lumenpulse™

CCT and Dynamic Lighting Fundamentals

Warm, inviting light
to get you on your way…


Crisp, bright light
to choose the right path…

Intimate, relaxing light to welcome the night…

Human-centric lighting

What is human-centric lighting?

Anyone that has ever watched a sun rise would be able to tell you the impact light has on their mood. But lately, science has started to back that up, showing how light can impact behavior, alertness, sleep patterns, and even our perception of the world.

When designed in the right way, light can improve concentration and efficiency in the workplace or schools; promote well-being and recovery in hospitals and clinics; and signal the time to relax in restaurants, bars or hotels.

With Lumenpulse technology, light can now be dynamic and flexible, mimicking our natural relationship with light, and making sure we are always at our best.

3000K

5500K

2200K

What is color temperature?

Correlated color temperature (CCT) is the relative color appearance of a white light source. Does it appear warm and golden, cool and bluish or a shade in between?

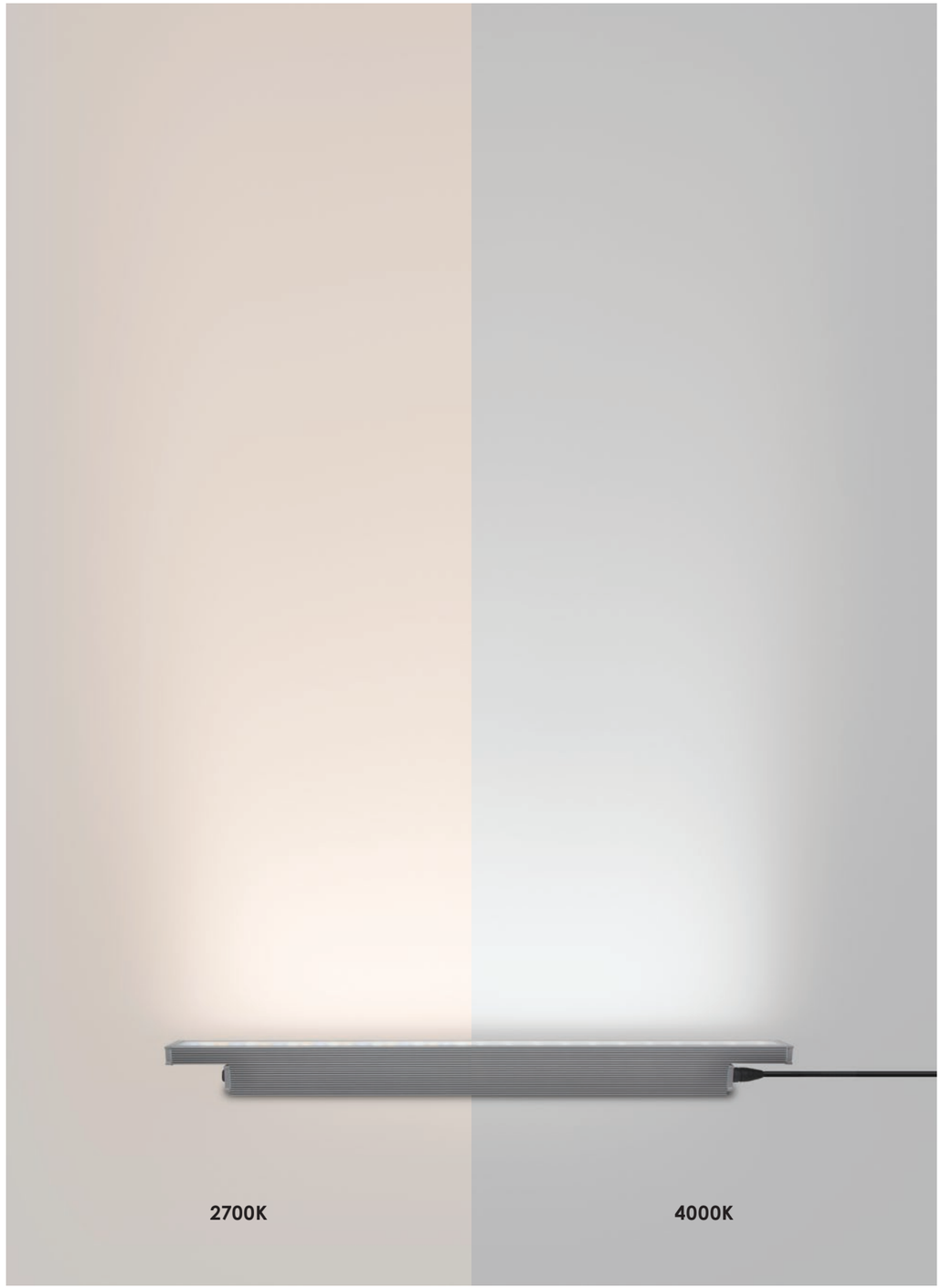
Adjusting the color temperature of your light source can completely change the look and mood of a space:

