



# The new standard of office lighting

Philips SmartForm TBS460-461-464-471

**PHILIPS**  
sense and simplicity



SmartForm 'light beam' TBS460



SmartForm 'light surface' TBS461-471



SmartForm 'light effect beam' TBS464



SmartForm 'light effect cover' TBS464



# SmartForm - the new standard for office lighting

Reflecting Philips' drive for simplicity, SmartForm recessed is a complete family of highly versatile modular luminaires. These luminaires are available with MASTER TL5 lamps in square and rectangular, standard and Dynamic Lighting versions and have been designed to fit in a wide range of modular ceiling types (600-mm-module grids) and plaster ceilings. They can fulfill the majority of project requirements in most applications.

## **Energy efficiency**

As well as incorporating energy-efficient TL5 lamps and a range of Philips electronic ballasts, the SmartForm recessed family can be equipped with lighting controls for presence detection and daylight regulation (ActiLume) or daylight regulation only (Luxsense) in order to reduce energy consumption ( $W/m^2$  is very low). In this way, this Green Flagship range also reduces the overall cost of ownership as well as  $CO_2$  levels, making SmartForm an environmentally friendly choice.

## **SmartForm – ultra-flat ‘light beam’**

SmartForm recessed TBS460 is a combination of ‘light beams’. The luminaire is built around superior micro optics and has a build-in height of a mere 45 mm. The very flat fittings make them ideal for applications where there is little space above false ceilings, e.g. in refurbishment projects where ceiling space may be especially limited.

## **SmartForm – a real ‘light surface’**

SmartForm recessed TBS461/471 ‘light surface’ luminaires are equipped with a micro-lens optic (MLO) to create a homogeneous edge-to-edge lighting appearance with a comfortable brightness impression, as is often required in healthcare, education or architectural lighting projects where visual quality is very important. The housing of these luminaires has a build-in height of 95 mm. The TBS471 version has also Dynamic Lighting.

## **SmartForm – attractive ‘light effect beam’**

SmartForm recessed TBS464 is a combination of light beams and decorative panels. With an innovative way of guiding the light towards the infill panels, while ensuring a high quality office beam, this result in crispy and homogenous decorative light effects.

## **SmartForm – attractive ‘light effect cover’**

SmartForm recessed TBS464 with a selection of optical covers: opal-satinized and micro-lens optics, combined with top-reflectors, create linear lighting effects of different levels within a surface of light: – medium and intense – for different applications.



[www.philips.com/lighting](http://www.philips.com/lighting)

# Choice of lighting concept

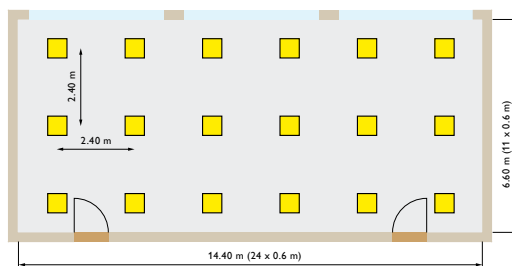
The new SmartForm range offers three ways to optimise your lighting solution. You can choose the best option to ensure the right balance between the necessary investment, the energy performance required and the desired improvement in well-being for the employees. SmartForm delivers on three fronts: energy efficiency, visual comfort and advanced dynamic lighting.

## Energy efficiency

The latest optical technology has been used to create a highly effective optic, giving rise to new opportunities for saving energy. New SmartForm installations with C/D8-VH (Very High output) optics use up to 25% less energy than standard TL5 solutions. Even greater savings can be made by retrofitting TL-D lighting installations with SmartForm luminaires.

Because daylight-linking and presence-detecting lighting control systems can be included in the SmartForm range as an optional, extra, energy consumption can easily be halved in comparison to conventional office lighting solutions. The reduced energy consumption results in a lower cost of ownership and reduced CO<sub>2</sub> output, thus helping to protect the environment.

The quality of the lighting is maintained, however, thanks to the Omnidirectional Lighting Control optic which increases luminous efficacy whilst at the same time reducing glare in all directions and complying with the relevant brightness limits. As a result, the SmartForm range enables sustainable and green lighting solutions to be created.

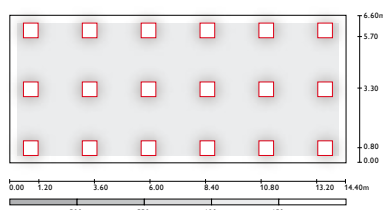


### Lighting design example

According to EN12464-1 for offices, the lighting requirements are:  $E_{av} > 500$  lux,  $R_a > 80$ ,  $UGR < 19$  and  $L < 1000$  cd/m<sup>2</sup>.

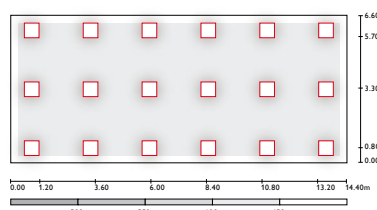
The lighting solutions presented here for a large open-plan office with a height of 2.70 m fulfill all of the relevant requirements.

Standard TL-D installation  
4 x TL-D 18W/830 D6  
conventional ballast



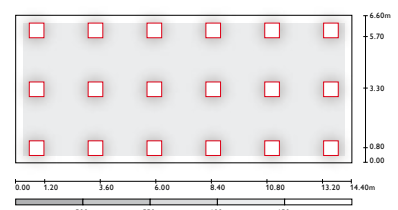
$E_{av} = 610$  lux  
Installed power: 19 W/m<sup>2</sup>

SmartForm TBS460 TL5 installation  
3 x TL5 14W/830 D8-VH  
electronic ballast



$E_{av} = 510$  lux  
Installed power: 9 W/m<sup>2</sup>

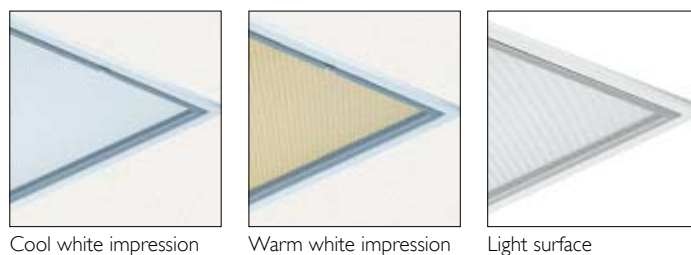
Standard TL5 installation  
4 x TL5 14W/830 D6  
electronic ballast



$E_{av} = 600$  lux  
Installed power: 12 W/m<sup>2</sup>

50% energy saving

25% energy saving



### Visual comfort

From an architectural point of view, the optic selected determines the look of the lighting installation. With an MLO micro-lens optic, the luminaire is considered to be an architectural element in the ceiling, where it can provide visual guidance or enhance architectural structures. The lighting in the room stands out because of the clear visual appearance of the lighting elements.



C8-C(omfort) /  
D8-C(omfort)

The comfort micro optic (C/D8-C) provides light, yet the luminaire is barely visible. In this case the luminaire is visually integrated in the ceiling, and attention is drawn to the illuminated working area. In terms of reflected glare, the most stringent requirements are fulfilled ( $200 \text{ cd/m}^2$ ) and, as a result, the luminaire is suitable for use in all offices with computer screens (low to good quality) and in control rooms. The comfort micro optic C/D8-C(omfort) also boasts a high-quality visual appearance. In both situations all the lighting complies with EN12464-1. The comfort optic option has a higher energy efficiency due to the highly reflective material used.

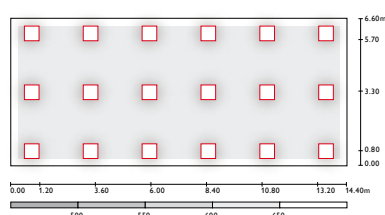
### Advanced Dynamic Lighting

Daylight – the form of light with which we are most comfortable – is never constant. It changes in lighting level and colour temperature throughout the day and over the seasons, affecting our emotions, moods, perception and performance. It has been proven that the dynamics of daylight have a stimulating and inspiring effect. Utilising this potential of lighting in offices, SmartForm enables the creation of 'Personal light' and 'Dynamic ambience', which have a positive effect on the well-being of office workers.

Personal light enables individuals to control the lighting according to their personal preference. They can use a remote control to set the desired lighting level and colour temperature to suit their work and mood. Personal light is very useful in cell offices, combi offices and conference rooms. Dynamic ambience controls the lighting in an entire room, animating the workspace by changing the lighting level and colour temperature of the light according to a programmed rhythm. It can also be altered to create a different 'feel' in the room, or to revive flagging spirits as energy levels drop. Dynamic ambience is designed for use in open-plan offices, conference rooms, entrances and lobbies.

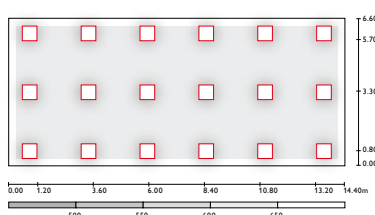
For more information on Dynamic Lighting, please visit [www.philips.com/dynamiclighting](http://www.philips.com/dynamiclighting)

SmartForm TBS461 TL5 installation  
4 × TL5 14W/830 AC-MLO ND  
electronic ballast



$E_{av} = 530 \text{ lux}$   
Installed power:  $12 \text{ W/m}^2$   
 $1000 \text{ cd/m}^2$  and  $UGR < 16$

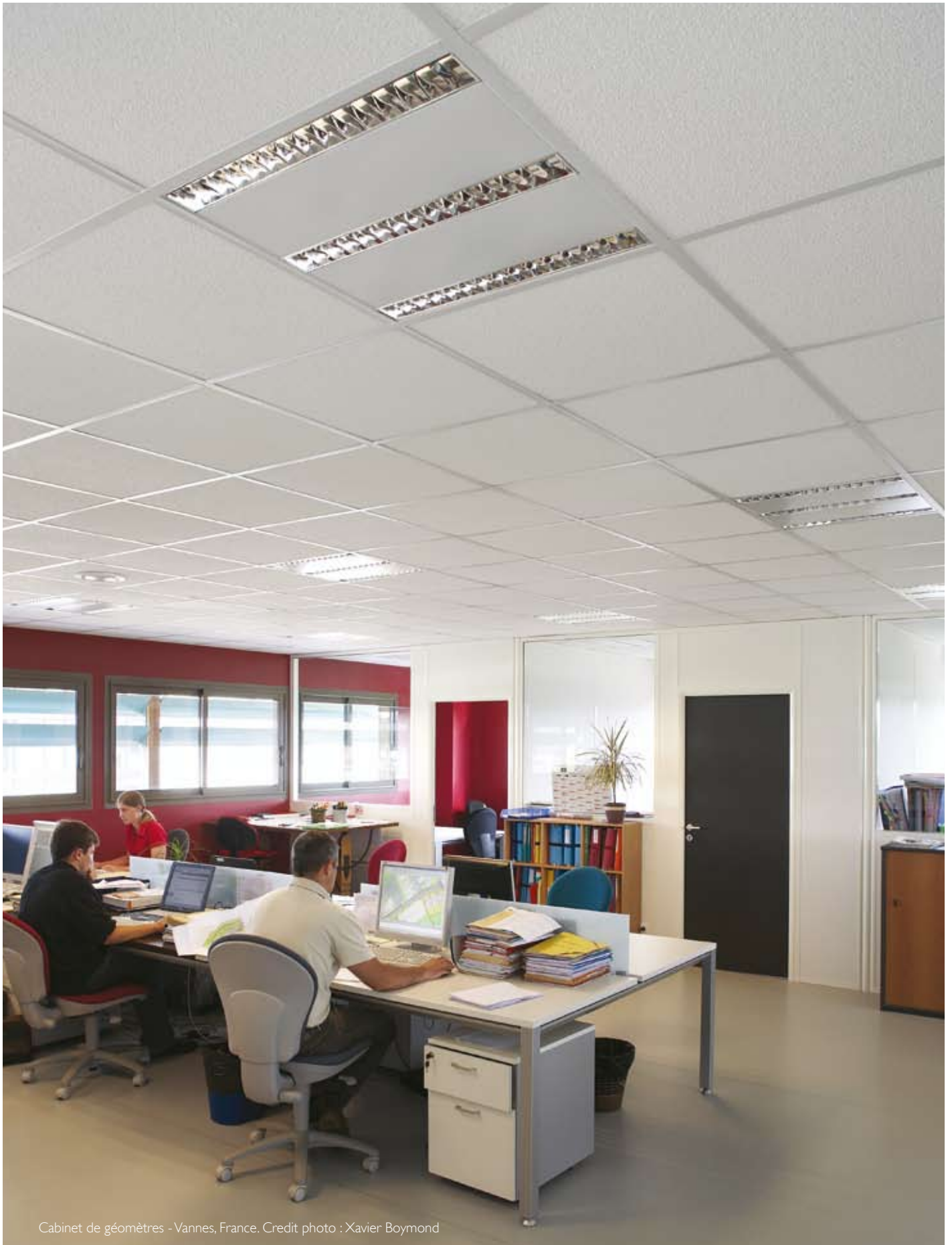
SmartForm TBS460 TL5 installation  
4 × TL5 14W/830 D8-C  
electronic ballast



$E_{av} = 650 \text{ lux}$   
Installed power:  $12 \text{ W/m}^2$   
 $200 \text{ cd/m}^2$  and  $UGR < 16$

## Recessed luminaires

SmartForm TBS460-461-464-471



Cabinet de géomètres - Vannes, France. Credit photo : Xavier Boymond

## Aesthetic light effect

When a lighting installation requires character, luminaires with 'effect' lighting panels are the right choice. Selected areas can be 'zoned' or distinguished by installing the Smartform TBS464 luminaire with the 'effect' panels. Choose from panels containing small perforations with optional colours behind for a discrete effect, or, for a more dramatic effect, opt for the illuminated optional coloured infill panels. Both light 'effect' options mix well with classic or modern structures and enable your lighting design to stand out, without compromising the basic specifications related to direct glare and brightness.



