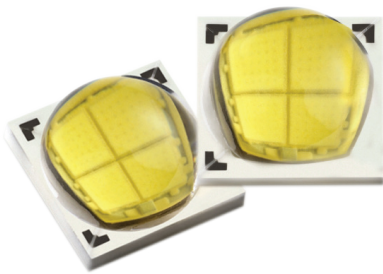




# Barcelona Tunnel Comes to Light

LED fixtures along el Túnel de La Vila Olímpica deliver vastly improved visibility and a robust design that will last decades into the future.



## Challenge

To provide a safe and energy efficient lighting upgrade for the Túnel de la Vila Olímpica Barcelona.

## Solution

With a flexible optical design, the Carandini T-Max luminaire projects uniform lighting to the roadway from one side of the tunnel and is specifically designed for use in harsh environments.

## Results and Benefits

By providing higher lumen levels at the tunnel entrance and exit and consistent, high quality levels throughout, the T-Max luminaires with LUXEON M LEDs provide drivers with safe tunnel lighting that will last 25 years. When regular cleaning with high pressure water is performed, only one lane of traffic needs to be interrupted.

## Challenge

Winding along the beautiful Barcelona coastline is La Vila Olímpica, a road that carves its way through some seventeen tunnels. Though drivers traversing this freeway might give little thought to lighting inside these tunnels, they may now notice a dramatic change inside one tunnel that has undergone a lighting upgrade. Inspired by the potential savings in operating cost and improved visibility for drivers, the city of Barcelona decided to invest in LED tunnel lighting to replace the existing low pressure sodium fixtures.

In el Túnel de la Vila Olímpica, only one side can be used to situate the luminaires. This requires a more flexible optical system that can provide light projection downward and to the side to illuminate both driving lanes equally. In addition, drivers entering a tunnel face stark contrast between daylight and a dark tunnel, so additional lumen output is needed at the openings to allow visual adjustment. Further, vehicle speed and light reflection from road and tunnel materials help determine necessary light levels inside the tunnel.



T-Max fixtures by Carandini using LUXEON M LEDs were installed in el Túnel de la Vila Olímpica. Carandini provided a customized design, which minimizes the stark contrast between outside daylight and the dark tunnel.



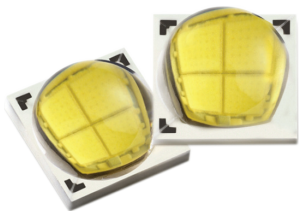
## Solution

With multiple years of experience in tunnel lighting, Carandini brought a custom design to the tunnel. Working with Lumileds and choosing the LUXEON M LED for its consistency of light output, high reliability and ultrahigh efficacy, the Carandini T-Max fixture provides 10,000 lm of light inside el Túnel de la Vila Olímpica. The T-Max has 11 different optical configurations to meet a variety of needs including lighting from one side. At the entrance and exit of this 1.5 km (1 mile) tunnel, stacked fixtures are used to provide 40,000 lm output. The luminaires utilize 4000K color temperature at a color rendering index of 70. The luminaires are evenly spaced for maximum uniformity.

“Safety drives the design in tunnel lighting. We can drastically improve safety today by precisely modeling conditions and providing the exceptional light quality of LED lighting.

— Francesc Palma  
Carandini

The T-Max luminaire is a completely sealed unit with separate driver system that can be mounted together or separate from the light module. In this tunnel, the light module is mounted 30 cm above the drivers, allowing improved heat dissipation from the luminaire. Because the LEDs and other electronics are fully protected in a sealed, IP66 rated housing, the fixtures and drivers can be high-pressure spray washed as needed.



The Carandini T-Max fixtures uses LUXEON M for its consistency of light output, high reliability and ultrahigh efficacy.

## Results and Benefits

The greatest benefit to the lighting upgrade is significantly improved visibility and therefore, driver safety. The high color rendering (70) and cooler color temperature (4000K) LED light provides far superior visibility, allowing drivers to see “real” colors within the tunnel. In contrast, the old low pressure sodium lamps (2000K, 20 CRI) caused everything to look yellow and only provided one brightness level. The T-Max configuration and layout is modeled to provide optimal visibility along the Túnel de la Vila Olímpica Barcelona.

“We partnered with Lumileds to provide luminaires that deliver exceptional output, use 40% less energy, and will last up to 25 years.”

— Eduardo Serna  
Carandini

Many tunnels throughout Europe feature centerline tunnel lighting. Unfortunately, when maintenance is required, both lanes of traffic must be shut down. With the side-based illumination, one lane of the Túnel de la Vila Olímpica Barcelona can be kept open at all times.

Finally, the luminaire and LEDs deliver high reliability with rated lifetime of 100,000 hours (25 years). If maintenance of the driver is required in that period, it is performed separately from the light module. The upgrade has reduced the lighting electricity cost by 40%. Now that one tunnel has been upgraded to T-Max LED lighting with LUXEON M LEDs, Barcelona is receiving positive feedback from drivers.

## About Lumileds

Lumileds is the global leader in light engine technology. The company develops, manufactures and distributes groundbreaking LEDs and automotive lighting products that shatter the status quo and help customers gain and maintain a competitive edge. With a rich history of industry “firsts,” Lumileds is uniquely positioned to deliver lighting advancements well into the future by maintaining an unwavering focus on quality, innovation and reliability.

To learn more about our portfolio of light engines visit [www.lumileds.com](http://www.lumileds.com).

## About Carandini

Since its founding in 1919, Carandini has been dedicated to the design of light fixtures for outdoor lighting, sports facilities and multiple other applications. The company provides lighting designs for specific uses with a focus on photometrics, quality, ease of use, low maintenance, long life and beautiful design. Since 1999, Carandini has been part of the international group Acuity Brands Lighting. Learn more at [www.carandini.com](http://www.carandini.com).

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