Lighting Product Innovations | OLED

An Overview of Current Product Trends and Future Momentum

"This panel will explore how R&D advances are impacting luminaire and system designs while discussing the challenges that remain in the path of continued development"

January 2020

AcuityBrands.

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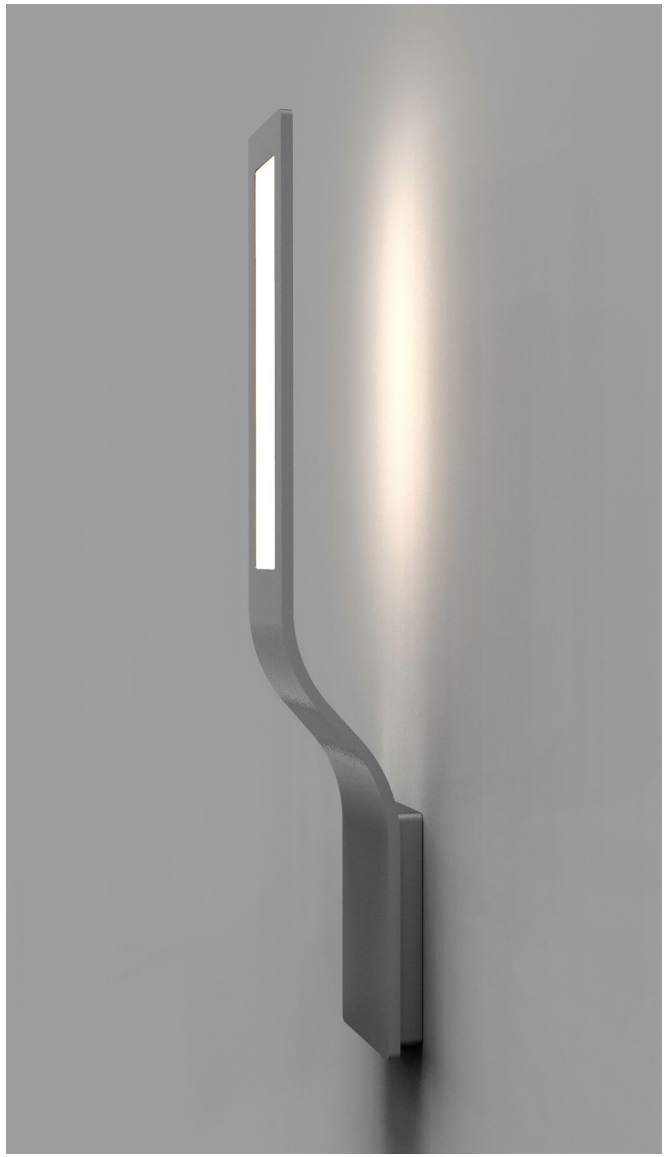
Product Available Now



Currently Trending

- Linear, curvilinear elements
- Slim products with even better performance
- OLED's can be placed back to back
- Source is beautiful, no diffuser required, do not hide it

Performance

- Rectangular OLED panel
  - Noteworthy progress from 68 lm/panel to 300 lm/panel
  - 4.2W per panel, Nom 300 lm, ~70 lm/W
- Luminaire efficacy from 25-32 lm/W to nominal 55-65 lm/W
- L70 lifetime from 10-30K to 30-100K hours

Outcome?

- Embraced by industry and design community

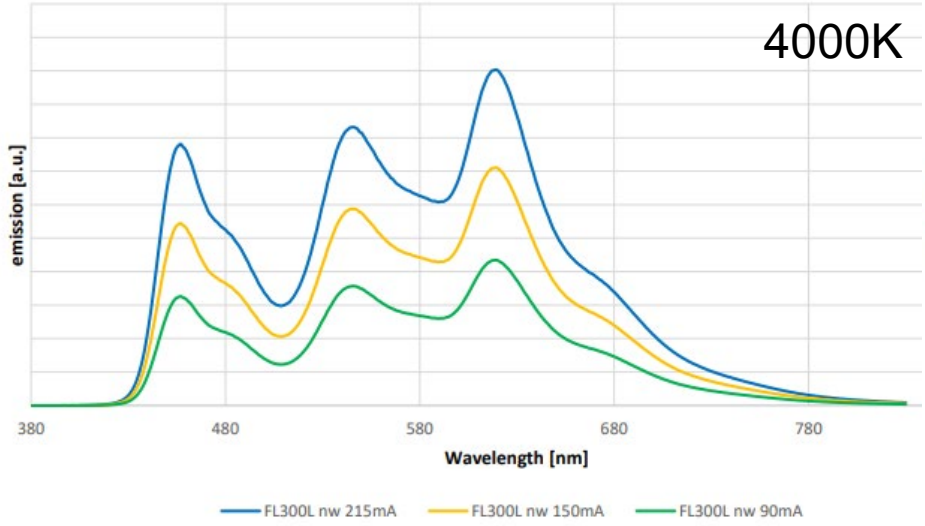
Product: Aedan & Nomi Wall Mounts, Acuity Brands Lighting