The luminaires with light 'effect' panels are available with 3 option choices; energy efficiency (-VH), optimal comfort (-C) and performance.

Further options in the light 'effects' range are the luminaires with 'effect' covers. These give clear visual guidance. Ultra flat luminaires with a seamless rim, available with an acrylate or polycarbonate cover, give a clearly visual pattern in the space. Areas 'zoned' with these luminaires are clearly visible from a distance, as the lamp position gives visual guidance of its lengthwise position. A subtle cover 'effect' can be created using the AC-MLO or PC-MLO optics, or, for a stronger and more visual 'effect' select the O-SAT optic; both are available with a choice of top reflectors (white or high reflectance aluminium) which determine the intensity of the light output.



Typical application areas for aesthetical light effect covers are those where the general lighting could distinguish from standard efficient lighting. E.g. the office in a car showroom, the shop-in-the-shop area in a shopping centre, as guidance in shop corridors, in conference rooms in combination with dimmable lighting, hotel lobbies etc.



# Range architecture for SmartForm 'light beam' TBS460



The SmartForm recessed range TBS460 is a concept with a combination of 'light beams' for ceilings with modular grids of 600x600 mm, 300x1200 mm and 300x1500 mm and for plaster ceilings.

The luminaires are very flat, measuring only 45 mm (Push-in versions), and are easy to install.

- Square luminaires have 2, 3 or 4 lamps of 14 or 24 W.
- Rectangular luminaires have 1 or 2 lamps of 28 or 54 W and 35, 49 or 80 W.

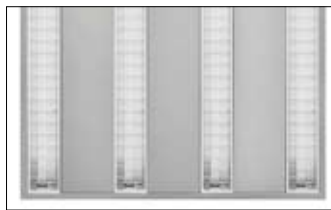
The housings are filled symmetrically with 'light beam' micro optics, which are available in different quality levels and with closed or perforated infill plates.

The high-quality finishing and the seamless rim with a height of only 5 mm ensure the luminaire blends in with every ceiling.

The TBS460 luminaires have closed or perforated infill plates and are painted white or silver-grey. The attractive perforated pattern makes the luminaire appear richer when it is mounted in the ceiling.



The height is only 45 mm (Push-in versions), showing the white colour (RAL9016 based). White RAL9010 based is optional.



The luminaire is also available in silver-grey (RAL9006 based).



As option infill plates can be perforated.



Rim detailing is seamless and with only 5 mm height



Air-handling slots beside optics



## Range architecture for SmartForm 'light surface' TBS461-471



The SmartForm recessed range TBS461 is a 'light surface' concept which incorporates the superior micro-lens optics (MLO). The range is for ceilings with modular grids of 600x600 mm, 300x1200 mm and 300x1500 mm and for plaster ceilings. The luminaires are designed for edge-to-edge homogeneous light surfaces and have a height of 95 mm (push-in version). The luminaires offer the full TL5 range:

- The square luminaires have 4 lamps of 14 or 24 W
- The rectangular luminaires have 2 lamps of 28 or 54 W and 35, 49 or 80 W.

The SmartForm TBS471 is the Dynamic Lighting version with the colour variation controller (CVC). The luminaires offer the full TL5 range:

- The square luminaires have 6 lamps of 14 or 24 W and
- The rectangular luminaires have 3 lamps of 28 or 54 W and 35, 49 or 80 W.

Due to the low height of the rim (5 mm), the luminaire fits flush with the ceiling.



The height is 95 mm and the rim is seamless with a height of only 5 mm.



The luminaire is available with a silver-grey (RAL9006-based) painted rim.



## Range architecture for SmartForm 'light effect beam' TBS464



The deco-infill panels have square holes of 4 mm.



The coloured foils generate light effects in white, blue, green or yellow.



The customised panels are also available in standard colours



### SmartForm 'light effect' luminaire with beam optics and deco panels

The SmartForm recessed TBS464 range is a concept that offers comfortable 'light effects' thanks to the combination of 'light beams' and decorative perforated infill panels (IPD-xx). The attractive way of guiding light towards the infill panels, ensuring high quality light beam, results in crispy and homogenous decorative light effects. With additional foils colour accents can be made. This range is available as standard for ceilings with modular grids of 600 x 600 mm (3- and 4-lamp) and 300 x 1200 mm (2-lamp), and for plaster ceilings. The luminaires are very flat, height only 47 mm, are suitable for use with TL5 lamps, offer quick connection facilities and are easy to install. The housings are filled symmetrically with 'light beam' micro optics, which are available in different qualities. To facilitate maintenance, all these elements are easy to remove. The high-quality finishing and the flat seamless rim ensure the luminaires blend in with any ceiling.

### SmartForm 'light effect' luminaire with beam optics and customised panels

The SmartForm TBS464 with customised infill panels (IPC-xx) has a frame construction which can be adapted for use with different cover materials. A few standard choices are made for colour effects but there is also a lot of freedom to use other transparent materials which ensure an appealing light effect on the ceiling. The dimensions, material weight and recommended transparency are specified.



Deco version with LuxsenseMicro in optic



Deco version with ActiLume in optic



Luminaire TBS464 in silver-grey painted rim and panels

## Range architecture for SmartForm 'light effect cover' TBS464



TBS464, 2 and 3-lamp with opal satinized cover (O-SAT)



TBS464, 2 and 3-lamp with AC-MLO and top reflector with very high-reflectance aluminum (T-VH AC-MLO)



### SmartForm 'light effect' luminaire with opal satinized cover or micro lens optic (MLO)

The SmartForm recessed TBS464 range is a concept that offers comfortable 'light effects'. The combination comprises a very flat luminaire and special transparent covers. Excellent results can be achieved for a variety of applications using additional top reflectors to create linear lighting effects of different levels: medium or intense. MASTER TL5 lamps with colour 840 are recommended to produce clear brightness effects.

This range is available as standard for ceilings with modular grids of 600 x 600 mm (3- and 4-lamp) and 300 x 1200 mm (2-lamp), and for plaster ceilings. The luminaires are very flat, measuring only 47 mm, can be used with TL5 lamps, offer quick connection facilities and are easy to install. The high-quality finishing and the flat seamless rim ensure clean and superior visual appearance on the ceiling.



TBS464 with MLO cover and internal top reflector



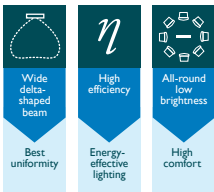
Cover version with LuxsenseMicro



Cover version with ActiLume

# Optics for SmartForm 'light beam'

SmartForm 'light beam' concepts incorporate the latest optic technology: the aluminium micro optics with 3D lamellae and several different grades of aluminium ensure optimum visual comfort and efficiency compliant with the latest office-lighting norm (EN 12464-1).



## Lighting distribution features

At the heart of the TBS460 range is a patented Philips Omnidirectional Lighting Control optic. The 3-dimensional shaped lamellae improve light distribution, reduce glare in all directions and increase overall luminous efficacy. A variety of lamellae is available to provide tailor-made solutions for specific requirements.



### C/D8-VH

Very high efficiency micro optic made of high-quality very high reflectance silver aluminium (98% reflection) in high gloss (C) and semi-high gloss (D). The optic creates a delta-shaped light distribution, has a very high efficiency (LOR up to 94%), provides all-round glare control and complies with the 1000 cd/m<sup>2</sup> brightness limit. UGR is ≤ 19.



### C/D8-C

Excellent comfort micro optic made of high-quality very high reflectance aluminium (95% reflection) in high gloss (C) and semi-high gloss (D). The optic creates a delta-shaped light distribution, has a high efficiency (LOR up to 85%), provides all-round glare control and complies with the 200 cd/m<sup>2</sup> brightness limit. UGR is ≤ 16.



### C/D8

Performer micro optic, made of high-quality anodized aluminium (85% reflection) in high gloss (C) and semi-high gloss (D). The optic creates a delta-shaped light distribution, has a good efficiency (LOR up to 76%), provides all-round glare control and complies with the 1000 cd/m<sup>2</sup> brightness limit. UGR is ≤ 19.



### M2

Micro optic with high-quality aluminium side reflectors in combination with flat profiled aluminium lamellae. The optic creates a delta-shaped light distribution, offering a distinctive appearance in combination with clear visual guidance along the length of the lamps. LOR up to 75%. UGR is 16-19 for square versions and 19-22 for 2-lamp rectangular versions.



### O

Flat optic with opal beams parallel to the lamps. The optic creates a round diffuse light distribution, offering a distinctive appearance in combination with clear visual guidance in all directions. LOR is up to 73% and UGR is 16-19 for square versions and 19-22 for 2-lamp rectangular versions.

## Optics for SmartForm 'light surface'



SmartForm 'light surface' concepts incorporate the latest optic technology: the patented micro-lens optic (MLO) ensures optimum visual comfort and efficiency compliant with the latest office-lighting norm (EN 12464-1).

### Micro-lens optic

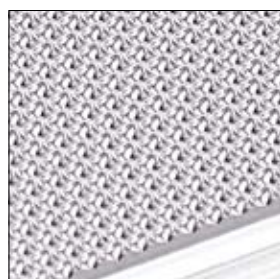
With the micro-lens optic (MLO) including a diffuser, the lamps are not directly visible and offer full glare control from all viewing angles (Omnidirectional Luminance Control, OLC). The micro-lens optic is highly efficient (LOR up to 62%) and meets the latest office standards:  $L_m < 1000 \text{ cd/m}^2$  in all viewing directions at  $\geq 65^\circ$  and  $UGR_R < 19$  (EN 12464-1). This means no disturbing glare on PC or laptop screens, regardless of where they are positioned in the room. The micro-lens optic provides a uniform light distribution, ensuring an even and comfortable brightness impression – a real 'surface of light'.

The patented micro-lens optic design uses conical lenses with inverted tops that are positioned in a square array for the best possible glare control. The optic fully justifies the designation 'micro' since it incorporates over

35 high-precision lenses per square centimetre. Daylight – the form of light with which we are most comfortable – is never constant. It changes in level and colour temperature throughout the day and over the seasons, affecting our emotions, moods, perception and performance.

The dynamics of daylight have been shown to have a stimulating and inspiring effect. Utilising this potential, Dynamic Lighting enables the creation of 'personal light' and 'dynamic ambience', which have a positive effect on the well-being of office workers.

Personal light enables individuals to control the lighting according to their personal preference. They can set the desired lighting level and colour temperature easily with a remote control to suit their work and mood. Personal light is very useful in cell offices, combi-offices and conference rooms.



The principle



The cone

# Optics for SmartForm 'light effect beam'

SmartForm 'light effect beam' concepts incorporate the latest optic technology: the aluminium micro optics with 3D lamellae and several different grades of aluminium ensure optimum visual comfort and efficiency compliant with the latest office-lighting norm (EN 12464-1).

## The SmartForm recessed TBS464 range offers

comfortable 'light effects' thanks to the combination of 'light beams' and decorative perforated infill panels (IPD-xx) or customised infill panels (IPC-xx). The attractive way of guiding light towards the infill panels, ensuring high quality light beam, results in crispy and homogenous decorative light effects.



### C/D8-VH (IPD-IPC)

Very high efficiency micro optic made of high quality very high reflectance silver aluminium (98% reflection) in high gloss (C) and semihigh gloss (D). The optic creates a delta-shaped light distribution, has a very high efficiency (LOR up to 88%), provides all-round glare control and complies with the 1000 cd/m<sup>2</sup> brightness limit. UGR is ≤ 19.



