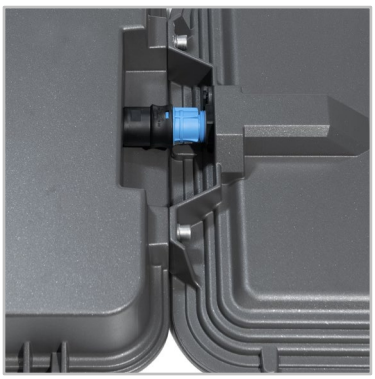
TFLEX COMBI



LENSO FLEX™4

The all-round powerful tunnel lighting solution

TFLEX COMBI is a revolutionary, modular-based lighting solution for enhancing the road tunnel lighting experience.

Part of the TFLEX lighting concept, TFLEX COMBI is the combination of TFLEX MODULE and its driver box, TFLEX DRIVE. This association provides optimised, energy-efficient lighting solutions for all typical tunnel zones from entry to exit.

An advanced, fully integrated system with lighting, cabling and control, it guarantees the lowest energy consumption while respecting the most stringent tunnel lighting requirements and standards.

Integrating the latest digital and optical technology, TFLEX COMBI ensures high visual performance for an improved driving experience.

IP 66 | IK 10 | IK 09

TUNNELS & UNDERPASSES

Concept

TFLEX COMBI provides a flexible and homogeneous solution that meets the tunnel lighting requirements of various specific zones (threshold, transition, interior and exit).

Made of robust and sustainable materials (aluminium, steel and glass), TFLEX COMBI ensures long-lasting performance in the harshest tunnel environments. With a tool-free philosophy for the opening/closing and smart cabling, TFLEX COMBI facilitates installation and maintenance operations to minimise costs and traffic disruption.

TFLEX COMBI combines the energy efficiency of LED technology with the photometric performance of the latest LensoFlex® platform developed by Schréder. It integrates specific tunnel optics for symmetrical, pro-beam or counter-beam (CBL) lighting distributions to optimise lighting levels on road and wall surfaces while providing high visual comfort.

The TFLEX COMBI lighting modules have been developed to enable constant dimming. Equipped with a double circuit, TFLEX COMBI can either be dimmed completely, partially or even have 50% of its LEDs switched off. This possibility not only maximises energy savings, it also extends the lifetime of the complete installation and reduces the need for disruptive maintenance.

TFLEX COMBI is a complete tunnel solution that includes lighting modules, dedicated driver box (TFLEX DRIVE), smart cabling with quick-on QPD connectors and advanced control systems to improve safety for drivers and to provide major operational benefits for tunnel managers.

The TFLEX COMBI is a complete tunnel lighting solution designed to suit all kinds of tunnel projects.

Tool-free, fire rated cables and connectors reduce the installation time dramatically and improve installation quality and reliability.

TYPES OF APPLICATION

- TUNNELS & UNDERPASSES

KEY ADVANTAGES

- Flexibility: modular approach with wide range of lighting distributions
- Compact, lightweight and easy to install
- Two electrical circuits for enhanced dimming possibilities, optimised power factor and longer lifespan
- High quality and robust materials
- Designed for long-lasting performance
- Tool-free access for easy maintenance

TFLEX COMBI's driver box, TFLEX DRIVE, is equipped with the latest control technologies to provide the best solution in tunnel lighting management.

TFLEX COMBI offers various mounting options for ceiling or wall mounting with fixed or tiltable fixations.

TFLEX COMBI | TFLEX DRIVE + 1 Module

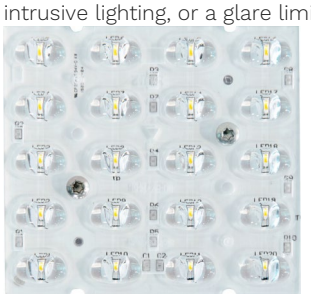
TFLEX COMBI | TFLEX DRIVE + 2 Modules

TFLEX COMBI | TFLEX DRIVE + 3 Modules

LensoFlex®4

LensoFlex®4 maximises the heritage of the LensoFlex® concept with a very compact yet powerful photometric engine based upon the addition principle of photometric distribution. The number of LEDs in combination with the driving current determines the intensity level of the light distribution. With optimised light distributions and very high efficiency, this fourth generation enables the products to be downsized to meet application requirements with an optimised solution in terms of investment.

LensoFlex®4 optics can feature backlight control to prevent intrusive lighting, or a glare limiter for high visual comfort.



Advanced Tunnel Solution (ATS)

The ATS (Advanced Tunnel Solution) is a control system that manages luminaire controllers (Lumgates) to deploy pre-defined lighting scenarios or to take charge of the lighting installation at any moment.

The ATS controller can operate as a standalone unit or can be linked to the main tunnel control system to interact with features not directly related to lighting (traffic management, ventilation, fire detection etc.).

Luminance meter (L20)

The luminance meter measures the luminance provided by natural light in the access zone from the safe stopping distance. It sends the data to the ATS control system that adjusts the lighting levels to avoid any visual adaptation problems.

Lumgate

The Lumgate is an RS485 closed-loop device connected to the luminaire drivers to control the light intensity and provide command/reporting features.

One Lumgate can control several luminaires.

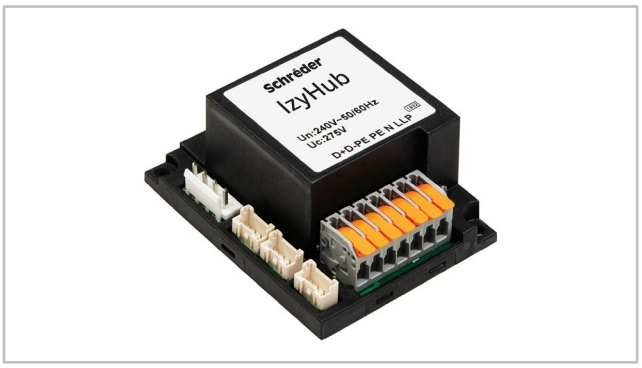
Tunnel Control System (TCS)

The Tunnel Control System (TCS) is a gateway ensuring the connection/control of the multiple ATS controllers as well as the communication with the central management system of the tunnel infrastructure (SCADA) if applicable.

IzyHub

IzyHub is an innovative device that aims to keep luminaire installation and maintenance hassle-free. This single central connection hub distributes electricity and control information to all parts of the luminaire, ensuring that all components work together and offering reliable, long-term performance.

Its compact size and error-proof connections enable smaller and lighter luminaires that are easier to maintain and upgrade.



Surge Protection

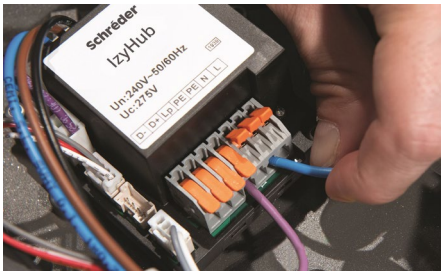
IzyHub features a built-in surge protection device. This prevents electrical surges resulting from lightning strikes and other transient voltages that originate from the mains network from damaging the luminaire, even in the most demanding conditions. The protective device also includes an end-of-life LED warning light, indicating that the luminaire is protected correctly.

User-friendly

Installing a luminaire has never been easier. IzyHub features tool-free connector as the main connection terminal. It enables 30% shorter installation times compared with standard solutions. Lever actuated spring-loaded electrical connectors provide optimal contact throughout the entire life of the product.

