

# חשמל 2017 Electricity 2017

## The Intelligent Energy Revolution

The International Annual Convention of SEEI  
November 7 – 11, 2017 | Eilat, Israel

הכינוס השנתי הבינלאומי ה-18  
7-11 בנובמבר, 2017 | אילת

# תאורת LED – סיכום שנת 2017

Eng. Alex Yarmolinsky,  
Or Ad Engineers, Kfar Saba, Israel

## What's New – CIE vs IES



International Commission on Illumination  
Commission Internationale de l'Eclairage  
Internationale Beleuchtungskommission

The banner for the Illuminating Engineering Society (IES) website. It features a night-time photograph of a modern city skyline with illuminated buildings and a bridge over water. The IES logo is in the top left corner, and a search bar is in the top right. A navigation menu is located below the header. The main text reads 'The Premier Lighting Community' with a subtext 'Grow your career through membership in the IES.' and a 'READ MORE' button.

IES Illuminating  
ENGINEERING SOCIETY

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# The Premier Lighting Community

Grow your career through membership in the IES.

READ MORE



IES



LEUKOS

LEUKOS

The journal of the Illuminating Engineering Society



IES



## Recommended Practices and ANSI Standards

Recommended Practices provide you with the information you need to accomplish a lighting design. They are based on accumulated knowledge and experience, and provide in-depth treatment of generally accepted criteria about specific lighting applications.

Showing 1-24 of 25 results

Default sorting



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Practice for Office Lighting

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American National Standard  
Practice on Lighting for Educational  
Facilities

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IES Lighting Library

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IES/NALMCO Recommended  
Practice for Lighting Maintenance

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Lighting and the Visual  
Environment for Seniors and the  
Low Vision Population

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Lighting for Exterior Environments

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# IES vs CIE vs ...

## Calculation Requirements

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|                          | IES RP-8 | CIE 140-2000 | BSEN 13201-3 | ABNT NBR5101 | Australia 1158.2 | New Zealand 1158.2 |
|--------------------------|----------|--------------|--------------|--------------|------------------|--------------------|
| Illuminance <sup>1</sup> | x        | x            | x            | x            | x                | x                  |
| Luminance <sup>2</sup>   | x        | x            | x            | x            | x                | x                  |
| Veiling Luminance        | x        | x            | x            |              | x                | x                  |
| STV                      | x        |              |              |              |                  |                    |
| Long. Uniformity         |          | x            | x            | x            | x                | x                  |
| TI                       |          | x            |              | x            | x                | x                  |

### Notes

1. Secondary approach
2. Calculation techniques vary by document

# What's New?



INTERNATIONAL

The future. Illuminated.

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# What's New?



## What's New?



ioNature is an interactive installation consisting of 1500 sets of real grass and dried grass. When people walk nearby, the grass will respond to people by swinging back and forth, form wave patterns, just like when wind blows in the nature field. It's an exploration of the question - what will be like in the future when everything is connected?