### C/D8-C (IPD-IPC)

Excellent comfort micro optic made of high quality very high reflectance aluminium (95% reflection) in high gloss (C) and semi-high gloss (D). The optic creates a delta-shaped light distribution, has a high efficiency (LOR up to 77%), provides all-round glare control and complies with the 200 cd/m<sup>2</sup> brightness limit. UGR is ≤ 16.



### C/D8 (IPD-IPC)

Performer micro optic, made of high-quality anodised aluminium (85% reflection) in high gloss (C) and semi-high gloss (D). The optic creates a delta-shaped light distribution, has a good efficiency (LOR up to 75%), provides all-round glare control and complies with the 1000 cd/m<sup>2</sup> brightness limit. UGR is ≤ 19.

## Optics for SmartForm 'light effect cover'

SmartForm 'light effect cover' concepts incorporate the latest optic technology: the patented micro-lens optic (MLO) ensures optimum visual comfort and efficiency compliant with the latest office lighting norm (EN 12464-1).

### Lighting distribution features

The SmartForm recessed TBS464 range offers comfortable 'light effects'. The combination comprises a very flat luminaire and special transparent covers. Excellent results can be achieved for a variety of applications using additional top reflectors to create linear lighting effects of different levels: medium or intense.



#### AC/PC-MLO Micro Lens Optic:

MLO is optimised for the best balance between efficiency and low brightness at viewing angles above 65 degrees.

In TBS464 no diffuser is used.

LOR up to 72%, UGR  $\leq$  19, L < 2000 cd/m<sup>2</sup>



#### O-SAT:

Opal satinised acrylate cover creates a diffused light distribution.

OR up to 75%, UGR  $\leq$  25, L < 2000 cd/m<sup>2</sup>



#### Two top-reflector options:

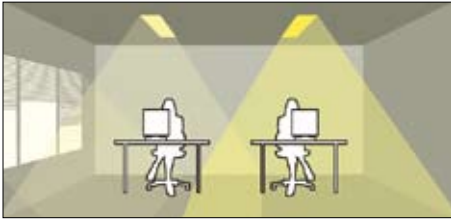
- T-WH: White lacquered metal reflector for medium linear lighting effects.
- T-VH: Aluminium top reflector made of high quality, very high reflective optimum silver-coated aluminium, reflection  $\geq$  97 % for intense linear effects.

T-VH O-SAT: LOR up to 93%

T-VH AC-MLO: LOR up to 85%



## Lighting Controls: Green



### Intelligent luminaires

New legislation states that energy-saving functions must meet the new requirements laid down in the European Union Energy Performance of Buildings Directive. LENI stands for Lighting Energy Numeric Indicator and it states – per building – the value in [kWh/m<sup>2</sup>/yr]. Buildings have to meet specific values (LENI) if they are to be let or sold. The two main functions are:

- Energy savings – presence detection. The easiest way to save energy is to switch off the lights when there is nobody present. On average the savings are 30%. Average absence: 30%.
- Energy savings – daylight-dependent regulation. The potential energy savings depend on the room layout (mainly window size and light level). Studies show that savings of between 20% and 70% can be made, but a figure of 30% savings is a safe estimate.

The availability of daylight (daylight factor) can be derived from Dialux by means of lighting calculations. The SmartForm TBS460 is compatible with all Philips Lighting Controls equipment, e.g. Light Master Modular and Occuswitch, and also offers built-in controls like LuxsenseMicro and ActiLume.



### Lighting controls – ActiLume

The ActiLume luminaire-based solution delivers excellent performance in terms of energy savings for room applications: by means of daylight-dependent regulation, occupancy control and infra-red (IR) control. A TBS460 with ActiLume usually acts as a master for several other luminaires (slaves, using DALI ballasts). A sensor extension for movement detection (LRM8118/00) is available. The control output is DALI for a maximum of 10 luminaires. ActiLume is preferred if the aim is to combine presence detection and daylight regulation in the luminaire, to have a luminaire-based master-slave control for daylight regulation or to enable personal interaction. The IRT8098 commissioning tool can be used to change settings and functionality.



### Lighting controls – LuxsenseMicro

The LuxsenseMicro luminaire-based solution offers basic daylight-dependent regulation without the lights being switched off. LuxsenseMicro enables fast payback times but it is not suitable if personal control of the lighting level is required.



# Lighting Controls: Well-being



IRT7090/00

## Lighting controls – Personal Light

The SmartForm TBS471 Dynamic Lighting has an integrated colour variation control (CVC). Personal Light can be used to provide individual control of brightness and colour temperature in the room using the IRT7090 remote control. A TBS471 with CVC can act as a master for up to 3 other Dynamic Lighting luminaires.



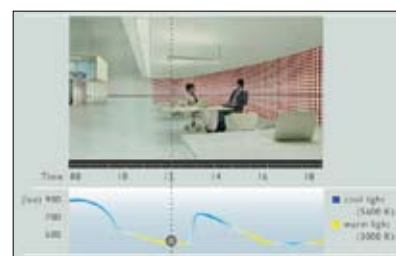
## Lighting controls – Dynamic Ambience

Dynamic Ambience controls the lighting in an entire room, animating the workspace by changing the level and colour temperature of the light according to a programmed rhythm. It can also be altered to create a different 'feel' in the room or to revive flagging spirits as energy levels drop. Dynamic ambience is designed for use in open-plan offices, conference rooms, entrances and lobbies. Dynamic Lighting for rooms includes the following scenarios: Human, Nature, Pendulum and Wave.



KIT7091

A Dynamic Ambience system consists of a DA control system (KIT7091) and up to 32 TBS471 luminaires. The KIT7091 provides all equipment for a fully automated system, including a remote control to switch the lights and change the rhythm. It is possible to extend the system with movement detectors and/or units to control more than 32 luminaires. The TBS471 luminaires are to be used without the CVC option. For more information on Dynamic Lighting, visit [www.philips.com/dynamiclighting](http://www.philips.com/dynamiclighting)



# Efficient lighting based on MASTER TL5 lamps and ballasts.

The HF-operated TL5 lamps are designed to combine maximum energy saving with miniaturization. The High Efficiency lamps (HE) are designed for maximum energy efficiency and a good light output, whilst the High Output lamps (HO) are designed for maximum light output and good energy efficiency. The chosen lamp colours (standard option) for the SmartForm are 827, 830, 840, 865 and for both ActiViva lamps 451 (Natural) and 452 (Active).



MASTER TL5 High Efficiency



MASTER TL5 High Output

Type	Wattage	Lamp length	Lumen output
MASTER TL5 High Efficiency	14 W	600 mm	1200 lm
MASTER TL5 High Efficiency	28 W	1200 mm	2600 lm
MASTER TL5 High Efficiency	35 W	1500 mm	3300 lm
MASTER TL5 High Output	24 W	600 mm	1750 lm
MASTER TL5 High Output	54 W	1200 mm	4450 lm
MASTER TL5 High Output	49 W	1500 mm	4300 lm
MASTER TL5 High Output	80 W	1500 mm	6150 lm

Lumen output at 25°C

### The advantages of Philips ActiViva lamps include:

- People say they feel more active, energetic and alert when working under ActiViva lamps
- ActiViva lamps help to optimize working conditions and, in so doing, boost performance
- People working under this light indicate an increase in their performance of 10% or more
- It is high-quality lighting that fulfills all norms and regulations



ActiViva Active lamps are available in TL5 version and provide extremely cool white light with 85% more blue light than current cool white daylight lamps. Due to the high blue light content, these lamps can create a real sky effect. Active lamps are most suitable for a total installation change. ActiViva Natural lamps provide natural, cool light that contains 25% more blue light than existing cool daylight lamps; they can be combined well with other light sources in existing installations.



MASTER TL5 ActiViva Active



MASTER TL5 ActiViva Natural

Type	Wattage	Lamp length	Lumen output
MASTER TL5 ActiViva Active 452	24 W	600 mm	1550 lm
MASTER TL5 ActiViva Active 452	49 W	1500 mm	3700 lm
MASTER TL5 ActiViva Active 452	54 W	1200 mm	3800 lm
MASTER TL5 ActiViva Natural 451	24 W	600 mm	1650 lm
MASTER TL5 ActiViva Natural 451	49 W	1500 mm	4100 lm
MASTER TL5 ActiViva Natural 451	54 W	1200 mm	4250 lm

Lumen output at 25°C



### Electronic ballasts

TL5 lamps operate with several types of HF electronic ballast.

The main advantages are:

- 25% less energy consumption than conventional systems.
- Up to 70% savings using HF-R or HF-D electronic ballasts in combination with lighting controls such as ActiLume (HF-D) and Luxsense (HF-R).
- Up to 50% extension of the lamp life, thus reducing maintenance costs.
- Smooth and rapid starting without flicker.
- No stroboscopic effects due to high-frequency operation.
- No flicker at the end of lamp life, the lamp is automatically switched off.
- Over-voltage detection and protected control of the mains voltage input.

### HF-Performer (HFP)

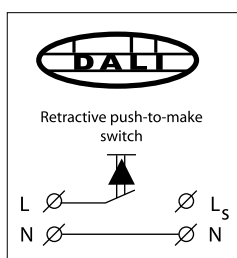
These high-frequency ballasts use far less energy than conventional ballasts.

A warm-start circuit pre-heats the lamp electrodes, enabling the lamp to be switched on/off without reducing its useful life.



### HF-Regulator (HFR)

These high-frequency regulating ballasts enable the light output to be dimmed down to 1%, which means that when used in combination with daylight-linked lighting controls (Luxsense) a reduction of up to 70% in energy consumption can be achieved.



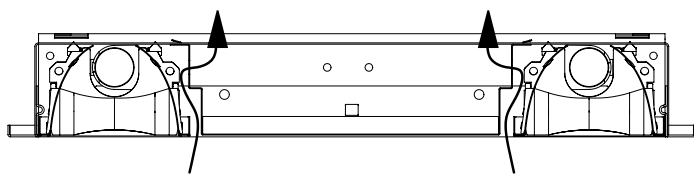
### HF-Regulator DALI (HFD-T)

In addition to the normal regulator specification, Touch and DALI ballasts (HFD-T) have a digital addressable functionality in accordance with the 'Digital Addressable Lighting Interface' (DALI) protocol as well as a Touch & Dim functionality. With Touch & Dim up to 32 luminaires can be dimmed and switched off/on using a single reactive push-to-make switch. The DALI (IEC 929) standard is supported by many renowned companies and enables up to 64 luminaires to be addressed and to receive data relating to switching on/off, dimming and light scenes as well as test data from a central controller.

# Integrated multi-functions



In addition to the standard possibilities with optics, controls, lamps and ballasts, the SmartForm TBS460 range offers a number of multi functions to make the luminaire concept really smart. Philips has built in these additional functions, such as air handling or air ventilation, noise reduction handling and emergency lighting.

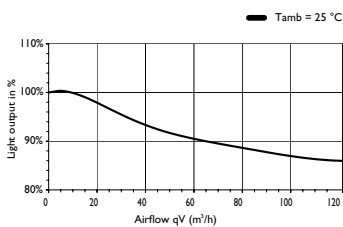


The luminaires suitable for air handling comply with the requirements of the luminaire safety standard EN 60598-2-19 "Air handling luminaires", and also comply with the special requirements for certain countries

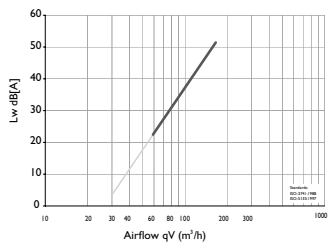
## Air handling

Air handling, air ventilation or air circulation is an important function for an office environment. For optimum light output in these luminaires with return-air facilities, the slots are positioned besides the micro-optic compartments. A return-air volume of 50 m<sup>3</sup>/hour is possible with a normal return-air temperature and a lamp output drop of less than 5%. Air-handling data, such as changes in the Light Output Ratio, thermal radiation, pressure drop and sound power, is available. The infill panels are available in closed and perforated versions. Both can be combined with air-handling functionality. Air handling is not possible in the opal optic (O) versions of the TBS460, TBS461, TBS464 and TBS471.

