Schréder
Experts in lightability™

Lighting solutions for **tunnels and underpasses**

Safe and reliable solutions with high added-value

EVERY TUNNEL IS UNIQUE AND SO IS THE WAY TO LIGHT IT

A tailored lighting philosophy

Each tunnel is unique, requiring different technical parameters and a bespoke lighting system.

The design of tunnel lighting is complex - it needs to take into consideration the location, configuration, use, setting and local standards. We take a **custom approach**, implementing an environment analysis, extensive photometric studies and cutting-edge and versatile technology.

We work closely with our customers, partners and suppliers using proven design and **co-creation processes**. From the photometrical study, integrating a performing control system, to compliance checks, to system set-up, we coordinate every aspect of your lighting project, delivering the best value.

A complete **package of services**

We deliver more than luminaires - we also provide our own **Advanced Tunnel Solution (ATS**) to effectively manage your lighting network, together with a range of services including installation, commissioning and optimisation.

Our long-standing expertise enables us to propose state-of-the-art lighting, based on **proven tunnel experience**. We constantly push limits to pave the way in new innovative tunnel lighting.

Your customised solution

Our project philosophy is your guarantee to get the best solution for your tunnel. From the first topology analysis to the handover and even after, Schreder manages your project with a co-creation approach to deliver the most appropriate lighting solution. Our teams analyse your project and carry out in-depth studies to design a lighting solution adapted to YOUR requirements and standards.