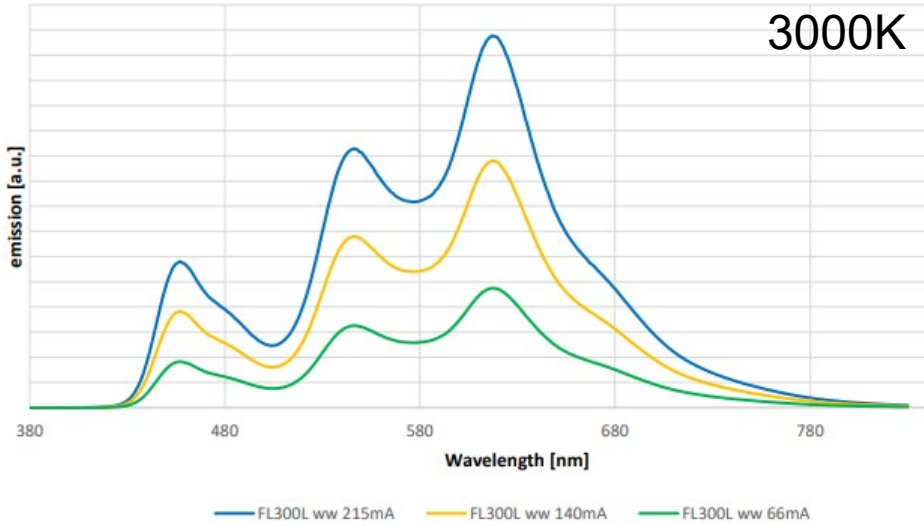
Currently Trending

- Sleek minimalist styles
- ¼” Thick Housing
- 0.035” Window lip
- Back to back panels for direct / indirect

OLED Characteristics

- Glare free
- Always cool to the touch
- 90 CRI+
- Broadband spectrum





Product: Aedan PM, Acuity Brands; Spectral Plots: Oledworks

Currently Trending

- Sleek, linear, minimalist styles
- Thin housings

Performance

- Back to back panels for direct / indirect, features up to (4) panels & roughly 1200 lumens maximum

Products: Ira family, Arcio Lighting

Currently Trending

- Different approach to the minimalistic
- Round but housing is still associated with single material thickness
- Modern take to traditional RLM

OLED Luminaire Characteristics

- Always cool to the touch
- Glare free
- 90 CRI +
- Round OLED
- 3.2W, 190 lm, ~60 lm/W (3000K)

Products: Echo, Eureka Lighting

Currently Trending

- Different designs, similar approach
- Form and material to appear uninterrupted by source

OLED Luminaire Characteristics

- Always cool to the touch
- Glare free
- 90 CRI +
- Square OLED
- 20W, 850 lm, ~43 lm/W (left)
- 6.6W, 287 lm, ~43 lm/W (right)

Products: Limit, Visa Lighting (left) / Sail, Eureka Lighting (right)

Currently Trending

- Leaf like aesthetic
- Multiple panels purposefully placed, greater quantity of panels
- OLED to the forefront, less trim
- Luminaire design & source combine for an emotional experience – warm feeling, surrounding you in pleasant light

OLED Luminaire Characteristics

- Always cool to the touch
- Glare free
- 90 CRI +
- ~21W, 1290 lm, 62 lm/W (3000K, left)
- 20W, 700 lm, ~30 lm/W (3000K, right)