ENERGY.GOV



Office of  
ENERGY EFFICIENCY  
AND RENEWABLE ENERGY

ational Labs

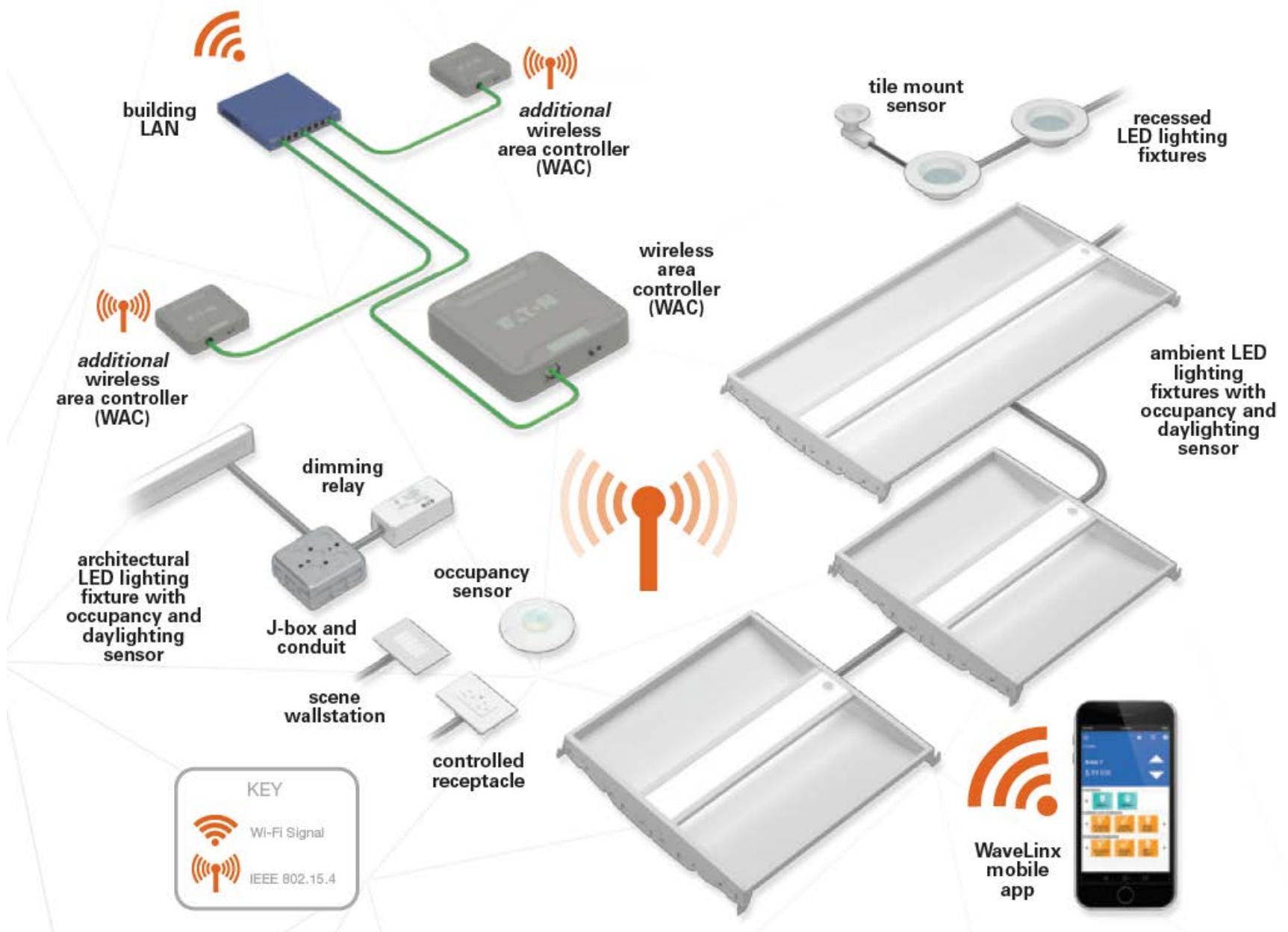
RENEWABLES

SOLID-STATE LIGHTING

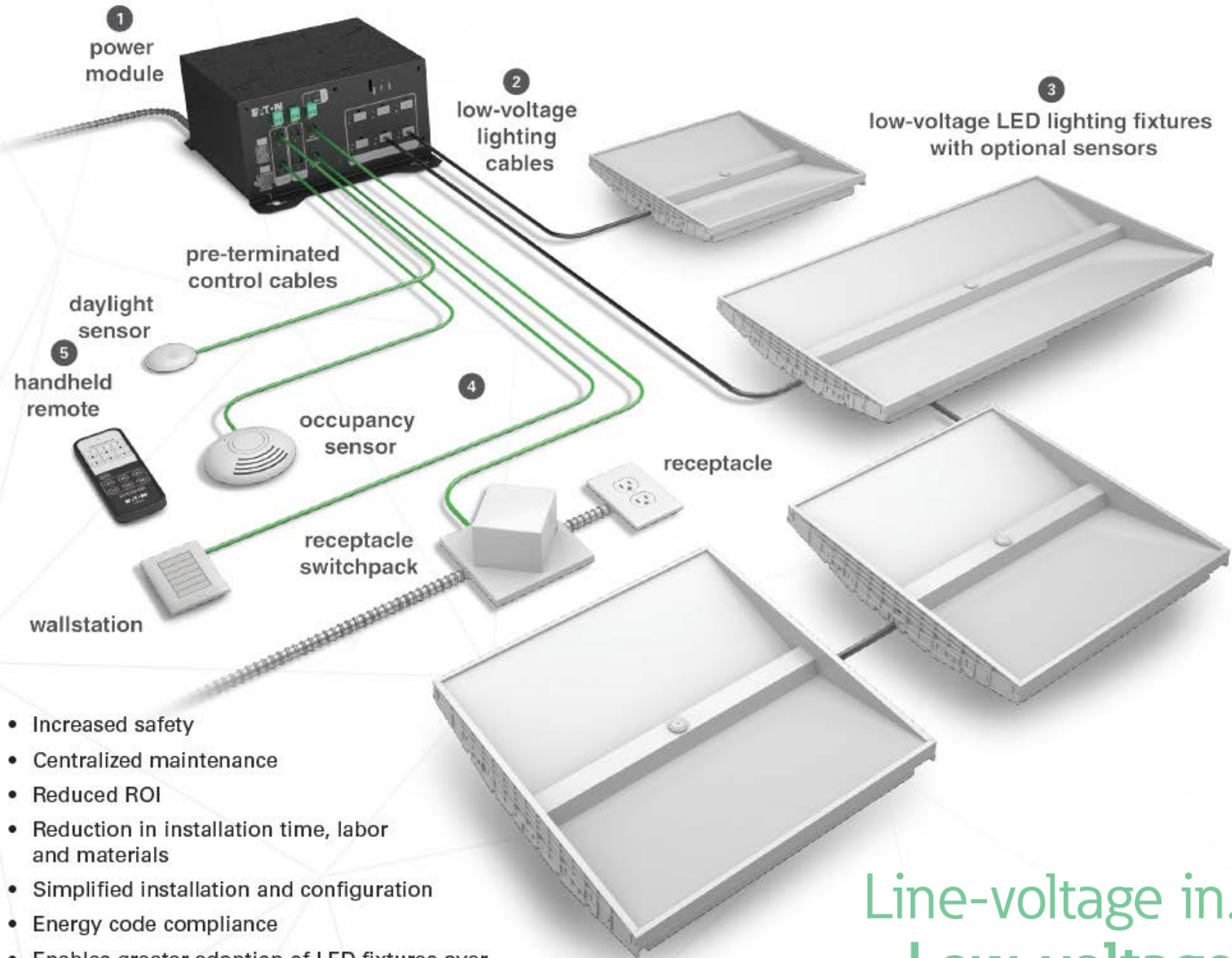
<https://vimeo.com/218731502>

# Connected Lighting Systems

# Wireless Connected Lighting System



The Distributed Low-Voltage Power System blends the benefits of both AC and DC power distribution to reduce the total installed cost of a lighting project by up to 20% while providing a completely flexible and electrically efficient solution.



- Increased safety
- Centralized maintenance
- Reduced ROI
- Reduction in installation time, labor and materials
- Simplified installation and configuration
- Energy code compliance
- Enables greater adoption of LED fixtures over fluorescent technology

Line-voltage in.  
**Low-voltage out.**

# What's New? Drivers!



Datasheet

Xitanium LED Xtreme drivers – Sensor Ready

# What's New? Drivers!



## Benefits

- Sensor Ready concept, ideal for use with sensors applied in outdoor and industrial management systems
- Dual integrated power supplies to power sensors and wireless radios directly from the driver, open spec for all OEMs, simplifying integration of sensors into the luminaire
- High-accuracy integrated power metering