AUDIT

ANALYSIS AND TECHNICAL EVALUATION

CONSULTATION

LIGHTING DESIGN AND RECOMMENDATIONS

SOLUTION

DEFINITION AND FINE TUNING

PROJECT PLAN

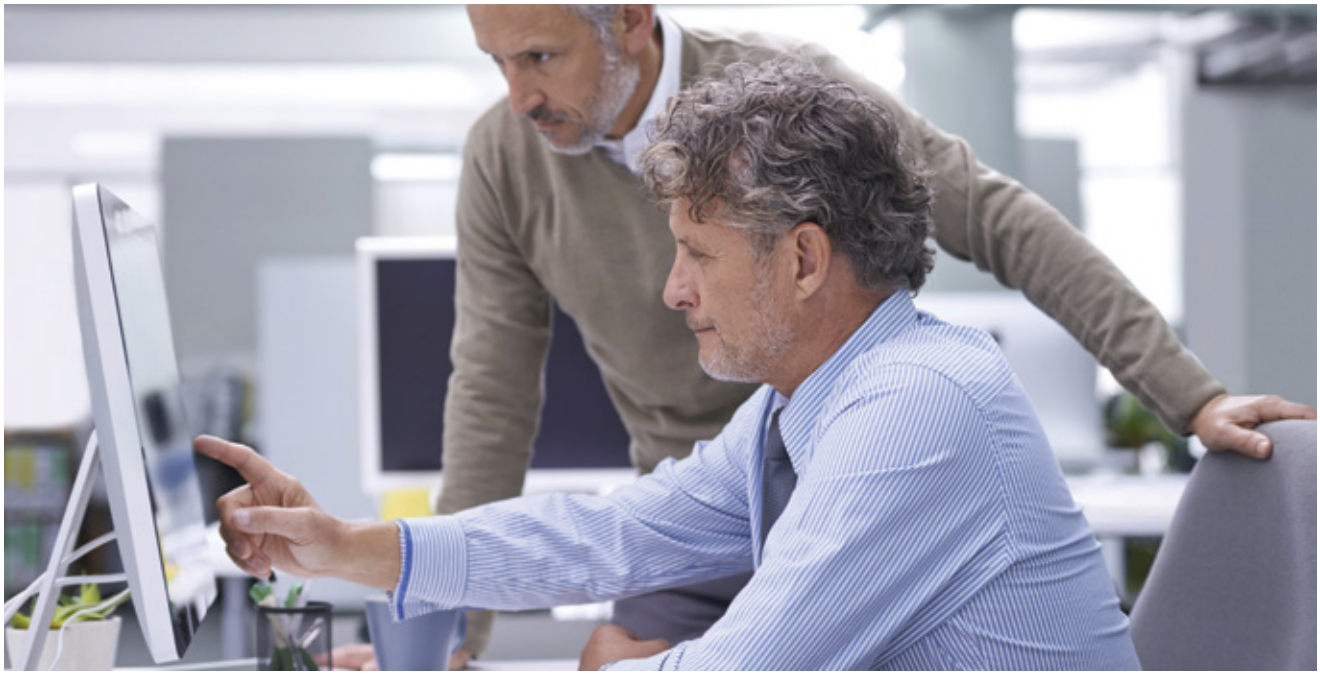
SCHEDULE AND PROJECT MANAGEMENT

QUOTATION

COMMERCIAL OFFER, TERMS AND CONDITIONS

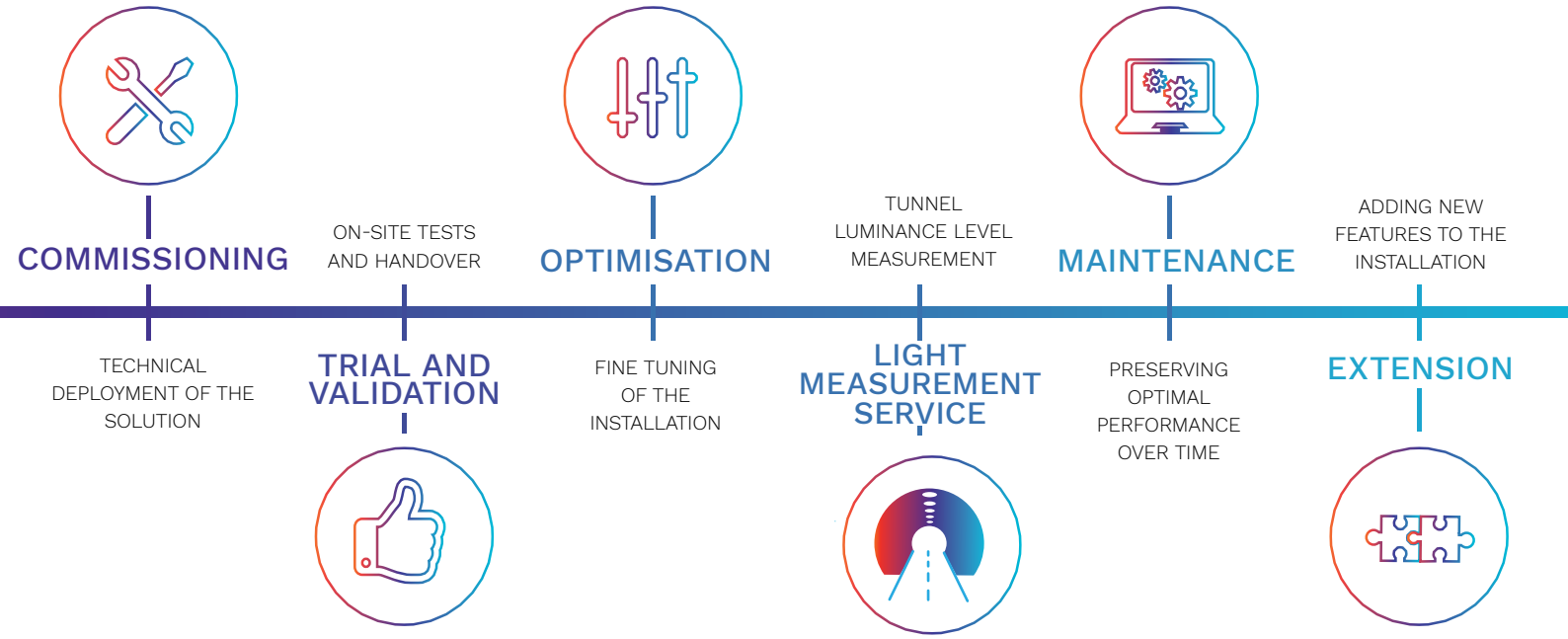
INSTALLATION

DEPLOYMENT LIGHTING EQUIPMENT



Your full project follow-up

Our strength lies in our capacity to manage an entire project, from designing to incorporating the installation, commissioning, testing and validation. Our offer also includes training, after-sales services, maintenance and optimisation over time.



Technology-driven design

As a long-standing tunnel lighting expert, Schreder puts all of its know-how and expertise into developing new smart solutions to enhance the tunnel experience and facilitate your day-to-day challenges.

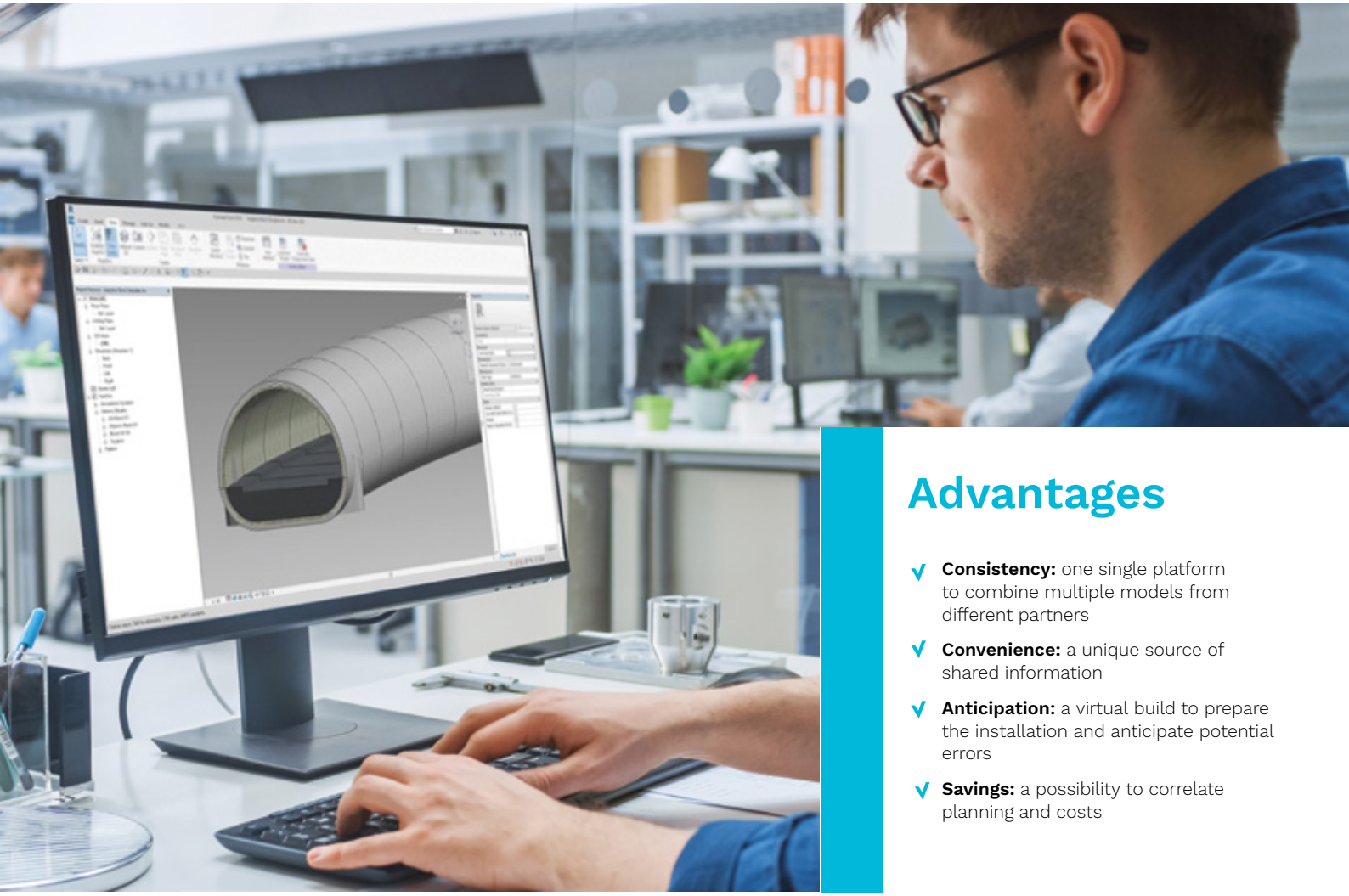
Building Information Modeling

A technology to improve quality and reduce operating costs

Over the decades, paper drawings have been replaced by digital drawings, and now virtual reality comes into the tunnel design. Our design teams work with the latest technology, including Building Information Modelling (BIM) files - **digital models of our luminaires -** integrate the customer's virtual tunnel environment to visualise and prepare the future installation.

Based on customer requirements, we can provide several 3D models of our tunnel luminaires with **key data** such as overall dimensions and material. Customers can then make well-informed decisions faster.

Depending on the project phase, we can provide different **levels of details**. In the preliminary phase, basic details such as global dimensions, weight or materials will be given. As the project progresses, more details (fixation type, IP, IK, cable diagram, etc.) will be supplied.