Relative light output



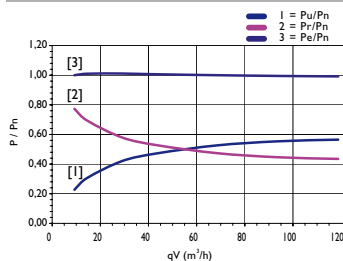
Sound power



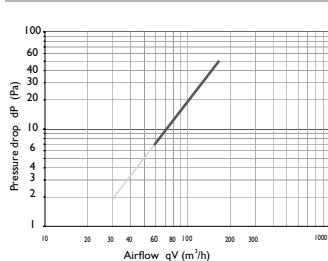
## Noise transmission

Noise transmission between adjacent rooms can be a problem. The sound insulation of a ceiling system is in general >30dB. The standard luminaires have a sound reduction of roughly 5-10 dB. To reduce this room-to-room airborne sound transmission via the luminaires and ceiling, SmartForm luminaires can be equipped with sound-absorbing covers. These covers are made from zinc-coated steel that is lined with sound-absorbing material and will improve sound insulation to more than 15 dBA, without hampering the return-air facility. Of course, the data mentioned will vary according to the luminaire type. Depending on the luminaire type and ceiling construction, delivery will take place on a project basis (customized solution).

Thermal diagram at 25 °C



Pressure drop







A small LED (green light) indicates that the emergency lighting system is functioning properly.

### Emergency lighting

In the SmartForm TBS460-461-464-471 we can supply a built-in emergency battery pack, enabling the luminaires to function as both standard and emergency luminaires in the event of a power failure. One TL5 lamp is connected to this emergency converter and gives a light flux as shown in the table. The battery pack provides 1 to 3 hours of emergency lighting. The rechargeable NiCd batteries are automatically recharged within 24 hours of the mains being restored. All luminaires supplied with an emergency pack are tested and approved before shipment. The luminaires are delivered with safety and maintenance instructions.

#### Emergency Lighting table - 1 hour

TL5 lamp	Emergency duration	Number of batteries	Ballast lumen factor in %	Rated lumen output in lumen
14W	1 hour	3	9	110
24W	1 hour	4	10	175
28W	1 hour	5	13	340
35W	1 hour	6	12	400
49W	1 hour	5	5	180
54W	1 hour	5	5	180
80W	1 hour	6	7	400

#### Emergency Lighting table - 3 hours

TL5 lamp	Emergency duration	Number of batteries	Ballast lumen factor in %	Rated lumen output in lumen
14W	3 hours	4	15	180
24W	3 hours	6	17	300
28W	3 hours	5	13	340
35W	3 hours	6	12	400
49W	3 hours	6	7	250
54W	3 hours	6	7	250
80W	3 hours	6	7	400

# Designed to fulfill most installation needs

The optics and infill plates are easily removable for quick and easy maintenance or bracket mounting; the optics have smart clips at the end lamellae and the infill plates have catches in the bottom plate. The de-mounted optic can be suspended using a plastic cord. For easy maintenance the MLO optics have a simple device for removing the cover, which is secured with V-clips in the housing.



### Range of ceiling brackets (suspension brackets)

Thanks to a range of smart brackets, the ultra-flat SmartForm TBS460 and 464 ranges can be easily mounted in different ceiling systems: exposed, concealed mineral or metal and plaster.

- No brackets are required to mount the TBS460-464 in exposed ceilings (lay-in).  
The universal bracket ZBS460 SMB (4 pcs) can be used to secure fixation in the ceiling.
- The ZBS460 SMB-TPM (4pcs) bracket is required to fix the TBS460-464 in symmetrical concealed mineral and metal ceilings with fixed 38-mm T-bars.
- The universal bracket ZBS460 (4 pcs) with a reach of 25-65 mm is required to fix the TBS460-464 in symmetrical concealed mineral and metal ceilings. The bracket can easily be screwed on the housing and is adjustable from inside and outside the housing.
- The ZBS460 SMB-PLC bracket with a reach of 10-20 mm is available for fixing TBS460-464 in plaster ceilings. Depending on the type of luminaire two optics may have to be removed.
- The SmartForm 'light surface' TBS461-471 range can be easily mounted in different ceiling systems.
- For mounting in exposed ceiling systems (lay-in). To secure the fixation in the ceiling use universal bracket ZBS460 SMB (4 pcs).
- For symmetrical concealed mineral and metal ceilings use the same bracket with a reach of 25-65 mm, ZBS460 SMB.
- The ZBS461 SMB-PLC bracket with a reach of 10-20 mm is available for plaster ceilings. The MLO cover has to be removed.

### Installation features

- Exact fit for most standard modular ceiling systems with use of brackets.
- Wide range of connectors for mains and data
- Safety cable connected to building construction
- Protective foil to prevent dirt entering luminaire
- Smart packaging
- Maintenance features and tips

Cut-out dimensions of holes in plaster ceilings	
Square 14/24 W	585 x 585 mm
Rectangular 28/54 W	285 x 1185 mm
Rectangular 35/49/80 W	285 x 1485 mm



ZBS460 SMB-TPM



ZBS460 SMB



ZBS460 SMB



ZBS460 SMB-PLC



ZBS460 SMB-PLC

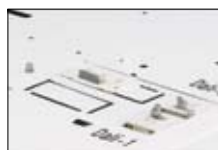




Push-in connector block



Connection block  
T-GST18 (Wieland)



Connection block  
733 - 2x 732 (Wago)



Connection block  
2x T-BST14 (Wieland)



Connection block  
NK3P.W (Ensto)

### Mains and data connections

Philips SmartForm can be ordered with four connection facilities:

- 1. Push-in:** a standard push-in connection block with two contacts per pole for all connections, such as mains and controls, on the housing exterior. In the SmartForm these push-in connectors are positioned on a hatch to be connected outside.
- 2. Plug-in:** universal, 3-pole, plug-in, through-wiring connector (Wieland GST18TT) for fast connection from outside the housing. When controls are used, an extra 2-pole, plug-in, through-wiring connector (Wieland BST 14) is mounted. For Emergency Lighting versions and separate switching the plug-in connector is a 4-pole single connector.
- 3. Plug-in:** universal, 3-pole, plug-in, through-wiring connector (Wago 770-733) for fast connection from outside the housing. When controls are used, an extra 2-pole connector (Wago 890-732) is mounted. For Emergency Lighting versions and separate switching, the plug-in connector is a 4-pole single connector.
- 4. Plug-in:** universal, 3-pole, plug-in connector (Ensto NK3P.W) for fast connection from outside the housing. When controls are used, an extra 2-pole connector (Ensto NK2P.W) is mounted. For Emergency Lighting versions and separate switching, the plug-in connector is a 4-pole single connector.
- 5. Cord and plug:** it is possible to order the luminaire with a 2-meter cord and plug (CCE).

Function	Push-in connection	Wieland connection T = T connector		Wago connection (no T connectors)	
Mains (HFP)	3-pole	3-pole	GST18	3-pole	770-733
Mains + I-10V (HFR)	5-pole	3- + 2-pole	T-GST18 + BST14	3- + 2-pole	770-733 + 890-732
Mains + Luxsense (HFR)	5-pole	3- + 2-pole	T-GST18 + BST14	3- + 2-pole	770-733 + 890-732
Mains + DALI (HFD)	5-pole	3- + 2-pole	T-GST18 + BST14	3- + 2-pole	770-733 + 890-732
Mains + ActiLume (HFD)	5-+2-pole	3- + 2x2-pole	T-GST18 + 2x BST14	3- + 2x2-pole	770-733 + 2x 890-732
Mains + ELI/3 hours (HFP)	4-pole	4-pole	GST18	4-pole	770-734
Mains + I-10V + ELI/3 hours (HFR)	4- + 2-pole	4- + 2-pole	GST18 + BST14	4- + 2-pole	770-734 + 890-732
Mains + separate switching (HFP)	4-pole	4-pole	GST18	4-pole	770-734
Mains + Touch and dim (HFD-T)	4-pole	4-pole	GST18	4-pole	770-734



## Recessed luminaires

SmartForm TBS460-461-464-471



Cabinet de géomètres - Vannes, France. Credit photo : Xavier Boymond

**Safety cable**

Due to regulations in some countries it is not permitted for the luminaire to only be fitted to the recessed ceiling. Instead, it must be connected to the fixed ceiling construction of the building. It is possible to order a universal suspension safety cable with the luminaire. This steel cable can be fixed diagonally (preferable) on the housing and should be connected to the fixed ceiling.

**Protection foil**

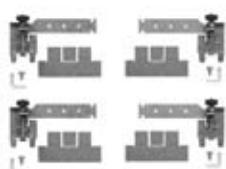
Philips supplies the SmartForm range as ready-to-install luminaires which come with optics, lamps and outside connectors. A strong plastic cover foil (re-usable) protects the optic against dust and fingerprints during installation. Once installation has been completed, this foil can be easily removed.

**Packaging**

Standard TBS luminaires come in a specially designed box which is easy to open and can be easily flattened and stacked when empty to ensure minimum volume of waste on site.

**Accessories**

List of brackets for all SmartForm ranges:		
ZBS460 SMB-PLC (24 pcs)	Suspension bracket for plaster ceiling TBS460-462	493053 99
ZBS460 SMB-PLC (24 pcs)	Suspension bracket for plaster ceiling TBS460-462-464-465	493053 99
ZBS460 SMB-TPM (4 pcs)	Suspension bracket for 38-mm profile TBS460-462	493039 99
ZBS460 SMB-TPM (4 pcs)	Suspension bracket for 38-mm profile TBS460-462-464-465	493039 99
ZBS460 SMB (4 pcs)	Suspension bracket universal for all SmartForm ranges	493077 99
ZBS461 SMB-PLC (4 pcs)	Suspension bracket for plaster ceiling TBS461-463 / 471-473	641776 99



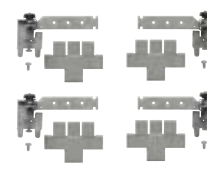
ZBS460 SMB



ZBS460 SMB-TPM



ZBS460 SMB-PLC

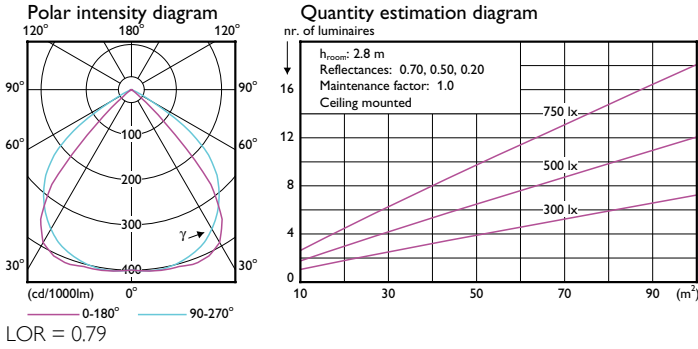


ZBS461 SMB-PLC

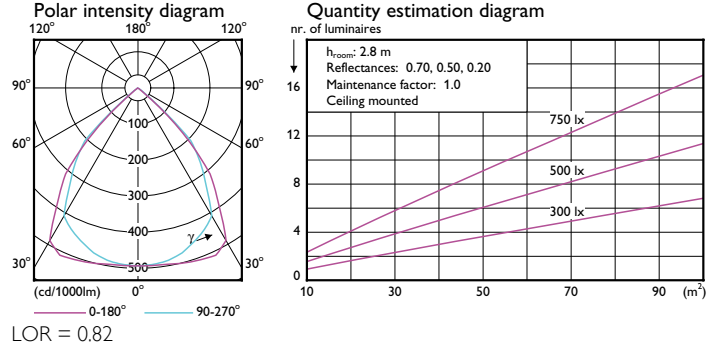
List of control devices:		
Commissioning tool for ActiLume-enabled luminaires, IRT8099/00	Commissioning tool IRT8099/00	518893 00
Remote control for IRT7090/00	Remote control IRT7090/00	518855 00
Control kit including all components for dynamic ambience, KIT7091	Control kit KIT7091	519203 99
Seperate controller for dynamic ambience, LRC5140/71	Controller LRC5140/71	518922 00