Easy maintenance

On the rare occasion that a component needs to be replaced in the luminaire, IzyHub makes sure that operations are carried out quickly and easily. Luminaire component connections are keyed so that mixing up electrical connections is physically impossible. Installers do not need to trace wires individually: plug it in, and it works straight away.



Versions and upgrades

IzyHub has several versions featuring different connectivity options.

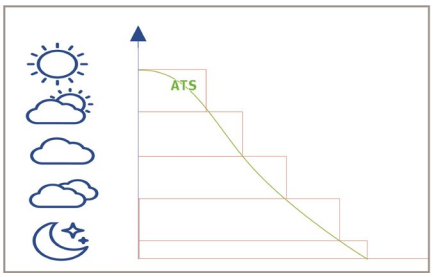
IzyHub can include an SPD, can work with external dimming and operate with all type of control sockets. It is also able to provide bi-power control and to include fuse options.

These options provide flexibility for future upgrades by only having to replace the IzyHub to connect the new equipment. No complicated re-wiring needed.

Jointly developed by Schréder and Phoenix Contact, the Advanced Tunnel Solution (ATS) has been designed to control every lighting point or clusters of luminaires to perfectly adapt the lighting level according to conditions in the tunnel, to monitor the power consumption and to report the burning hours or any failure to facilitate maintenance. The system includes a self-commissioning feature and enables scenarios to be adapted remotely at any moment.

PRECISE AND CONTINUOUS DIMMING

ATS provides 25 different dimming levels to precisely adapt the lighting to the real needs. Without any over-lighting, the energy consumption is limited to what is absolutely necessary to ensure safe and comfortable driving conditions.



FLEXIBILITY

Flexible redundancy offers security on multi-level applications, not only for the lighting.

PLUG AND PLAY COMMISSIONING

The tunnel lighting study can be directly imported into the ATS control system.

This unique feature, in combination with the auto-addressing of the Lumgates, leads to an extremely short commissioning time once the fixtures have been installed.

Each luminaire or cluster of luminaires is attributed the precise dimming profile linked to its position and characteristics.

INTERACTION WITH THIRD PARTY SYSTEMS

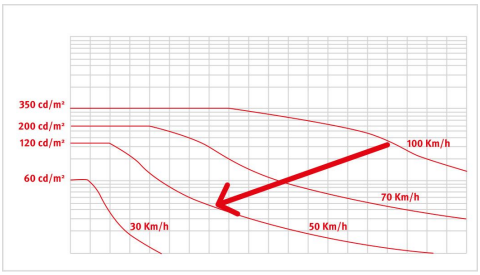
Every command or signal sent to or coming from a tunnel component (emergency exit, smoke extraction system, traffic management system...) can be used to trigger a responsive lighting scenario. All of the tunnel equipment can be controlled through the same bus command.

MAXIMISED SAFETY

The system enables the easy set-up of emergency and disaster management scenarios.

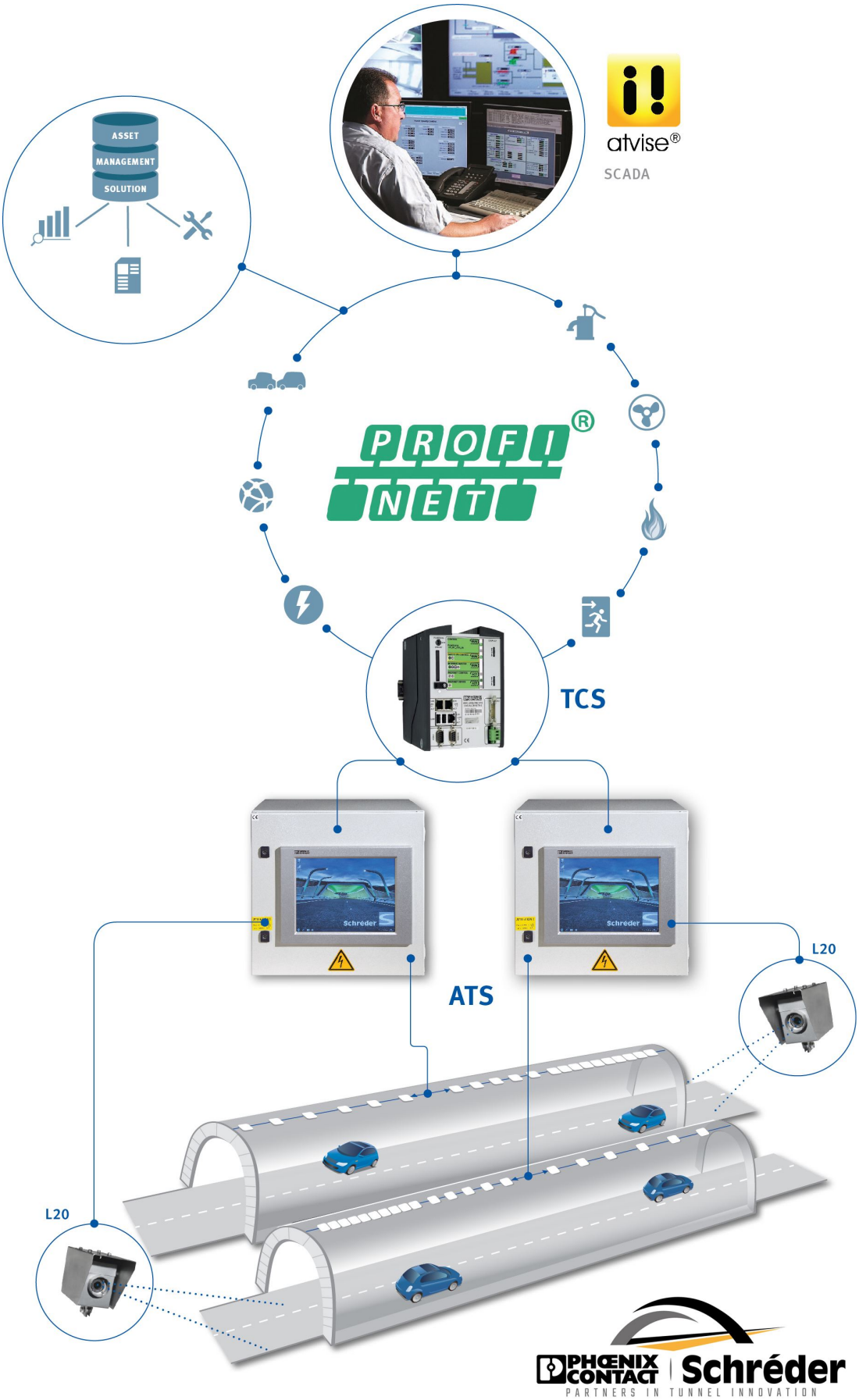
ADAPTIVE LIGHTING ACCORDING TO SPEED

The ATS can be linked to a traffic monitoring system to obtain data regarding speed or density to adapt the lighting level according to safety standards. This option further reduces energy consumption and increases the lifetime of the installation while ensuring the best driving conditions for motorists.



ADAPTIVE LIGHTING ACCORDING TO POLLUTION

Based on cleaning cycles, the ATS can take into account the depreciation of the flux due to dirt accumulation to continuously provide the requested lighting level in the tunnel. No more, no less. This feature offers additional energy savings while providing safety and comfort for users.