Advantages

- **Consistency:** one single platform to combine multiple models from different partners
- **Convenience:** a unique source of shared information
- **Anticipation:** a virtual build to prepare the installation and anticipate potential errors
- **Savings:** a possibility to correlate planning and costs

A long lasting **experience**

As pioneer in tunnel lighting, Schreder has designed and delivered lighting solutions for more than 1,000 tunnels worldwide, from Mont Blanc in France to Queens Midtown Tunnel in USA.

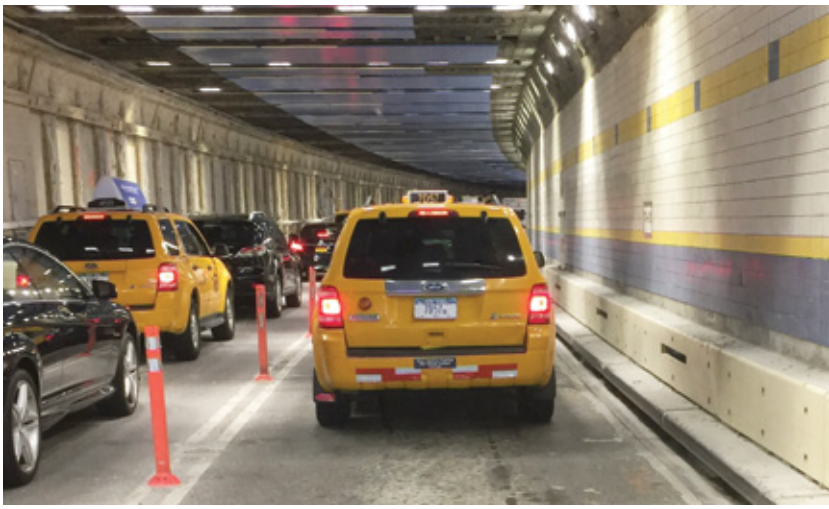
Your challenges make beautiful stories

Queens Midtown Tunnel – New-York (United States)

The Queens Midtown tunnel is one of the best known and recognisable motorway tunnels in all North America, connecting the Borough of Queens to Manhattan.

In October 2012, floodwaters from Superstorm Sandy damaged the tunnel's architectural, mechanical and electrical components.

We brought our tunnel expertise across the channel and provided a **safe and sustainable** lighting set-up.



Loi Tunnel – Brussels (Belgium)

The Loi Tunnel is one of the main entrances into Brussels city centre. It brings motorists onto Rue de la Loi, which is home to many European institutional buildings.

As part of a large-scale renovation, the lighting was replaced. To ensure a **safe and comfortable** environment for the numerous motorists who pass through it every day, we supplied a lighting solution that enhances the **aesthetic quality** and safety of the route. It creates a vibrant yet relaxing landscape for a pleasant driving experience.

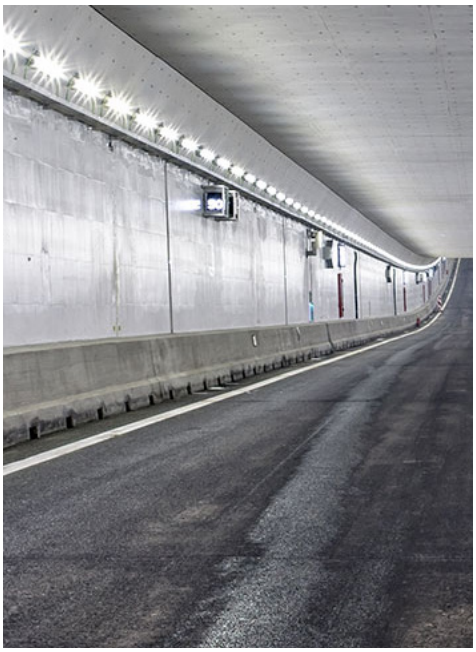
Velser tunnel – Velsen-Zuid (Netherlands)

Built in 1957, the Velser tunnel was closed by the Dutch motorway authority for 9 months to undertake extensive renovation and repair work.

For this tunnel, we supplied a complete lighting solution, integrating luminaires that provide optimal visual comfort while significantly **reducing energy costs**, and an **intelligent control system** that enables the tunnel operators to remotely management the whole installation.

YOUR MOBILITY

Tunnels require lighting that enables drivers to quickly adapt to an enclosed environment so they can easily identify possible obstacles and travel without reducing speed. Excellent visibility and high visual comfort is key to ensure smooth mobility.



Focus on your visibility

Our luminaires have been specifically designed with optics that **optimise luminance** for tunnel environments. They provide the correct levels of lighting with excellent visibility to enable drivers to avoid the black hole effect at the tunnel entrance and any glare phenomenon at the exit.

Photometry for each application

We have various photometrical engines capable of generating **wide photometric distributions** to meet all types of applications while maximising energy savings.

Our LensoFlex® platform has been designed with high-power LEDs that can be associated with a large variety of optics that withstand high currents for a maximised lumen output.

Lenses, reflectors and collimators

Some projects need precise lighting features due to a particular tunnel environment or some local standards. We deliver the photmetrical solution that provides the **most optimum result**, whether this requires lenses, reflectors or collimators to ensure a comfortable and glare free experience.

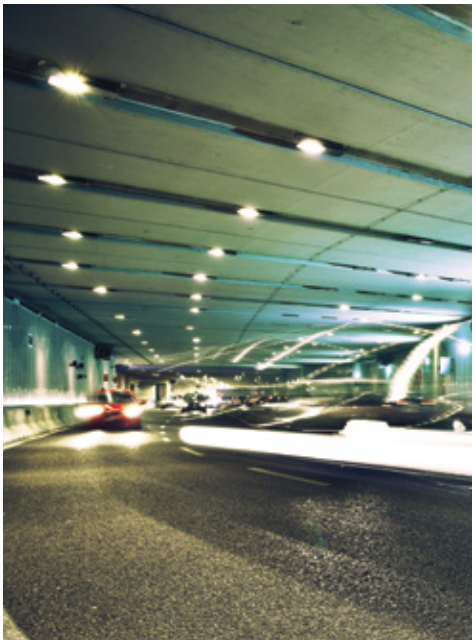
Less maintenance to minimise disruptions and closures

Tunnel maintenance activities might cause some closures, causing delays and disruption to traffic and so, city life. An unexpected 15-minute tunnel closure is estimated to cost €15,000. Tunnel operators need reliability.

That is why our tunnel solutions are designed to reduce maintenance to a minimum. They are made of robust materials and benefit from long-lasting components ensuring **performance 24/7 in the long term**. Furthermore, our tool free solutions enable fast on-site repairs and maintenance interventions if necessary. Smart cabling and quick-on connectors also speed up any field interventions by avoiding any wiring or mounting issues.