Cool

Cooler color temperatures offer a bluer white light, helping to create brighter, more energetic spaces.

Warm

Warmer color temperatures impart a more golden light, creating a warmer, friendlier ambience.



How do I select the right color temperature?

Whole spectrum

2200K 4000K 6500K

When selecting the right color temperature, consider two factors:

1.

What material are you lighting?

The color temperature you select should complement the materials in the space you are lighting. Blues, silvers and metallic colors, for example, are often best matched with cooler color temperatures. Woods, golds and reds, meanwhile, respond well to warmer color temperatures.

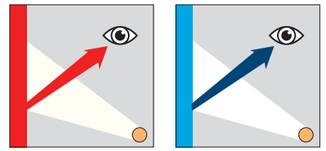
2.

What atmosphere are you seeking to create?

Whether you're trying to create a sense of intimacy in a restaurant or aiming to increase alertness in a classroom, each application requires a different color temperature. Understanding how the space will be used will influence your choice.

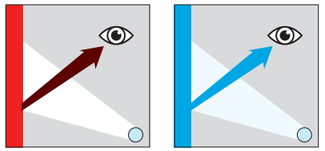
Portman Mews, London, UK
Client: Rede Partners

Color temperature in the material world



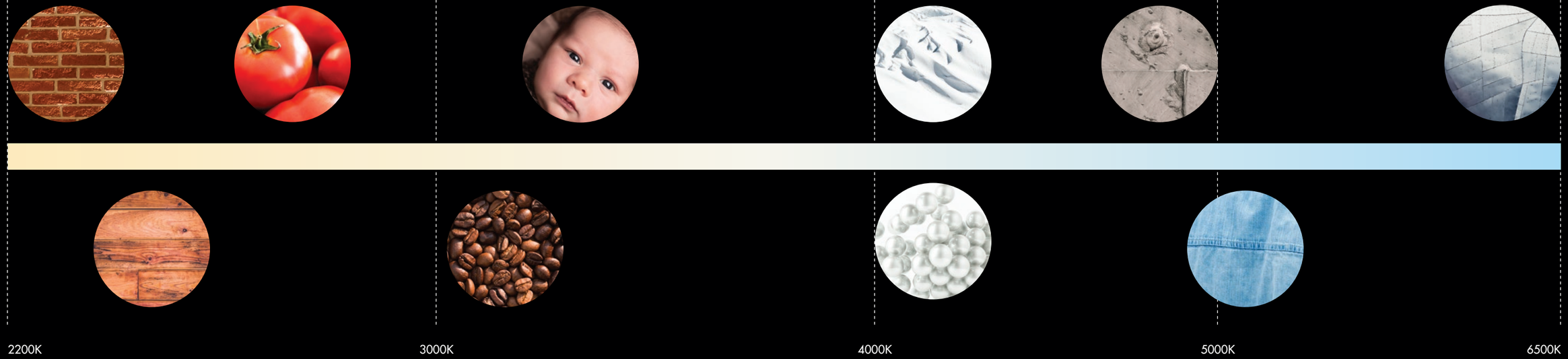
Warm White

Intensifies warm surface colors (e.g. red) and impairs colder surface colors (like bluish surfaces).



Cool White

Impairs warm sufrace colors (e.g. red) and intensifies colors on cooler surfaces (bluish surfaces).