### Operational temperatures and humidity

| Specification item          | Value     |
|-----------------------------|-----------|
| Ambient temperature         | -40...+55 |
| Tcase-max                   | 85        |
| Tcase-life                  | 75        |
| Maximum housing temperature | 120       |
| Relative humidity           | 10...90   |

## Features

- Integrated ~15VDC current source power supply based on DALI 2.0
- Integrated 24VDC/3W auxiliary power supply
- Highly accurate power metering, accessible over DALI
- SimpleSet®, wireless configuration interface
- High surge immunity (CM/DM)
- Long lifetime and robust protection against moisture, vibration and temperature
- Configurable operating windows (AOC)
- Autonomous dimming via Integrated DynaDimmer
- Suitable for central DC operation (DCemDim)
- Thermal protection for driver and for module (MTP)
- Constant Light Output (CLO)
- Adjustable Start-up Time (AST)
- Adjustable Light Output (ALO)
- End-Of-Life indicator (EOL)
- OEM Write Protection (OWP)

## Application

- Road and street lighting
- Area lighting
- Industrial lighting

### Lifetime

| Specification item | Value   |
|--------------------|---------|
| Driver lifetime    | 100,000 |



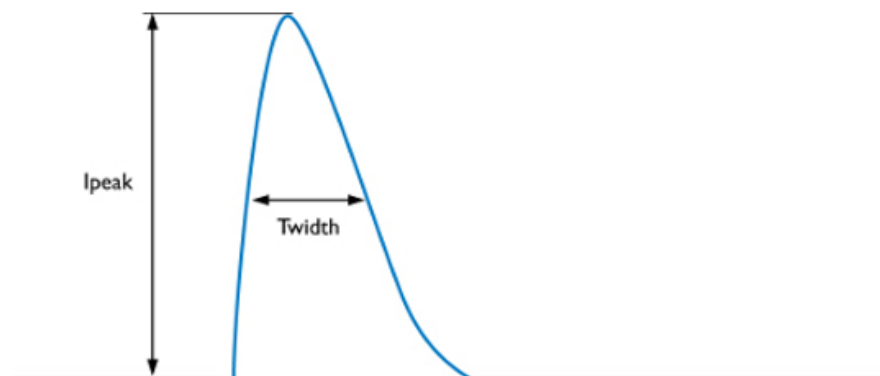
# What's New? Drivers!

