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# Technical Application Guide

Philips is now introducing a new line of connected LED lighting products. Philips MasterConnect LEDtube, which is Interact Ready, enables an easy upgrade to a connected lighting system. The 2.4GHz mesh networking technology allows integration with a variety of control devices, such as sensor and switch, and offers secure and reliable communication towards the Interact IoT platform. The result? Great energy savings, various control possibilities and a more adaptable space!



**interact**  
ready.

## Product Features

### Ballast Compatibility

- Compatible with electro-magnetic ballast or direct mains.
- Quick and easy installation.

### Mechanical Design

- Rotatable end-cap up to 90 deg.
- IEC T8 dimension, perfect fit into existing fluorescent luminaires.

### Connectivity

- 2.4GHz mesh networking technology.
- Reliable and secure wireless communication, nominal range 12m.
- Easy commissioning and (re-) configuration from the floor.

### Control Functionality

- Automatic on/off, dimming based on occupancy detection and daylight variation.
- Personal dimming and scene setting with wireless switch.
- High-end trimming to fit various application needs.

### Energy Savings

- Energy savings of 50% or more\* compared to fluorescent lamps.
- Additional 20-40% energy saving when used with advanced control, such as dimming, occupancy sensing and daylight harvesting.
- Energy label A++.

### User comfort

- Uniform light output and superior optical efficiency with advanced optical design.
- Personal light setting to enhance user comfort and productivity.
- Typical CRI 83.

### Reliability

- Reliable operation between -20°C and +45°C ambient temperature.
- Tested to B50 L70 requirement. Lamps are rated for 50,000 hours.
- 200,000 switching cycles.

### Safety

- Over voltage and over temperature protection.
- Complies with IEC safety requirements.
- Misuse protected. Passed 4kV high-pot test and 1kV surge test.

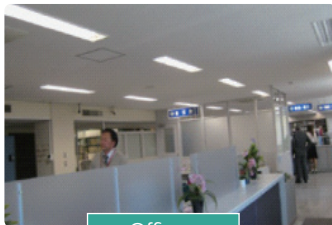
### Environment

- No Mercury.
- No breakage and pollution risk.

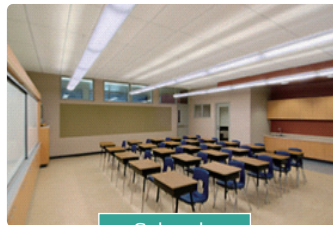
\* Compared to 1 x 36W/58W TL system with Philips reference ballast. Lamps are set at 100% light level.