Products: Revel (left), Acuity Brands / Petal (right), Visa Lighting

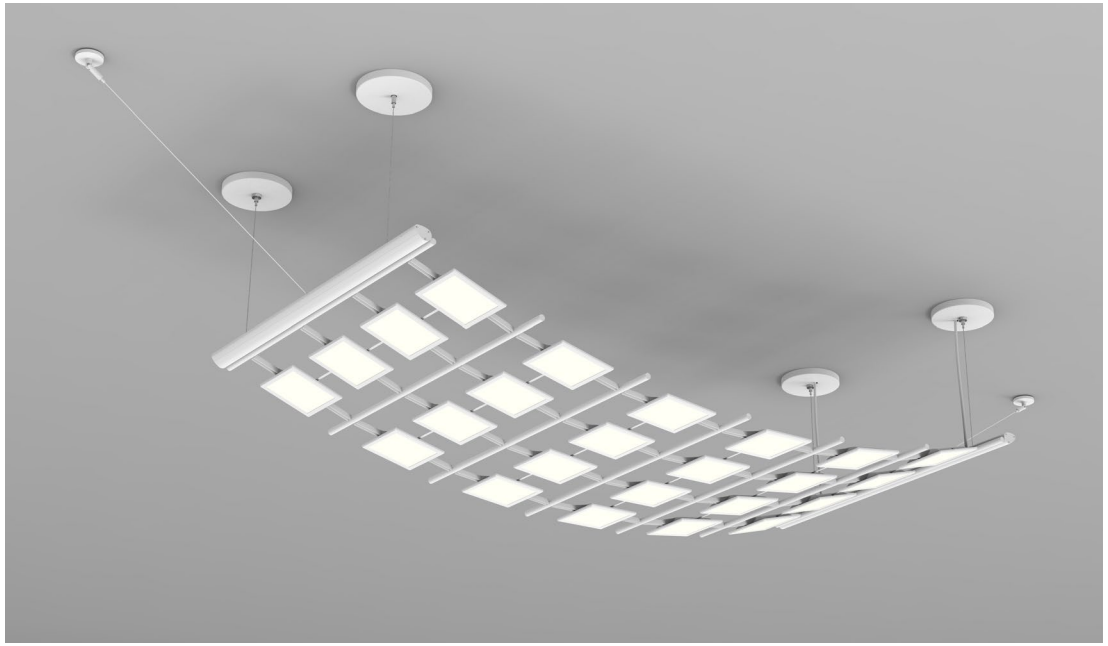
“ ~ “ = expected value, luminaire in testing

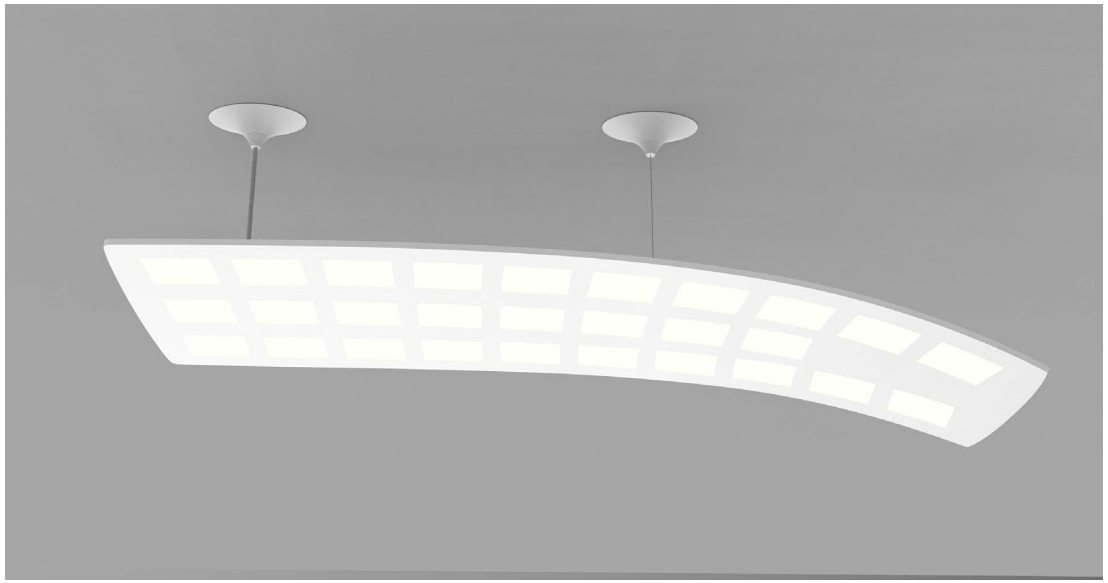
Currently Trending

- Area illumination, area completely lit with OLED
- Eliminates glare and harsh shadows in your space!
- Soft curvature, gesturing toward the occupant