YOUR SECURITY

A good tunnel is first and foremost a safe tunnel. The lighting should make motorists feel like they are driving on the open road. It must ensure that they enter, transit and exit the structure in complete safety and comfort



Light for safety

A strong and uniform visibility all the way through every tunnel zone ensures a safe journey.

As security is a priority, our luminaires are equipped with state-of-the art optics that deliver **excellent uniformity** on the road and walls, as well as optimised contrast levels for **perfect visual guidance** and visibility inside the tunnel.

Emergency management

If an accident occurs, our lighting solutions safely guide motorists to emergency exits. Coupled with our Advanced Tunnel Solution (ATS), our luminaires automatically switch to an **emergency scenario** to help users evacuate the tunnel. At the same time, this control system can send commands to the central control point to close the tunnel entrance or reduce speed limit.

MAKE A DIFFERENCE

Light uniformity has a huge impact on drivers' visibility and safety. Without a clear view, they cannot anticipate potential dangers. By studying your tunnel environment, we can propose a highly uniform lighting installation to guarantee a higher level of security.

Monotony, a threat for drivers security

Tunnels are designed to be as straight and uniform as possible. This concept might quickly become monotonous and have a negative impact on drivers' behaviour. Accidents occur when motorists tire and do not focus on the road anymore. A vibrant and customised lighting installation creates a **unique ambiance** which catches the driver's eye and enhances the tunnel experience.

Our LEDs and optics can be customised for each tunnel installation. Give your tunnel an **unique identity** with a dynamic lighting scenario to provide a safe but unforgettable experience.

No two tunnels are the same. Even if people don't remember the name, they will always recall a detail, a feeling that reminds them of driving through.

We are proud to help our customers create these memories by taking advantage of flexible LED technology.

YOUR INVESTMENT

Maximise savings and optimise time

Save time

City life is more and more demanding and therefore requires quick and efficient solutions. Our tunnel lighting is designed to answer those daily challenges:

- **Tool free** luminaires for a fast on-site response
- **Smart cables** and quick-on connectors to ease and speed-up installation
- **Advanced control solutions** to remotely manage the installation at all times

Reduce maintenance operations

Our luminaires are built to last and withstand the harshest conditions:

- **Advanced electrical components** to significantly minimise operating costs while providing high visual comfort and safety
- **Various anti-corrosion treatments** to resist to all type of environmenrs
- **A strong validation process** to comply with international standards and obtain the corresponding certifications

Enhance performance

We aim to develop solutions providing an ultimate tunnel lighting experience:

- **Efficient photometrical engines** guarantee the best performance
- State-of-the-art power and control components significantly **reduce energy costs**

Invest for the futur

As towns and cities face major challenges due to urbanisation and climate change, they need to foster sustainable urban environments. Our **low consumption solutions** require very little maintenance and can be remotely dimmed and managed to guarantee as few on-site operations as possible.
Our product designers and engineers take into account the environmental impact early in the product development process to build a more sustainable future.

CIRCLELIGHT

The Circle Light Label

The environmental impact of our luminaires has always been a priority for us. We launched the Circle Light Label with transparent criteria to help our customers adopt a circular economy and drive a **positive future** for all.

The Circle Light Label clearly designates products that are optimised for circular economy **without compromising** on the quality. Our new tunnel platform, TFLEX, was attributed this label thanks to its innovative installation and maintenance friendly concept.

YOUR **ENERGY**

The right light where, when, and how it is needed

Generate energy savings and improve safety

Each tunnel zone requires a different luminance level. This level should be high at the entrance and in the threshold zone and then decrease inside the tunnel as the eye adapts. These requirements generate an ideal lighting curve called the **CIE curve.** The more your lighting installation follows this recommended curve, the less spill light there will be and the more efficient the installation will be.

At Schréder, our **advanced luminance calculation software** analyses all aspects of your tunnel environment to provide you with the right luminance level in all tunnel zones. We deliver lighting systems to improve safety, reduce energy consumption and generate savings.

During our study, we calculate the number of luminaires to be installed in the tunnel and their orientation to create a curve as close as possible to the CIE normative curve for an efficient and economical light installation.

YOUR CONNECTED TUNNEL

Our smart solutions provide multiple features to bring tunnels into the era of smart lighting and considerably improve users' safety and comfort. From individual dimming and switching to emergency signals, our Advanced Tunnel Solution offers a large variety of scenarios to effectively control and monitor all tunnel parameters.

Advantages

- **Improve reactivity to any sudden changes in the tunnel**
- **Maximise energy savings thanks to highly efficient dimming**
- **Easy to install and configure**
- **Reduce commissioning time significantly (up to 75%)**
- **Reduce on-site interventions**

ATS control system, your solution for tunnel automation management

Jointly developed with Phoenix Contact, the Advanced Tunnel Solution (ATS) is an all-in-one central control system designed to easily manage all tunnel lighting parameters remotely. The ATS is built on components compliant with IEC62 443 standards providing a system compliant as well with the EU NIS directive applicable for TERN infrastructures.

The ATS communicates with all local controllers (Lumgates) installed in the tunnel luminaires. It collects information from the luminaires and driver boxes, but also from sensors installed inside the tunnel.

This innovative tool is capable of constantly adapting the lighting levels according to specific tunnel conditions like weather, traffic speed and density and other sensor inputs like dirt accumulation, wall reflectance etc.

This intelligent system permanently monitors the power consumption and reports any failures. It integrates the initial tunnel lighting study while the industrial BUS system enables individual auto-addressing, to speed up the commissioning process, saving valuable time and resources on-site.

In addition, a Tunnel Control System (TCS) unit facilitates and manages the communication between multiple ATS devices as well as the seamless upstream exchange of data and commands to a higher level system.

PHOENIX CONTACT | Schréder
PARTNERS IN TUNNEL INNOVATION


Disconnect & Branch Circuit Protection to be provided by installer
CAUTION
Before opening housing, turn off main power switch!
PHOENIX

YOUR CONNECTED TUNNEL

ATS DALI

The best of ATS in a cost-effective solution

As part of our continuing collaboration with Phoenix Contact and to deliver even more accessible smart tools for our customers, we have developed the ATS DALI.

This new version of ATS does not require a converter unit in the luminaire. It communicates using a DALI line as a network protocol rather than via an industrial BUS system.

This ATS DALI has all the essential functions of ATS, like controlling the base lighting.