GENERAL INFORMATION

Circle Light label	Score ≥90 - The product fully meets circular economy requirements
CE mark	Yes
ENEC certified	Yes
ENEC+ certified	Yes

HOUSING AND FINISH

Housing	Aluminium Stainless steel Galvanised steel
Optic	PMMA
Protector	Tempered glass
Housing finish	Polyester powder coating
Standard colour(s)	AKZO grey 900 sanded
Tightness level	IP 66, IP66/IP69
Impact resistance	IK 09, IK 10
Vibration test	Compliant with modified IEC 68-2-6 (0.5G)
Access for maintenance	Tool-less access to gear compartment

· TFLEX COMBI 3 modules with fixed brackets complies with ANSI C 136-31 standard, 3G load

OPERATING CONDITIONS

Operating temperature range (Ta)	-30°C up to +50°C / -22°F up to 122°F

· Depending on the luminaire configuration. For more details, please contact us.

ELECTRICAL INFORMATION

Electrical class	Class I EU
Nominal voltage	220-240V – 50-60Hz
Surge protection options (kV)	10
Electromagnetic compatibility (EMC)	EN 55015 / EN 61000-3-2 / EN 61000-3-3 / EN 61547
Control protocol(s)	DALI
Control options	Lumgate, Bi-power, Remote management
Associated control system(s)	Advanced Tunnel Solution (ATS)

OPTICAL INFORMATION

LED colour temperature	4000K (Neutral White 740)
Colour rendering index (CRI)	>70 (Neutral White 740)

LIFETIME OF THE LEDS @ TQ 25°C

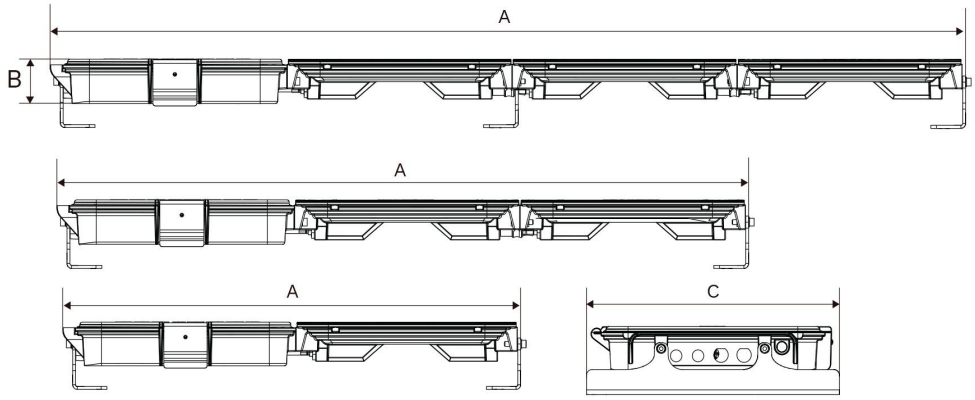
All configurations	100,000h - L95

· Lifetime may be different according to the size/configurations. Please consult us.

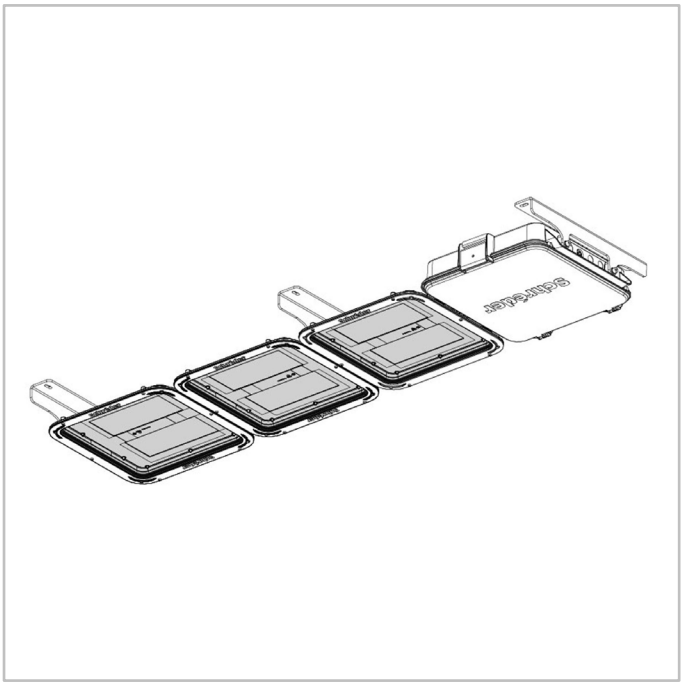
DIMENSIONS AND MOUNTING

AxBxC (mm | inch)	TFLEX COMBI 1 - 786x74.3x440 | 30.9x2.9x17.3 TFLEX COMBI 2 - 1175x74.3x440 | 46.3x2.9x17.3 TFLEX COMBI 3 - 1564x74.3x440 | 61.6x2.9x17.3
Weight (kg | lbs)	TFLEX COMBI 1 - 16 | 35.2 TFLEX COMBI 2 - 23 | 50.6 TFLEX COMBI 3 - 32 | 70.4
Mounting possibilities	Surface mounting Wall-mounted

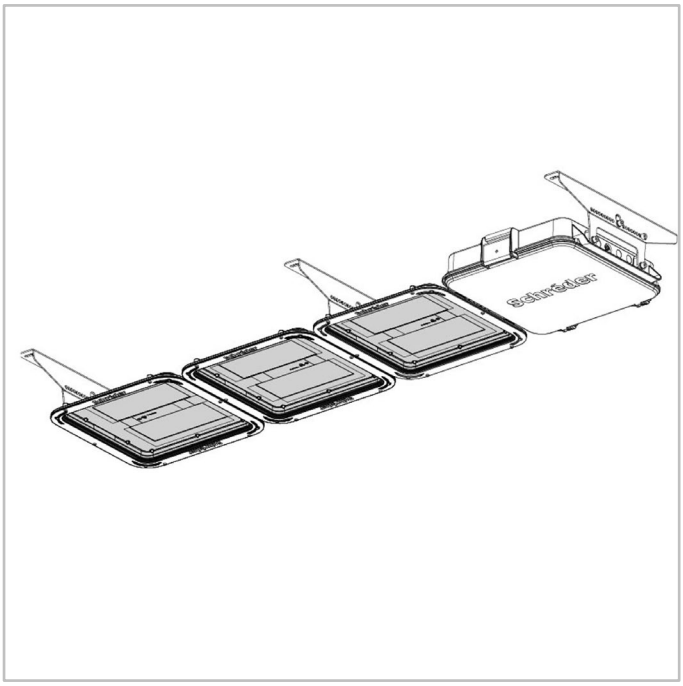
· *For more information about mounting possibilities, please consult the installation sheet.*