Does color temperature affect the appearance of clothing? A bowl of apples? A heritage red-brick facade? The answer is yes. Bringing out the best in the materials that make up your space requires the right choice of color temperature.

KEEPING YOUR COOL

Use cooler color temperatures to simulate daylight and increase alertness during the day.

Cooler color temperatures are preferred for activities requiring concentration.

La Presse, Montreal, QC, Canada
Lighting Design: JBC Architects, Architecture 49

Warmer color temperatures create a place of calm and reflection.

Warm white light signals a time to relax and feel comfortable.

Canadian Museum for Human Rights, Winnipeg, MB, Canada
Lighting Design: Mulvey+Banani International Inc.

MIX AND MATCH

Enhance the color of specific materials using the appropriate color temperature.

Sandstone
3000K

Granite
4000K

Customs House, Montreal, QC, Canada
Lighting Design: Éclairage Public

A DRAMATIC CONTRAST

Use warm light to bring important elements to the fore.

Contrast warmer elements against a cooler background to bring them sharply into focus.

Notre-Dame Basilica of Montreal, Montreal, QC, Canada
Lighting Design: Éclairage Public

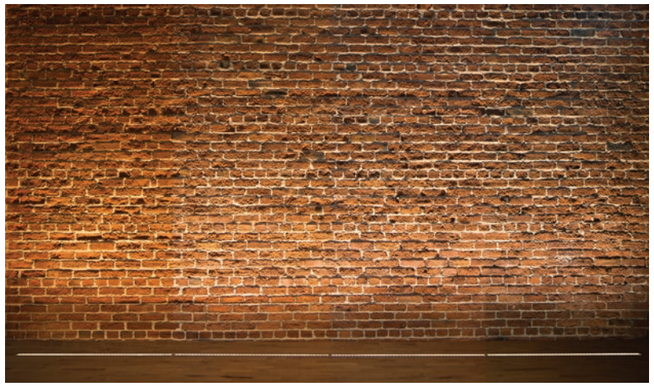
Dynamic White

What is Dynamic White?

Thanks to the flexibility of LED technology, projects no longer have to settle for a single unchanging color temperature. With tuneable white, you can vary color temperatures over the course of a day, creating different moods or ambiences.

You now have the freedom to set a classroom's CCT to 5500K during tests, 4000K for classroom discussions, and 3000K after lunch breaks and recess.

Dynamic Warm



2200K 2700K 3000K

Two solutions for Dynamic White

Lumenpulse offers two separate tuneable white systems, allowing you to change the character of a space using variable color temperature.

1.

Dynamic White encompasses a full range of color temperatures from warm 2700K to cool 6500K.

2.

Dynamic Warm allows variations at the warmer end of the spectrum from 2200K to 3000K.

Dynamic white color temperature range

1. Dynamic White

2700K — 6500K

2. Dynamic Warm

2200K — 3000K

Dim to Warm Control

2700K — 2200K

Dim to warm control

DTW
Dim to warm

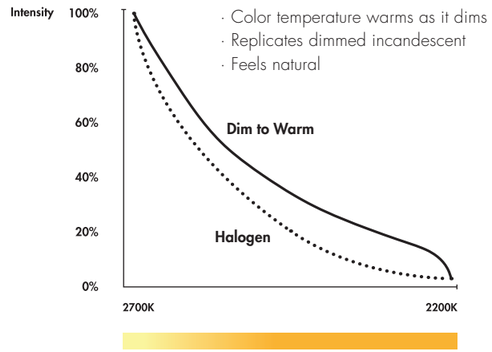
2700K to 2200K

Lumenpulse's Dim to Warm is offered as part of the Dynamic Warm color option. The technology reduces a luminaire's color temperature when dimmed, allowing for natural dimming of warm white light (from 2700K to 2200K). Dim to Warm was designed to replicate the familiar, natural feeling of dimmed incandescent, while still providing modern LED efficiency and versatility.

