering products for a specific application. In the case of GE outdoor LED systems, an exponential distribution may be applied to model system reliability. Reliability values are often requested in the form of an MTBF (Mean Time Between Failures) value. MTBF is often misunderstood since it is expressed as a time value, but more accurately defines the failure rate during the useful life of the product. The relationship is illustrated below, where λ is the failure rate with units of hrs^{-1}.

$$MTBF = \frac{1}{\lambda}$$

It is important to note that this failure rate is valid only during the useful life portion of the bathtub curve where the failure rate is relatively constant. When the failure rate begins to increase, a product has entered wearout and a different mathematical model is needed to represent this behavior. For this reason, it is important to understand when wearout failure modes begin. Both component-level and full-system testing are utilized by GE Lighting engineers to understand and accurately model the reliability of outdoor LED systems.

GE reliability philosophy

At GE, the Design for Reliability (DFR) process is key to any product's development cycle. For this reason, GE maintains a corporate-level reliability program to train and certify GE engineers in the important DFR tools and processes. Practitioner and Expert certifications are attainable, with the latter including an additional external accreditation. These certified professionals carry their reliability toolboxes across the GE businesses, driving a culture of education and best practice sharing.

GE Lighting leverages the expertise of its certified Reliability Practitioners and Experts to drive rigor in its internal DFR process. This multistep approach incorporates a variety of design, analysis and test methods to deliver robust and reliable LED systems.

GE's DFR process begins by establishing the reliability goals for the product. These goals are based on a variety of inputs, including benchmarking activities, application considerations, customer expectations and warranty requirements. Engineers then analyze the system by developing Functional Block Diagrams (FBDs). These diagrams help engineers identify the critical subsystems and components in the system and allocate the appropriate reliability targets. From there, design teams complete an FMEA (Failure Modes and Effects Analysis) and Parameter Diagram (P-diagram). The FMEA is a structured analysis that surfaces potential failure modes in a system, while the P-diagram highlights key inputs, noise variables and control parameters that affect the system. Both tools help engineers design robust reliability test plans focused on the critical system elements and most likely failure modes. These test plans often include both Reliability Growth Testing (RGT) and Reliability Demonstration Testing (RDT). RGT is used early in the product design cycle to identify potential weak points or latent defects in a design. This allows engineers to implement corrective actions or design improvements to make the product more robust. When the design is finalized, RDT is used to validate the specified reliability goals for the product. This process is illustrated in Figure 4.