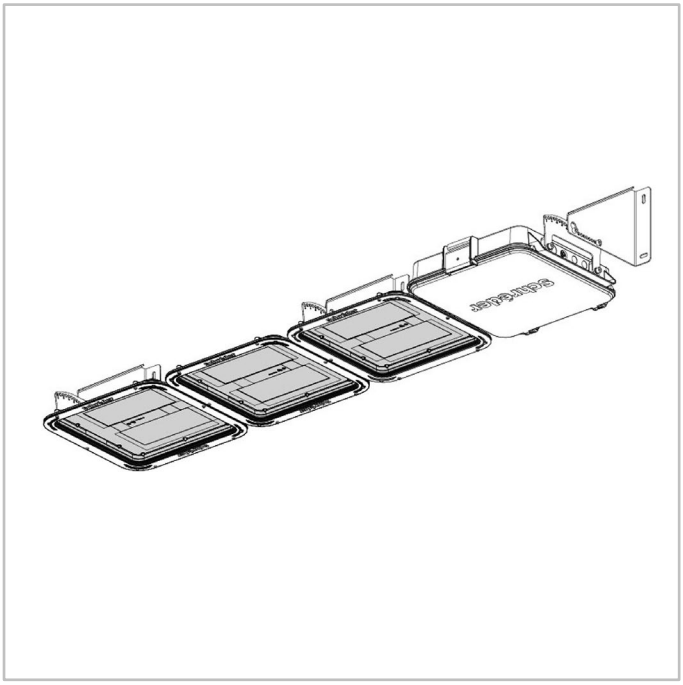
TFLEX COMBI | Fixed brackets - more details in the installation sheet



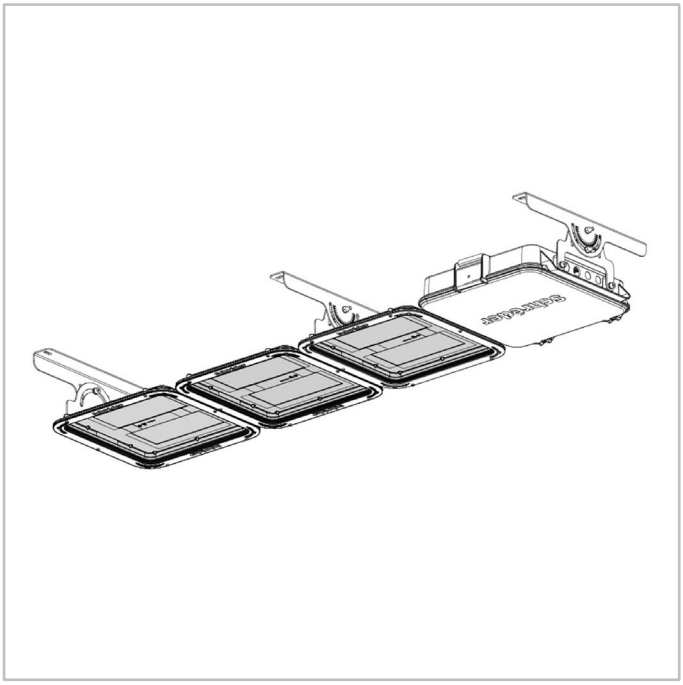
TFLEX COMBI | Pull-out swivelling mounting - more details in the installation sheet



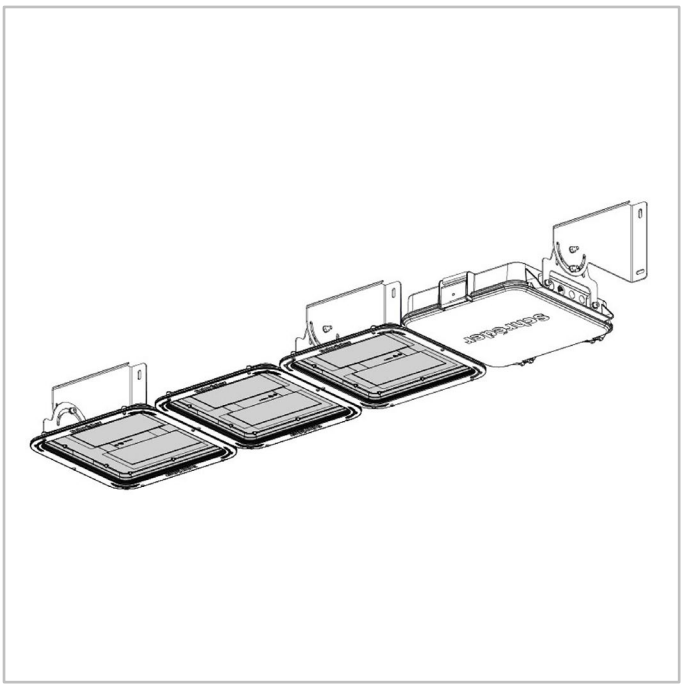
TFLEX COMBI | Pull-out swivelling wall mounting - more details in the installation sheet



TFLEX COMBI | Adjustable swivelling mounting - more details in the installation sheet



TFLEX COMBI | Adjustable swivelling wall mounting - more details in the installation sheet.



			Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
Luminaire	Number of LEDs	Current (mA)	Min	Max		Up to	Photometry
TFLEX COMBI 1	80	350	12800	14100	87	168	LENSO FLEX 4
	80	400	14400	15800	99	160	LENSO FLEX 4
	80	500	17400	19100	125	158	LENSO FLEX 4
	80	600	20100	22200	152	147	LENSO FLEX 4
	80	630	20900	23100	160	145	LENSO FLEX 4
	80	700	22700	25000	178	142	LENSO FLEX 4
	80	800	25000	27600	204	137	LENSO FLEX 4
	80	880	26800	29500	224	133	LENSO FLEX 4
	80	900	27200	29900	228	131	LENSO FLEX 4
	80	1000	29100	32000	264	126	LENSO FLEX 4

Tolerance on LED flux is ± 7% and on total luminaire power ± 5 %

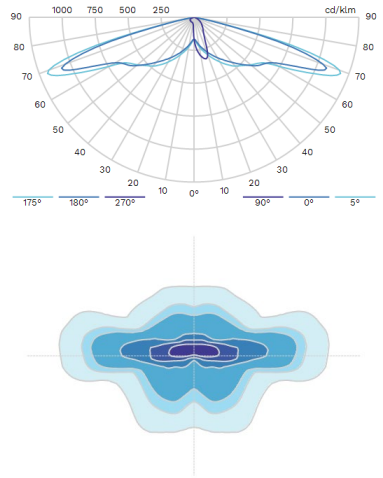
			Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
Luminaire	Number of LEDs	Current (mA)	Min	Max		Up to	Photometry
TFLEX COMBI 2	120	350	19200	21100	128	167	LENSO FLEX 4
	120	400	21600	23700	146	162	LENSO FLEX 4
	120	500	26100	28700	186	156	LENSO FLEX 4
	120	600	30300	33400	224	149	LENSO FLEX 4
	120	610	30600	33700	228	148	LENSO FLEX 4
	120	700	34100	37500	266	144	LENSO FLEX 4
	120	800	37600	41400	304	136	LENSO FLEX 4
	120	900	40800	44900	342	131	LENSO FLEX 4
	120	1000	43600	48000	388	124	LENSO FLEX 4
	160	350	25600	28200	172	168	LENSO FLEX 4
	160	400	28800	31700	198	160	LENSO FLEX 4
	160	500	34800	38300	248	158	LENSO FLEX 4
	160	600	40400	44500	302	147	LENSO FLEX 4
	160	700	45500	50100	356	141	LENSO FLEX 4
	160	800	50200	55300	402	138	LENSO FLEX 4
	160	880	53600	59000	444	133	LENSO FLEX 4
	160	900	54400	59900	456	131	LENSO FLEX 4
	160	1000	58200	64100	518	126	LENSO FLEX 4

Tolerance on LED flux is ± 7% and on total luminaire power ± 5 %

			Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
Luminaire	Number of LEDs	Current (mA)	Min	Max		Up to	Photometry
TFLEX COMBI 3	240	700	68200	75100	524	143	LENSO FLEX 4