PHILIPS

Xitanium

## Inrush current

| Specification item         | Value     | Unit    | Condition                                      |
|----------------------------|-----------|---------|------------------------------------------------|
| Inrush current $I_{peak}$  | 21        | A       | Input voltage 230V                             |
| Inrush current $T_{width}$ | 300       | $\mu s$ | Input voltage 230V, measured at 50% $I_{peak}$ |
| Drivers / MCB 16A type B   | $\leq 21$ | pcs     |                                                |



| MCB | Rating | Relative number of LED drivers |
|-----|--------|--------------------------------|
| B   | 10A    | 63%                            |
| B   | 13A    | 81%                            |
| B   | 16A    | 100% (stated in datasheet)     |
| B   | 20A    | 125%                           |
| B   | 25A    | 156%                           |
| C   | 10A    | 104%                           |
| C   | 13A    | 135%                           |
| C   | 16A    | 170%                           |
| C   | 20A    | 208%                           |
| C   | 25A    | 260%                           |

# Inrush current

| MCB type | Rating (A) | Relative number of LED drivers (%) |
|----------|------------|------------------------------------|
| B        | 4          | 25                                 |
| B        | 6          | 40                                 |
| B        | 10         | 63                                 |
| B        | 13         | 81                                 |
| B        | 16         | 100 (stated in datasheet)          |
| B        | 20         | 125                                |
| B        | 25         | 156                                |
| B        | 32         | 200                                |
| B        | 40         | 250                                |
| C        | 4          | 42                                 |
| C        | 6          | 63                                 |
| C        | 10         | 104                                |
| C        | 13         | 135                                |
| C        | 16         | 170                                |
| C        | 20         | 208                                |
| C        | 25         | 260                                |
| C        | 32         | 340                                |
| C        | 40         | 415                                |
| L, I     | 16         | 108                                |
| L, I     | 10         | 65                                 |
| G, U, II | 16         | 212                                |
| G, U, II | 10         | 127                                |
| K, III   | 16         | 254                                |
| K, III   | 10         | 154                                |

The max. recommended amount of drivers in the table above only serve as guidance. The actual maximum amount in the application may differ due to local grid conditions and is also dependent on MCB brand/type and inherent MCB tolerances.

## How to Determine the Number of Drivers on a MCB

The maximum amount of drivers on a 16 A type B Miniature Circuit Breaker (MCB) is stated in the driver datasheet. In the conversion table on the left that stated amount is used as reference (100%).

The maximum quantity of drivers on different types of MCB can be calculated by the reference (see driver's datasheet) x Relative number (last column).

**Note:** this conversion table does not apply to the following drivers:

Xi FP 35-70-110W 0.3-1.0A NLD 230V C150 sXt  
Xitanium FULL PROG 35-70-110W NLD C150 Xt  
Xitanium FULL PROG 35-70-110W NL1 C150 Xt  
Xi FP 330W 2:0.2-0.75A SNDAE 230V C240 sXt

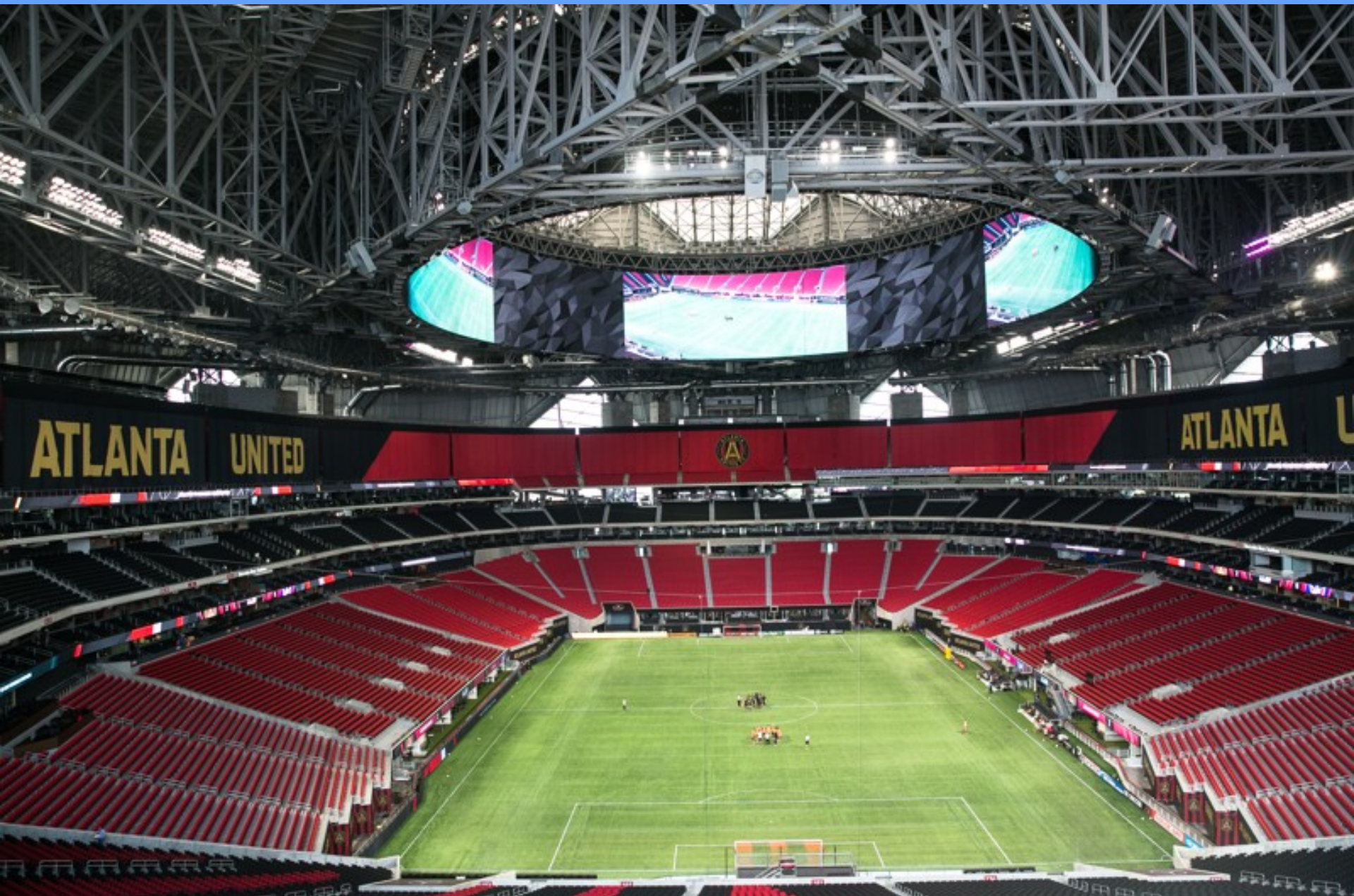
These drivers are equipped with the inrush-limiting feature called SoftStart. As a result, the rated steady-state driver input current limits the maximum amount of drivers that can be connected to an MCB. The maximum amount of these drivers per MCB can be found in the driver datasheet.