ATS and ATS DALI **functionalities**

	ATS	ATS DALI
COMMUNICATION PROTOCOL	RS422 Closed Loop	DALI
FEATURES	Double circuit, Current measurement	No additional device
MAINTENANCE FEEDBACK	With failure location	Without failure location
ADRESSING	Auto-addressing, individual control and feedback	Broadcast command (each device on the same segment receive the same command)
CIRCUIT CABLE LENGTH	Up to 400m between two devices	Max. 300m per entire segment
MAX DEVICES PER SEGMENT	240	64

Adavanced tunnel solution **communication system**

SPS ATVISE®
scada server

ASSET MANAGEMENT SOLUTION

REPORTS

MAINTENANCE MODULE

XLS FILE FOR PREDICTIONS

UTILITIES

VENTILATION

FIRE DETECTION

SAFETY

ENERGY SUPPLY

NETWORK INFRASTRUCTURE

TRAFFIC FUNCTIONS

The Schréder tunnel solutions are based on the Profinet technical standard for data communication over Industrial Ethernet, designed for collecting data from, and controlling, equipment in industrial systems.

Profitnet cloud/industrial bus safety-related data management system

- **Real-time tunnel data analysis**
- **Lighting component maintenance management**

TCS

Tunnel Control System (TCS)

- **Mapping luminaires**
- **Data visualisation**
- **Emergency scenarios**
- **Luminance sensor reading**
- **Alarming function**
- **Customisable**

ATS

L20 luminance meter

L20 luminance meter

- **Luminance measurement**
- **Data reporting to ATS**

L20 luminance meter

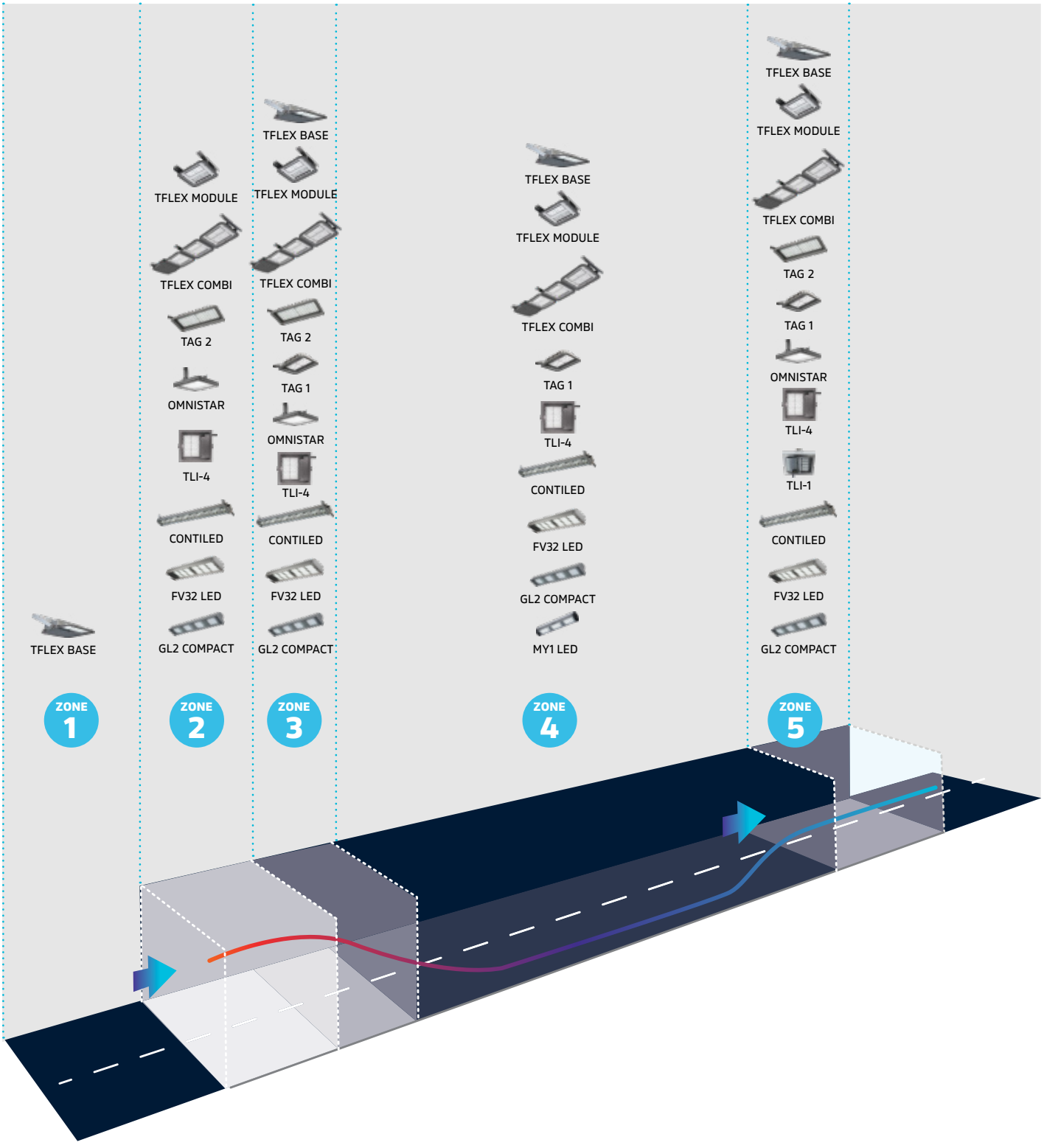
Lumgate Interbus device

- **Light intensity monitoring**
- **Luminaire failure reports**
- **CE and UL compliant**

PHOENIX CONTACT | Schréder
PARTNERS IN TUNNEL INNOVATION

A lighting solution for **each tunnel zone**

A tunnel can be characterised by 5 main zones: the access, the threshold zone, the transition zone, the interior zone, and then, the exit zone. Each of these needs an appropriate light level to ensure perfect visibility and security for motorists. Our product portfolio provides a solution for every lighting requirement in each tunnel zone.



	ZONE	DEFINITION	REQUIREMENTS	CHALLENGE IN TERMS OF LIGHTING	RISK LEVEL
1	ACCESS	Area leading to the tunnel entrance	Drivers must be able to identify obstacles	- Light uniformity - Lay-out restrictions (wall mounting)	Medium
2	THRESHOLD	Tunnel entrance	Maintaining the uniformity in luminance between the access area and this zone	- Prevent the black hole effect coming from the contrast - Luminaires can create a glare effect	High
3	TRANSITION	Second part of the tunnel coming directly after the threshold zone	Progressively reduce the luminance to allow the human eye to adapt	Provide the right levels to enable adaptation	Medium
4	INTERIOR	Interior zone of the tunnel leading to the exit zone	High uniformity to ensure safety	Prevent flickering	Low
5	EXIT	Last section of the tunnel	Increased luminance level to prepare the human eye to adapt to the brightness outside	Prevent glare	High

TFLEX

A whole package for your tunnel projects in **one single versatile platform**

Built to meet **your ambitions**

Discover a revolutionary, modular-based platform, designed to fit into every tunnel geometry and enhance the tunnel experience. This unique concept includes luminaires, optical and power units, flexible mounting, smart cabling and control systems in one single solution.

