TIME FOR A CHANGE
FUTURE-PROOF LED TUBES FOR YOUR APPLICATIONS
SEPTEMBER 2021

OSRAM SubstiTUBE

LEDVANCE is licensee of product trademark OSRAM for lamps products in general lighting.
The new European Single Lighting Regulation (SLR) and Energy Labeling Regulation (ELR) mean that from September 2021 many conventional fluorescent tubes will be gradually phased out. But there’s nothing to worry about for you. Having LEDVANCE with more than 100 years of experience by your side as an innovative lighting partner will give you peace of mind.

Whether it’s a conversion (rewiring) or retrofit you require, our comprehensive SubstiTUBE range offers you the ideal LED tubes for your projects – energy-efficient and durable, low-flicker and with a shatter-proof glass body but, above all, EU-compliant and therefore future-proof.

Discover all the advantages of the new extended SubstiTUBE range from LEDVANCE on the following pages and switch to high-quality, climate-friendly and future-proof light.
With their powerful performance and leading technology, OSRAM SubstiTUBE LED tubes are superior to conventional T8, T5 and T9 fluorescent lamps in many ways.

**OSRAM SubstiTUBE**

- **DURABLE. HIGH-QUALITY. EFFICIENT. TOP BENEFITS GUARANTEE FUTURE-PROOF SOLUTIONS**

**EASY RETROFIT**
Quick, simple and safe replacement with no rewiring

**LOW MAINTENANCE AND OPERATING COSTS**
Thanks to a long life of up to 75,000 hours

**HIGH EFFICIENCY**
Up to 175 lm/W

**LOW-Flicker LIGHT**
According to the EU 2019/2020 regulation, and already meeting the requirements of 2024

**DIRECT LAMP START**
Instant 100% light, ideal in combination with sensors

**EFFICIENT POWER FACTOR**
Pay only for the energy that is used

**GREAT ENERGY SAVINGS**
Up to 70% compared to similar fluorescent lamps

**SAFE SHATTER PROTECTION**
Glass body with protective PET sleeve on many SubstiTUBE

**EXCELLENT ECONOMY**
Payback of acquisition and replacement costs possible after only four months

**HIGH-QUALITY FULL GLASS**
T5 and T8 range in full glass

**RELIABLE PRODUCT GUARANTEE**
3 or 5 years; more information at: www.ledvance.com/guarantee

**APPROVED SAFETY**
VDE-tested and certified according to IEC 62776: SubstiTUBE T8 EM PRO UO and PRO, SubstiTUBE T8 EM Food and Motion Sensor
GET READY FOR CLIMATE-FRIENDLY LIGHT
THE NEW EU ECODESIGN AND ENERGY LABELING REGULATIONS

The EU is embarking on the next stage in the journey toward efficient, climate-friendly lighting and there are some fundamental changes coming to the lighting market in 2021.

These changes are being triggered by the new EU 2019/2020 Single Lighting Regulation (SLR) and the new EU 2019/2015 Energy Labeling Regulation (ELR), which have been in force since the end of 2019. They are now being implemented in phases. The aim is to protect the environment, boost consumer protection and improve the sustainability of products.

Another innovation is the European Product Registry for Energy Labeling (EPREL). For the first time, all the relevant information for all the light sources on the market will be centralized here and made available to all users of this database.

AMBITIOUS CLIMATE TARGETS
The EU plans to save a total of 260 TWh of energy in 2030. Lighting would account for around 16% of that. Energy consumption for lighting is to be reduced by 41.9 TWh. This target can only be achieved if the energy efficiency requirements for light sources are further increased.

Energy-saving Target for 2030:

- Total: 260 TWh
- ~ 100 million t CO₂

CO₂ REDUCTION – BUSINESS POTENTIAL

In the EU, the building sector accounts for around 36% of total CO₂ emissions. Since 35% of the buildings are over 50 years old, there is great renovation potential in this area. The goal is to reduce CO₂ emissions on the European construction market by at least 55% by 2030 through energy-related retrofits and efficient technology. The EU countries support this goal with subsidies for energy-related building renovation. LEDVANCE’s economical LED and connected lighting solutions are an excellent match for these savings.
CLEAR AND TRANSPARENT
THE NEW ENERGY LABELS

Since 1994, energy labels in the EU have been used as quick and simple guidelines for consumers. The labels are now entering round three. Apart from a slightly modified design, the new labels for light sources differ essentially in two respects:

— The new energy efficiency scale from A to G.
— A QR code with a link to the product data stored in the EPREL database.

NEW CLASSIFICATION
The highest energy efficiency class was previously A++. Light sources in this class now fall into the new C to F classes. However, this does not mean they have been downgraded. The products are only being reclassified on a different calculation basis.

HOW TO READ OUR PRODUCT TABLES
The new lighting regulation states that the new EU label indicating the energy efficiency class must be clearly visible on every product packaging. To make our product tables clearer and easier to read, the energy efficiency class isn’t specified by a colored arrow but a letter. See on the right.

TRANSITION PHASE UNTIL 2023
During a one-and-a-half-year transition period you will see both labels at the distributor.

Sept 1, 2021
Start of the transition phase. The old labels are now allowed only for products that were placed on the market before this date.

March 1, 2023
End of the transition phase. From this date, only the new label is allowed.
OPTIMIZED QUALITY OF LIGHT: ILLUMINATING WORKSTATIONS FOR THE FUTURE

LEDVANCE will provide you with LED lamps that reliably fulfill the requirements of the new EU regulations at an early stage. Some of them already meet requirements that do not take effect until 09/01/2024 (see the infobox). Thanks to these products, you will be able to help your customers increase the safety of their workstations, improve employees’ ability to concentrate, promote their well-being – and, in general, facilitate increased productivity.

MEETING TOMORROW’S REQUIREMENTS TODAY
The following OSRAM LED tubes already meet the requirement of SVM ≤ 0,4¹ that will go into effect on 09/01/2024:

- OSRAM SubstiTUBE T8 EM and Connected
- OSRAM SubstiTUBE T8 HF and Universal
- OSRAM SubstiTUBE T5 HF and AC Mains
- OSRAM SubstiTUBE T9 EM

STROBOSCOPIC AND FLICKER EFFECTS
As part of the SLR, the following new quality features are being introduced to improve the light quality of LED mains voltage light sources:

**SVM (stroboscopic effect visibility measure)**
These effects can occur if non-compliant light sources illuminate a moving object. Stroboscopic effects can create dangerous situations because rotating or moving objects become less visible (e.g., revolving machine components are perceived to be “standing still”).

**PₘLM (perception of short-term light modulation)**
This describes discernible flicker on monitors and light sources, among other areas. Compliance with the new thresholds will help prevent a feeling of discomfort, visual fatigue and headaches.

NEW REGULATIONS AND KEY DATES
Requirements governing low-flicker qualities and the stroboscopic effect will be gradually toughened:

- **SEPT. 1ST 2021**
  - Stroboscopic effect SVM ≤ 0,9¹
  - Low-flicker qualities PₘLM ≤ 1

- **SEPT. 1ST 2024**
  - Stroboscopic effect SVM ≤ 0,4¹

¹ Exemptions: light sources for outdoor, industry and other uses that offer color rendering with CRI ≤ 80.
ALWAYS LOOKING AHEAD:
LEDVANCE BY YOUR SIDE

The new EU regulations are not aimed simply at removing certain lighting products from the market. They specifically promote energy-efficient and sustainable lighting design, strengthening of the circular economy and transparent information for consumers.

LEDVANCE expressly welcomes this path. That’s why we are actively supporting our partners with the development of new, even more energy-efficient light sources, with measures and information that will guide you through the various phases of the regulations coming into force.