# Light technical data SmartForm TBS460

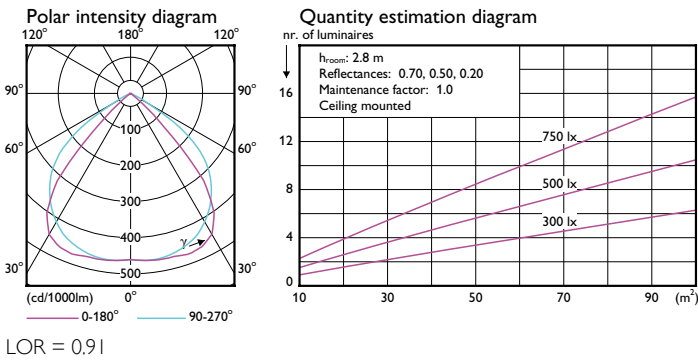
**TBS460 2 x TL5-28W / 830 D8**



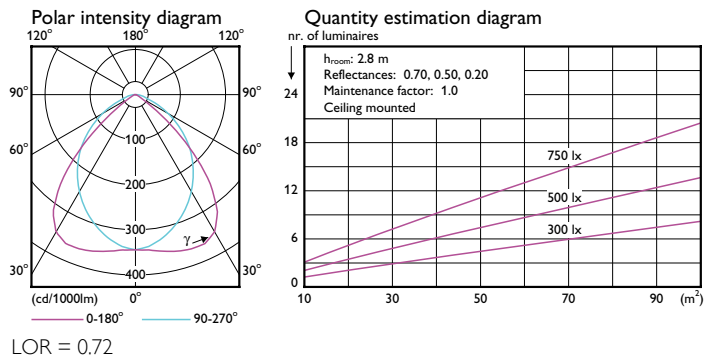
**TBS460 2 x TL5-28W / 830 D8-C**



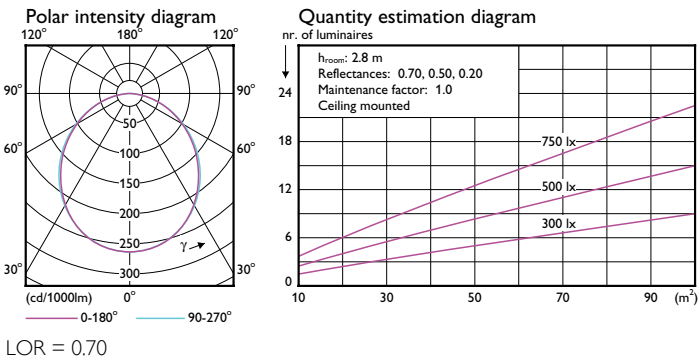
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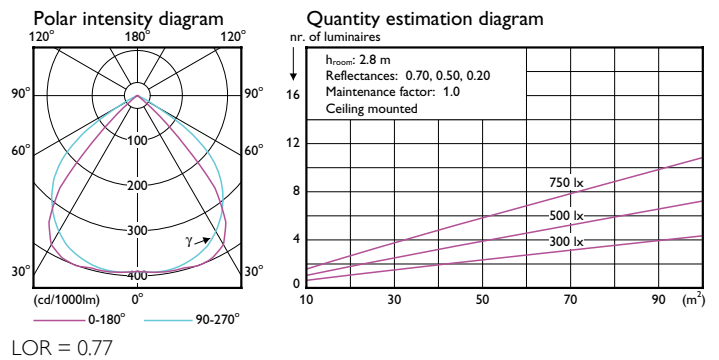
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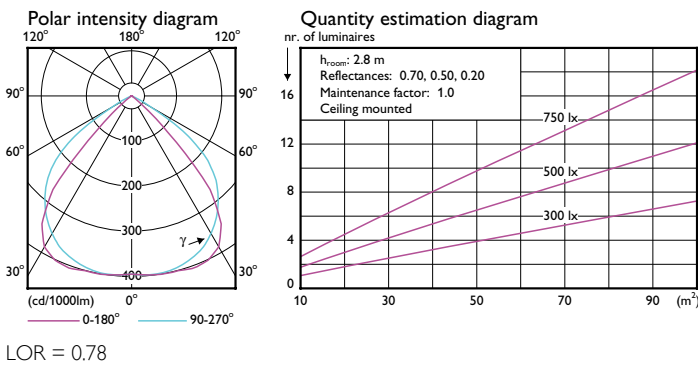
**TBS460 2 x TL5-28W / 830 O**



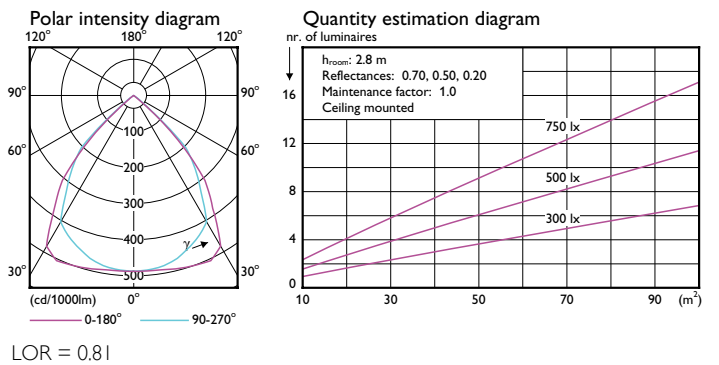
**TBS460 2 x TL5-54W / 830 D8**



**TBS460 3 x TL5-24W / 830 D8**

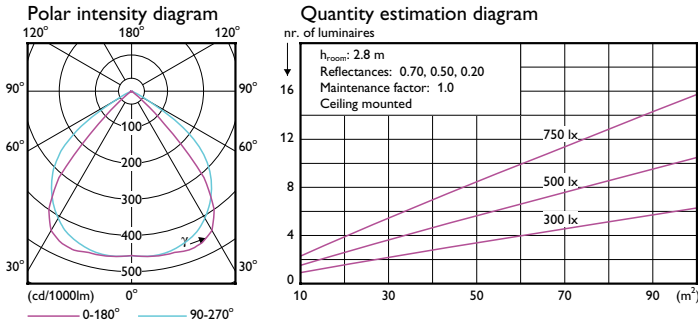


**TBS460 3 x TL5-24W / 830 D8-C**



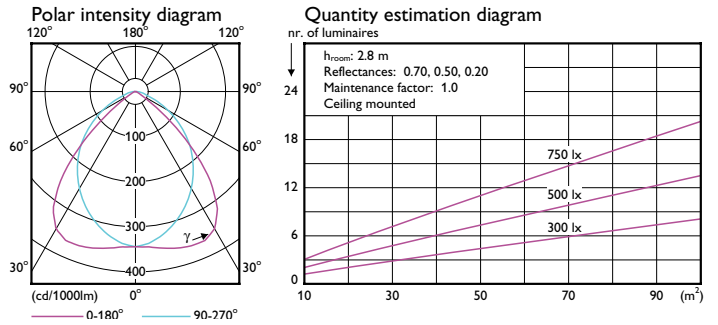
# Light technical data SmartForm TBS460

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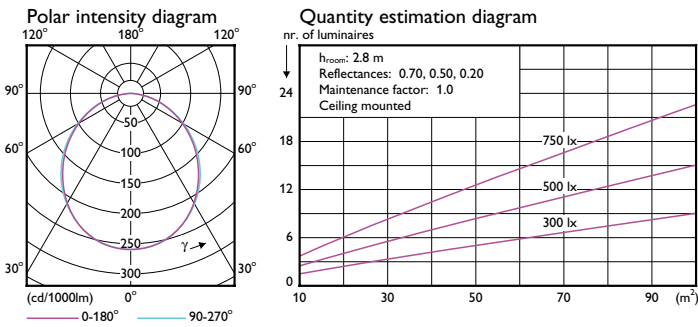
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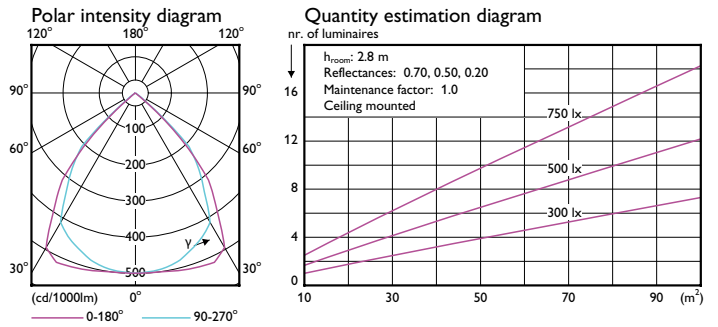
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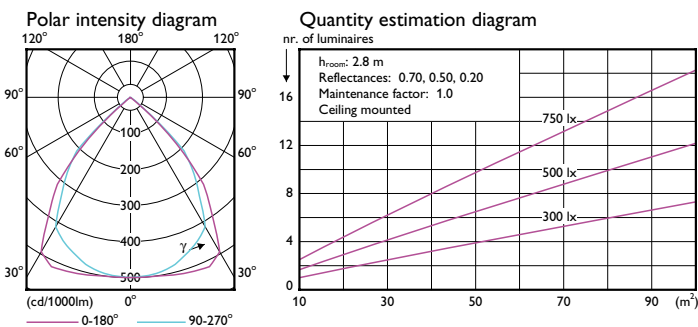
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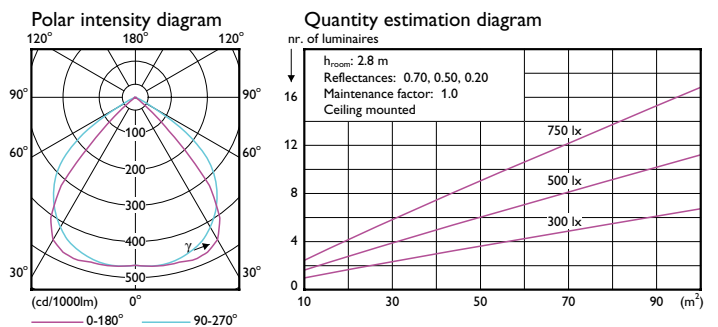
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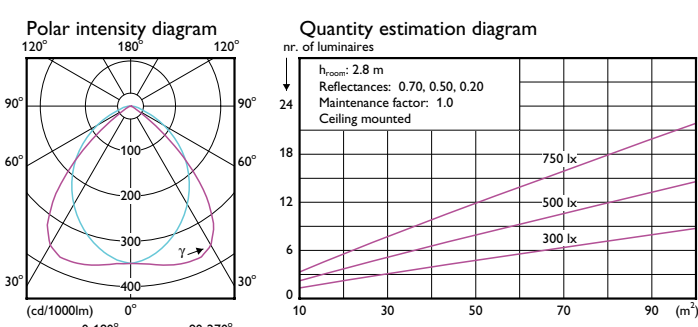
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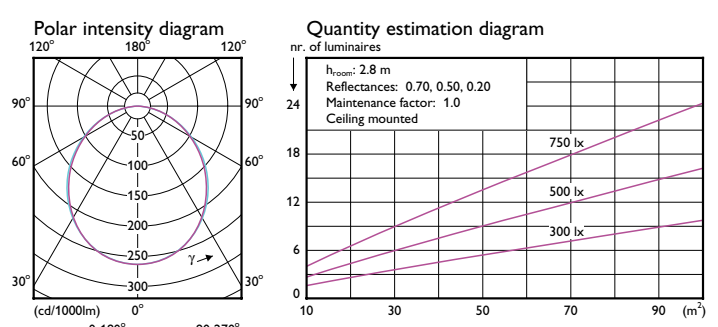
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## TBS460 4 x TL5-14W / 830 O

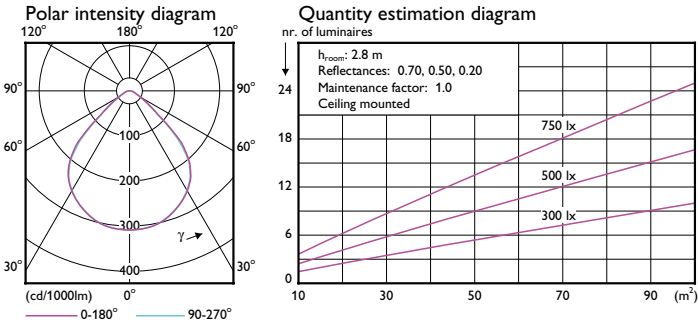


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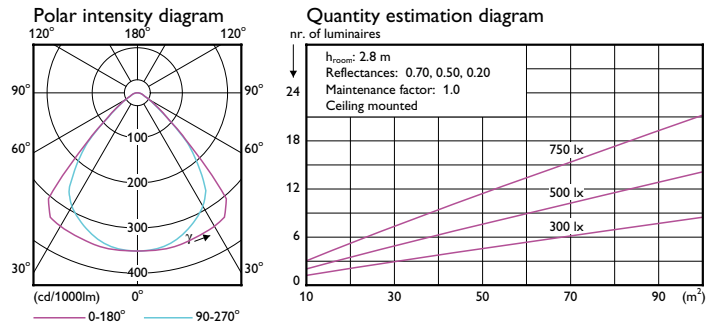
# Light technical data SmartForm TBS461/471