## Example;

If datasheet states: max number on type B, 16 A = 20,  
then for type C, 13 A the value will be  $20 \times 135\% = 27$

## How to determine the Number of Drivers on a melting fuse

# What's New? Sport!



# What's new – LED!

Binning condition:  $T_j = 85^\circ\text{C}$ ; 12 V,  $I_f = 1050\text{ mA}$

Reference condition:  $T_j = 85^\circ\text{C}$ ; 6 V,  $I_f = 2100\text{ mA}$

| Nominal CCT | CRI |     | Minimum Luminous Flux |                   |                    | 2-Step |                          | 3-Step |                          |
|-------------|-----|-----|-----------------------|-------------------|--------------------|--------|--------------------------|--------|--------------------------|
|             | Min | Typ | Group                 | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Group  | Order Code               | Group  | Order Code               |
| 5000 K      | 70  |     | P2                    | 1830              | 2015               |        |                          |        |                          |
|             |     |     | N4                    | 1710              | 1883               |        |                          |        |                          |
|             | 80  |     | N2                    | 1590              | 1751               |        |                          | 50G    | XHP70B-00-0000-0D0H      |
|             |     |     | M4                    | 1485              | 1635               |        |                          |        | XHP70B-00-0000-0D0H      |
|             | 90  |     | M4                    | 1485              | 1635               |        |                          | 50G    | XHP70B-00-0000-0D0U      |
|             |     |     | M2                    | 1380              | 1520               |        |                          |        | XHP70B-00-0000-0D0U      |
| 4500 K      | 70  |     | P2                    | 1830              | 2015               |        |                          |        |                          |
|             |     |     | N4                    | 1710              | 1883               |        |                          |        |                          |
|             | 80  |     | N2                    | 1590              | 1751               |        |                          | 45G    | XHP70B-00-0000-0D0HN245G |
|             |     |     | M4                    | 1485              | 1635               |        |                          |        | XHP70B-00-0000-0D0HM445G |
|             | 90  |     | M2                    | 1380              | 1520               |        |                          | 45G    | XHP70B-00-0000-0D0UM245G |
|             |     |     | K4                    | 1290              | 1420               |        |                          |        | XHP70B-00-0000-0D0UK445G |
| 4000 K      | 70  |     | P2                    | 1830              | 2015               |        |                          |        |                          |
|             |     |     | N4                    | 1710              | 1883               |        |                          |        |                          |
|             | 80  |     | N2                    | 1590              | 1751               | 40H    | XHP70B-00-0000-0D0HN240H | 40G    | XHP70B-00-0000-0D0HN240G |
|             |     |     | M4                    | 1485              | 1635               |        | XHP70B-00-0000-0D0HM440H |        | XHP70B-00-0000-0D0HM440G |
|             | 90  |     | M2                    | 1380              | 1520               | 40H    | XHP70B-00-0000-0D0UM240H | 40G    | XHP70B-00-0000-0D0UM240G |
|             |     |     | K4                    | 1290              | 1420               |        | XHP70B-00-0000-0D0UK440H |        | XHP70B-00-0000-0D0UK440G |