OLED Luminaire Characteristics

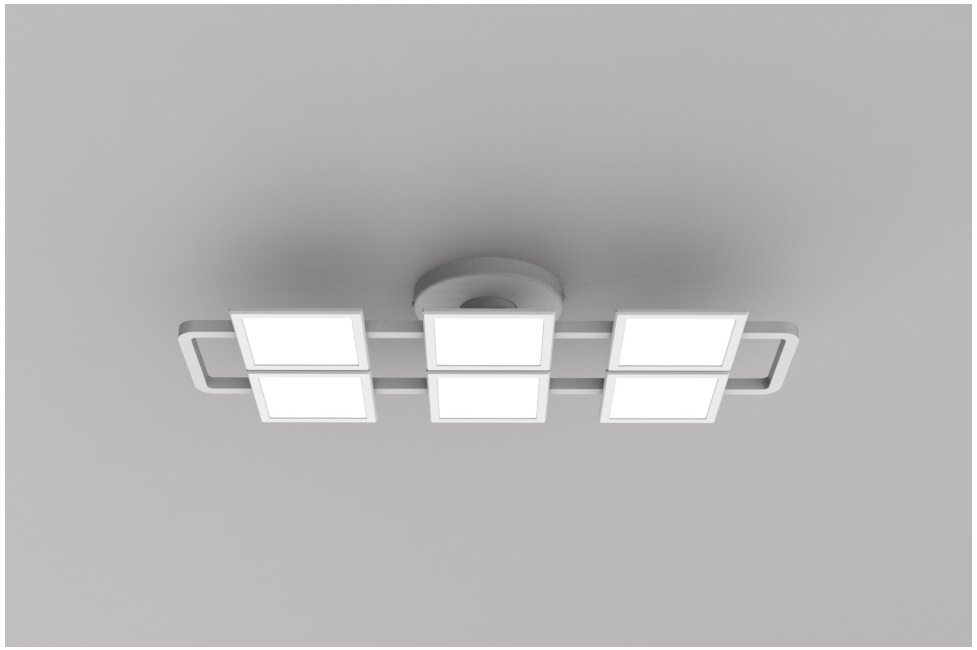
- 24 OLED Panels (top), 28 OLED Panels (bottom)
- ~100W, 6192 lm, 62 lm/W (3000K, top)
- ~117W, 7224 lm, 62 lm/W (3000K, bottom)

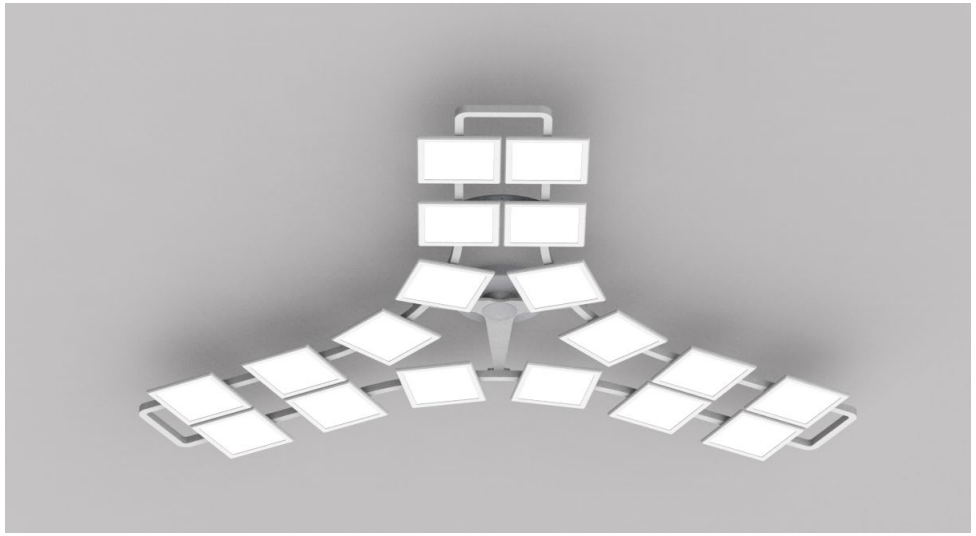




Products: Canvis (top) & Kindred (bottom), Acuity Brands Lighting

“ ~ “ = expected value, luminaire in testing





Currently Trending

- Area illumination
- Modular design, combine configurations for larger full area solutions
- Create an area completely lit with OLED to eliminate glare and shadows but with configurable option you have the capability to locate light in best possible locations