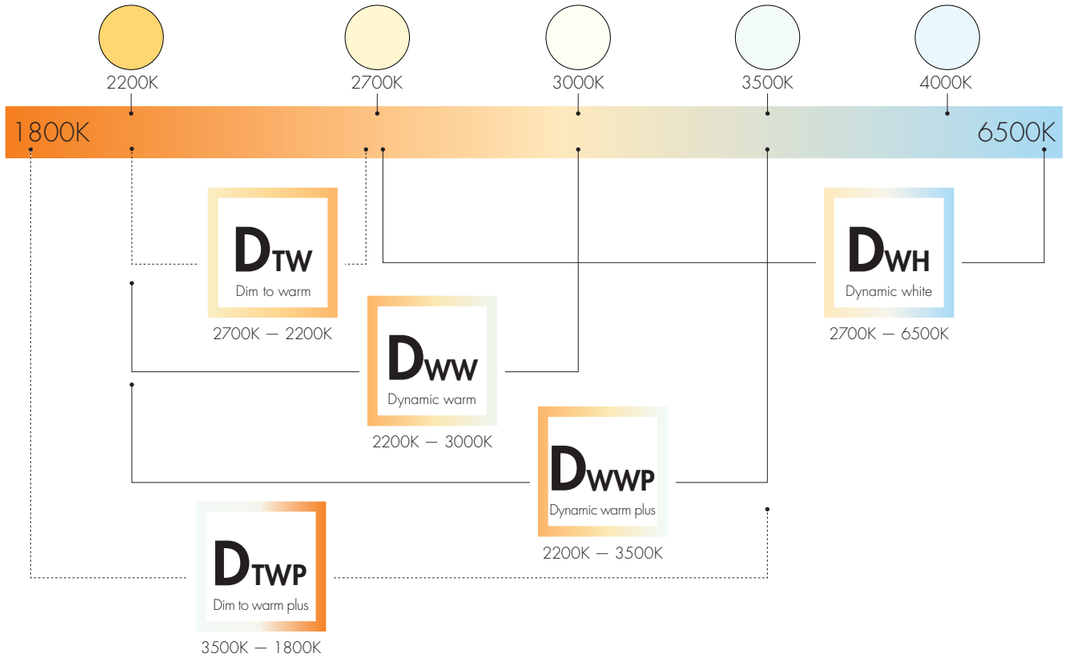
Ambience at your Fingertips

Sophisticated control and smooth, natural dimming – without additional programming.

Lumenpulse Dim to Warm dimming curve compared to halogen



Ambience at your fingertips



DTW Dim to warm
2700K — 2200K

Dim to Warm reduces a luminaire's color temperature when dimming, allowing for the natural dimming of warm white light.

DTWP Dim to warm plus
3500K — 1800K

Dim to Warm Plus reduces a luminaire's color temperature when dimming, allowing for smooth variations in warm white light.

DWH Dynamic white
2700K — 6500K

Dynamic White* is a tunable white, that lets you use your lighting controls to create a scenario that coincides with the rhythmic changes of the natural environment.

DWW Dynamic warm
2200K — 3000K

Dynamic Warm White* allows variations at the warmer end of the spectrum. Projects no longer have to settle for a static color temperature.

DWWP Dynamic warm plus
2200K — 3500K

Dynamic Warm White Plus* allows for variations at the warmer end of the spectrum without any loss in the luminaire's output or intensity.

..... **1 channel (DTW - DTWP)**
Compatible with: 0-10V, DMX/RDM, Lumentalk, SDALI

——— **2 channels (DWH, DWW, DWWP)**
Compatible with: DMX/RDM, Lumentalk, DALI Type 8

*Can be field-changeable via RDM & LT to 3 channels for individual CCT control – DWH, DWW, DWWP only.

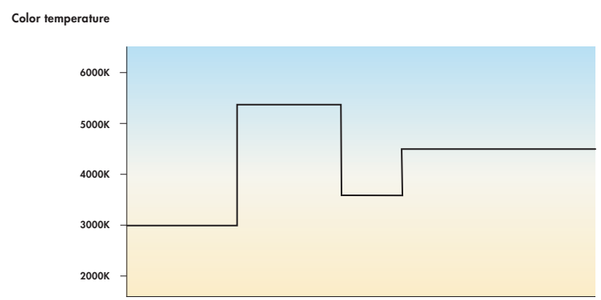
Why dynamic lighting?