0D0BP245E

XHP70B-00-0000-0D0BN445E

XHP70B-00-0000-0D0HN245G

XHP70B-00-0000-0D0HM445G

XHP70B-00-0000-0D0UM245G

XHP70B-00-0000-0D0UK445G

XHP70B-00-0000-0D0BP240E

XHP70B-00-0000-0D0BN440E

XHP70B-00-0000-0D0HN240G

XHP70B-00-0000-0D0HM440G

XHP70B-00-0000-0D0UM240G

XHP70B-00-0000-0D0UK440G

# What's new - LED?



| <b>CREE</b>  <b>LED COMPONENTS</b> <span>Products ▾ Applications ▾ Document Library Support ▾ Where to Buy Why C</span> |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------|
| manufacturers to offer smaller, more efficient LED luminaires that deliver both beautiful light and industry-leading performance.                                                                        |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                       |
| CMA LED Arrays                                                                                                                                                                                           |  |  |  |  |  |                       |
|                                                                                                                                                                                                          | <b>CMA1516</b>                                                                    | <b>CMA1825</b>                                                                    | <b>CMA1840</b>                                                                    | <b>CMA2550</b>                                                                      | <b>CMA3090 (48 V)</b>                                                               | <b>CMA3090 (72 V)</b> |
| LES (mm)                                                                                                                                                                                                 | 9                                                                                 | 12                                                                                | 14                                                                                | 19                                                                                  | 23                                                                                  |                       |
| Lumen range (lm)                                                                                                                                                                                         | 1,400 – 4,800                                                                     | 2,150 – 7,300                                                                     | 3,300 – 10,300                                                                    | 4,400 – 15,000                                                                      | 7,300 – 21,700                                                                      |                       |
| Typical Vf (V) @ 85°C                                                                                                                                                                                    | 35.0                                                                              | 34.6                                                                              | 34.7                                                                              | 34                                                                                  | 45                                                                                  | 68                    |
| Current range (mA)                                                                                                                                                                                       | 450 – 1050                                                                        | 700 – 1600                                                                        | 1100 – 2300                                                                       | 1400 – 3300                                                                         | 1800 – 3600                                                                         | 1200 – 2400           |
| Maximum power (W)                                                                                                                                                                                        | 41                                                                                | 61                                                                                | 87                                                                                | 122                                                                                 | 174                                                                                 |                       |

757G-V2 Series

Surface Mount Type



The highest luminous efficacy 3030 package  
High value and versatility (Jan. 19, 2017)

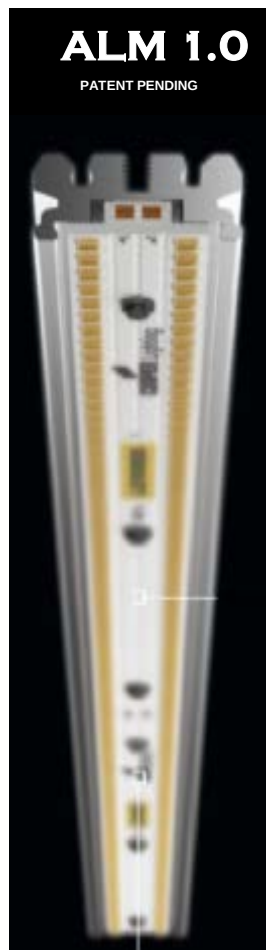
# Solution? Midpower Revolution!

