NOX

Tunnel lighting is the most technically demanding and fundamental of all lighting applications. HEPER Tunnel Series is the result of years of experience in tunnel lighting and the application of the latest technologies developed by HEPER R&D. NOX is the outcome of a multidisciplinary design study carried out in HEPER Test Laboratories and production facilities, where safety and performances are tested by qualified technical staff.

At HEPER, we have a proud history of over a decade of working in tunnel lighting applications. In the course of time, we have completed many significant tunnel projects successfully all around the world.

NOX is HEPER's brand-new family member with its solitary design and optical flexibility in tunnel and underpass lighting. As a result of its high-grade stainless-steel body and low copper die-cast aluminium heatsink body; where the thermal management is handled in the best possible way, NOX offers superb corrosion resistance, thermal conductivity, electrical resistivity, and prevention of rust and staining.

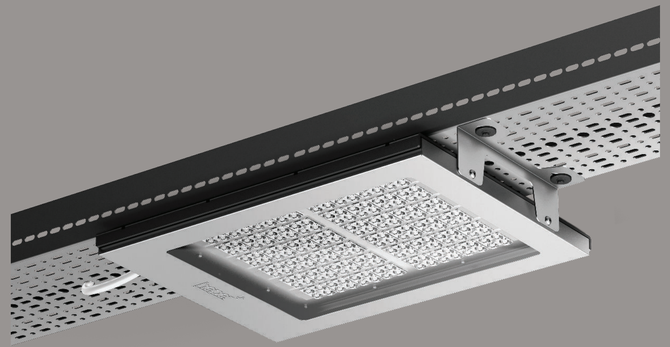
NOX integrates the latest optimized optics to provide perfect lighting levels and visual comfort all along the tunnel and promises to maintain a safe journey at most. NOX assures the optimal lighting solution, lighting intensity and uniformity for any type of tunnel application thanks to its wide range of PMMA lenses. These high-quality and flexible lenses are also nature friendly with no use of chemicals. Nox is equipped with anti-reflective tempered glass that helps to bring the highest efficiency from the luminaire.

At HEPER, one of the things we are most proud of is our developed ability to find a balance between production and environmental values and how that reflects on our products. That is why we support the use of 100% recyclable green materials such as aluminium and stainless steel. To enable a more sustainable world, energy saving is a major principle for HEPER. Known for their modularity, applicability and ability to work in an optimized way with LED technology, HEPER's lenses and optics always sustain to lower power consumption and the right use of light. Moreover, integrating the NOX in a fully combined tunnel automation system helps to minimize the initial and maintenance costs by lessening the use of fixtures.

Several control options for the NOX family, such as an analogue 4-20mA direct current loop, offer less wiring and connections than other signals, greatly reducing initial setup costs and allowing ease of installation. Using 3 control boxes of different sizes and types and being able to locate them remotely, we gain functionality in the tunnel infrastructure. With a max range of 70 meters DC, fewer products could be installed than stipulated. That helps the end-user to reduce maintenance costs and less effort. Many combinations can be made with the control boxes such as, with the biggest control box, up to 8 low-power products can be fed. Not but least, all the necessary components that run the tunnel automation system can be put into the control boxes. For example, you can use DALI, 1-10V and 0-10V control options all in one box.

NOX

Vigorous, Flexible and
Nonperishable Tunnel
Lighting Family



Unique design and optical flexibility combined with energy efficient LED modules and appropriate optics to provide the maximum lighting level and uniformity. Main body is made of stainless steel with high resistance to corrosion and chemicals. Heatsink body is made of aluminum alloy, which has the advantage of good thermal management.

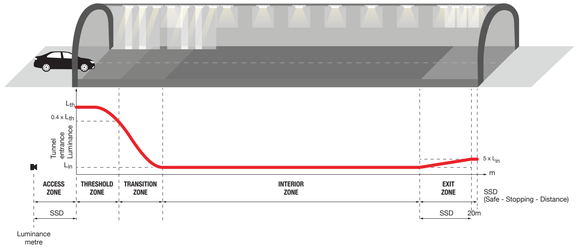
- Equipped with highly efficient LED modules
- Advanced optical technology allowing case-specific lighting design for turnkey tunnel projects
- Durable material and component selection for harsh working conditions within tunnels and underpasses
- Outstanding corrosion control with stainless steel body
- Remarkable thermal management with aluminium alloy heatsink body
- Adaptable performance for global and country specific tunnel and underpass lighting regulations and requirements
- Easy installation and maintenance with direct cable-tray or ceiling mount bracket design

heper

CE IK10 IP66

TUNNEL LIGHTING PRINCIPLES

ZONE TYPES



1. Access zone
The part of the open road in front of the tunnel portal in the approach direction, covering the distance over which an approaching driver is able to see tunnel entrance. The access zone begins at the stopping distance before of the entrance portal and it ends at the tunnel entrance portal.