Circadian rhythm

Human circadian clocks are set by light, and timing, as they say, is everything. Our circadian rhythm is hardwired with the light cycle of the solar day, which means exposure to cool bright light at the wrong time can have a disruptive effect. By adjusting light intensity and color temperature over the course of the day, we can simulate the drama and variety of natural light.

Easy scene setting

When it comes to smart, modern lighting, flexibility is king. By allowing easy scene setting, dynamic lighting provides much needed versatility, allowing the setting of specific moods for different events, exhibits, displays, promotions, and more.



Space Shuttle Atlantis, Cape Canaveral, FL, USA
Lighting Design: Fisher Marantz Stone

Casino Lac-Leamy, Gatineau, ON, Canada
Lighting Design: Lightemotion

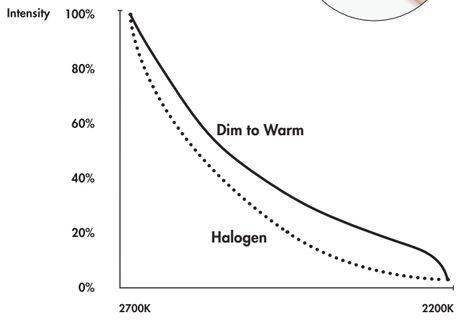
Control for any situation

Lumenpulse's dynamic lighting solutions offer a full range of control options – from no-programming behaviors to highly sophisticated control using DMX.

1-channel control – dim to warm

Use for simple warm dimming.
Solutions for hotels and restaurants.
No programming required.

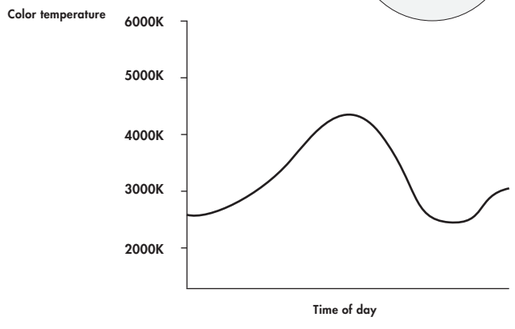
· 0–10V
· 1 channel DMX
· Dim to Warm



3-channel control – dynamic warm and dynamic white

For highly sophisticated circadian rhythm and scene setting applications.