Tolerance on LED flux is ± 7% and on total luminaire power ± 5 %

5300



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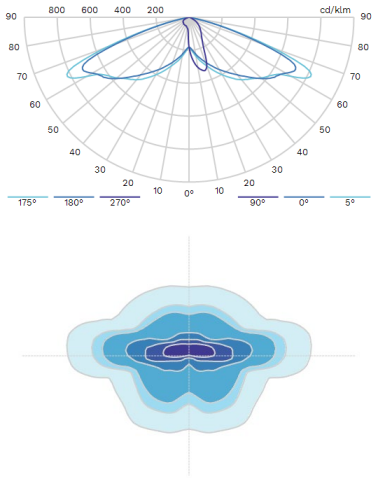

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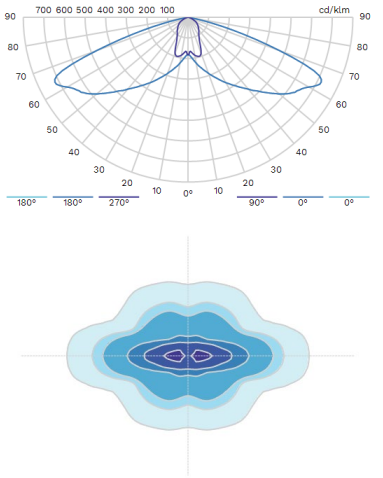

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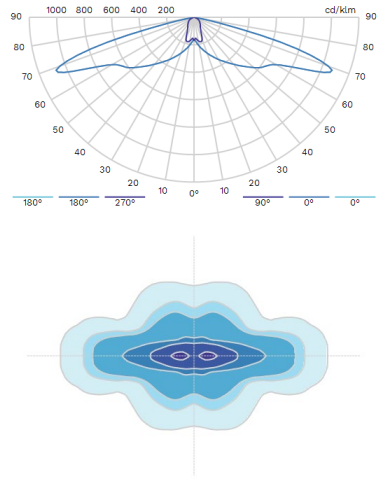

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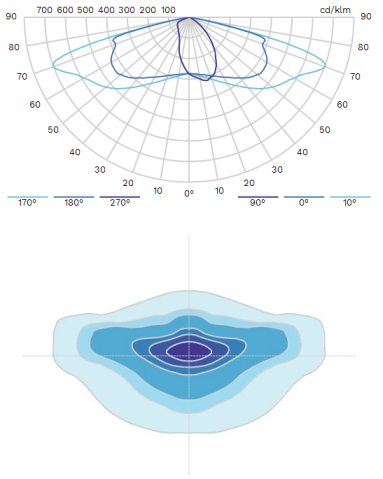

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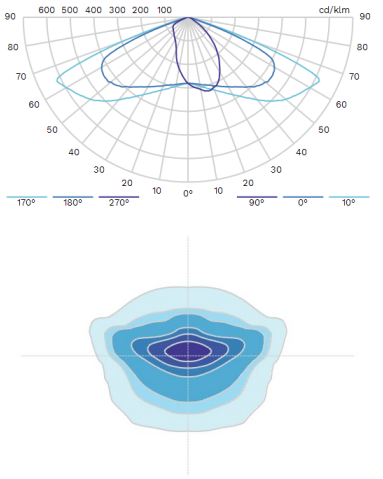

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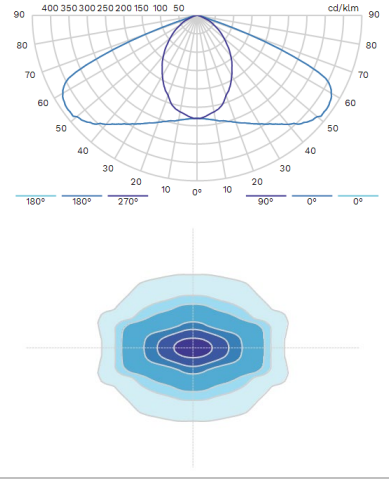

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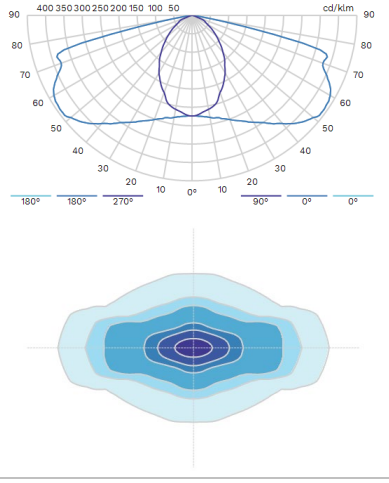

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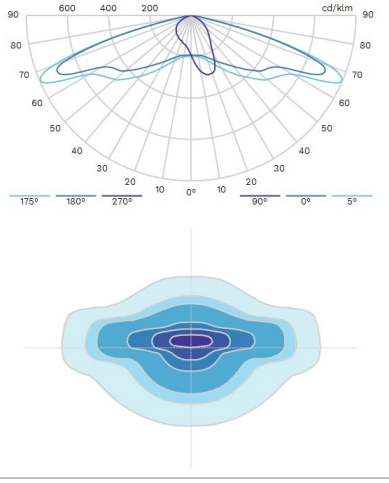

LENSO FLEX 4

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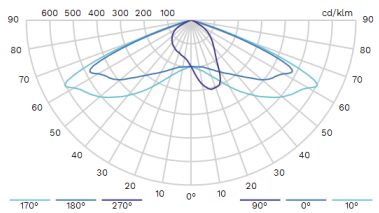

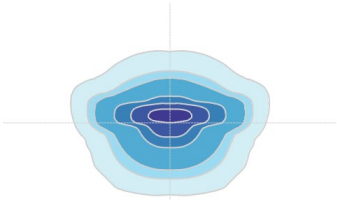

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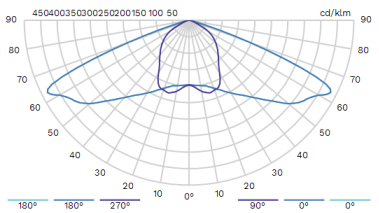

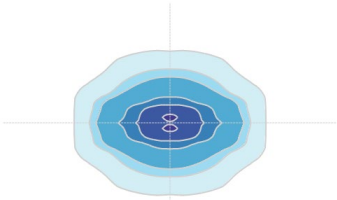

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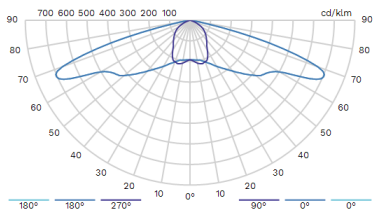

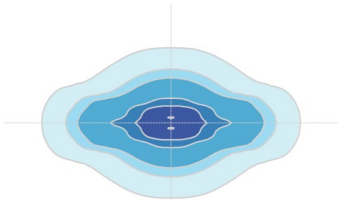

LENSO FLEX 4

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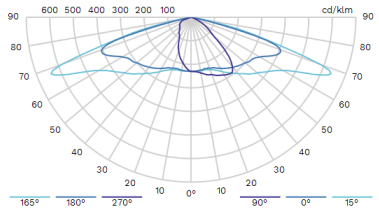