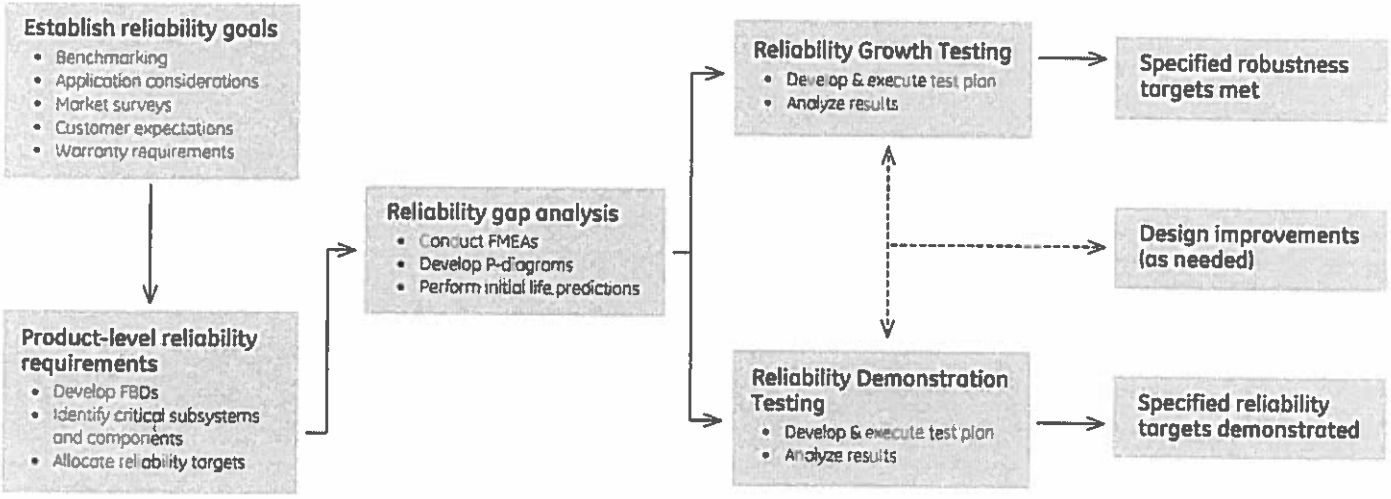


Figure 4: DFR flow diagram

GE reliability testing

As already stated, there are several key contributors to outdoor LED system reliability. Each of these contributing factors is scrutinized both individually and together at the system level to ensure the acceptability of overall system performance and reliability. Examples of this approach are highlighted in the next several paragraphs.

Electronic drivers

Electronic driver reliability begins with a series of predictive models using tools such as those in Reliacore's Relex Reliability Studio or Reliasoft's® Lambda Predict®. These models function as design tools used for predicting failure rates based on reliability prediction standards such as Bellcore/Telcordia and MIL-HDBK-217F as two examples. Engineers use these tools to make initial reliability estimates of a design, identify potential weak points, and evaluate the system impact when components or application conditions are changed. During the design phase, engineers evaluate tradeoffs and compare model results to the specified project requirements to select the optimal design for fabrication and testing.

Drivers are required to pass a variety of well-defined testing requirements before entering service in GE LED systems. In addition to standard reliability life testing, accelerated test methods, robustness testing, surge immunity and EMI testing are employed.

ALT (Accelerated Life Test) utilizes elevated stress conditions to more quickly estimate performance and life at lower nominal conditions by fitting the output data to a statistical model. Common acceleration factors include temperature, humidity and power cycle testing.

HALT (Highly Accelerated Life Testing) includes a series of progressive steps with wide-ranging temperatures, rapid thermal cycling, multi-axis vibration testing, power cycling and other product-specific conditions. This testing is used to determine the operation and destruct limits of the product.

STRIFE, or Stress Plus Life testing, is also used early in the development cycle to draw out potential design or manufacturing weaknesses.

STRIFE, or Stress Plus Life testing, is also used early in the development cycle to draw out potential design or manufacturing weaknesses. During testing, units are put through high- and low-temperature cycles over a period of time defined by the industry standard model for fatigue-induced solder joint failures (known as the Norris-Landzberg equation).

DME (Design Margin Evaluation) is a qualitative reliability tool that measures the margin between design strength of a unit and key environmental stressors such as ambient temperature and incoming line voltage. Results can be used to improve the margin of strength of a given design, as well as to highlight potential design weaknesses or manufacturing flaws.

Test methods such as HALT and DME are typically used as Reliability Growth Tests. When used early in product design, engineers are able to identify potential failure modes and then implement corrective actions or design changes to make the product more robust. Life testing or ALT methods may then be applied as Reliability Demonstration Tests to validate specified product reliability targets.

LEDs

Component-level qualification testing is performed on any new LED to validate manufacturer claims and provide long-term reliability data under specified conditions. Such reliability testing includes thermal shock, powered temperature cycling and life testing under extreme temperature and humidity conditions.

Optics

The optics used in GE outdoor LED systems undergo a series of thermal soak, thermal fatigue and water emersion testing to ensure material robustness, even under elevated stress conditions. This provides confidence across a broad range of application conditions, including temperature excursions in the field.