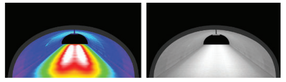
2. Threshold zone
The first part of the tunnel, just after the entrance portal. The threshold zone starts either at the beginning of the tunnel or at the beginning of the daylight sunscreens when occurring. The length of the threshold zone is at least equal to the stopping distance.

3. Transition zone
The part of the tunnel starts from just after the threshold zone and ends at the beginning of interior zone. The lighting level in the transition zone is decreasing from the level at the end of the threshold zone to the level of the interior zone. Interior zone: the part of the tunnel after the transition zone till to the beginning of the exit zone.

4. Interior zone
The part of the tunnel after the transition zone till to the beginning of the exit zone.

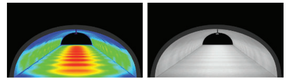
5. Exit zone
The exit zone begins at the end of the interior zone, ends at the exit portal of the tunnel.

DESIGN CRITERIA



Tunnel
Tunnel is the structure over a roadway that restricts the normal daytime natural illumination of a roadway section such that the driver's visual sensation is diminished. In order to classify changing lighting requirements along with the tunnel length, tunnel is evaluated in the form of sub interior zones: the access zone, the threshold zone, the transition zone, the interior zone, the exit zone and parting zone.

Traffic Flow
The number of vehicles passing a specific point in a stated time in stated direction(s). In tunnel design, peak hour traffic, vehicles per hour per lane, will be used.



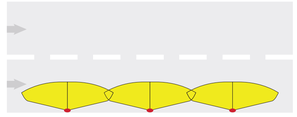
Design Speed
The design speed is the speed for which the tunnel is laid out. It is generally accepted that this speed is the maximum speed allowed on the access roads to the tunnel.

Reference Point
The reference point is in principle the point located in the centre of the approaching lanes, at a height of 1,5 m and at a distance from the entrance of the tunnel equal to the stopping distance (SD) at the design speed.

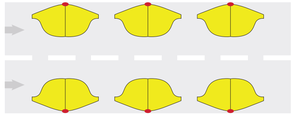
Stopping Distance
Stopping distance is the distance necessary to stop the vehicle moving at the speed in question in total safety. It comprises the distance covered during the reaction time and during the braking time.

LUMINAIRE LAYOUT

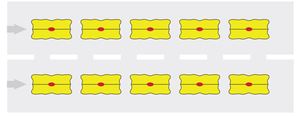
SYMMETRICAL / ASYMMETRICAL LIGHTING



Lateral Layout

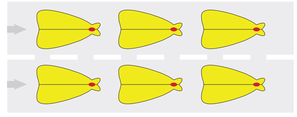


Bilateral Layout (ceiling or wall)

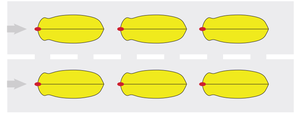


Biaxial Layout

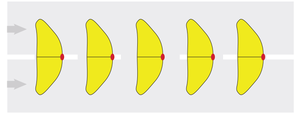
COUNTER / PRO BEAM LIGHTING



Biaxial Layout (counter beam)



Biaxial Layout (pro beam)



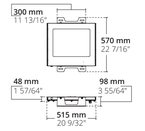
Axial Layout

Symmetric lighting
The lighting where the light equally falls on objects in directions with and against the traffic. Symmetric lighting is characterized by using luminaries that show a luminous intensity distribution that is symmetric in relation to the plane normal to the direction of the traffic.

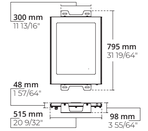
Counter-beam lighting
The lighting where the light falls on objects from an opposite direction to the traffic. Counter-beam lighting is characterized by using luminaries that show a luminous intensity distribution that is asymmetric in relation to the plane normal to the direction of the traffic, where the maximum luminous intensity is aimed against the direction of the traffic. The term refers only to the direction of normal travel

Pro-beam lighting
The lighting where the light falls on objects in the same direction as the traffic. Pro-beam lighting is characterized by using luminaries that show a luminous intensity distribution that is asymmetric in relation to the where the maximum luminous intensity is aimed in the same direction as the direction of the traffic.