Products that do not achieve the minimum efficiency required by SLR may no longer be manufactured or sold from certain dates. You will find exceptions in the current SLR/ELR regulation in Annex III (SLR) and Annex IV (ELR) at www.eur-lex.eu.

The good news for you is that LEDVANCE defined all the affected products early on and can offer suitable alternatives. They will be ready in good time.

<table>
<thead>
<tr>
<th>PHASE-OUT AND LEDVANCE REPLACEMENT PRODUCTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODUCTS AFFECTED</td>
</tr>
<tr>
<td>LINEAR FLUORESCENT LAMPS</td>
</tr>
<tr>
<td>T12 und T2</td>
</tr>
<tr>
<td>LINEAR FLUORESCENT LAMPS</td>
</tr>
<tr>
<td>T8</td>
</tr>
<tr>
<td>600 mm, 1 200 mm, 1 500 mm</td>
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<tr>
<td>BANNED FROM†</td>
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<tr>
<td>01.09.2021</td>
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<tr>
<td>01.09.2023</td>
</tr>
</tbody>
</table>

† Products that are already on the market may still be sold after this date, but may not be placed on the market again.

HOW LEDVANCE AS A PARTNER CAN HELP YOU:

For you as a wholesaler, two aspects are particularly important – you need LED replacements for phased-out products to be available in good time and you need full compliance with the regulations regarding the new energy label and other information.

In both respects LEDVANCE ensures that you are compliant, both technically and legally. Here’s how we support you:

- **Complete data management and registration** of all LEDVANCE light sources in EPREL – including all required data
- **Full compliance with all labeling and information requirements** – for example on packaging, on product data sheets and in operating instructions
- **Prompt availability of energy-efficient LED replacements** for affected products
- **Continued reliable supply** of traditional lamps as permitted in law
- **Continual development of our portfolio** – for even greater energy efficiency and climate-friendly products
- **Clear and comprehensive information** so you can be technically and legally compliant
THREE SEGMENTS FOR EVERY NEED
PERFORMANCE & TECHNOLOGY

OSRAM SubstiTUBE T8 EM PRO ULTRA OUTPUT
Operation on CCG and AC mains

- Luminous flux up to 4,100 lm
- Efficiency up to 175 lm/W
- Lifetime of 75,000 h
- 1200 mm, 1500 mm

OSRAM SubstiTUBE T8 EM PRO
Operation on CCG and AC mains

- Luminous flux up to 3,100 lm
- Efficiency up to 165 lm/W
- Lifetime of 75,000 h
- 438 mm, 600 mm, 900 mm, 1,100 mm, 1,200 mm, 1,500 mm

OSRAM SubstiTUBE T8 EM ADVANCED ULTRA OUTPUT
Operation on CCG and AC mains

- Luminous flux up to 3,700 lm
- Efficiency up to 160 lm/W
- Lifetime of 50,000 h
- 1200 mm, 1500 mm

OSRAM SubstiTUBE T8 EM ADVANCED
Operation on CCG and AC mains

- Luminous flux up to 3,100 lm
- Efficiency up to 150 lm/W
- Lifetime of 50,000 h
- 600 mm, 1,200 mm, 1,500 mm

OSRAM SubstiTUBE T8 EM VALUE
Operation on CCG and AC mains

- Luminous flux up to 2,200 lm
- Efficiency up to 120 lm/W
- Lifetime of 30,000 h
- 600 mm, 1,200 mm, 1,500 mm

MAKE THE RIGHT CHOICE
CONTROL GEAR AND TECHNOLOGY OVERVIEW

<table>
<thead>
<tr>
<th>COMPATIBILITY</th>
<th>CCG</th>
<th>ECG</th>
<th>FOR AC MAINS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SubstiTUBE EM: “Electro magnetic”</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Replacement for T8 fluorescent lamps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SubstiTUBE AC: “AC Mains”</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Replacement for T5 fluorescent lamps</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

✗ = not compatible  ✓ = compatible

GLASS CRI 83

1 L70/B50
2 Check of the ECG compatibility list before installation required: www.ledvance.com/ecg-compatibility
The SubstiTUBE LED tubes come in the PRO, ADVANCED and VALUE segments. This allows you to easily meet the requirements of each of your lighting projects. And when it comes to technology, the SubstiTUBE range will also have the answer – no matter whether operated on ECG², CCG or AC mains.

OSRAM SubstiTUBE T8 HF/UN PRO ULTRA OUTPUT
HF on ECG² | UNIVERSAL on ECG², CCG and AC mains

- Lumen output up to 3 700 lm
- Efficiency up to 161 lm/W
- Lifetime of 60 000 h¹
  - 600 mm (UN only), 1 200 mm, 1 500 mm

OSRAM SubstiTUBE T8 HF PRO
HF on ECG² | UNIVERSAL on ECG², CCG and AC mains

- Lumen output up to 3 100 lm
- Efficiency up to 155 lm/W
- Lifetime of 60 000 h¹
  - 600 mm, 1 200 mm, 1 500 mm

OSRAM SubstiTUBE T8 HF/UN VALUE
HF on ECG² | UNIVERSAL on ECG², CCG and AC mains

- Lumen output up to 2 800 lm
- Efficiency up to 116 lm/W
- Lifetime of 30 000 h¹
  - 600 mm (HF only), 1 200 mm (UN only), 1 500 mm (UN only)

compatibility

<table>
<thead>
<tr>
<th></th>
<th>CCG</th>
<th>ECG²</th>
<th>FOR AC MAINS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SubstiTUBE HF: “High frequency” Replacement for T8/T9 fluorescent lamps</td>
<td>x</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>SubstiTUBE UN: “Universal” One for everything. Replacement for T8 fluorescent lamps</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

x = not compatible ✓ = compatible

¹L70/B50
²Check of the ECG compatibility list before installation required: www.ledvance.com/ecg-compatibility
OSRAM SubstiTUBE SPECIAL TYPES
SPECIAL TASKS, SPECIAL SOLUTIONS

The SubstiTUBE range from LEDVANCE also includes specialists. You can use them to offer your customers real added value for special applications.

**OSRAM SubstiTUBE T8 EM CONNECTED**
Operation on CCG and AC mains

Light on demand: intelligent control via a sensor reduces energy consumption.

- Communication via Zigbee 3.0
- Low-flicker according to EU 2019/2020
- (SVM ≤ 0.4; PstLM ≤ 1)
- Glass tube with splinter protection
- Only in connection with the LEDVANCE Connected Sensor:
  - Installation height
    - Low bay: up to 4 m
    - High bay: 4 – 14 m

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**OSRAM SubstiTUBE T8 EM MOTION SENSOR**
Operation on CCG and AC mains

With movement there’s light. Lighting control via the microwave sensor integrated in the tube.

- Integrated 5.8 GHz microwave sensor
- Available in three lengths: 600 mm, 1 200 mm, 1 500 mm
- Detection range up to 5 m
- 2-step dimming:
  - 100 % (5 min), then 20 % (2 min), then off
- Also works in closed luminaires

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**OSRAM SubstiTUBE T8 EM FOOD**
Operation on CCG and AC mains

A burst of freshness for food presentation thanks to a high R9 value.

- Similar spectrum to traditional NATURA (76) lamps with a high R9 value
- Available in three lengths: 600 mm, 1 200 mm, 1 500 mm
- Luminous flux up to 1 700 lm
- Ideal for meat processing plants, butchers, supermarkets

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**OSRAM SubstiTUBE T9 EM**
Operation on CCG and AC mains

A great all-rounder: the efficient LED alternative for traditional T9 fluorescent lamps.