Mechanical enclosure

Fixture-level vibration testing is used to evaluate the mechanical reliability of the system by simulating conditions that may be encountered during service. Examples include vibration induced by traffic, wind, ground disturbances, shipping and handling, and accidental impact. Minimum testing of 100,000 cycles per axis for three axes is designed to simulate normal fatigue conditions over the course of an outdoor fixture's life, and is in line with ANSI C136.31. Additionally, enclosures undergo ingress protection (per ANSI C136.25), salt fog testing (per ASTM B117 and D1654) and QUV testing on the paint system (per ASTM G154 and D523). These accelerated tests are designed to ensure durability under expected environmental conditions over the product's lifetime.

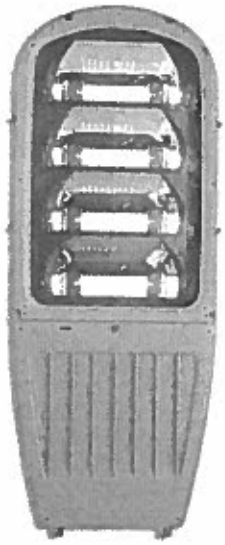


Figure 5: GE's Evolve™ LED Roadway Scalable Cobrahead

Full system reliability testing

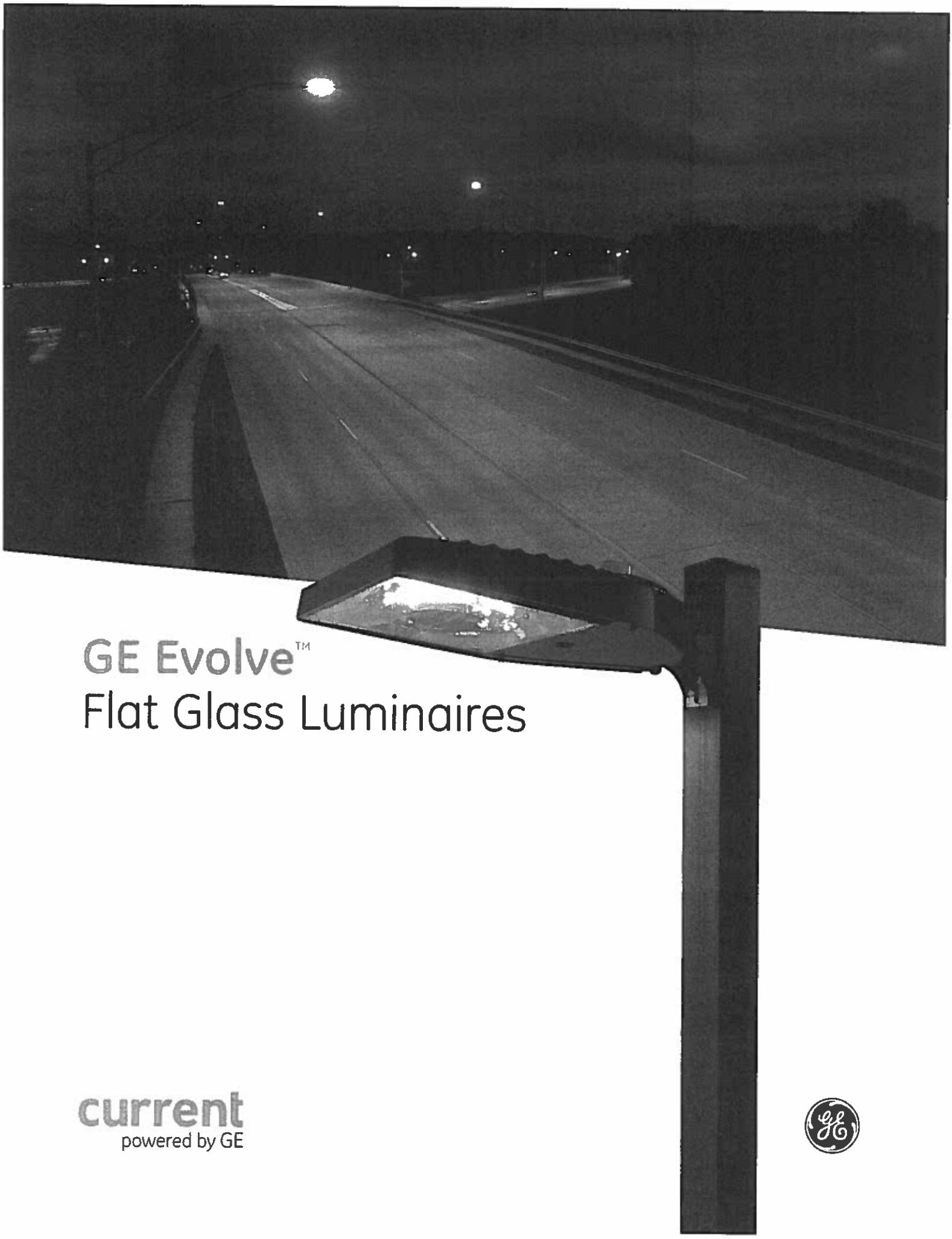
GE outdoor LED fixtures also undergo full system reliability testing at nominal and elevated temperatures to ensure robust system-level reliability. This testing also highlights any potentially harmful interactions among the subsystems and their components, reducing the likelihood of early life failures. This testing continues even after products enter the field, providing a valuable database of long-term performance and reliability information to further support product claims. To date, GE outdoor LED systems have accumulated more than 1.4 million unit-hours of system-level reliability testing.