OLED Luminaire Characteristics

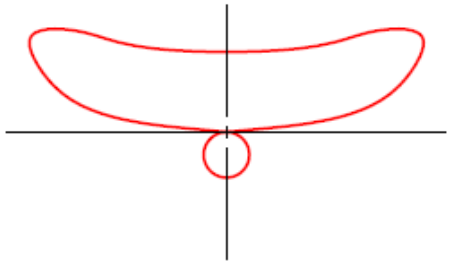
- 6 OLED Panels (top), 18 OLED Panels (bottom)
- ~25W, 1548 lm, 62 lm/W (3000K, top)
- ~76W, 4644 lm, 61 lm/W (3000K, bottom)

Products: Trilia, Acuity Brands Lighting

“ ~ “ = expected value, luminaire in testing

Currently Trending

- Combine LED and OLED sources
- Efficacy of both improving adding a practical element to sleek forms
- Knife edge design and OLED has minimal impact on housing size
- Consider adding OLED to any luminaire product family to add improved perceived psychological brightness



Luminaire Characteristics

- Continuous Run, 4ft / 6ft / 8ft sections
- OLED direct, 4ft unit : 17.2W, 1032 lm, 62 lm/W (3000K)
- LED indirect, 4ft unit : ~60W, 6000 lm, 100 lm/W (3000K)
- Combined sources, per foot : ~19W, 1750 lm, 90 lm/W (3000K)

Products: Olessence, Peerless Lighting

“ ~ “ = expected value, luminaire in testing

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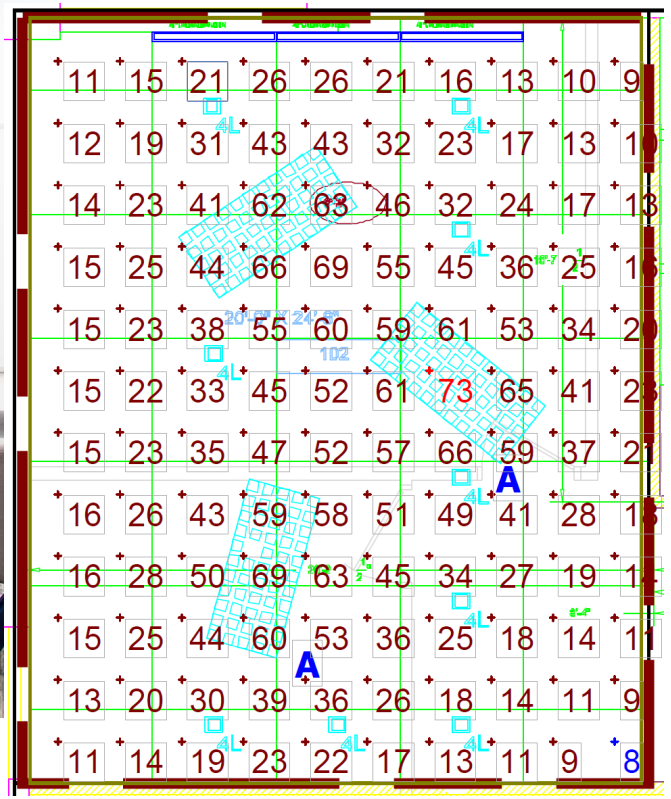
The Why? Applications

- Harmonious integration of artificial and natural light
- Ideal working conditions
- Great natural light during the day
- OLED picks up when nature cannot cooperate

- Even illumination
- RCP shows 32FC Ave (about 480ft$^{2)}$
- .65 W/ft^2
- Note wall illumination uniformity



- Interesting patterns of individual units
- Over counters or in lobby spaces
- Ornamental
- Luminaire once again to be part of the décor
  - draws the eye
  - used over display cases