| Product Type                                                                                     |          | Size<br>LxWxH<br>(mm)                                                               | Chromaticity Coordinate<br>Typ(x,y) |        | Luminous<br>Intensity<br>Typ(cd) | Luminous<br>Flux<br>Typ(lm) | Ra<br>Min | R9<br>Min | Forward Voltage<br>V <sub>F</sub> (V) |     | Directivity<br>2θ ½<br>(degree) | I <sub>F</sub><br>(mA) |
|--------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|-------------------------------------|--------|----------------------------------|-----------------------------|-----------|-----------|---------------------------------------|-----|---------------------------------|------------------------|
|                                                                                                  |          |                                                                                     | x                                   | y      |                                  |                             |           |           | Typ                                   | Max |                                 |                        |
|                                                                                                  |          |                                                                                     |                                     |        |                                  |                             |           |           |                                       |     |                                 |                        |
|  NF2W757G-V2F1 N | 3×3×0.65 |    | 0.3447                              | 0.3553 |                                  | 37.5                        | 70        |           | 2.73                                  | 3.0 | 120                             | 65                     |
|                                                                                                  |          |    | 0.3447                              | 0.3553 |                                  | 37.2                        | 80        | 0         | 2.73                                  | 3.0 | 120                             | 65                     |
|                                                                                                  |          |    | 0.3447                              | 0.3553 |                                  | 31.9                        | 90        | 50        | 2.73                                  | 3.0 | 120                             | 65                     |
|                                                                                                  |          |    | 0.4338                              | 0.4030 |                                  | 35.8                        | 70        |           | 2.73                                  | 3.0 | 120                             | 65                     |
|                                                                                                  |          |    | 0.4338                              | 0.4030 |                                  | 34.6                        | 80        | 0         | 2.73                                  | 3.0 | 120                             | 65                     |
|                                                                                                  |          |    | 0.4338                              | 0.4030 |                                  | 29                          | 90        | 50        | 2.73                                  | 3.0 | 120                             | 65                     |
|  NFSW757G-V2 N | 3×3×0.65 |   | 0.3447                              | 0.3553 |                                  | 37                          | 70        |           | 2.84                                  | 3.1 | 120                             | 65                     |
|                                                                                                  |          |  | 0.3447                              | 0.3553 |                                  | 36.9                        | 80        | 0         | 2.84                                  | 3.1 | 120                             | 65                     |
|                                                                                                  |          |  | 0.3447                              | 0.3553 |                                  | 31.1                        | 90        | 50        | 2.84                                  | 3.1 | 120                             | 65                     |
|                                                                                                  |          |  | 0.4338                              | 0.4030 |                                  | 35.2                        | 70        |           | 2.84                                  | 3.1 | 120                             | 65                     |
|                                                                                                  |          |  | 0.4338                              | 0.4030 |                                  | 34.1                        | 80        | 0         | 2.84                                  | 3.1 | 120                             | 65                     |
|                                                                                                  |          |  | 0.4338                              | 0.4030 |                                  | 28.3                        | 90        | 50        | 2.84                                  | 3.1 | 120                             | 65                     |