LT1010.761 / LT1010.762 / LT1010.763
LT1010.764 / LT1010.765



LT1010.766 / LT1010.767 / LT1010.768
LT1010.769 / LT1010.770



Product code	Product name	Delivered lumens flux	Rated input power	Colour temperature	Weight
LT1010.761-EN	NOX 32 LED	8190 - 9843 lm	70 W	3000 K CRI 70, 4000 K CRI 70	10.50 kg
LT1010.762-EN	NOX 48 LED	12285 - 14765 lm	103 W	3000 K CRI 70, 4000 K CRI 70	10.50 kg
LT1010.763-EN	NOX 64 LED	16385 - 19687 lm	136 W	3000 K CRI 70, 4000 K CRI 70	10.50 kg
LT1010.764-EN	NOX 80 LED	20480 - 24610 lm	170 W	3000 K CRI 70, 4000 K CRI 70	10.50 kg
LT1010.765-EN	NOX 96 LED	24575 - 29531 lm	207 W	3000 K CRI 70, 4000 K CRI 70	10.50 kg
LT1010.766-EN	NOX 112 LED	28670 - 34453 lm	240 W	3000 K CRI 70, 4000 K CRI 70	13.40 kg
LT1010.767-EN	NOX 128 LED	32765 - 39375 lm	274 W	3000 K CRI 70, 4000 K CRI 70	13.40 kg
LT1010.768-EN	NOX 144 LED	35840 - 44297 lm	310 W	3000 K CRI 70, 4000 K CRI 70	13.40 kg
LT1010.769-EN	NOX 160 LED	40960 - 49219 lm	343 W	3000 K CRI 70, 4000 K CRI 70	13.40 kg
LT1010.770-EN	NOX 192 LED	49150 - 59063 lm	420 W	3000 K CRI 70, 4000 K CRI 70	13.40 kg

Accessories (To be ordered separately)

Extras

Light output

[CLO]
Constant light output

[SS]
Stainless steel

INTELLIGENT TUNNEL LIGHTING SOLUTION

TUNNEL APPLICATIONS ARE NOW SAFER AND MORE EFFECTIVE WITH SMART SOLUTIONS

Our control system that is integrated to our fixtures offers a flexible solution for all the zone configurations in road tunnels. The solution for the lighting system allows the control of each fixture.

By simulating the bright environment outside, the light intensity is adjusted according to the luminance level read by the luminance meter, thus ensuring both traffic safety and visual comfort.

Thus, while handling energy savings by limiting energy consumption and extending the lifespan of the luminaires and maximum safety, it also reduces initial costs.

Their basic function is the coordinated dimming of luminaires with data reading from the external and/or internal luminance meters via analog sensor (4-20mA). Up to a considerable value of luminance meters can be connected to our system and the luminaire groups are also connected to each other.

Gateway is a luminaire controller that dims the connected luminaire via 0/1 - 10V voltage signal or with the help of DALI/DALI2 control systems, the luminaires can be monitored from the central management system.

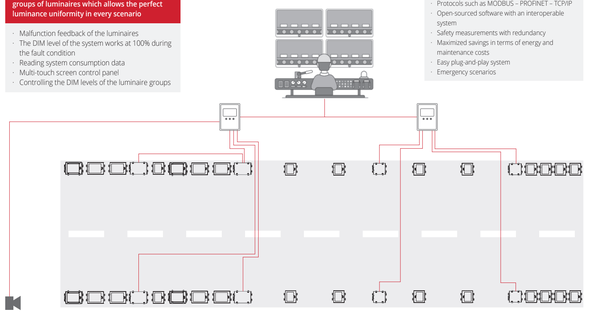
HEPER's control system, which provides easy installation and maintenance without requiring a huge amount of initial costs and effort, can be stand-alone or integrated into a tunnel software-defined infrastructure.

FACILE NETWORK INTEGRATION

With the flexibility and convenience provided by HEPER's control system during the installation and assembly phase, it enables tunnel lighting luminaires to be managed from the central management system. In this way, energy efficiency is brought to the highest level. By offering different types of automation solutions, we can provide many different scenarios to the end user. The network system plays a vital role not only in the operation and control of the luminaire but also in receiving and processing feedback on the conditions of the luminaires. It also has features such as partial deactivation of automation and activation of emergency scenarios in cases like maintenance and malfunctions.

Based on external light levels managing the groups of luminaires which allows the perfect luminance uniformity in every scenario

- Malfunction feedback of the luminaires
- The DIM level of the system works at 100% during the fault condition
- Reading system consumption data
- Multi-touch screen control panel
- Controlling the DIM levels of the luminaire groups



HCS provides control of multiple gateways and connections to the central management system.

- Protocols such as MODBUS – PROFINET – TCP/IP
- Open-sourced software with an interoperable system
- Safety measurements with redundancy
- Maximized savings in terms of energy and maintenance costs
- Easy plug-and-play system
- Emergency scenarios

The luminance meter sends the data to the HEPER's control system to adjust the lighting levels to avoid traffic issues and visual adaptation problems.