- Retrofit solution without rewiring
- Suitable for many luminaires thanks to rotatable base
- Uniform illumination
- Lifetime of 30 000 h¹

¹ L70/B50

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SubstiTUBE T5 LED tubes are the right energy-efficient and SLR-compliant replacement for virtually all conventional T5 HO or T5 HE fluorescent tubes. Available as SubstiTUBE T5 HF for the operation on ECG² or as SubstiTUBE T5 AC for operation directly on mains voltage (AC). Particularly convenient: you can keep using existing luminaires.

THE BENEFITS OF BOTH PRODUCT SEGMENTS AT A GLANCE:

- Maximum luminous flux of up to 5600 lm
- Low-flicker according to EU 2019/2020 (SVM ≤ 0.4; P_stLM ≤ 1)
- Shatter-proof glass tubes
- Lifetime of up to 50,000 h¹

OSRAM SubstiTUBE T5 HF
Operation on ECG²

- High energy savings and longer lifetime result in fast payback times
- Quick and easy installation
- Operation on compatible ECG ², ³
- Shatter-proof glass tubes

OSRAM SubstiTUBE T5 220 – 240 V AC
Operation on AC mains

- Existing luminaire is kept: rewired directly on 220 – 240 V AC mains
- Removes any compatibility issues and energy losses from the control gear
- Eliminating maintenance costs associated with ballast replacements
- Shatter-proof glass tube

¹L70/B50 ²Check of the ECG compatibility list before installation required: www.ledvance.com/ecg-compatibility
³Non-compatible with a direct mains voltage connection, 220–240 V AC
STEP BY STEP
FINDING A SUITABLE OSRAM SubstiTUBE

The requirements for an LED tube vary greatly from application to application. For existing installations, the following steps will help you to decide whether a retrofit or conversion (rewiring) is the better solution, and to find the exact SubstiTUBE you need.

01 DETERMINE THE TUBE DIAMETER: T5 OR T8

02 DETERMINE THE TUBE LENGTH

03 DETERMINE THE CONTROL GEAR INSTALLED IN THE LAMP: ECG OR CCG?

ECG

See page 16: Professional tips for identifying the installed control gear.

CCG

04 FIND COMPATIBLE PRODUCTS FOR YOUR ECG OR CCG:
A) CHECK WHICH LEDVANCE LED TUBES YOUR ECG IS COMPATIBLE WITH

Check at ledvance.com/ecg-compatibility

Check online in the web app at ledvance.com/tubefinder

Step 1: Make a note of the ECG’s brand, name and reference number
Step 2: Find the ECG in the list
Step 3: Select compatible LED tube from the list

Result: ✓ matching SubstiTUBE available: retrofit

X no matching SubstiTUBE: rewiring or new ECG required

B) CCG ARE ALWAYS COMPATIBLE WITH THE SUBSTITUBE EM AND UNIVERSAL PRODUCTS: RETROFIT

05 DEFINE THE DESIRED OUTPUT AND OTHER PRODUCT FEATURES AND CHOOSE THE RIGHT PRODUCT
HELP TO DECIDE
HOW TO CHOOSE THE RIGHT LED TUBE

RETROFIT OR CONVERSION:
WHICH PROCESS IS THE RIGHT ONE?

RETROFIT

ADVANTAGES
- Easiest installation
- Lowest installation costs

DISADVANTAGES
- Compatibility check required for ECG

CONVERSION

ADVANTAGES
- No compatibility issues
- Maximum efficiency and no driver maintenance

DISADVANTAGES
- Higher installation costs
- More complex installation and additional material required
- New CE label needed for luminaire

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RETROFIT

existing ECG compatible with SubstiTUBE T5 HF

RETROFIT: ON CCG

with SubstiTUBE T8 EM or UN

CONVERSION

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- More complex installation and additional material required
- New CE label needed for luminaire
REPLACEMENT MADE EASY

RETROFIT IN T8 LUMINAIRE WITH CCG

1. Disconnect luminaire from mains
2. Unscrew and remove conventional T8 lamp
3. Remove conventional starter
4. Insert SubstiTUBE LED starter
5. Insert SubstiTUBE T8 EM/UN
6. Screw in SubstiTUBE T8 EM/UN
7. Turn on power
8. That’s it!

RETROFIT IN T8 OR T5 LUMINAIRE WITH ECG

1. Disconnect luminaire from the mains
2. Unscrew and remove conventional T8 or T5 lamp
3. Insert and screw in SubstiTUBE T8 HF/UN or T5 HF
4. Turn on power
5. That’s it!

Check ECG compatibility at ledvance.com/compatibility
CONVERSION OF T8 OR T5 LUMINAIRES

1. Disconnect luminaire from mains

2. Unscrew and remove conventional T8 or T5 lamp

3. Remove ECG/CCG from the luminaire
   For CCG: also remove capacitors for reactive power compensation

4. Rewiring following wiring diagram for single-lamp luminaires

5A. 1x LED tube

5B. ≥ 2x LED tube
   Rewiring following wiring diagram for multi-lamp luminaires

6A. Replace conventional starter with SubstiTUBE LED starter

6B. Insert microfuse (250V, T2A)

7. Insert and screw in SubstiTUBE T8 or T5

8. Turn on power

9. That’s it!

NOTES
- The rewiring may only be carried out by qualified electricians.
- After rewiring, fluorescent lamps may no longer be used in the luminaire, only LED tubes. This should be mentioned on the luminaire’s new type plate, for example. The SubstiTUBE LED tubes are already provided with an appropriate sticker.

IMPORTANT!
- A new CE label has to be placed on the luminaire after the modification. For this purpose, testing following legal and safety requirements and technical standards such as DIN VDE 0701-0702 and DIN EN60598-1 is recommended.
- Affix a new type plate to the luminaire and obscure the old type plate.
ALL MATERIALS IN ONE PACKAGE
THE LEDVANCE CONVERSION KIT

The LEDVANCE conversion kit includes all the materials you need for converting T8 or T5 lamps – including step-by-step instructions. Rewiring is quick and easy with this kit.

It comes in two versions for single- or double-lamp luminaires and includes:
- WAGO connectors
- Adhesive sockets for cable ties
- Cable ties
- New blank type plate
- Microfuse (250 V T2A) with wiring
- Step-by-step instructions

NOTE:
The conversion kit is available in combination with selected LED tubes. For ordering information, see page 40.

FIND THE RIGHT TECHNOLOGY
EM OR HF

Are you wondering which technology you need for your luminaire with T8 fluorescent lamp – an EM lamp or an HF lamp? Our insider tip reveals two easy ways to find out.

STARTER TEST

Check whether the luminaire you want to fit the new lamp in has a starter. If it does, you need a SubstiTUBE T8 EM for operation on a CCG. If not, use an ECG-compatible version, either SubstiTUBE HF or UNIVERSAL.

CAMERA TEST

If the luminaire still has a working T8 lamp, take a look at it through a digital camera (such as the one on your smartphone or tablet). If the light flickers, you need a SubstiTUBE T8 EM for operation on a CCG. Otherwise use an ECG-compatible version, either SubstiTUBE HF or UNIVERSAL.
TOTAL COST OF OWNERSHIP
IT ALL ADDS UP

Our TCO sample calculation using a parking garage clearly shows that a switch to efficient, durable SubstiTUBE LED tubes is also worthwhile financially for your customers. Because the upgrade costs will be offset very quickly. And from that point on, it’s savings, savings, savings.