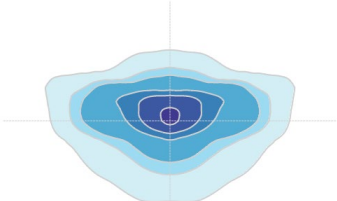

LENSO FLEX 4

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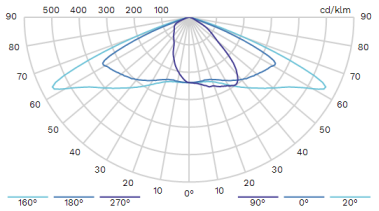

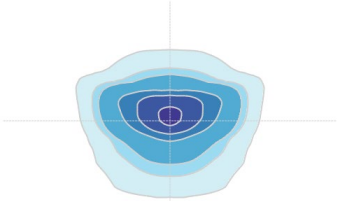

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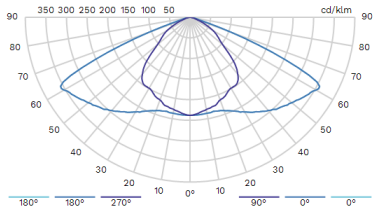
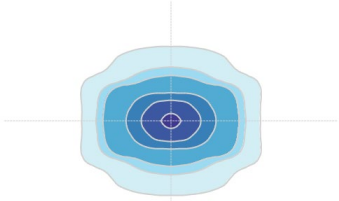
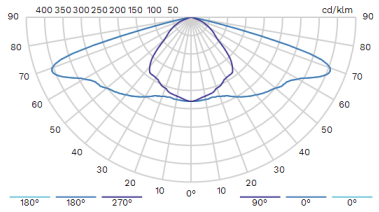
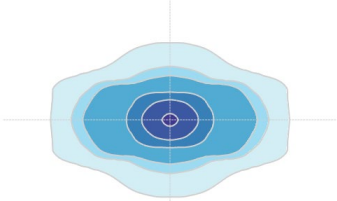




LENSO FLEX 4

5303 SY





LENSO FLEX 4

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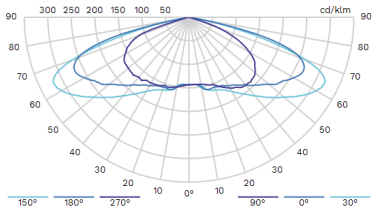
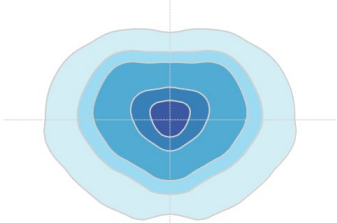
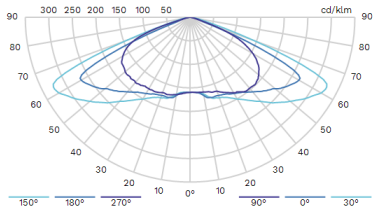
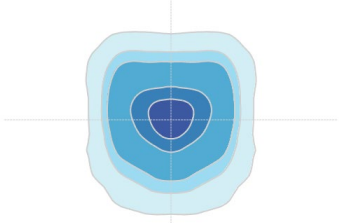




LENSO FLEX 4

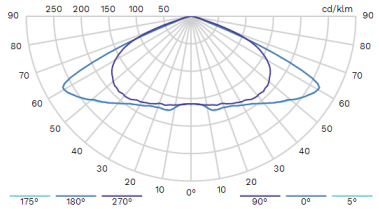
5304 GL

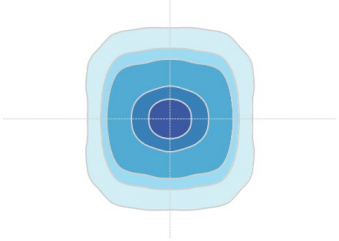




LENSO FLEX 4

5304 GL SY





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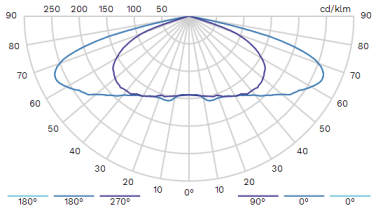
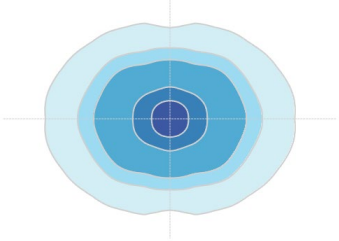
5304 SY





LENSO FLEX 4

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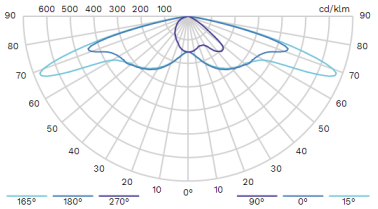

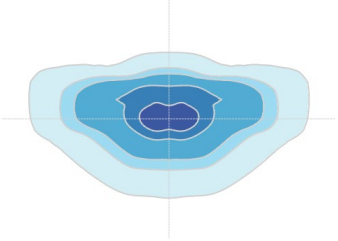

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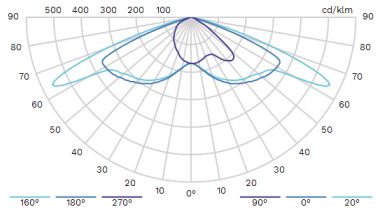
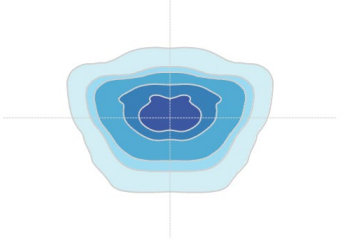
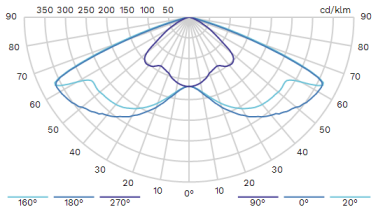
5305 GL

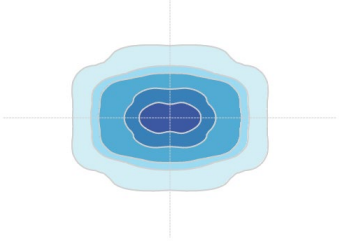




LENSO FLEX 4

5305 GL SY





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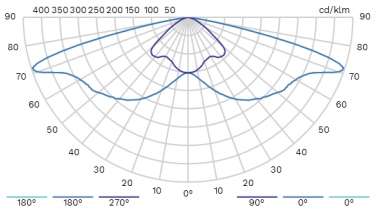
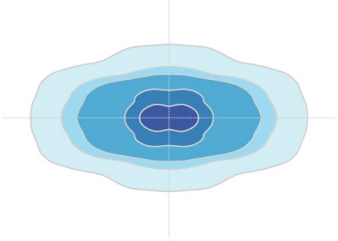
5305 SY





LENSO FLEX 4

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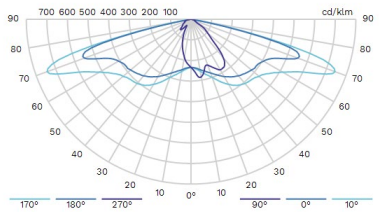
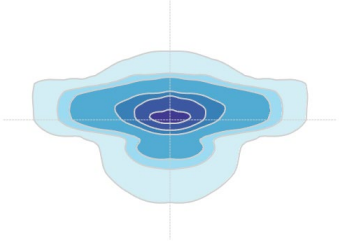
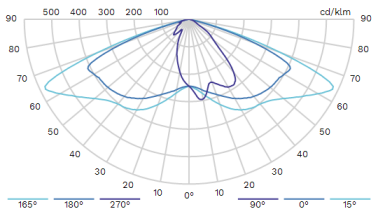
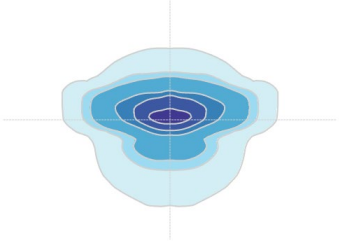