## TBS461 2 x TL5-28W / 830 AC-MLO



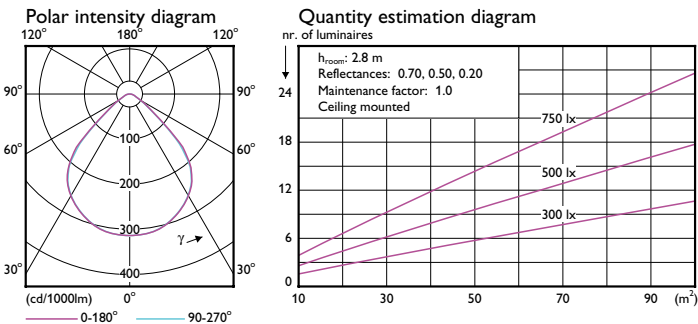
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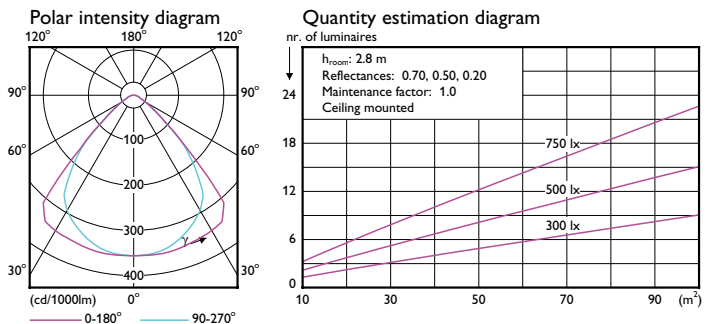
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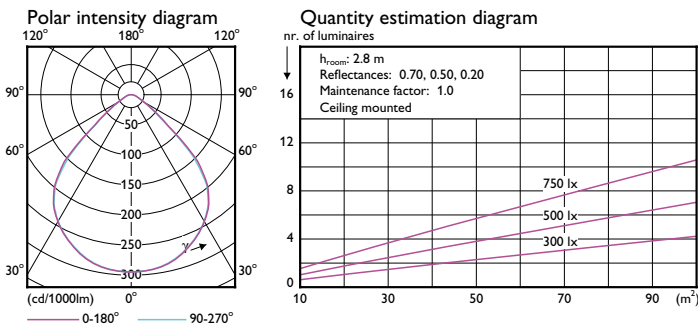
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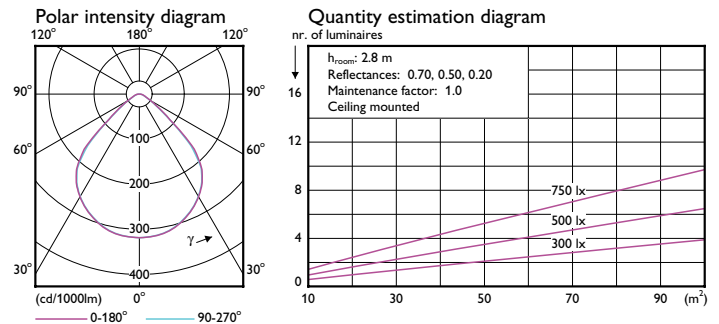
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## TBS471 3 x TL5-54W/865/827/865 AC-MLO



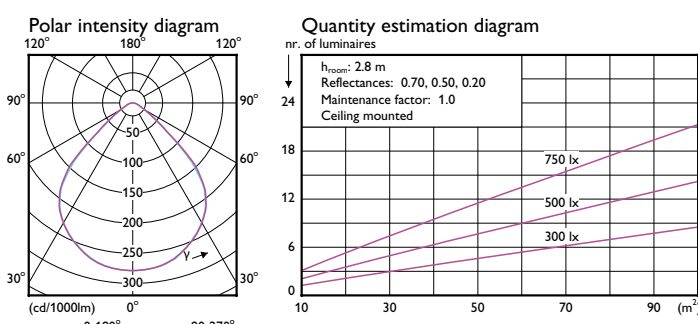
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## TBS471 3 x TL5-54W/865/827/865 PC-MLO



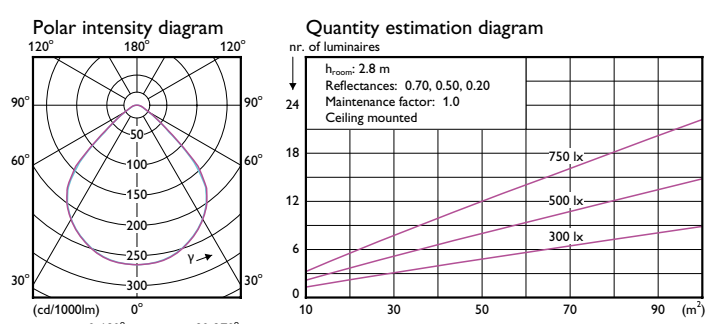
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## TBS471 6 x TL5-14W/865/827/865 AC-MLO



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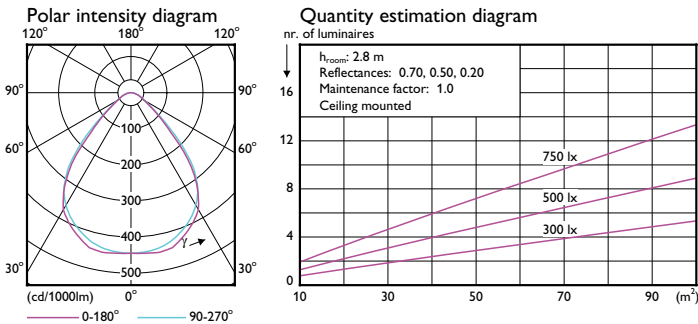
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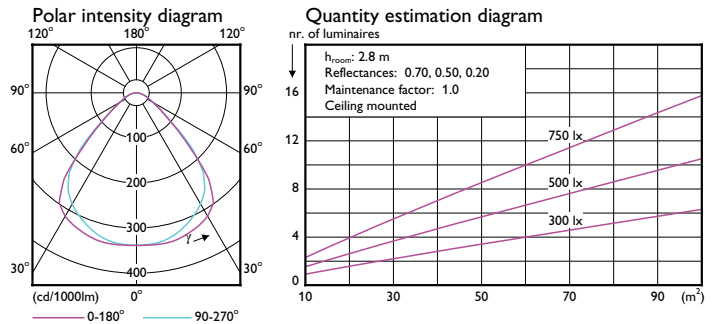
# Light technical data SmartForm TBS464

## TBS464 4xTL5-24W / 840 T-VH AC-MLO



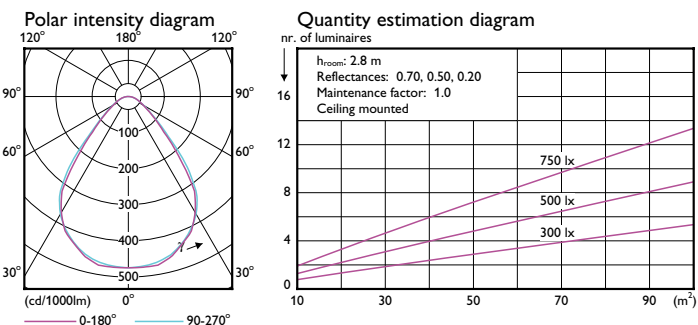
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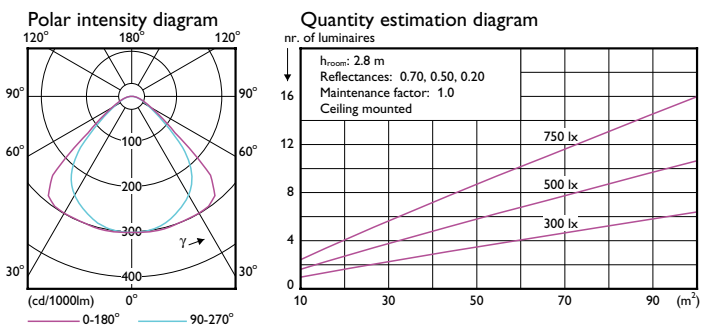
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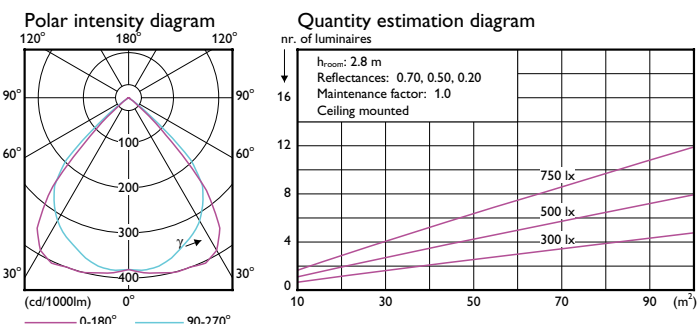
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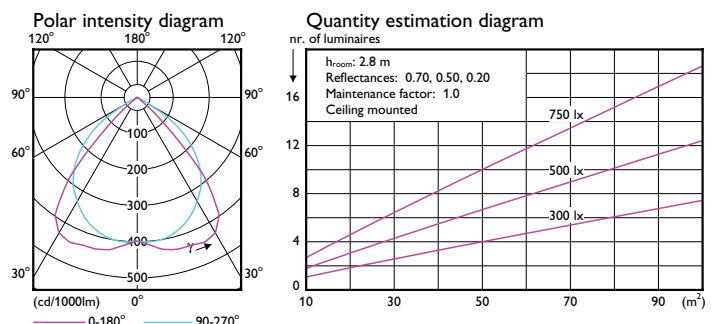
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## TBS464 2xTL5-54W D8-C IPD-WH



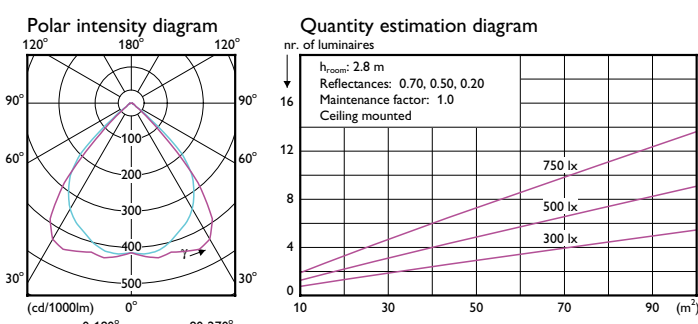
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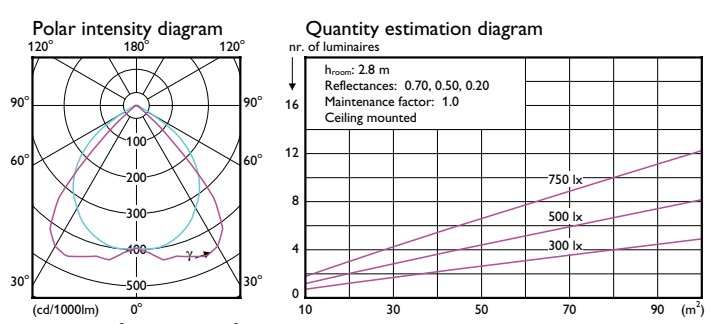
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## TBS464 4xTL5-24W / 840 D8-VH IPC-WH



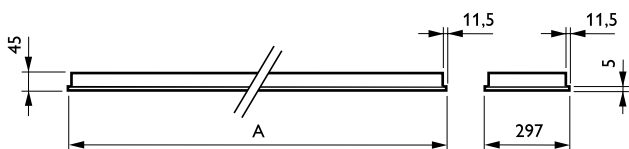
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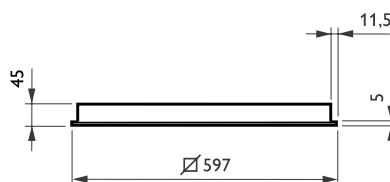
# Recessed luminaires