OSRAM SubstiTUBE T8 EM ADVANCED UO 23,1W

OSRAM SubstiTUBE T8 EM Connected 24W

GLOBAL PARAMETERS:
 Period of operation: 60 months, 5 years, 43,680 operating hours
 Operating times: 7 days per week, 52 weeks per year, 24 hours per day

<table>
<thead>
<tr>
<th>OLD: Traditional T8 58W</th>
<th>NEW: OSRAM SubstiTUBE T8 EM Advanced UO 23,1W</th>
<th>Savings</th>
<th>NEW: OSRAM SubstiTUBE T8 EM Connected 24W</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of light points:</td>
<td>100 Lamps</td>
<td>100 Lamps</td>
<td>100 Lamps</td>
<td>100 Lamps</td>
</tr>
<tr>
<td>Efficiency:</td>
<td>90 lm/W</td>
<td>24.1 W</td>
<td>25 W</td>
<td></td>
</tr>
<tr>
<td>System wattage (incl. CCG losses)</td>
<td>68 W</td>
<td>50 000 h</td>
<td></td>
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<tr>
<td>Operating hours per year</td>
<td>8 736 h/year</td>
<td>4 368 h/year</td>
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<td></td>
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<tr>
<td>Energy consumption over period of operation</td>
<td>297 024 kWh</td>
<td>191 755 kWh</td>
<td>54 600 kWh</td>
<td>242 424 kWh</td>
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<tr>
<td>CO2 emissions (474 g/kWh)</td>
<td>140 789 kg</td>
<td>90 892 kg</td>
<td>25 880 kg</td>
<td>114 909 kg</td>
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<tr>
<td>Energy consumption of project</td>
<td>6.8 kW</td>
<td>2.41 kW</td>
<td>2.5 kW</td>
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<tr>
<td>Number of lamps/sensors needed</td>
<td>300 Lamps</td>
<td>100 Lamps</td>
<td>100 Lamps</td>
<td></td>
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<tr>
<td>Lamp and labor costs over period of operation</td>
<td>3 905 €</td>
<td>2 500 €</td>
<td>5 055 €</td>
<td>50 000 €</td>
</tr>
<tr>
<td>Energy costs over period of operation</td>
<td>44 554 €</td>
<td>15 790 €</td>
<td>8 190 €</td>
<td>36 364 €</td>
</tr>
<tr>
<td>Total cost over period of operation</td>
<td>48 454 €</td>
<td>18 290 €</td>
<td>13 245 €</td>
<td>35 209 €</td>
</tr>
</tbody>
</table>

GLOBAL PARAMETERS:
 Period of operation: 60 months, 5 years, 21 840 operating hours
 Operating times: 7 days per week, 52 weeks per year, 12 hours per day

Note: reduced operating hours thanks to control by sensors based on demand

THE POTENTIAL SAVINGS ARE ENORMOUS:

OSRAM SubstiTUBE T8 EM ADVANCED UO 23,1W

OSRAM SubstiTUBE T8 EM Connected 24W

RESULTS:
- Easier and faster upgrade and payback with SubstiTUBE T8 EM ADVANCED
- Higher initial investment and installation costs, but light control based on demand and greater savings long-term when using SubstiTUBE T8 EM Connected

1 Calculation parameters for traditional T8 58 W compared to OSRAM SubstiTUBE T8 EM ADVANCED UO 23,1W and OSRAM SubstiTUBE T8 EM Connected: Number of light points: 100; Replacement costs for one lamp: Traditional T8 58 W 3.00 €/piece, SubstiTUBE T8 EM Advanced UO 23,1W 15.60 €/piece; SubstiTUBE T8 EM Connected 24W 33.60 €/piece; sensor costs: 129.-*/piece; Costs for exchanging one lamp (incl. labour cost): 10.00 €/piece; Electricity costs: 0.15 €/kWh.
2 Illustrative pricing. Prices may vary.
### OSRAM SubstiTUBE PORTFOLIO

#### SubstiTUBE APPLICATION MATRIX

<table>
<thead>
<tr>
<th>Industry</th>
<th>T8</th>
<th>T5</th>
<th>T9C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OSRAM SubstiTUBE PORTFOLIO</strong></td>
<td></td>
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<tr>
<td><strong>INDUSTRY</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Typical operating time: 24h/day 6 days/week</td>
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<tr>
<td>Recommended illuminance: 200–500+ lux</td>
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<td></td>
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<tr>
<td><strong>WAREHOUSE</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Typical operating time: 24h/day 6 days/week</td>
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<td></td>
<td></td>
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<tr>
<td>Recommended illuminance: 200–300 lux</td>
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<td></td>
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<tr>
<td><strong>PARKING</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>Typical operating time: 24h/day 7 days/week</td>
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<tr>
<td>Recommended illuminance: 75–300 lux</td>
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<td><strong>RETAIL</strong></td>
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<td>✓</td>
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<td>Typical operating time: 15h/day 7 days/week</td>
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<tr>
<td>Recommended illuminance: 500+ lux</td>
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<tr>
<td><strong>FOOD PRESENTATION</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Typical operating time: 15h/day 7 days/week</td>
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<td></td>
<td></td>
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<tr>
<td>Recommended illuminance: Special spectrum with high CRI-R9 level, shatter protection</td>
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<tr>
<td><strong>OFFICE</strong></td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Typical operating time: 14h/day 5 days/week</td>
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<tr>
<td>Recommended lighting intensity: 500+ lux</td>
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<td><strong>RESIDENTIAL AREAS</strong></td>
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<td>✓</td>
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<tr>
<td>Typical operating time: 2.7h/day 7 days/week</td>
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<tr>
<td>Recommended illuminance: 100+ lux</td>
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<td><strong>OUTDOOR AREAS / PUBLIC TRANSPORTATION</strong></td>
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<tr>
<td>Typical operating time: 10h/day 7 days/week</td>
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<td>Recommended illuminance: 5–500+ lux</td>
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<tr>
<td><strong>PUBLIC BUILDINGS / SPORTS AND LEISURE</strong></td>
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<td>✓</td>
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<tr>
<td>Typical operating time: 15h/day 7 days/week</td>
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<td></td>
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<tr>
<td>Recommended illuminance: 100–500+ lux</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

1 < 10 light outlets
SETTING LIGHT TRENDS, FULFILLING REGULATORY REQUIREMENTS:
ALWAYS REMAIN UP TO DATE WITH LEDVANCE PRODUCTS

01 OSRAM SubstiTUBE T8 EM
Whether it’s PRO, ADVANCED or VALUE, the core range of SubstiTUBE T8 EM LED tubes offers unprecedented performance as replacements for conventional T8 fluorescent lamps with G13 bases. All SubstiTUBE T8 EMs are low-flicker according to EU 2019/2020 at SVM ≤ 0.4 and feature shatter-proof, no-bend glass bodies as well as metal end caps. Other major benefits include extremely high efficiency of up to 175 lm/W, extremely high luminous flux of up to 4100 lm and an extremely long life of up to 75000 hours. Thanks to energy savings of up to 70%, the switch to SubstiTUBE T8 EM pays for itself very quickly.
► Ideal for industry, warehouses and offices

02 OSRAM SubstiTUBE T8 EM MOTION SENSOR
Thanks to its integrated 5.8 GHz microwave sensor, the new SubstiTUBE T8 EM MOTION SENSOR with low-flicker at SVM ≤ 0.4 in line with EU 2019/2020 detects movements within a radius of up to 5 meters even if it is installed in a closed luminaire. Its 2-step dimming – from 100 % to 20 % after 5 minutes, and shutdown after another 2 minutes – increases the potential for energy savings. And plug and play makes installation super easy.
► Ideal for small warehouses and homes