## Application



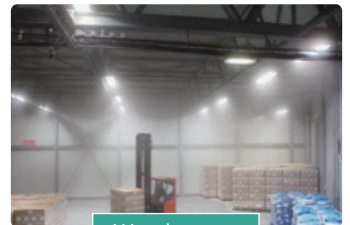
Offices



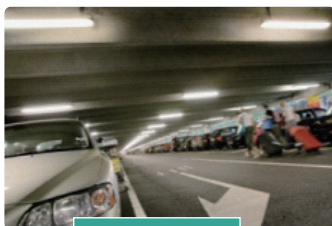
Schools



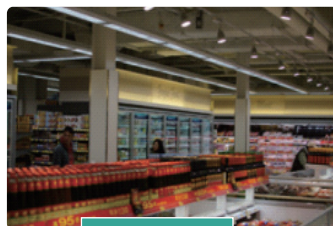
Industry



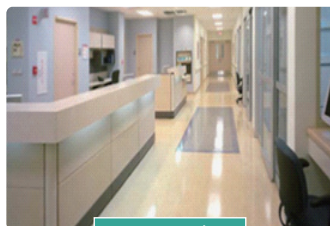
Warehouses



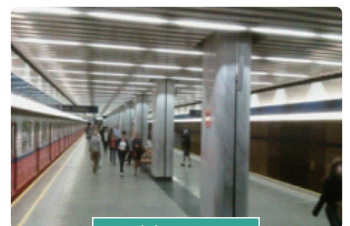
Parking Lots



Retail



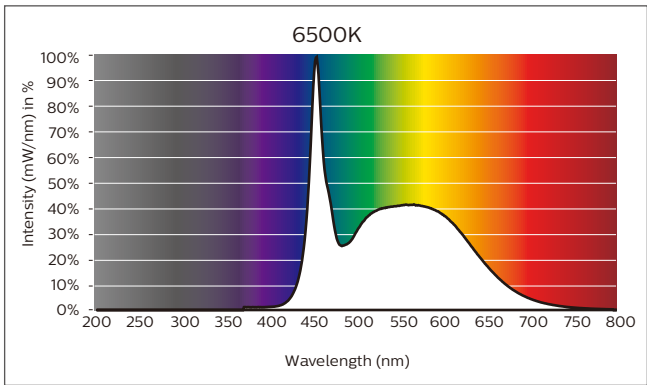
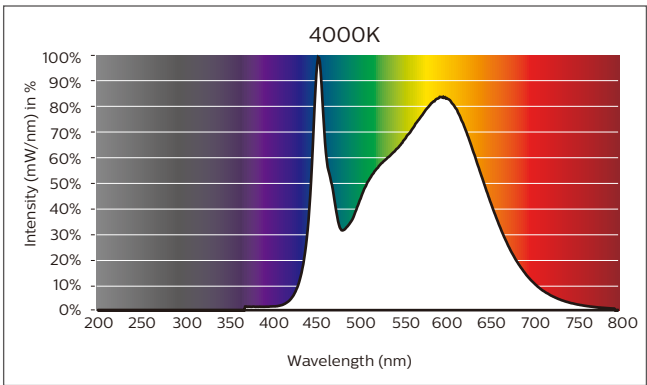
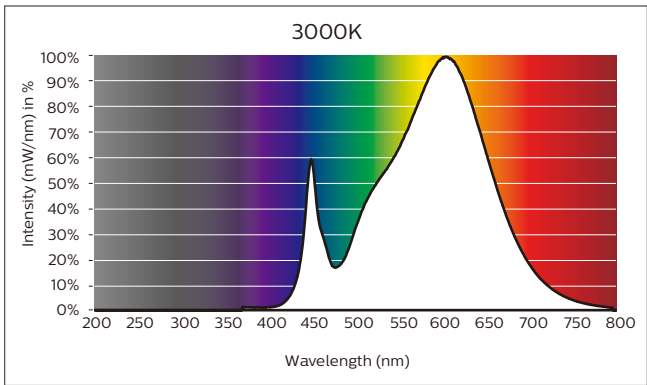
Hospitals



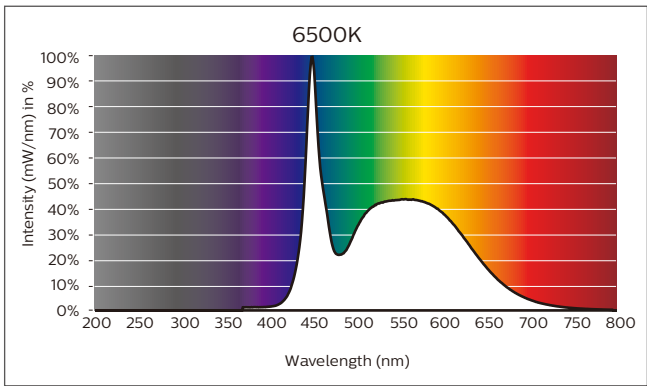
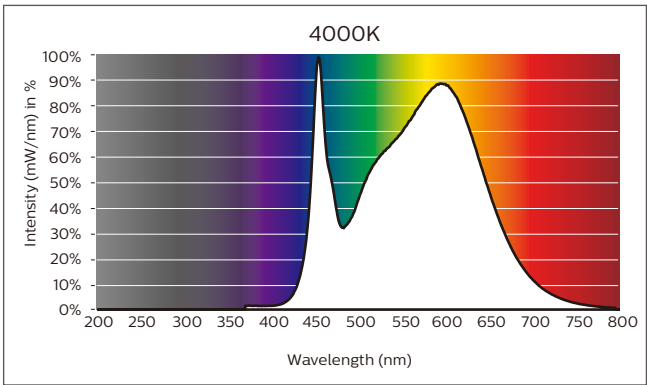
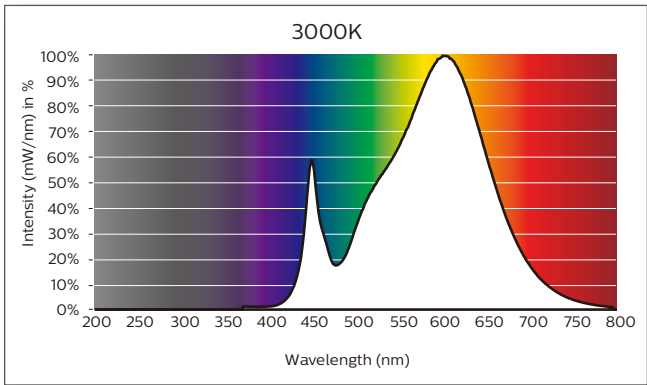
Public Areas