· 3 channels DMX/RDM
· Lumentalk*

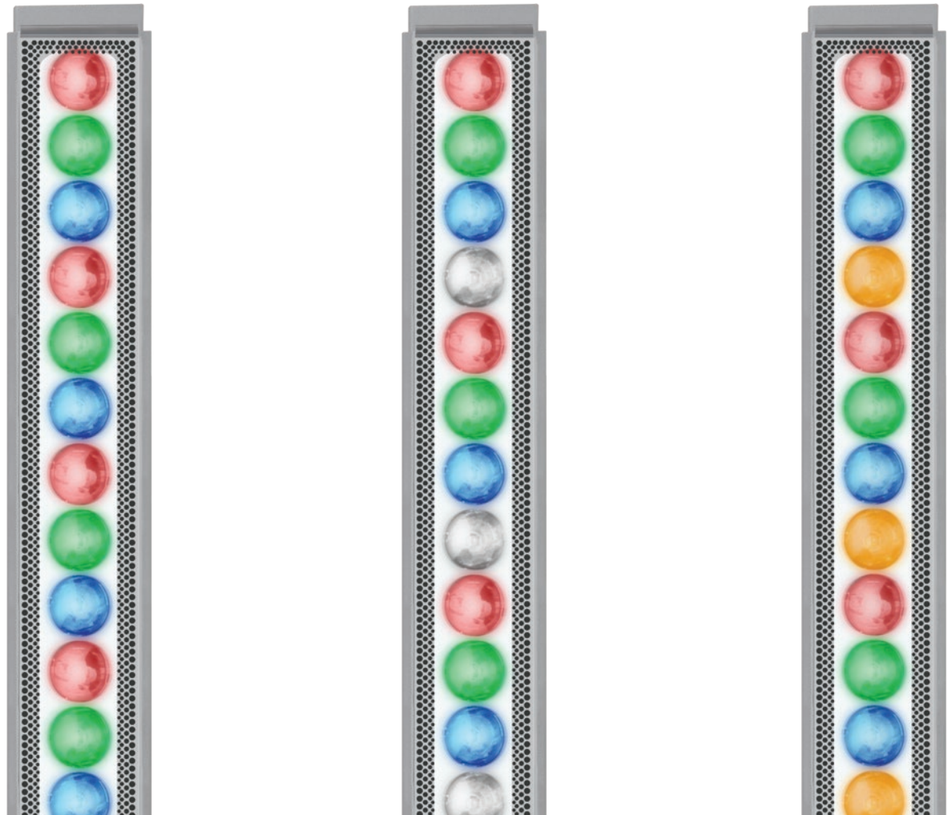


*Consult factory for product availability.

RGB

RGBW

RGBA



Choosing the right color

You now have the option of choosing RGBW and RGBA as more nuanced alternatives to RGB. RGBW provides a mix of RGB with cool white diodes, while RGBA adds warm, amber diodes, enabling:

- Extended color control
- Brighter whites and pastels
- Enhanced white light with higher CRI

RGB
Red Green Blue

Use RGB for decorative color applications requiring high intensity colors.

RGBW
Red Green Blue White

Use RGBW for multifunctional applications requiring a mix of white and colored light.

RGBA
Red Green Blue Amber

Use RGBA to add color warmth using amber tones within a mix of colored light.

Adjustable, dynamic lighting lets New York's Building Energy Exchange change the look and feel of its multifunctional space for different classes, events, and times of the day.

1

1. Building Energy Exchange, New York, NY, USA

2. GM Renaissance Center, Detroit, MI, USA
Lighting Design: YESCO

Dynamic branding, at all hours.

The right color can bring logos and façades to life at night, helping to reinforce and enhance your brand.

2

Hyatt Regency Chicago, IL, USA
Lighting Design: Kaplan Gehring McCarroll Architectural Lighting

Lumenbeam™ family

Lumenquad™ family

Lumenfacade™ family

Lumencove™ family

Cylinder™ family

Downlight™ family

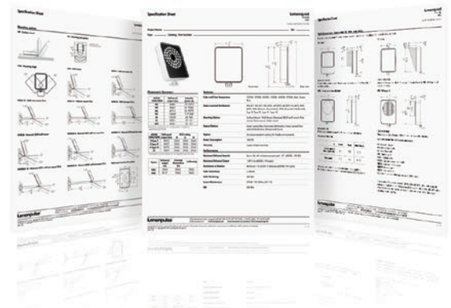
Spotlight™ family

Lumendome™ family

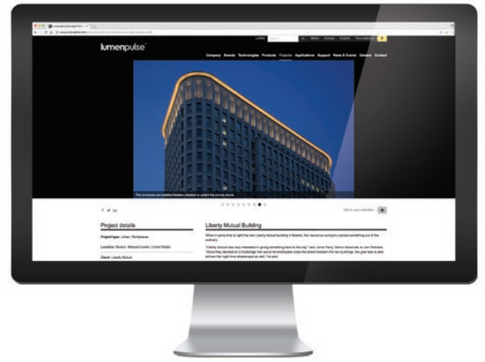
Lumenline™ family

Element™ family

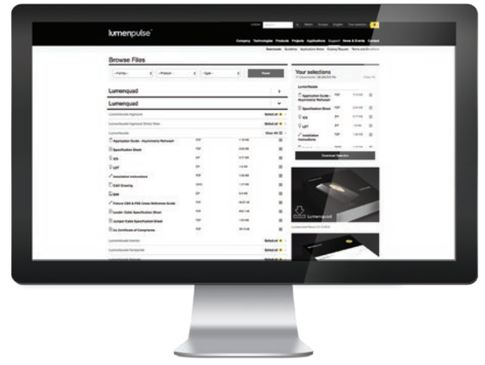
Documentation



Website



Support files



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