03 OSRAM SubstiTUBE T9
The OSRAM SubstiTUBE T9 C with low-flicker at SVM ≤ 0.4 in line with EU 2019/2020 serves as a direct LED replacement for T9 fluorescent lamps with 22 or 32 W output. With its new rotatable base it now fits into even more luminaires. The SubstiTUBE T9 C is CCG-compatible but can also be operated on mains voltage. What’s more, it offers up to 45 % energy savings, a long lifetime and an excellent price/performance ratio.
► Ideal for public buildings and homes
SubstiTUBE PRO Ultra Output EM\(^1,2\)

High performance LED tubes for electromagnetic control gears (CCG), shatterproof

**PRODUCT FEATURES**
- LED replacement for classic T8 fluorescent lamps with G13 socket for use in CCG luminaires or on AC mains
- Low flicker according to EU 2019/2020 (SVM ≤ 0.4 / PstLM ≤ 1)
- Lamp tube made of glass with splitter protection e.g. for food industry applications
- VDE certified according to IEC62776
- For especially uniform illumination

**PRODUCT BENEFITS**
- No bending thanks to glass tube
- Shatter protection thanks to special PET coating
- Support the implementation of the HACCP concepts from production through to presentation
- Very high resistance to switching loads
- High luminous flux for sophisticated lighting tasks

**AREAS OF APPLICATION**
- General illumination within ambient temperatures from -20...+50 °C
- Illumination of production areas
- Traffic zones and corridors
- Supermarkets and department stores
- Industry

**SAFETY ADVICE**

Not suitable for operation with electronic control gear.
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.

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\(^1\) Protection class: IP20 | \(^2\) Non-dimmable | \(^3\) You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee | \(^4\) L70/B50 | \(^5\) Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE PRO EM\(^1,2\)

High performance LED tubes for electromagnetic control gears (CCG), shatterproof

**PRODUCT FEATURES**
- LED replacement for classic T8 fluorescent lamps with G13 socket for use in CCG luminaires or on AC mains
- Low flicker according to EU 2019/2020 (SVM ≤0.4 / PstLM ≤ 1)
- Lamp tube made of glass with splitter protection e.g. for food industry applications
- VDE certified according to IEC62776
- Lamp tube made of glass with splitter
- Low flicker according to EU 2019/2020
- Product name GTIN (EAN)

**PRODUCT BENEFITS**
- No bending thanks to glass tube
- Shatter protection thanks to special PET coating
- Support the implementation of the HACCP concepts from production through to presentation
- Very high resistance to switching loads
- High luminous flux for sophisticated lighting tasks

**AREAS OF APPLICATION**
- General illumination within ambient temperatures from -20...+50 °C
- Illumination of production areas
- Traffic zones and corridors
- Supermarkets and department stores
- Industry

**SAFETY ADVICE**
Not suitable for operation with electronic control gear.
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.
SubstiTUBE Advanced Ultra Output\textsuperscript{1,2}

LED tubes for electromagnetic control gear (CCG)

**PRODUCT FEATURES**
- LED replacement for classic T8 fluorescent lamps with G13 socket for use in CCG luminaires or on AC mains
- Low flicker according to EU 2019/2020 (SVM ≤ 0.4 / PstLM ≤ 1)
- Tube made of glass
- For especially uniform illumination
- Mercury-free and RoHS compliant

**PRODUCT BENEFITS**
- No bending thanks to glass tube
- Quick, simple and safe replacement without rewiring
- Energy savings of up to 60 % (compared to T8 fluorescent lamp on CCG)
- Very high resistance to switching loads
- High luminous flux for sophisticated lighting tasks

**AREAS OF APPLICATION**
- General illumination within ambient temperatures from -20…+50 °C
- Illumination of production areas
- Traffic zones and corridors
- Supermarkets and department stores

**SAFETY ADVICE**
Not suitable for operation with electronic control gear.
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.

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\textsuperscript{1} Protection class: IP20  \textsuperscript{2} Non-dimmable  \textsuperscript{3} You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee  \textsuperscript{4} L70/B50  \textsuperscript{5} Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE Advanced\textsuperscript{1,2}

LED tubes for electromagnetic control gear (CCG)

PRODUCT FEATURES

\begin{itemize}
\item LED replacement for classic T8 fluorescent lamps with G13 socket for use in CCG luminaires or on AC mains
\item Low flicker according to EU 2019/2020 (SVM ≤0.4 / PsrLM ≤ 1)
\item Single and tandem operation on conventional control gear (0.6 m version)
\item Tube made of glass
\item Mercury-free and RoHS compliant
\end{itemize}

PRODUCT BENEFITS

\begin{itemize}
\item No bending thanks to glass tube
\item Quick, simple and safe replacement without rewiring
\item Energy savings of up to 64 % (compared to T8 fluorescent lamp on CCG)
\item Instant-on light, therefore ideally suitable in combination with sensor technology
\item Very high resistance to switching loads
\end{itemize}

AREAS OF APPLICATION

\begin{itemize}
\item General illumination within ambient temperatures from -20…+50 °C
\item Illumination of production areas
\item Traffic zones and corridors
\item Supermarkets and department stores
\item Industry
\end{itemize}

SAFETY ADVICE

Not suitable for operation with electronic control gear.
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.

\begin{table}
\centering
\begin{tabular}{|l|l|l|l|l|l|l|l|l|l|l|l|}
\hline
Product name & GTIN (EAN) & W & V & lm & \% & K & CRI & 10 & 1 & \\
\hline
SubstiTUBE T8 EM Advanced 7.3 W/4000K 600 mm & 4058075611795 & 18 & 613 & 603 & 7.3 & 1100 & 150 & 4000 & 190 & 83 & 50000 & D & 10 & 1 \\
SubstiTUBE T8 EM Advanced 7.3 W/6500K 600 mm & 4058075611818 & 18 & 613 & 603 & 7.3 & 1100 & 150 & 6500 & 190 & 83 & 50000 & D & 10 & 1 \\
SubstiTUBE T8 EM Advanced 14 W/4000K 1200 mm & 4058075611832 & 36 & 613 & 1212 & 14 & 2100 & 150 & 4000 & 190 & 83 & 50000 & D & 10 & 1 \\
SubstiTUBE T8 EM Advanced 14 W/6500K 1200 mm & 4058075611856 & 36 & 613 & 1212 & 14 & 2100 & 150 & 6500 & 190 & 83 & 50000 & D & 10 & 1 \\
SubstiTUBE T8 EM Advanced 20.6 W/4000K 1500 mm & 4058075611870 & 58 & 613 & 1513 & 20.6 & 3100 & 150 & 4000 & 190 & 83 & 50000 & D & 10 & 1 \\
SubstiTUBE T8 EM Advanced 20.6 W/6500K 1500 mm & 4058075611894 & 58 & 613 & 1513 & 20.6 & 3100 & 150 & 6500 & 190 & 83 & 50000 & D & 10 & 1 \\
\hline
\end{tabular}
\end{table}

\textsuperscript{1} Protection class: IP20 \textsuperscript{2} Non-dimmable \textsuperscript{3} You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee \textsuperscript{4} L70/B50 \textsuperscript{5} Energy efficiency class (IEC) on a scale of A (highest efficiency) to G (lowest efficiency)
Economic LED tubes for electromagnetic control gears (CCG)

OSRAM LED LAMPS FROM LEDVANCE | LED TUBES FOR ELECTROMAGNETIC CONTROL GEAR (CCG)