CREATE YOUR OWN UNIQUE PLATFORM AND ENJOY A NEW WAY TO APPROACH TUNNEL LIGHTING

1 One platform to fulfill all general lighting requirements

2 Flexibility and modularity

3 High visual performance

4 Integrated advanced control technologies

5 Tool free access and Smart Cabling technology for maximised time savings

6 Strong anti-corrosion coating

TFLEX

PLATFORM

TFLEX BASE

The standalone luminaire designed to serve the base lighting needs in every tunnel environment. Its adjustable bracket, available in different materials, allow TFLEX BASE to fit into every kind of architecture. Its flexible optical configurations can provide all of the required lighting scenarios. This luminaire is ready for your tunnel project, thanks to its plug and play cabling and integrated control system.

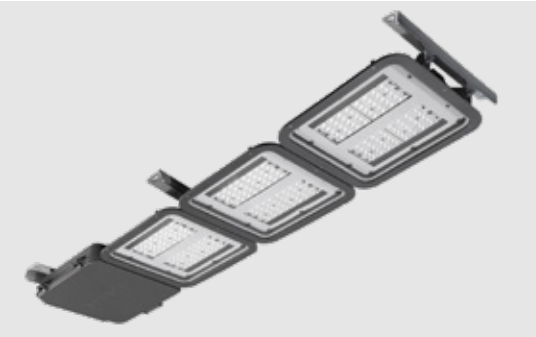
TFLEX MODULE

A versatile optical unit equipped with the most recent photometrical engine and optics, fully customisable to create specific ambiances and light up every tunnel zone, even the most complex ones. TFLEX MODULE is designed with two circuits for the most efficient switching and dimming with an optimised Power Factor.

TFLEX DRIVE

A remote gear box fitted with the latest power and control devices (Lumgate, drivers, fuses.). This driver box comes either directly assembled to one or more optical units, or remotely positioned on cable trays or walls. TFLEX DRIVE and MODULES are connected with the preassembled extension cables to take advantage of the tool free plug and play.

Its slim design makes it the most flexible driver box, capable of being mounted in confined spaces.



TFLEX COMBI

TFLEX MODULE and TFLEX DRIVE can be assembled together to create the powerful TFLEX COMBI. This innovative lighting solution can integrate up to 3 optical units and has no less than 10 different brackets (fixed, orientable and swivelling) to meet various mounting options and easy adjustable lighting. TFLEX COMBI benefits from all of the advantages of its components (smart cabling, high-performing photometrical engines, customised optics and advanced control system).

TFLEX	BASE	MODULE	DRIVE	COMBI
IP	69	69	69	69
IK	10	10	9	9

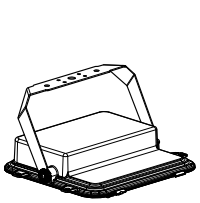
FIXATIONS

DISCOVER the TFLEX fixations portfolio and create the most appropriate lighting installation for your tunnel.

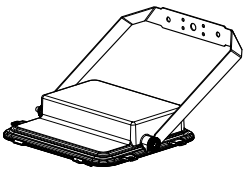
TFLEX BASE

TFLEX BASE can be delivered with or without its adjustable bracket. Available in two sizes and two different types of material (stainless steel or galvanised steel), this swiveling fixation allow TFLEX BASE to perfectly fit into every kind of wall and roof.

10° STEPS INCLINATION



WALL: FROM 40° TO 90°
ROOF: FROM -20° TO 20°

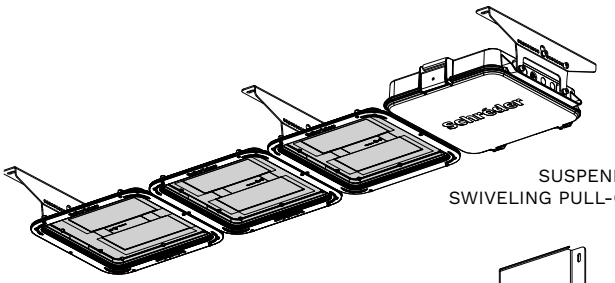


WALL ONLY: FROM 0° TO 40°

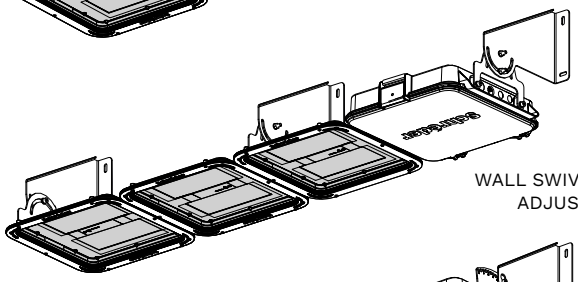
TFLEX COMBI AND MODULE

TFLEX COMBI and MODULE can be customised with 5 different types of brackets, available in both stainless and galvanized steel. Ten different combinations to meet all tunnel challenges.

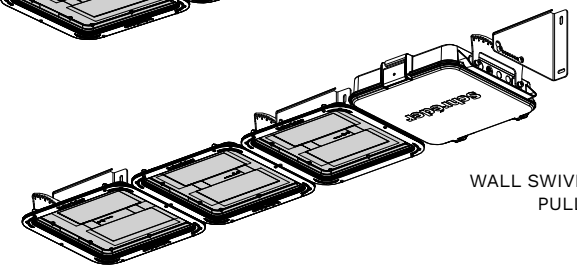
All fixations can be inclined from -20° to 20° and are delivered with a special kit for a safe and robust installation.