- Comfortable spaces
- Luminaire is a conversation piece, meant to be seen

- Modular design to create long continuous runs
- Indirect / direct at its best

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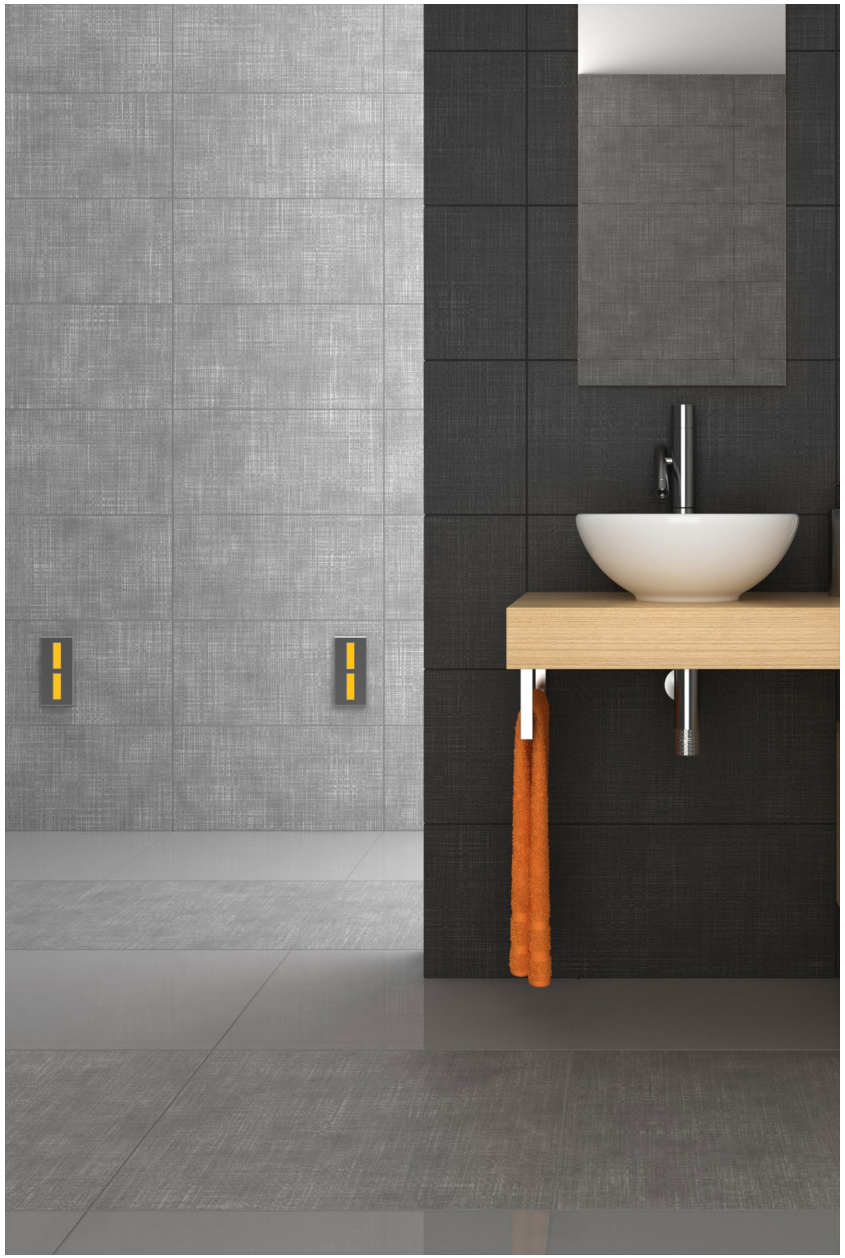
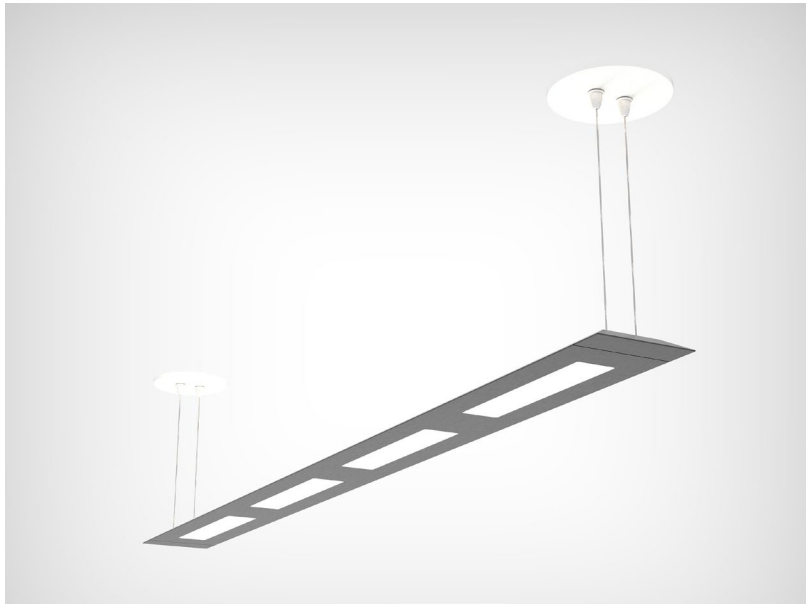
Future of OLED