PRODUCT FEATURES

— LED replacement for classic T8 fluorescent lamps with G13 socket for use in CCG luminaires or on AC mains
— Low flicker according to EU 2019/2020 (SVM ≤0.4 / PsILM ≤ 1)
— Tube made of glass
— Mercury-free and RoHS compliant
— Uniform illumination

PRODUCT BENEFITS

— No bending thanks to glass tube
— Energy savings of up to 68 % (compared to T8 fluorescent lamp on CCG)
— Quick, simple and safe replacement without rewiring
— Instant-on light, therefore ideally suitable in combination with sensor technology
— Very high resistance to switching loads

AREAS OF APPLICATION

— General illumination within ambient temperatures from -20…+45 °C
— Corridors, stairways, parking garages
— Industry
— Warehouses
— Cooling and storage rooms

SAFETY ADVICE

Not suitable for operation with electronic control gear.
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.
SubstiTUBE MOTION SENSOR\textsuperscript{1,2}

LED tubes with integrated microwave sensor for electromagnetic control gears (CCG), shatterproof

**PRODUCT FEATURES**
- LED replacement for classic T8 fluorescent lamps with G13 socket for use in CCG luminaires or on AC mains
- Integrated microwave sensor with motion detection
- Automatic dimming to 20 % light output after 5 minutes without motion detection
- Automatic light switch off 7 minutes after the last motion detection
- Microwave sensor with 5.8 GHz

**PRODUCT BENEFITS**
- Suitable for closed luminaires thanks to microwave technology
- No bending thanks to glass tube
- Shatter protection thanks to special PET coating
- Support the implementation of the HACCP concepts from production through to presentation
- Very high resistance to switching loads

**AREAS OF APPLICATION**
- General illumination within ambient temperatures from -20…+50 °C
- Corridors, stairways, parking garages
- Warehouses
- Walkways and corridors
- Storage rooms

**SAFETY ADVICE**
Not suitable for operation with electronic control gear.
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.
Recommended maximum mounting height: 5 m

\begin{tabular}{|l|l|l|l|l|l|l|l|l|l|l|}
\hline
Product name & GTIN (EAN) & mW & lm & K & CRI & T & \textsuperscript{1} & \textsuperscript{2} & \textsuperscript{3} & \textsuperscript{4} & \textsuperscript{5} & \textsuperscript{6} & \textsuperscript{7} & \textsuperscript{8} & \textsuperscript{9} \\
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SubstiTUBE T8 EM Motion Sensor 6.6 W/4000K 600 mm & 4058075904302 & 18 & 613 & 604 & 6.8 & 1100 & 161 & 4000 & 190 & 83 & 50000 & C & 8 & 1 \\
\hline
SubstiTUBE T8 EM Motion Sensor 13.1 W/4000K 1200 mm & 4058075904326 & 36 & 613 & 1212 & 13.1 & 2100 & 160 & 4000 & 190 & 83 & 50000 & C & 8 & 1 \\
\hline
SubstiTUBE T8 EM Motion Sensor 19.3 W/4000K 1500 mm & 4058075904340 & 58 & 613 & 1513 & 19.3 & 3100 & 160 & 4000 & 190 & 83 & 50000 & C & 8 & 1 \\
\hline
\end{tabular}

\textsuperscript{1} Protection class: IP20 | \textsuperscript{2} Non-dimmable | \textsuperscript{3} You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee | \textsuperscript{4} L70/B50 | \textsuperscript{5} Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
**SubstiTUBE FOOD**  
LED tubes for electromagnetic control gears (CCG), shatterproof, for food presentation

**PRODUCT FEATURES**
- LED replacement for classic T8 fluorescent lamps with G13 socket for use in CCG luminaires or on AC mains
- Lamp tube made of glass with splitter protection e.g. for food industry applications
- Specially tailored spectral distribution (comparable to T8 FL NATURA 76)
- VDE certified according to IEC62776
- Type of protection: IP20

**PRODUCT BENEFITS**
- Food looks fresh and appetizing without unduly “beautifying” it
- No bending thanks to glass technology
- Quick, simple and safe replacement of fluorescent lamps without rewiring the CCG
- Energy savings of up to 60 % (compared to T8 fluorescent lamp on CCG)
- Shatter protection thanks to special PET coating

**AREAS OF APPLICATION**
- General illumination within ambient temperatures from -20...+50 °C
- Supermarkets and department stores
- Bakeries, meat processors, butchers
- Shops
- Especially suitable for the food sector

**SAFETY ADVICE**
Not suitable for operation with electronic control gear.
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.

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1 Protection class: IP20  
2 Non-dimmable  
3 You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee  
4 L70/B50  
5 Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE Start
Starter for SubstiTUBE EM (CCG)

PRODUCT FEATURES
— Substitute starter for the replacement of a fluorescent lamp with a LED tube
— Suitable for operation with low loss or conventional control gear or line voltage
— Integrated electrical fuse

AREAS OF APPLICATION
— Not suitable for operation with electronic control gears

Product name | GTIN (EAN)
--- | ---
SUBSTITUBE LED T8 STARTER 10X2 OSRAM | 4059075013674 20 1
SubstiTUBE Connected Advanced Ultra Output ¹²
LED tubes for electromagnetic control gears

PRODUCT FEATURES
— Network protocol: ZigBee 3.0 (2.4 GHz mesh network)
— Connected tube can be only operated with Connected sensor
— Dimmable only with LEDVANCE Connected Sensor

PRODUCT BENEFITS
— No bending thanks to glass technology
— Shatter protection thanks to special PET coating
— Short payback period thanks to low energy consumption and maintenance costs

AREAS OF APPLICATION
— General illumination within ambient temperatures from -20...+50 °C
— Parking lots, warehouses, production areas, stairways
— Industry
— Offices

SAFETY ADVICE
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.

<table>
<thead>
<tr>
<th>Product name</th>
<th>GTIN (EAN)</th>
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<th>613</th>
<th>603</th>
<th>7.5</th>
<th>1100</th>
<th>146</th>
<th>4000</th>
<th>160</th>
<th>83</th>
<th>50000</th>
<th>27</th>
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<tbody>
<tr>
<td>SubstiTUBE T8 EM CON Advanced Ultra Dup. 7.5 W/4000K 600 mm</td>
<td>4058075187337</td>
<td>232969</td>
<td>Passive infrared (PIR)</td>
<td>126.0 x 65</td>
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<td>220...240</td>
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<td>SubstiTUBE T8 EM CON Advanced Ultra Dup. 16 W/4000K 1200 mm</td>
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</table>

¹ Protection class: IP20 ² Non-dimmable ³ You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee ⁴ L70/B50 ⁵ Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE Connected Sensor Low Bay

Stand-alone sensors

**PRODUCT FEATURES**

- Wireless smart PIR motion sensor
- Mounting height up to 4 m
- Two step dimming: 20 % and 100 % light output
- Network protocol: ZigBee 3.0 (2.4 GHz mesh network)
- Connected tube can be only operated with Connected sensor

**PRODUCT BENEFITS**

- Multiple sensors can be networked
- Control of compatible products without Internet connection or smart devices
- Easy to install and use

**AREAS OF APPLICATION**

- For indoor use only (IP54)
- Passive infra red sensor for ambient temperatures between -20 and +50 °C
- Parking lots, warehouses, production areas, stairways
- Industry
- Offices

### Product Table

<table>
<thead>
<tr>
<th>Product name</th>
<th>GTIN (EAN)</th>
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<th>IP</th>
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1 You will find further information and the exact guarantee terms and conditions at [www.ledvance.com/guarantee](http://www.ledvance.com/guarantee)
SubstiTUBE Connected Sensor High Bay
Stand-alone sensors