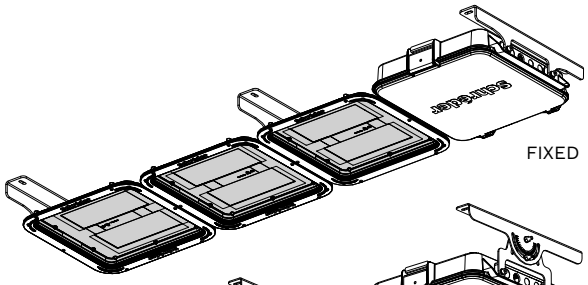
SUSPENDED
SWIVELING PULL-OUT



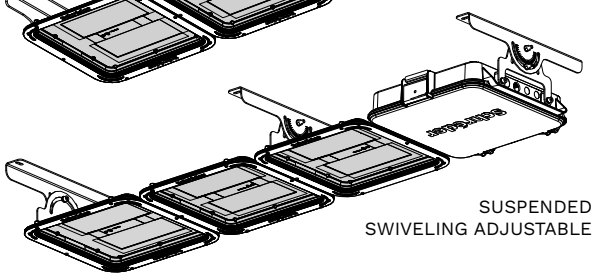
WALL SWIVELING
ADJUSTABLE



WALL SWIVELING
PULL-OUT



FIXED

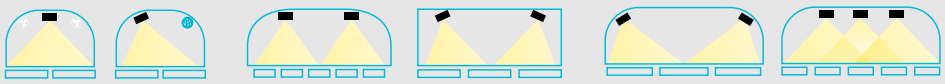


SUSPENDED
SWIVELING ADJUSTABLE

LUMEN PACKAGES

	TFLEX BASE	TFLEX MODULE			TFLEX COMBI		
lm output		MODULE 1	MODULE 2	MODULE 3	COMBI 1	COMBI 2	COMBI 3
Min.	3300lm	12800lm	19300lm	68300lm	12800lm	19300lm	68700lm
Max.	18800lm	31100lm	62200lm	73300lm	31300lm	62700lm	73700lm

Choose a fixed or a swiveling fixation, pull-out or adjustable system to ensure the lighting is adapted to the tunnel geometry



Discover our versatile tunnel range

OPTICAL UNITS

TAG

The powerful tunnel solution

2 sizes to light all tunnel zones

- **2 sizes: TAG 1 and TAG 2**
- **Made of aluminum and glass**
- **Fitted with High-power LensoFlex® photometrical engines**
- **Aluminum reflectors enabling counter beam lighting**
- **Quick-on plug and play connectivity**
- **Class I EU and Class II EU**
- **IP 66 and IK 09 rated**
- **ENEC PLUS certified**

LUMEN PACKAGES

TAG1	TAG2
6600lm to 24700lm	18000lm to 56500lm

OMNISTAR

The high-power solution for both tunnel and large areas

Designed to generate massive savings, performances and flexibility.

- **Made of aluminum and glass**
- **Fitted with High-power LensoFlex® photometrical engines**
- **Aluminum reflectors enabling counter beam lighting**
- **BlastFlex™ collimators for a precise control of the light**
- **Class I EU, Cl II EU, Class 1US**
- **IP 66 and IK 08 rated**
- **ENEC and cULus certified**

LUMEN PACKAGES

OMNISTAR
8400lm to 67800lm

LUMINAIRES

FV32 LED

The flexible solution

4 sizes and a wide range of LED configurations for unlimited possibilities

- **Made of aluminum and glass**
- **Fitted with High-power LensoFlex® photometrical engines**
- **Aluminum reflectors enabling counter beam lighting**
- **Various control options (Lumgate, DALI, 1-10V)**
- **Fixed and swiveling bracket sets**
- **Class I EU, Class 1US**
- **IP 66 and IK 08 rated**

LUMEN PACKAGES

FV32.0	FV32.1	FV32.2	FV32.3
3100lm to 7800lm	4700lm to 15600lm	9300lm to 31100lm	17100lm to 47000lm

GL2 COMPACT

Powerful and efficient LED lighting solution

A unique combination of features in a slender housing

- **5 sizes**
- **Made of aluminum and glass**
- **Fitted with High-power LensoFlex® photometrical engines**
- **Back light control**
- **Various control options (Lumgate, DALI, 1-10V)**
- **Fixed and swiveling bracket sets**
- **Class I EU, Class II EU, Class 1US**
- **IP 66 and IK 08 rated**
- **ENEC and UL certified**

LUMEN PACKAGES

GL2.1	GL2.2	GL2.3	GL2.4	GL2.5
2300lm to 4300lm	4700lm to 8600lm	7100lm to 13000lm	9500lm to 17300lm	11900lm to 26000lm

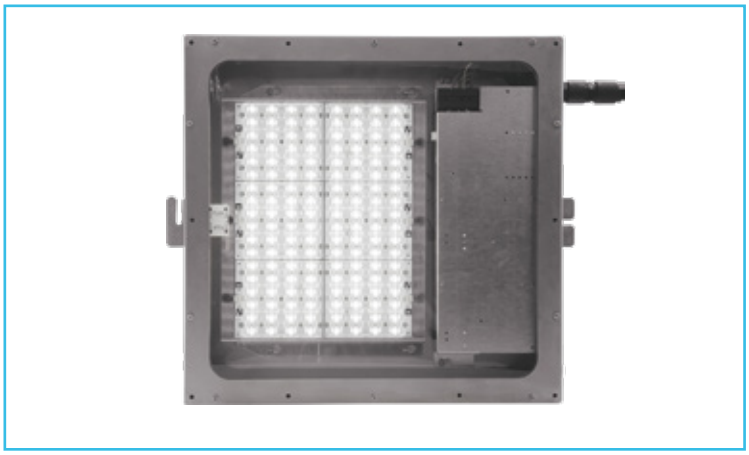
LUMINAIRES

TLI

The stainless-steel solution

A range of luminaires made of stainless-steel and glass designed for performance, flexibility and easy installation

- **2 sizes: TLI-1 and TLI-4**
- **Made of stainless-steel and glass**
- **Fitted with High-power LensoFlex® photometrical engines**
- **Aluminum reflectors enabling counter beam lighting**
- **Various control options (Lumgate, DALI, 1-10V)**
- **Class I EU**
- **IP 66 and IK 08 rated**
- **ENEC certified**



LUMEN PACKAGES

TLI1	TLI4
1200lm to 7000lm	5300lm to 13000lm

MY1 LED

The polyvalent alternative to old fluorescent tubes

MY1 LED is an efficient and flexible luminaire for enclosed areas such as tunnels, industrial halls, warehouses and car parks

- **6 sizes**
- **Made of aluminum and polycarbonate**
- **Fitted with High-power LensoFlex® photometrical engines**
- **Class I EU, Class II EU**
- **IP 67 and IK 10 rated**
- **ENEC certified**

LUMEN PACKAGES

MY1.1	MY1.2	MY1.3
1600lm to 2000lm	3000lm to 3700lm	4300lm to 5600lm
MY1.4	MY1.5	MY1.6
6300lm to 8100lm	7200lm to 9500lm	8500lm to 11100lm

LUMINAIRES AND CONTINUOUS LINES

CONTILED

The continuous LED line for tunnel lighting

The perfect alternative for tunnels fitted with fluorescent lamps for continuous line and underpasses

- **2 sizes: CONTILED 1 and CONTILED 2**
- **Made of aluminum and glass**
- **Fitted with high-power LEDs. A LensoFlex® 4 LEDs PCBAs version, or a ContiFlex™ version with linear LEDs photometric engines**
- **Quick-on plug and play connectivity**
- **Class I EU and Cl II EU**
- **IP 66 and IK 08 rated**
- **ENEC certified**