GE outdoor LED system reliability

In addition to a significant internal testing database, GE Lighting's large, global installed base of outdoor LED systems provides engineers with valuable field data across a broad range of application conditions. This feedback loop is an essential part of GE's DFR process, as it allows engineers to more accurately design, model and test systems based on realistic application conditions and incorporate lessons learned during development of next-generation products.

This approach of applying reliability tools and practices early in product design, combined with rigorous internal testing and active feedback from the field, allows GE Lighting to confidently deliver outdoor LED systems with world-class robustness and reliability.

For more information, please visit **gelighting.com.**



GE Evolve™
Flat Glass Luminaires

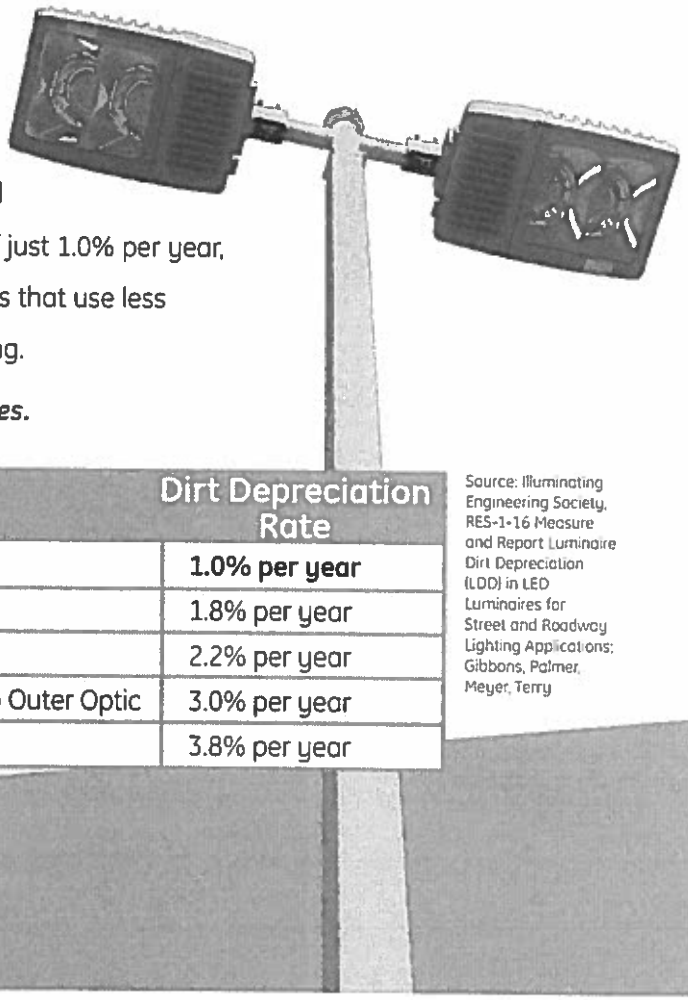
current
powered by GE

Sometimes, **flat** is **better.** Those crevices, pockets and ridges in competitor outdoor luminaires can become the perfect places for dirt and grime to collect—potentially reducing overall LED light output and impairing the intended pattern of light distribution. This problem is called ***Luminaire Dirt Depreciation (LDD)*** and it can reduce the performance of your outdoor LED lighting.

Smooth Operator

GE Evolve LED Outdoor Luminaires with flat glass lens and reflective optics chamber offers a dirt depreciation rate of just 1.0% per year, a significant difference compared to competitor luminaires that use less streamlined lens designs and alternative optics engineering.