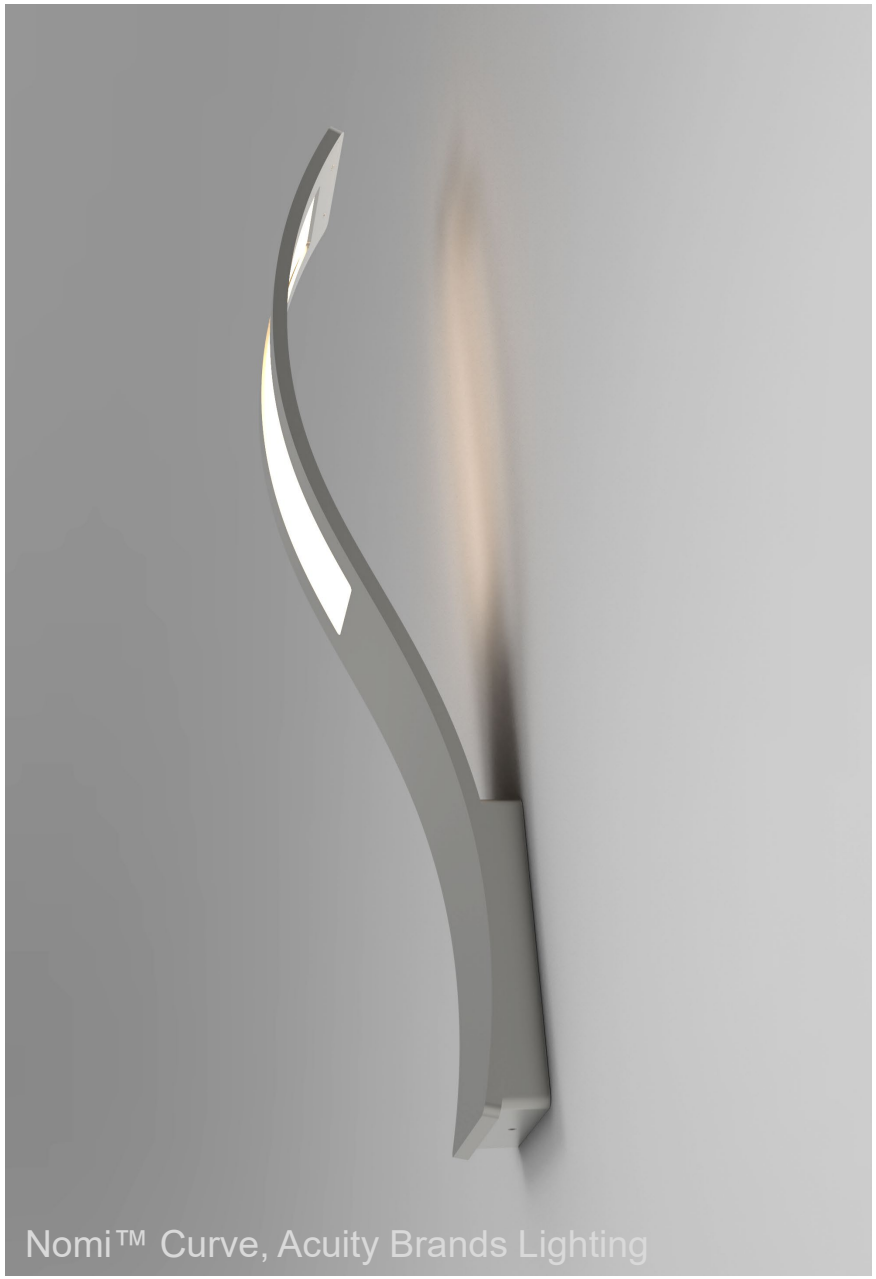
Marker Lights

- Static color OLED
- Amber, Red is common, additional colors possible



SSL Duet Technology

- Efficacy of both improving and adding a practical element to sleek forms
- Continue to merge LED and OLED sources to maximize performance, quality illumination and aesthetics.
- Add OLED to the surface for pleasant illumination with minimal impact on physical size.
- Easy to integrate
  - Plug & play style OEM wiring harnesses
  - Minimal thermal management considerations
  - Numerous driver possibilities
    - Programmable constant current
    - Constant voltage
    - Small form factor

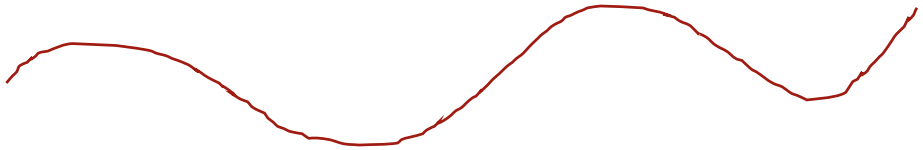

Nomi™ Curve, Acuity Brands Lighting

Curves

- Removes another roadblock to continuous curvilinear forms
- Efficacy has improved to make this a realistic source

Potential

- More forms?
- Customizable?
- Ribbon like, A continuous roll of light?