PRODUCT FEATURES
— Wireless smart PIR motion sensor
— Mounting height: 4…14 m
— Two step dimming: 20 % and 100 % light output
— Network protocol: ZigBee 3.0 (2.4 GHz mesh network)
— Connected tube can be only operated with Connected sensor

PRODUCT BENEFITS
— Multiple sensors can be networked
— Control of compatible products without Internet connection or smart devices
— Easy to install and use

AREAS OF APPLICATION
— For indoor use only (IP54)
— Parking lots, warehouses, production areas, stairways
— Passive infra red sensor for ambient temperatures between -20 and +50 °C
— Industry

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You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee
SubstiTUBE Connected Sensor Remote

Connected Sensor Remote for LEDVANCE Connected Sensor HB and LB

PRODUCT FEATURES

— Compatible with LEDVANCE Connected Sensor HB and LB (Gen 2)
— Battery included (Lithium, 3 V)

PRODUCT BENEFITS

— LEDVANCE Connected sensor remote control for easy installation
— 3 years guarantee

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SubstiTUBE PRO UO UN¹,²

LED tubes for electronic control gears (ECG), electromagnetic control gears (CCG) and mains, shatterproof

PRODUCT FEATURES
- T8 LED tube made of glass with G13 base
- Compatible with conventional and many common electronic control gears (see also compatibility list) and line voltage
- Low flicker according to EU 2019/2020
- Lamp tube made of glass with splitter protection e.g. for food industry applications
- Mercury-free and RoHS compliant

PRODUCT BENEFITS
- No bending thanks to glass technology
- Shatter protection thanks to special PET coating
- Also suitable for operation at low temperatures
- High luminous flux for sophisticated lighting tasks
- Easy installation

AREAS OF APPLICATION
- General illumination within ambient temperatures from -20…+45 °C
- Supermarkets and department stores
- Industry

SAFETY ADVICE
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction. The Tc point is marked on the base of the lamp.

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¹ Protection class: IP20 ² Non-dimmable ³ ST8 UN is not released for tandem circuit in CCG operation ⁴ You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee ⁵ L70/B50 ⁶ Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE Value UN\textsuperscript{1,2}

LED tubes for electronic control gears (ECG), electromagnetic control gears (CCG) and mains

SAFETY ADVICE

Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.

The Tc point is marked on the base of the lamp.

PRODUCT FEATURES

— LED tube made of glass
— Compatible with conventional and many common electronic control gears (see also compatibility list) and line voltage
— T8 LED tube made of glass with G13 base
— Low flicker according to EU 2019/2020
— Uniform illumination
— Lifetime: up to 30,000 h
— Mercury-free and RoHS compliant

PRODUCT BENEFITS

— No bending thanks to glass technology
— Also suitable for operation at low temperatures
— Easy installation

AREAS OF APPLICATION

— General illumination within ambient temperatures from -20…+45 \degree C
— Corridors, stairways, parking garages
— Warehouses

<table>
<thead>
<tr>
<th>Product name</th>
<th>GTIN (EAN)</th>
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<td>30000</td>
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</table>

SAFETY ADVICE

Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction. The Tc point is marked on the base of the lamp.

\textsuperscript{1} Protection class: IP20 | \textsuperscript{2} Non-dimmable | \textsuperscript{1} You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee | \textsuperscript{4} L70/B50 | \textsuperscript{4} Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE PRO UO HF\(^1\,\,^2\)
LED tubes for electronic high frequency control gears (ECG), shatterproof

PRODUCT FEATURES

- T8 LED tube made of glass with G13 base
- Compatible with many common electronic control gears (see also compatibility list)
- Low flicker according to EU 2019/2020
- Lamp tube made of glass with splitter protection e.g. for food industry applications
- Mercury-free and RoHS compliant

PRODUCT BENEFITS

- Quick, simple and safe replacement without rewiring
- Shatter protection thanks to special PET coating
- Also suitable for operation at low temperatures
- High luminous flux for sophisticated lighting tasks
- No bending thanks to glass technology

AREAS OF APPLICATION

- General illumination within ambient temperatures from -20…+45 °C
- Supermarkets and department stores
- Industry
- Offices, public buildings

SAFETY ADVICE

Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.
Not suitable for operation with low-loss and conventional control gears and main voltage.
The Tc point is marked on the base of the lamp.

1 Protection class: IP20 2 Non-dimmable 3 You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee 4 L70/B50 5 Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE PRO HF\textsuperscript{1,2}

LED tubes for electronic high frequency control gears (ECG), shatterproof

PRODUCT FEATURES

— T8 LED tube made of glass with G13 base
— Compatible with many common electronic control gears (see also compatibility list)
— Low flicker according to EU 2019/2020
— Lamp tube made of glass with splinter protection e.g. for food industry applications
— Mercury-free and RoHS compliant

PRODUCT BENEFITS

— Quick, simple and safe replacement without rewiring
— Shatter protection thanks to special PET coating
— Also suitable for operation at low temperatures
— High luminous flux for sophisticated lighting tasks
— No bending thanks to glass technology

AREAS OF APPLICATION

— General illumination within ambient temperatures from -20…+45 °C
— Supermarkets and department stores
— Industry
— Offices, public buildings

SAFETY ADVICE

Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.

Not suitable for operation with low-loss and conventional control gears and main voltage.

The Tc point is marked on the base of the lamp.

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\textsuperscript{1} Protection class: IP20 \textsuperscript{2} Non-dimmable \textsuperscript{3} You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee \textsuperscript{4} L70/B50

\textsuperscript{5} Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE Value HF\textsuperscript{1,2}
Economic LED tubes for electronic high frequency control gears (ECG)

PRODUCT FEATURES
- T8 LED tube made of glass with G13 base
- Compatible with many common electronic control gears (see also compatibility list)
- Low flicker according to EU 2019/2020
- Uniform illumination
- Lifetime: up to 30,000 h
- Mercury-free and RoHS compliant

PRODUCT BENEFITS
- Easy installation
- Also suitable for operation at low temperatures
- No bending thanks to glass technology

AREAS OF APPLICATION
- General illumination within ambient temperatures from -20…+45 °C
- Corridors, stairways, parking garages
- Warehouses

SAFETY ADVICE
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction. Not suitable for operation with low-loss and conventional control gears and main voltage.
The Tc point is marked on the base of the lamp.

<table>
<thead>
<tr>
<th>Product name</th>
<th>GTIN (EAN)</th>
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\textsuperscript{1} Protection class: IP20 | \textsuperscript{2} Non-dimmable | \textsuperscript{3} You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee | \textsuperscript{4} L70/B50 | \textsuperscript{5} Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE T5 HF\textsuperscript{1,2}

LED tubes for electronic high frequency control gears

### PRODUCT FEATURES

- Retrofit replacement of existing T5 lamps on HF ballast installations
- Lamp tube made of glass with splinter protection e.g. for food industry applications
- High color consistency: ≤ 5 SDCM
- Lifetime: up to 50,000 h
- Low flicker according to EU 2019/2020
- Uniform illumination
- No bending thanks to glass technology
- Also suitable for operation at low temperatures
- Suitable for ambient temperatures from -20…+45 °C

### PRODUCT BENEFITS

- No bending thanks to glass technology
- Quick, simple and safe replacement without rewiring
- High luminous flux for sophisticated lighting tasks

### AREAS OF APPLICATION

- Offices, public buildings
- Supermarkets and department stores
- Industry
- General illumination within ambient temperatures from -20…+45 °C

<table>
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SAFETY ADVICE

Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.
SubstiTUBE T5 220-240V AC\(^1,2\)

LED tubes for operation on AC mains connection

**PRODUCT FEATURES**
- LED replacement for T5 fluorescent lamps with G5 base on AC mains
- Lamp tube made of glass with spliter protection e.g. for food industry applications
- High color consistency: ≤ 5 SDCM
- Lifetime: up to 50,000 h
- Low flicker according to EU 2019/2020 standard

**PRODUCT BENEFITS**
- No bending thanks to glass technology
- Shatter protection thanks to special PET coating
- Quick, simple and safe replacement without rewiring
- High luminous flux for sophisticated lighting tasks

**AREAS OF APPLICATION**
- Offices, public buildings
- Supermarkets and department stores
- Industry
- General illumination within ambient temperatures from -20…+45 °C

**SAFETY ADVICE**
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.
Not suitable for operation with electronic control gear.