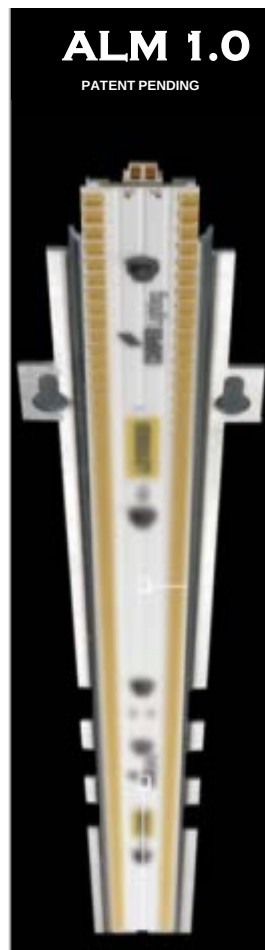
# Midpower LED Module transitions

185 lm/w

COMPONENTS / PRICE



85 lm/w



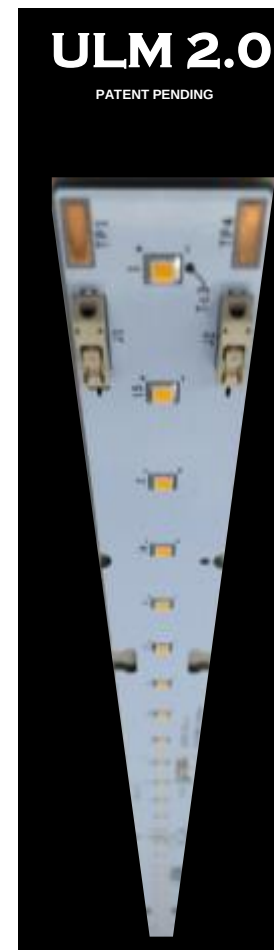
95 lm/w



117 lm/w



125 lm/w



138 lm/w

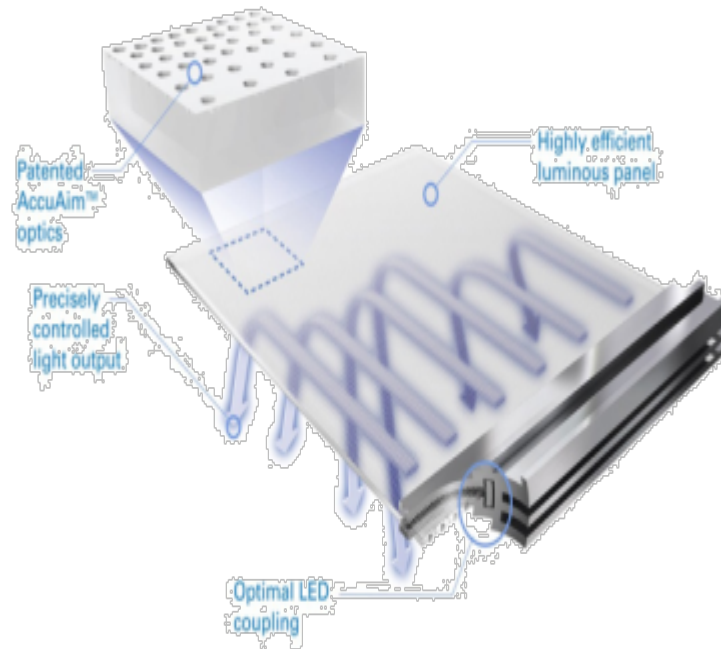
PERFORMANCE

# WaveStream™ LED Value Proposition

Linear Module  
Platform ULM2

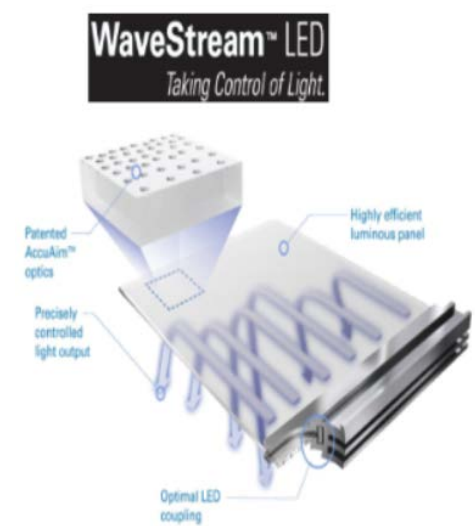
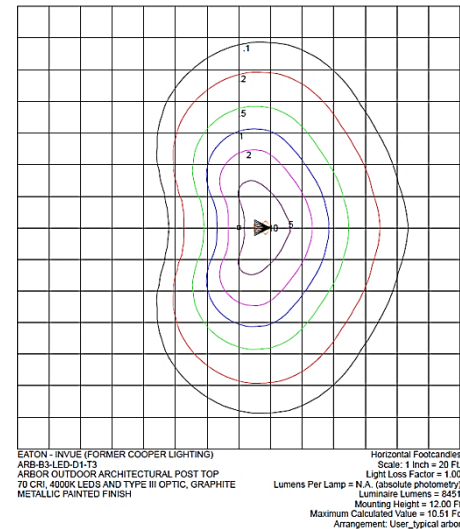
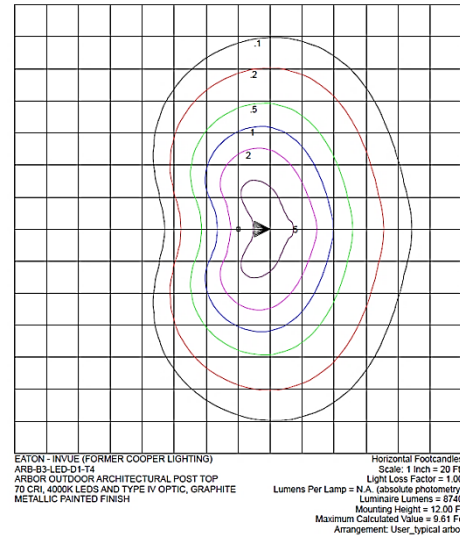
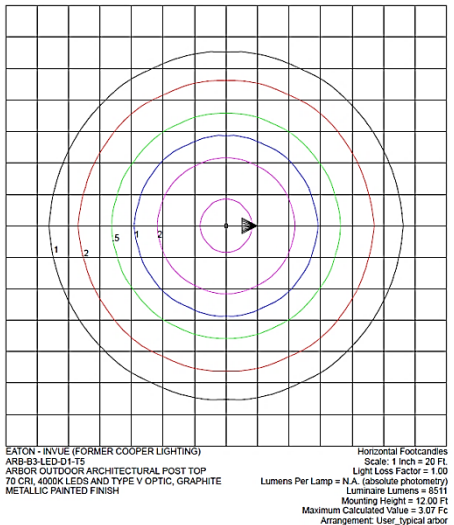
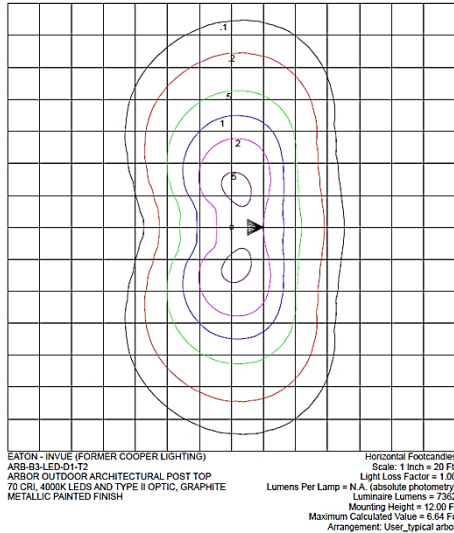


**WaveStream™ LED**  
*Taking Control of Light.*



WaveStream





# Midpower Revolution





No proven risks of LEDs on human health

[Home](#) > [Norms & Quality](#)

## Europe confirms that there are no proven health risks linked to LED technology

What risks do LEDs pose to human health? According to a report from the SCHEER European Committee, LED luminaires have no direct harmful effects on our health.



תודה רבה !