Segmented OLED

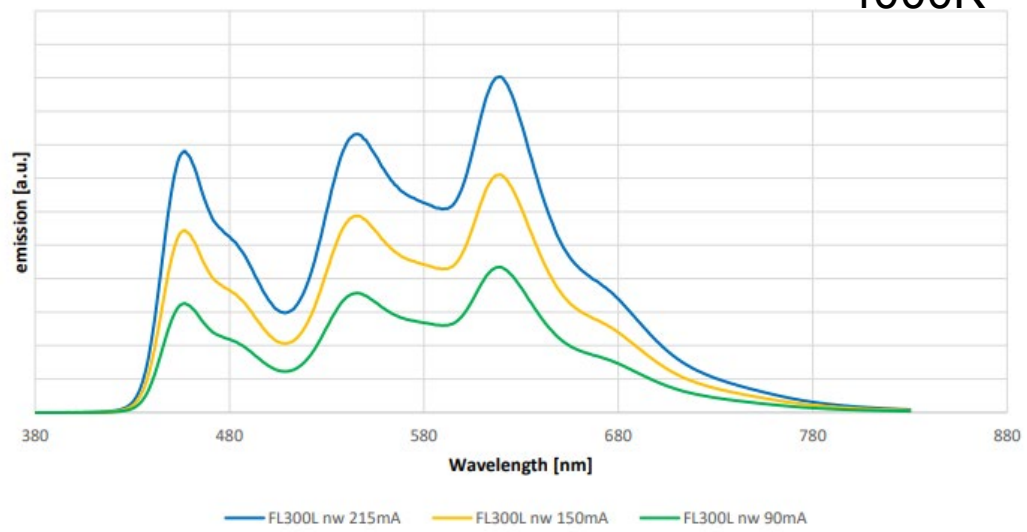
- Currently used in taillight applications
- High contrast patterns
- Zero bleed – crosstalk

Potential

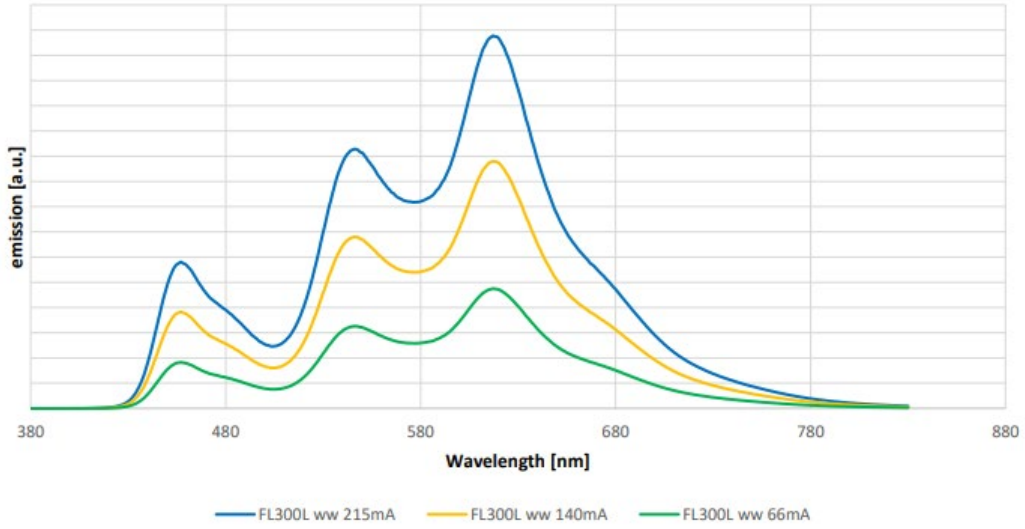
- Get into luminaire design?
  - Wayfinding
  - Signaling
  - Interactive response
    - Occupancy
    - Activity
    - Facility management
    - Safety
  - Through IOT

Spectrally Engineered Sources

4000K



3000K



- Additional Spectra designed for specific outcomes / environments?
  - Circadian Entrainment
  - Horticulture
  - Engineered for artifacts & sensitive materials
  - Tunability

Thank you!