That means time and money saved on cleaning schedules.



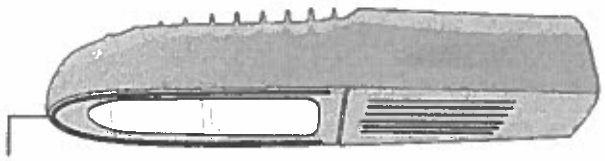
Product	LED Optic	Dirt Depreciation Rate
GE Evolve	**Flat Glass**	**1.0% per year**
Tested Product A	Individually Molded Acrylic	1.8% per year
Tested Product B	Molded Glass	2.2% per year
Tested Product C	Individually Molded Acrylic With No Outer Optic	3.0% per year
Tested Product D	Large Individually Molded Acrylic	3.8% per year

Source: Illuminating Engineering Society, RES-1-16 Measure and Report Luminaire Dirt Depreciation (LDD) in LED Luminaires for Street and Roadway Lighting Applications; Gibbons, Palmer, Meyer, Terry

Dust and Dirt Just *Can't Get a Grip*

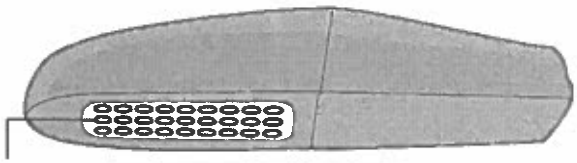
The Evolve fixture houses the LEDs and reflectors in a dirt- and dust-free cavity with an IP65/IP66-rated optical enclosure and a tempered glass lens to minimize the effects of dirt. This design approach provides consistent brightness and light distribution over the life of the product.

GE



Flat, tempered glass lens protects the LED optical enclosure. Lens surface is smooth and flat which is less prone to dirt accumulation.

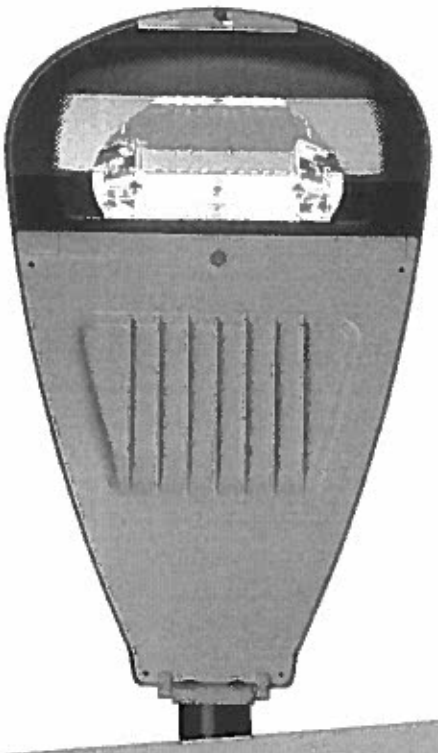
COMPETITION



Designs that have exposed refractive optics have more crevices (or surfaces, edges, pockets) prone to dirt accumulation that could adversely affect the beam distribution pattern.