LENSO FLEX 4

5306 GL





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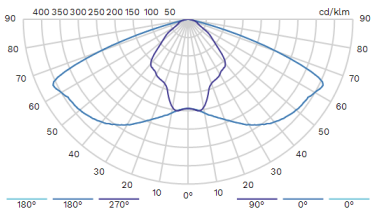
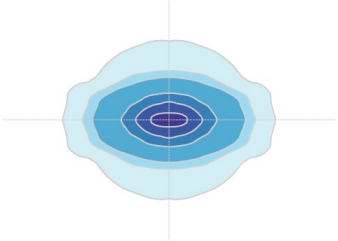
5306 GL SY





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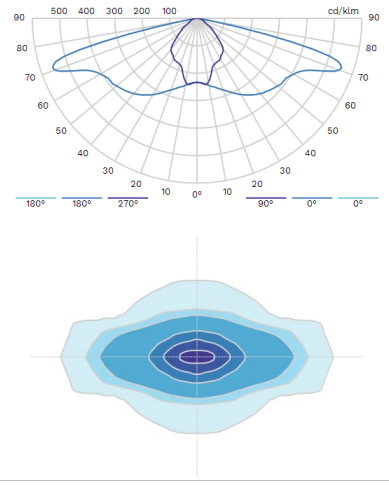

LENSO FLEX 4

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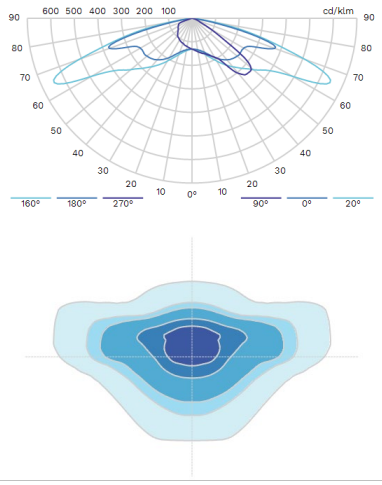

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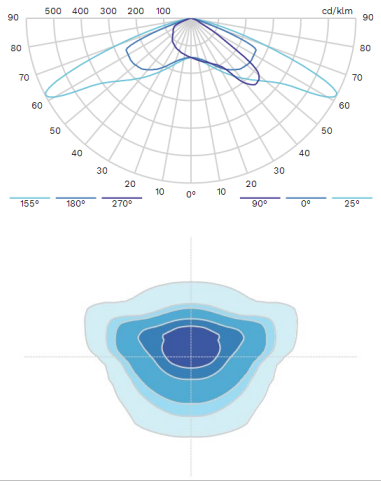

LENSO FLEX 4

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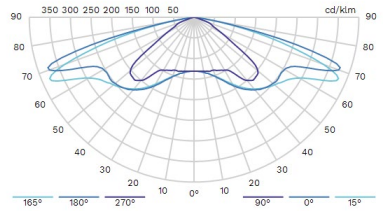

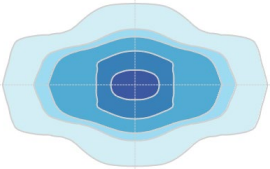

LENSO FLEX 4

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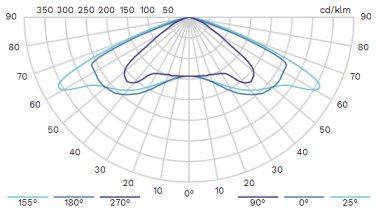

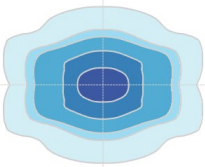

LENSO FLEX 4

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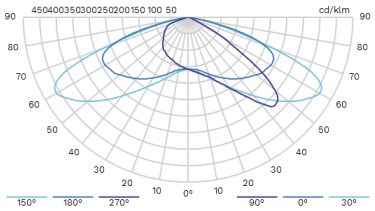

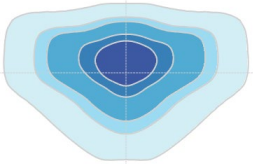

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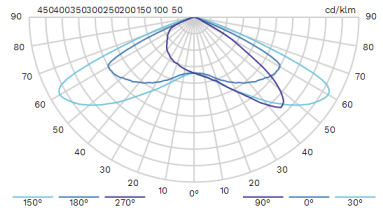
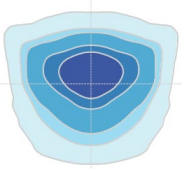
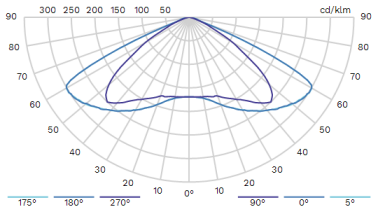
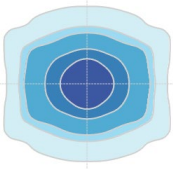




LENSO FLEX 4

5308 GL SY





LENSO FLEX 4

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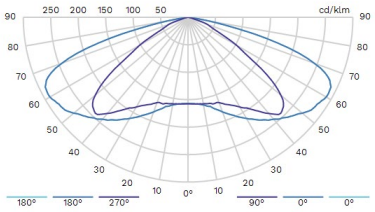

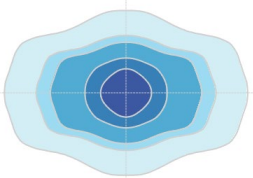

LENSO FLEX 4

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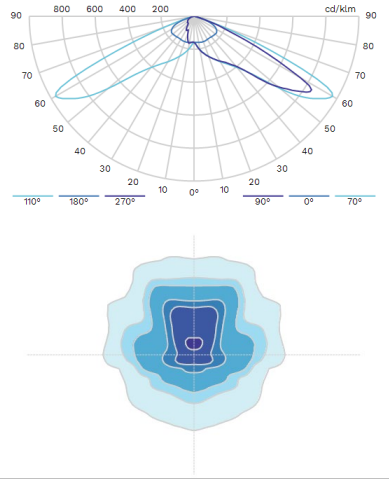

LENSO FLEX 4

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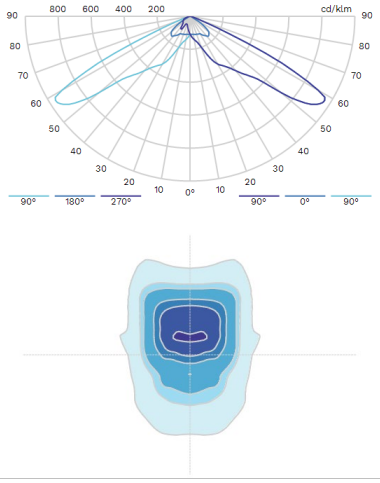
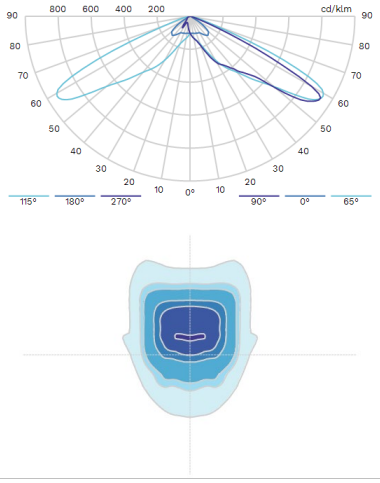