LUMEN PACKAGES
CONTILED
1000lm to 16500lm

DRIVER BOX

OMNIBOX

The multi-purpose remote gear box

Designed to power high-power LED optical untis

- **Power optical units with 48 to 144 LEDs**
- **Made of robust die-casted aluminum**
- **Smart cabling and connectors (output for up to 4 optical units)**
- **Various control options (Lumgate, DALI, 1-10V)**
- **Class I EU, Cl II EU, Class 1US**
- **IP 66 and IK 08 rated**
- **ENEC and cULus certified**

SMART CABLING:

A tailored solution to **increase field efficiency and reactivity**

Schréder provides a full package of CPR (EU Construction Product Regulation) compliant cables, serving **mains power, secondary power or BUS communication.**

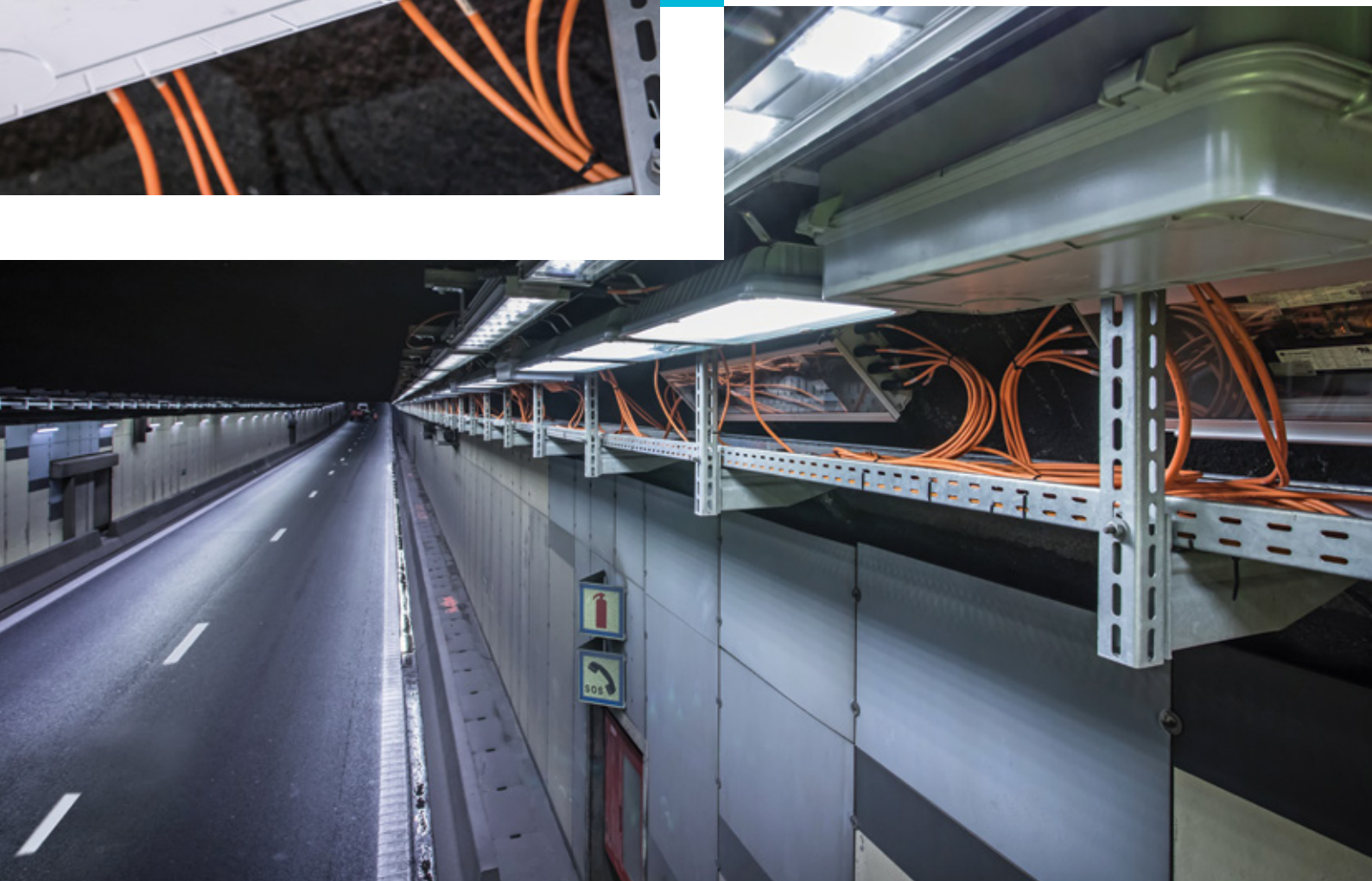
All cables are produced **custom specific lengths** and are equipped with click-on impact resistant connectors. “T” and “H-type” connectors provide the functionality of a five poles **junction box**. These connectors ensure a fast, reliable and **tool free installation.**

All cables are 100% factory assembled and tested. A unique code provides tracing capabilities. An intelligent and integrated phase shifting concept completes the set of advantages.

This innovative concept reduces the mounting and installation time by **up to 50%** compared to conventional methods and dramatically reduces the volume of scrap cables for **a more economical and sustainable installation**.

Advantages

- **Rapidity:** easy and fast installation
- **Reactivity:** enables quick on-site operations (maintenance, repair, replacement)
- **Reliability:** fire resistant cables and impact resistant connectors, factory assembled and tested
- **Cost-effective:** custom-made lengths to answer any kind of tunnel layout



An uncompromising **quality**

Tunnel luminaires are often subject to harsh environments. Vibrations, flying debris, car fumes, water leaks, de-icing salt and electrical surges can damage luminaires. Our manufacturing processes are rigorously controlled in our facilities to guarantee design excellence. Our products are tested and certified in accredited laboratories to resist these harsh conditions and ensure robustness and quality over time.

Anti-corrosion testing

All Schréder tunnel products undergo corrosion tests in laboratories and on-site.

Tightness and shocks

Schréder products offer a high level of protection against micro-particles, water splashes and violent shocks thanks to our robust designs and high-quality protectors.

Fire-resistant components

Our products are composed of non-flammable materials to comply with the most demanding requirements (m1, vo, etc) and do not propagate toxic fumes (0% halogen, f1, etc).

Vibrations

Each time vehicles pass, the luminaires are subjected to intense vibrations and gusts of air. In collaboration with universities, Schréder rigorously tests its tunnel products and mountings in laboratories and wind tunnels.

Schréder

Experts in lightability™

www.schreder.com

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