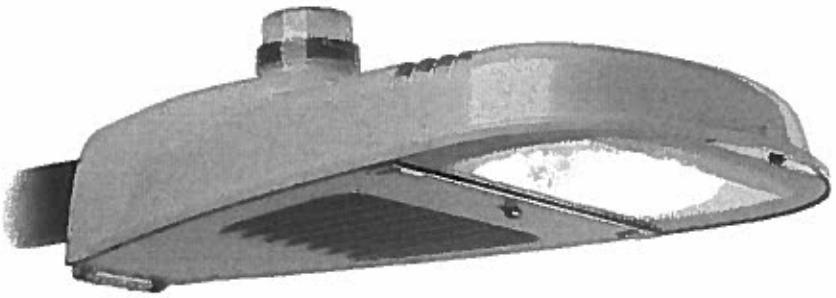
A recent Illuminating Engineering Society report* on LDD stated:

"LED luminaires with flat glass optics were less susceptible to average dirt depreciation than luminaires with exposed inner optics...With exposed optics, especially the individually molded acrylic, the surface of the optic is much more complex, has significantly more leeward edges, and significantly more surface area. These features will cause much more turbulence over the exposed optics, enabling dirt to accumulate on each individual optic and likely leading to more dirt sticking."



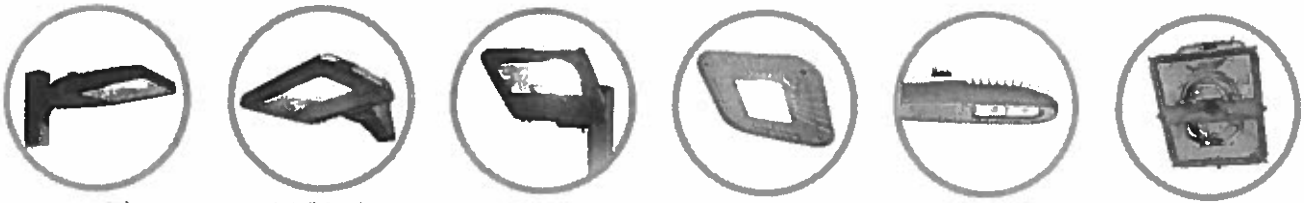
*Source: Illuminating Engineering Society. RES-1-16 Measure and Report Luminaire Dirt Depreciation (LDD) in LED Luminaires for Street and Roadway Lighting Applications, page 71. Gibbons, Palmer, Meyer, Terry

To learn more about **GE Evolve Flat Glass Luminaires**, go to: http://products.currentbyge.com



Clean up your Maintenance Costs

LED luminaires are designed to reduce maintenance but some optical designs are prone to more dust and dirt build-up than others, which may lead to additional trips to the pole for periodic cleaning. Choosing the right optical design can help avoid those unanticipated maintenance costs. GE's Flat Glass technology comes in a variety of luminaires for your application.



Area Light | Wall Pack | Flood Light | Canopy Light | Roadway Light | High Mast Light

GE Evolve™ Outdoor Luminaires:

- Best in class dirt depreciation technology to achieve rates as low as 1.0% per year
- Flat Glass LED Lens and Unique Reflective Optics chamber engineered for optimized light application efficiency and minimized glare
- Proudly designed and assembled in the USA
- Robustly engineered and tested using GE Six Sigma standards

The GE Difference

Building on a reputation for quality and excellence that dates back to Edison's first electric light bulb, GE brings an unsurpassed depth and breadth of expertise to every product. Our commitment to providing the greatest value in high technologically solutions is stronger than ever. We deliver innovative options backed by the international reputation of our 130-plus years in the business.