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\(^1\) Protection class: IP20 \(^2\) Non-dimmable \(^3\) You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee \(^4\) L70/B50 \(^5\) Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE T9 EM¹,²

Circular LED tube for electromagnetic control gear (CCG) and AC mains

PRODUCT FEATURES
- LED alternative to classic T9 fluorescent lamps in CCG luminaires
- Uniform illumination
- Lifetime: up to 30,000 h
- Mercury-free and RoHS compliant

PRODUCT BENEFITS
- Quick, simple and safe replacement without rewiring
- Energy savings of up to 50% (compared to T9 fluorescent lamp on CCG)
- Also suitable for operation at low temperatures
- Operation directly on 230 V AC mains possible

AREAS OF APPLICATION
- General illumination within ambient temperatures from -20…+45 °C
- Corridors, stairways, parking garages
- Domestic applications
- Decorative applications

SAFETY ADVICE
Not suitable for operation with electronic control gear.
Operation in outdoor applications in suitable damp-proof luminaires possible according to data sheet and installation instruction.

<table>
<thead>
<tr>
<th>Product name</th>
<th>GTIN (EAN)</th>
<th>W</th>
<th>lm</th>
<th>CRI</th>
<th>K</th>
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¹ Protection class: IP20 | ² Non-dimmable | ³ You will find further information and the exact guarantee terms and conditions at www.ledvance.com/guarantee | ⁴ L70/B50 | ⁵ Energy efficiency class (EEC) on a scale of A (highest efficiency) to G (lowest efficiency)
SubstiTUBE AS A MULTIPACK
LED TUBES WITH MATCHING CONVERSION KITS

A smart solution at an attractive price: you can get many OSRAM SubstiTUBE versions in a handy pack of 10 including matching conversion kits. This makes replacements even easier. If you can’t find the SubstiTUBE you required, please contact us at: kundenservice@ledvance.com. We will find a solution.

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ROBUST AND FUNCTIONAL
DAMP PROOF HOUSING

They are the ideal addition to the SubstiTUBE T8 LED tubes, especially for use in harsh environments. The robust housing of the damp-proof luminaire not only protects against moisture and dust but also easily withstands a hefty shock or two. Installation is particularly easy thanks to prewiring and integrated accessories. Wow your customers with our dream team of SubstiTUBE T8 and damp-proof housing.

PRODUCT FEATURES
– Housing made of robust polycarbonate (PC), gray
– Suitable for SubstiTUBE EM/UN and SubstiTUBE Connected
– Luminaire housing, available for 1 or 2 T8 LED lamps
– Type of protection: IP65
– Impact resistance: IK08

PRODUCT BENEFITS
– Sustainable solution thanks to exchangeable lamps
– Prewired for easy installation of tubular AC LED lamps
– Robust housing
– Easy and quick installation
– 5 years guarantee

EQUIPMENT/ACCESSORIES
– All required accessories included

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PERFORMANCE CLASS
OSRAM SUBSTITUBE T8 CONNECTED ADVANCED ULTRA OUTPUT LED tube, installed in a robust damp-proof housing (IP65), is connected wirelessly to LEDVANCE CONNECTED SENSOR ST8 LOW BAY via Zigbee. Two-stage switching (0 % Δ 100 % and 20 % Δ 100 %) increases efficiency even further.

1 Refer to www.ledvance.com/guarantee for precise conditions

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OSRAM SubstiTUBE | SHEDDING LIGHT AND SYMBOLS

SHEDDING LIGHT AND SYMBOLS

- Shatter protection
- Low-flicker according to EU 2019/2020
- Type of protection
- Wireless
- Power in W for conventional technology
- Power in W
- Output voltage in V
- Luminous flux in lm
- Luminous efficacy
- Base
- Length [mm]
- Beam angle in °

- Color temperature in K
- Color rendering index
- Average period of use/life in hours (B50/L70)
- Glass tube
- AC Mains
- Operation on conventional control gear
- Operation on electronic control gear
- Energy efficiency class
- Unit of Packaging
- Fig. no.
GOOD LIGHT ALL ROUND
THE FULL LEDVANCE RANGE

LEDVANCE is leading the fight against bad light in every area. That’s good news for you because when it comes to future-proof solutions relating to luminaires and lamps, HCL systems, electronic components, light management and smart residential products, you have a competent partner in LEDVANCE on your side for your complex lighting projects. You can always rely on LEDVANCE for excellent brand quality, professional service and a good price/performance ratio.

AESTHETICALLY FUNCTIONAL LUMINAIRES

The extensive luminaire portfolio covers virtually all professional and residential applications and delivers outstanding quality and functionality. The new BIOLUX HCL system is a winner of the VDE Quality Certificate, and the red dot 2020 Product Design and 2020 German Innovation Awards.

EACH LAMP A LIGHTING SOLUTION

The lamp portfolio includes a wide choice of shapes and base sizes as well as types with additional functions (e.g. sensors), all with outstanding efficiency and durability. Alongside UV-C and LED lamps, LEDVANCE will continue to offer conventional halogen, energy-saving, fluorescent and gas discharge lamps.

FLEXIBLE LED STRIP SYSTEM

The LED Strip System includes a large number of flexible LED strips, drivers and matching accessories. With a wide range of luminous fluxes and light colors, the system allows bespoke lighting solutions to be created for virtually any indoor or outdoor application. Easy to plan, easy to combine and easy to install – that’s the principle here.

VIVARES: LIGHT MANAGEMENT, MORE COMFORTABLE THAN EVER

The future-proof IoT light management system (LMS) from LEDVANCE makes it easier and more flexible than ever to always produce optimal lighting conditions for defined requirements. The system is extremely reliable and compatible and offers all LMS components and matching LED luminaires from one source.

SMART LIGHTING FOR RESIDENTIAL APPLICATIONS

Our smart residential products offer a comprehensive combination of innovation, quality, reliability and user-friendliness. We provide a suitable solution for a variety of requirements that intelligent lighting has to meet.

MORE INFORMATION AND CLEVER TOOLS

For more information on LEDVANCE’s extensive product portfolio and clever apps and tools that will help you in your day-to-day work go to www.ledvance.com
ABOUT LEDVANCE

With offices in more than 50 countries and business activities in more than 140 countries, LEDVANCE is one of the world’s leading general lighting providers for professional users and end consumers. Having emerged from OSRAM’s general lighting division, LEDVANCE offers a wide-ranging portfolio of LED luminaires for a broad spectrum of applications, intelligent lighting products for Smart Home and Smart Building solutions, one of the most comprehensive ranges of advanced LED lamps in the lighting industry, traditional light sources, an LED Strip System and light management systems.

LEDVANCE GmbH
Parkring 29–33
85748 Garching
Germany
LEDVANCE.COM

LEDVANCE is licensee of product trademark OSRAM for lamps products in general lighting.

LEDVANCE.COM