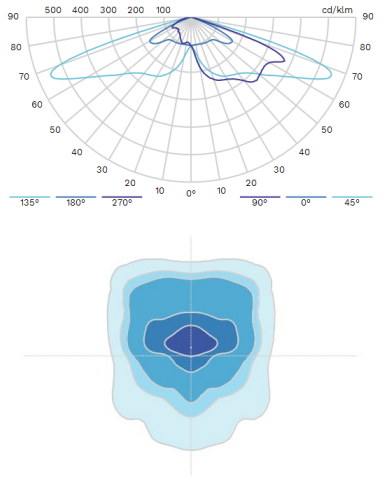
LENSO FLEX 4

5352 BL



LENSO FLEX 4

5353



LENSO FLEX 4

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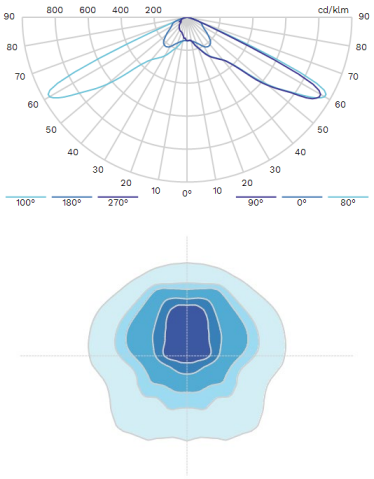
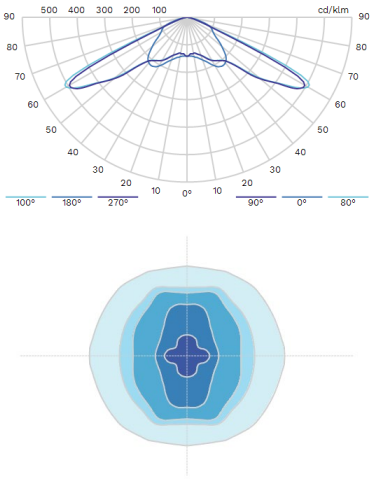


LENSO FLEX 4

5355 SY



LENSO FLEX 4

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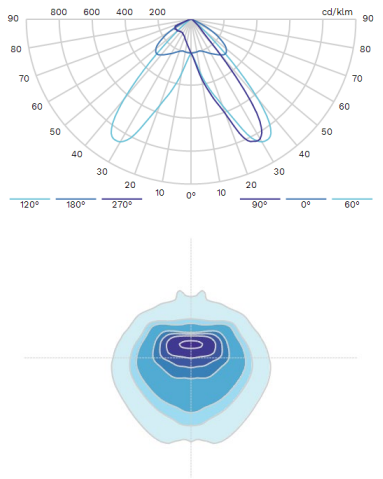
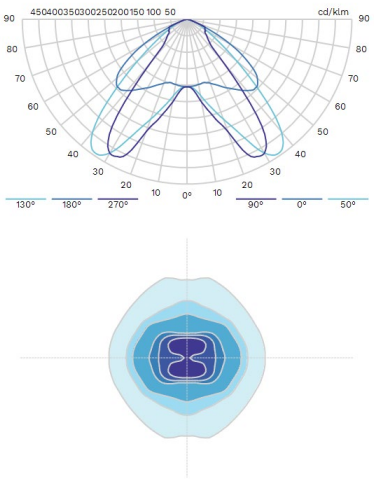


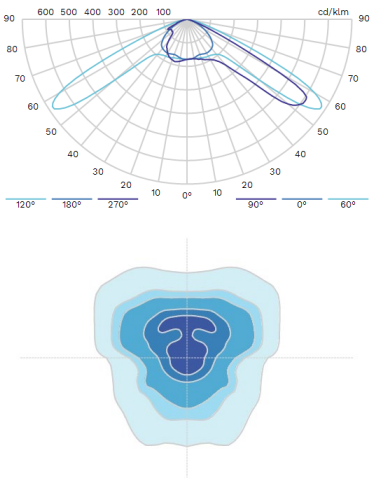
LENSO FLEX 4

5356 SY



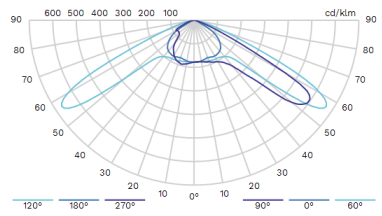
LENSO FLEX 4

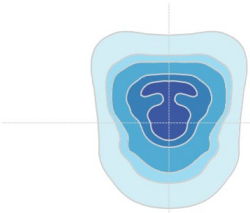
5366



LENSO FLEX 4

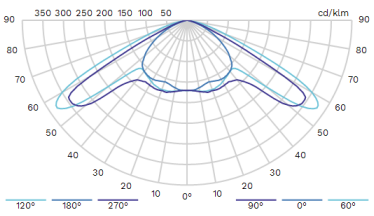
5366 GL

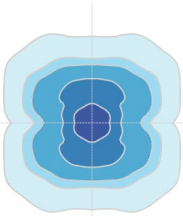




LENSO FLEX 4

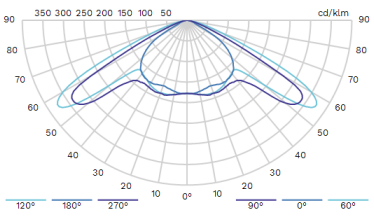
5366 SY

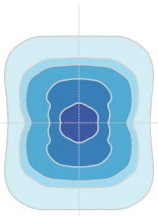




LENSO FLEX 4

5366 SY GL





LENSO FLEX 4

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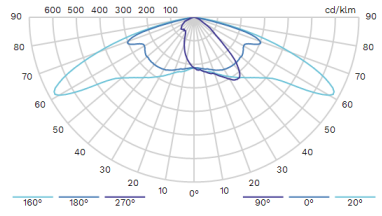
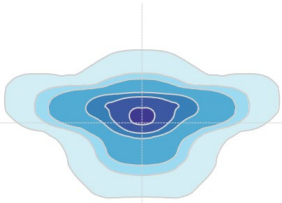
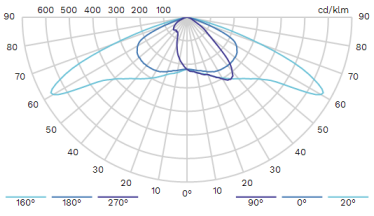
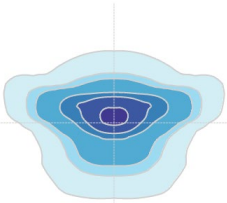




LENSO FLEX 4

5367 GL





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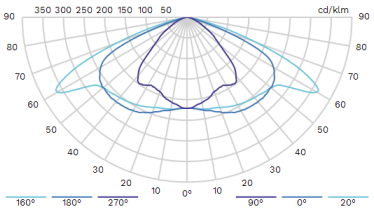

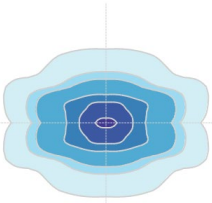

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