SmartForm TBS460-461-464-471

SmartForm			
Type	TBS460 (standard version)	Option	
Ceiling grid	Module size: 600 mm Exposed tee, concealed fixed and plasterboard ceilings		Emergency lighting: 1 hour (EL1), 3 hours (EL3) Lighting controls: Luxsense daylight controller (LX) ActiLume multi controller (ACL) Euro fuse (FU) included Safety cable (SC) Separate switching (SW)
Light source	Fluorescent: 2 x, 3 x or 4 x MASTER TL5 / G5 / 14, 24 W (square version) 1 x or 2 x MASTER TL5 / G5 / 28, 35, 49, 54, 80 W (rectangular version)	Infill plates	Infill plate closed (IP) Infill plate perforated (IPP)
Lamp included	Yes (lamp color 451 (ActiViva Natural), 452 (ActiViva Active), 827, 830 or 840) No	Material	Housing: zinc-coated steel, rim post lackered, white RAL9016 based Optional white RAL9010 or silver grey RAL9006 based Optic: aluminum
Gear	Electronic, 220 - 240 V / 50 - 60 Hz: High Frequency Performer (HFP) High Frequency Regulator; DALI (HFD) High Frequency Regulator (HFR) High Frequency Regulator; touch-switch (HFR-T)	Installation	Exposed ceilings: in lay, no brackets needed Concealed ceilings: bracket ZBS460 SMB (4 pcs) reach is 25 - 45 or 65 mm Concealed ceiling with T-bar 38 mm: bracket ZBS460 SMB-TPM (4 pcs) Plaster ceilings: bracket ZBS460 SMB-PLC (24 pcs), reach is 10 - 20 mm
Optic	High-gloss optic, 3D micro-lamellae, very high-reflective (C8-VH) High-gloss optic, 3D micro-lamellae (C8) High-gloss optic, 3D micro-lamellae, comfort (C8-C) Semi-high-gloss optic, 3D micro-lamellae, very high-reflective (D8-VH) Semi-high-gloss optic, 3D micro-lamellae (D8) Semi-high-gloss optic, 3D micro-lamellae, comfort (D8-C) Matt mirror; ribbed cross louvers (M2)	Accessory	Suspension bracket sets
Optical cover	Opal cover (O)	Remarks	Protection foil to protect the optic during installation Dedicated luminaires available with air-handling functionality (AIR), 50 m <sup>3</sup> / hour / luminaire
Connection (outside housing)	Push-in connector (PI) or with pull relief (PIP) Wieland connector GST 18, 3 or 4 poles (W, W4 respectively) Wago connector; 3 or 4 poles (WA, WA4 respectively) Cable, length 200 cm, with plug CEE7 (CCE)	Main applications	Office, education, healthcare, recreation, retail, industry



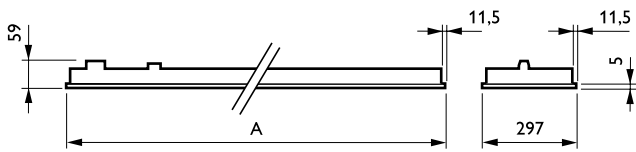
TBS460 1, 2 x TL5



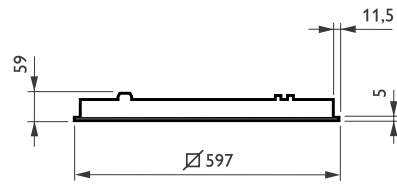
TBS460 2, 3, 4 x TL5

All dimensions in mm

SmartForm TBS460-461-464-471



TBS460 1, 2 x TL5 with connector



TBS460 2, 3, 4 x TL5 with connector



SmartForm TBS460 recessed modular with micro optic with flat, profiled lamellae (M2) and infill plate closed (IP)

**Preferred selection**

Product ID	Weight (kg)	European Order Code (EOC)
TBS460 1x28W/840 HFP M2 PI IP	4.80	002747 00

Please contact your local Philips representative for additional configurations



SmartForm TBS460 recessed modular with micro OLC very high efficiency high-gloss optic (C8) and very-high-gloss optic (C8-VH) and infill plate perforated (IPP)

**Preferred selection**

Product ID	Weight (kg)	European Order Code (EOC)
TBS460 2x28W/840 HFP C8-VH EL3 FU PI IPP	5.80	007247 00
TBS460 2x28W/840 HFP C8-VH EL3 FU W IPP	5.80	007254 00

Please contact your local Philips representative for additional configurations



SmartForm TBS460 recessed modular with micro optic with flat, profiled lamellae (M2) and infill plate closed (IP)

**Preferred selection**

Product ID	Weight (kg)	European Order Code (EOC)
TBS460 2x28W/840 HFP M2 EL3 FU W IP	5.80	007353 00

Please contact your local Philips representative for additional configurations

## Recessed luminaires

SmartForm TBS460-461-464-471



SmartForm TBS460 recessed modular with micro optic with flat, profiled lamellae (M2), air handling via slots beside optics (AIR) and infill plate closed (IP)

### Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
TBS460 2x24W/840 HFP M2 W AIR IP	4.60	003058 00

Please contact your local Philips representative for additional configurations



SmartForm TBS460 recessed modular with opal beam cover (O) and infill plate closed (IP)

### Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
TBS460 2x24W/830 HFP O W IP	4.60	003089 00

Please contact your local Philips representative for additional configurations



SmartForm TBS460 recessed modular with micro OLC excellent comfort high-gloss optic (C8-C) and infill plate closed (IP)

### Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
TBS460 3x14W/830 HFP C8-C PI IP	4.60	003959 00
TBS460 3x14W/840 HFP C8-C PI IP	4.60	004802 00

Please contact your local Philips representative for additional configurations



SmartForm TBS460 recessed modular with micro OLC excellent comfort semi-high-gloss optic (D8-C), air handling via slots beside optics (AIR) and infill plate closed (IP)

### Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
TBS460 3x14W/830 HFP D8-C W AIR IP	4.60	004512 00
TBS460 3x14W/830 HFR D8-C LX W AIR IP	4.60	004659 00

Please contact your local Philips representative for additional configurations



SmartForm TBS460 recessed modular with micro OLC very high efficiency semi-high-gloss optic (D8) and very-high-gloss optic (D8-VH) and infill plate closed (IP)

### Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
TBS460 4x14W/830 HFP D8-VH PI IP	4.60	004581 00
TBS460 4x14W/840 HFP D8-VH PI IP	4.60	006141 00

Please contact your local Philips representative for additional configurations

SmartForm TBS460-461-464-471



SmartForm TBS460 recessed modular with opal beam cover (O) and infill plate closed (IP)

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
TBS460 4x14W/830 HFP O PI IP	4.60	005663 00
TBS460 4x14W/840 HFP O PI IP	4.60	006295 00
TBS460 4x24W/830 HFP O W IP	4.60	006400 00
TBS460 4x24W/830 HFP O PI IP	4.60	006417 00
TBS460 4x24W/840 HFP O PI IP	4.60	006455 00

Please contact your local Philips representative for additional configurations

Accessories



Brackets for concealed ceilings with T-bar 38 mm

Product ID	EOC
ZBS460 SMB-TPM (4PCS)	493039 99



Brackets for concealed ceilings

Product ID	EOC
ZBS460 SMB (4PCS)	493077 99

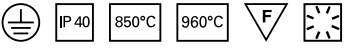



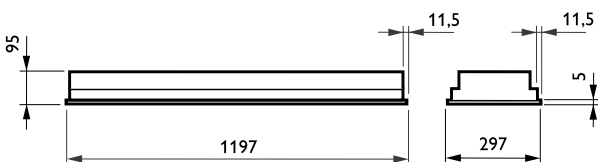
Brackets for plaster ceilings

Product ID	EOC
ZBS460 SMB-PLC (24PCS)	493053 99

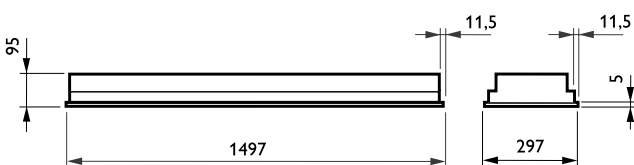
# Recessed luminaires

## SmartForm TBS460-461-464-471

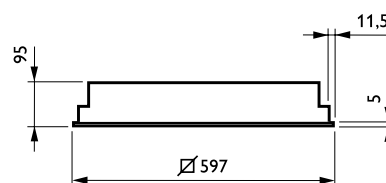
SmartForm			
Type	TBS461 (standard version) TBS471 (Dynamic Lighting version)	Option	Emergency lighting: 1 hour (EL1), 3 hours (EL3) Lighting controls: TBS461: ActiLume multi controller (ACL) TBS471: Color-Variation Controller (CVC) Euro fuse (FU) included Safety cable (SC) Separate switching (SW), TBS461 only
Ceiling grid	Module size: 600 mm Exposed tee, concealed fixed and plasterboard ceilings	Material	Housing: zinc-coated steel, rim post lackered, white RAL9016 based Optional white RAL9010 or silver grey RAL9006 based Optical cover: AC-MLO: PMMA, PC-MLO: polycarbonate
Light source	Fluorescent: Square TBS461: 4 x MASTER TL5 / G5 / 14, 24 W Square TBS471: 6 x MASTER TL5 / G5 / 14, 24 W Rectangular TBS461: 2 x MASTER TL5 / G5 / 28, 35, 49, 54, 80 W Rectangular TBS471: 3 x MASTER TL5 / G5 / 28, 35, 49, 54, 80 W	Installation	Exposed ceilings: in lay, no brackets needed Concealed ceilings: bracket ZBS460 SMB (4 pcs) reach is 25 - 45 or 65 mm Plaster ceilings: bracket ZBS471 SMB-PLC (4 pcs), reach is 10 - 20 mm
Lamp included	Yes (lamp color 451 (ActiViva Natural), 452 (ActiViva Active), 827, 830 or 840) No	Accessory	Suspension bracket sets
Gear	Electronic, 220 - 240 V / 50 - 60 Hz: TBS461: High Frequency Performer (HFP) TBS461/471: High Frequency Regulator; DALI (HFD) TBS461: High Frequency Regulator (HFR) TBS461: High Frequency Regulator; touch-switch (HFR-T)	Remarks	Protection foil to protect the optic during installation
Optical cover	Acrylate micro lens optic (AC-MLO) Polycarbonate micro lens optic (PC-MLO) Diffuser; standard MLO's have diffuser (DF)	Main applications	Office, education, healthcare, recreation, retail, industry
Connection (outside housing)	Push-in connector (PI) or with pull relief (PIP) Wieland connector GST 18, 3 or 4 poles (W, W4 respectively) Wago connector; 3 or 4 poles (WA, WA4 respectively) Ensto connector; 3 or 4 poles (EN, EN4) Cable, length 200 cm, with plug CEE7 (CCE), for TBS461 only	 	



TBS461/471 2, 3 x TL5



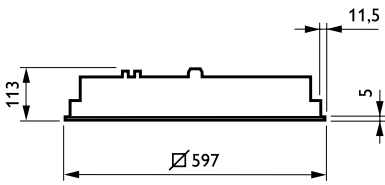
TBS461/471 2, 3 x TL5



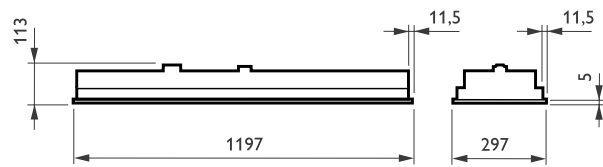
TBS461/471 4, 6 x TL5

All dimensions in mm

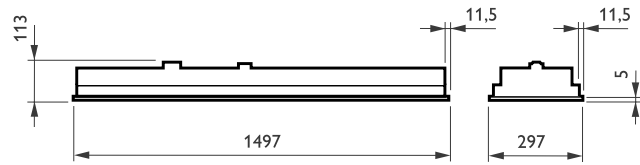
SmartForm TBS460-461-464-471



TBS461/471 4, 6 x TL5 with connector



TBS461/471 2, 3 x TL5 with connector



TBS461/471 2, 3 x TL5 with connector



SmartForm TBS461/471 recessed modular luminaire with PMMA or polycarbonate micro-lens optic (AC-MLO, PC-MLO); SmartForm TBS471 with Dynamic Lighting facility



SmartForm TBS461/471 recessed modular luminaire with PMMA or polycarbonate micro-lens optic (AC-MLO, PC-MLO); SmartForm TBS471 with Dynamic Lighting facility

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
TBS461 2x54W/830 HFP AC-MLO PI	7.80	006394 00
TBS461 2x49W/840 HFP AC-MLO PI	9.00	006509 00
TBS461 2x28W/840 HFP PC-MLO EL3 FU W	8.80	007858 00
TBS461 2x35W/840 HFD ND AC-MLO ACL W	9.00	007889 00
TBS461 2x54W/840 HFD ND AC-MLO ACL W	7.80	007940 00

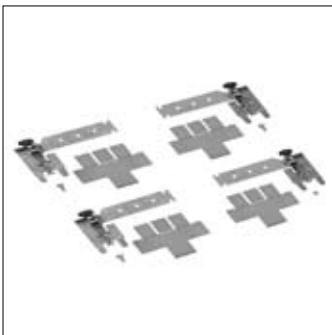
Please contact your local Philips representative for additional configurations

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
TBS461 4x14W/830 HFP AC-MLO PI	7.80	006530 00
TBS461 4x24W/840 HFP ND AC-MLO W	7.80	008015 00

Please contact your local Philips representative for additional configurations

Accessories



Suspension bracket set

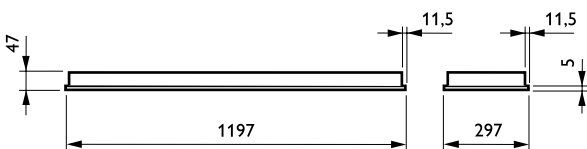
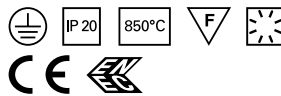
Product ID	EOC
ZBS461 SMB-PLC (4PCS)	641776 99

# Recessed luminaires

SmartForm TBS460-461-464-471

	SmartForm
Type	TBS464
Ceiling grid	Module size: 600 mm Exposed tee, concealed fixed and plasterboard ceilings
Light source	Fluorescent: Square: 3 x or 4 x MASTER TL5 / G5 / 14, 24 W Rectangular: 2 x MASTER TL5 / G5 / 28, 54 W
Lamp included	Yes, (lamp color 451 (ActiViva Natural), 452 (ActiViva Active), 827, 830,840) No
Gear (yes, lamp color)	Electronic, 220 - 240 V / 50 - 60 Hz: High Frequency Performer (HFP) High Frequency Regulator; DALI (HFD) High Frequency Regulator; 1-10V (HFR) High Frequency Regulator; touch and DALI (HFD-T)
Optic	Micro OLC Performer high-gloss optic (C8) Micro OLC Performer semi-high-gloss optic (D8) Micro OLC excellent comfort high-gloss optic (C8-C) Micro OLC excellent comfort semi-high-gloss optic (D8-C) Micro OLC very high efficient high-gloss optic (C8-VH) Micro OLC very high efficient semi-high-gloss optic (D8-VH)
Infill plates (beam version)	Infill plate deco (IPD) with colored foil, white (WH), blue (BL), green (GN), yellow (YE) Infill plate customized (IPC) empty frame, with opal and colored foil, white (WH), blue (BL), green (GN), yellow (YE), Teaser I (IPC-T1)

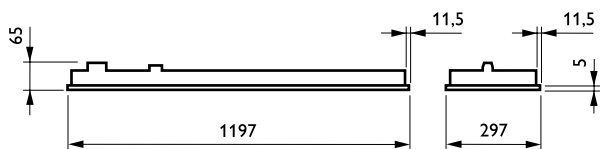
Controls (optional)	Luxsense daylight controller micro (LXM) ActiLume multi controller (ACL)
Emergency Lighting	Emergency lighting, 1 hour (EL1), 3 hours (EL3)
Connections (outside housing)	Push in connection (PI) or with pull relief (PIP) Wieland connector 3 or 4 pole GST 18 (W,W4) Wago connector 3 or 4 pole (WA,WA4) Ensto connector 3 or 4 pole (EN,EN4) Cord white, 2 m and plug CEE7 (CCE)
Other options	Euro fuse (FU), Safety cable (SC), Separate switching (SW), Separate switching EL-versions (SW-EL)
Material and colors	Housing: zinc-coated steel, rim post lackered, white RAL9016 based Optional white RAL9010 or Silver grey RAL9006 based
Deliveries	Luminaires are packed with mounting instructions and optics are protected with foil
Accessories	Exposed ceilings (in lay): no brackets needed Concealed ceilings: bracket ZBS460 SMB (4 pcs) Concealed ceiling with T-bar 38 mm: ZBS460 SMB-TPM (4 pcs) Plaster ceilings: bracket ZBS460 SMB-PLC (24 pcs)
Main applications	Office, education, healthcare, recreation, retail, industry



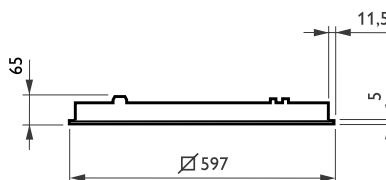
TBS464 2 x TL5



TBS464 3,4 x TL5



TBS464 2 x TL5 with connector



TBS464 3,4 x TL5 with connector

All dimensions in mm



SmartForm TBS460-461-464-471



SmartForm TBS464 recessed modular luminaire with micro OLC excellent comfort semi-high-gloss optic (D8-C) customised infill plate



SmartForm TBS464 recessed modular luminaire with micro OLC excellent comfort semi-high-gloss optic (D8-C) customised infill plates



SmartForm TBS464 recessed modular luminaire with micro OLC excellent comfort semi-high-gloss optic (D8-C) and decorative panels



SmartForm TBS464 recessed modular luminaire with micro OLC excellent comfort semi-high-gloss optic (D8-C) and decorative panels

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
<b>SmartForm 2-lamp TBS464, customized panels</b>		
TBS464 2x28W/840 HFP D8 W IPC	5.40	009883 00
TBS464 2x28W/840 HFP D8-C W IPC-WH	5.40	009890 00
TBS464 2x28W/840 HFR D8 LXM PI IPD-WH	5.40	009951 00
TBS464 2x28W/840 HFR D8 LXM W IPD-WH SI	5.40	009968 00
TBS464 2x54W/840 HFP D8-C W IPD-BL	5.40	980048 00

Please contact your local Philips representative for additional configurations

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
<b>SmartForm 3-lamp TBS464, customized panels</b>		
TBS464 3x14W/840 HFP D8 W IPC	5.50	980147 00
TBS464 3x14W/840 HFP D8-C W IPC-WH SI	5.50	980178 00

Please contact your local Philips representative for additional configurations

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
<b>SmartForm 4-lamp TBS464, customized panels</b>		
TBS464 4x14W/840 HFP C8 W IPC-GN	5.60	980345 00
TBS464 4x14W/840 HFP D8 W IPC	5.60	980413 00
TBS464 4x14W/840 HFP D8-C W IPC-BL SI	5.60	980437 00
TBS464 4x14W/840 HFP D8-VH W IPC-WH	5.60	980451 00

Please contact your local Philips representative for additional configurations

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
<b>SmartForm 3-lamp TBS464, decorative panels</b>		
TBS464 3x14W/840 HFP C8 W IPD-WH SC	5.50	980116 00
TBS464 3x14W/840 HFP C8-C W IPD-WH SC	5.50	980123 00
TBS464 3x14W/840 HFP D8 W IPD-WH SI	5.50	980154 00
TBS464 3x14W/840 HFP D8-C W IPD-BL	5.50	980185 00

Please contact your local Philips representative for additional configurations

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
<b>SmartForm 4-lamp TBS464, decorative panels</b>		
TBS464 4x14W/840 HFP C8 PI IPD-YE	5.60	980338 00
TBS464 4x14W/840 HFP C8 W IPD-WH SC	5.60	980352 00
TBS464 4x14W/840 HFP C8-C W IPD-WH	5.60	980383 00
TBS464 4x14W/840 HFP D8-C W IPD-GN	5.60	980444 00
TBS464 4x14W/840 HFR D8 LXM W IPD-WH	5.60	980666 00
TBS464 4x24W/840 HFP C8-VH PI IPD-WH	5.60	980772 00

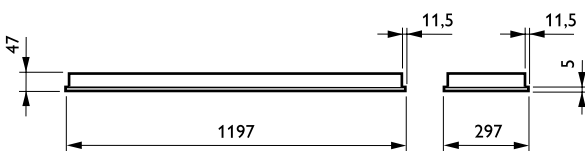
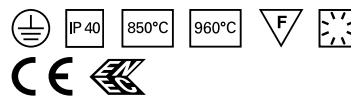
Please contact your local Philips representative for additional configurations

# Recessed luminaires

SmartForm TBS460-461-464-471

	Smartform
Type	TBS464
Light source	Fluorescent TL5: Square: 3 x or 4 x MASTER TL5 / G5 / 14, 24 W Rectangular: 2 x MASTER TL5 / G5 / 28, 54 W
Lamp included	Yes, (lamp color 451 (ActiViva Natural), 452 (ActiViva Active), 827, 830,840) No
Gear	Electronic, 220 - 240V / 50 - 60 Hz: High Frequency Performer (HFP) High Frequency Regulator; DALI (HFD) High Frequency Regulator; I-10V (HFR) High Frequency Regulator; touch and DALI (HFD-T)
Optic	Micro OLC lens optic cover of acrylate material (AC-MLO) Micro OLC lens optic cover of polycarbonate material (PC-MLO) Opal satinized cover of acrylate material (O-SAT) Top-reflector of white metal (T-WH), optional Top-reflector of very high reflectance aluminum (T-VH), optional
Controls (optional)	Luxsense micro daylight controller (LXM) ActiLume multi controller (ACL)
Emergency Lighting	Emergency lighting, 1 hour (EL1) Emergency lighting, 3 hours (EL3)
Connections (outside housing)	Push in connection (PI) or with pull relief (PIP) Wieland connector 3 or 4 pole GST 18 (W,W4) Wago connector 3 or 4 pole (WA,WA4) Ensto connector 3 or 4 pole (EN, EN4) Cord white, 2 m and plug CEE7 (CCE)
Other options	Euro fuse (FU), Safety cable (SC), Separate switching (SW), Separate switching EL-versions (SW-EL)

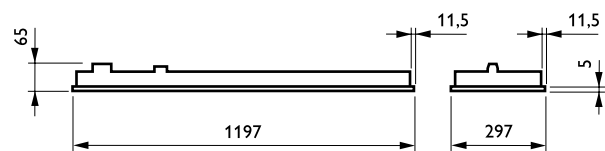
Material and colors	Housing: zinc-coated steel, rim post lackered, white RAL9016 based Optional white RAL9010 or Silver grey RAL9006 based
Deliveries	Luminaires are packed with mounting instructions and optics are protected with foil
Accessories	Exposed ceilings (in lay): no brackets needed Concealed ceilings: bracket ZBS460 SMB (4 pcs) Concealed ceiling with T-bar 38mm: ZBS460 SMB-TPM (4 pcs) Plaster ceilings: bracket ZBS460 SMB-PLC (24 pcs)
Main applications	Office, education, healthcare, recreation, retail, industry



TBS464 2 x TL5



TBS464 3,4 x TL5



TBS464 2 x TL5 with connector



TBS464 3,4 x TL5 with connector

All dimensions in mm

SmartForm TBS460-461-464-471



Smartform TBS464 recessed modular luminaire with opal satinized cover (O-SAT)

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
<b>SmartForm 2-lamp TBS464, O-SAT cover</b>		
TBS464 2x28W/840 HFP O-SAT PI	5.40	009906 00
TBS464 2x54W/840 HFP O-SAT PI	5.40	980055 00

Please contact your local Philips representative for additional configurations



Smartform TBS464 recessed modular luminaire with acrylate or polycarbonate microlens optic (AC-MLO/PC-MLO)

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
<b>SmartForm 2-lamp TBS464, AC/PC-MLO cover</b>		
TBS464 2x28W/840 HFD AC-MLO ACL W	5.40	009821 00
TBS464 2x28W/840 HFD AC-MLO W	5.40	009937 00
TBS464 2x28W/840 HFP PC-MLO W	5.85	980017 00
TBS464 2x54W/840 HFD T-VH AC-MLO W	5.40	980048 00

Please contact your local Philips representative for additional configurations



Smartform TBS464 recessed modular luminaire with with acrylate or polycarbonate microlens optic (AC-MLO/PC-MLO)

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
<b>SmartForm 3-lamp TBS464, AC/PC-MLO cover</b>		
TBS464 3x14W/840 HFD AC-MLO ACL W	5.50	980109 00
TBS464 3x14W/840 HFP PC-MLO W	5.50	980222 00
TBS464 3x14W/840 HFP T-VH AC-MLO PI	6.80	980239 00
<b>SmartForm 4-lamp TBS464, AC/PC-MLO cover</b>		
TBS464 4x14W/840 HFD AC-MLO ACL W	5.60	980260 00
TBS464 4x14W/840 HFP T-VH PC-MLO W SI	5.60	980574 00
TBS464 4x14W/840 HFP T-VH AC-MLO W	6.90	980598 00
TBS464 4x24W/840 HFD AC-MLO W	5.60	980734 00
TBS464 4x24W/840 HFD T-VH AC-MLO W	5.60	98075 800
TBS464 4x14W/840 HFR D8 LXM W IPD-WH	5.60	980666 00

Please contact your local Philips representative for additional configurations



Smartform TBS464 recessed modular luminaire with opal satinized cover (O-SAT)

Preferred selection

Product ID	Weight (kg)	European Order Code (EOC)
<b>SmartForm 3-lamp TBS464, O-SAT cover</b>		
TBS464 3x14W/840 HFP O-SAT W	5.50	980208 00
TBS464 3x24W/840 HFP O-SAT PI	5.50	980246 00
<b>SmartForm 4-lamp TBS464, O-SAT cover</b>		
TBS464 4x14W/840 HFD T-VH O-SAT ACL W SI	5.60	980307 00
TBS464 4x14W/840 HFP T-VH O-SAT W	6.90	980611 00
TBS464 4x24W/840 HFP O-SAT PI	5.60	980789 00
TBS464 4x14W/840 HFP D8-VH W IPC-WH		

Please contact your local Philips representative for additional configurations



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06/2008

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