# Spectral Power Distribution

1200mm



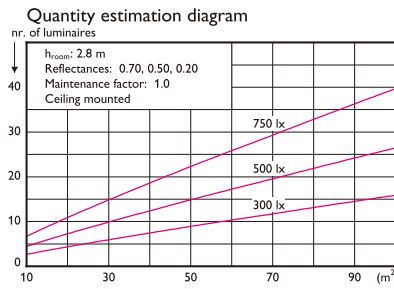
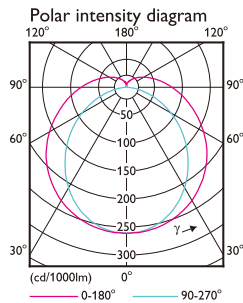
1500mm



## Photometric Diagrams

9290018137 1 x MAScon LEDtube IA 1200mm UO 16.5W830 T8

1 x 2300 lm



Utilisation factor table

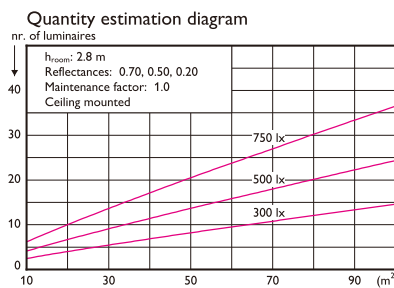
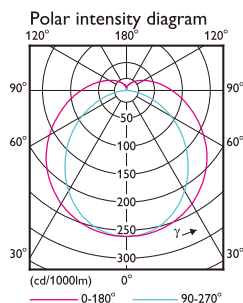
Room Index k	Reflectances (%) for ceiling, walls and working plane (CIE)									
	0.80	0.80	0.70	0.70	0.70	0.50	0.50	0.30	0.30	0.00
0.60	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
0.80	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.25	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.50	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
2.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
2.50	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
3.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
4.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
5.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00

Luminance Table

Plane Cane	0.0	15.0	30.0	45.0	60.0	75.0	90.0
45.0	9703	9646	9693	9922	10478	11699	14341
50.0	9107	9044	9048	9209	9674	10824	13645
55.0	8514	8456	8442	8529	8887	9911	12871
60.0	7953	7889	7860	7872	8108	8961	12006
65.0	7418	7367	7303	7264	7356	7989	11017
70.0	6924	6860	6817	6731	6679	6992	9889
75.0	6502	6430	6385	6257	6080	5965	8488
80.0	6130	6051	6009	5846	5543	4958	6569
85.0	5802	5759	5661	5511	5121	4063	3858
90.0	5526	5492	5444	5277	4830	3504	1696

9290018138 1 x MAScon LEDtube IA 1200mm UO 16.5W840 T8

1 x 2500 lm



Utilisation factor table

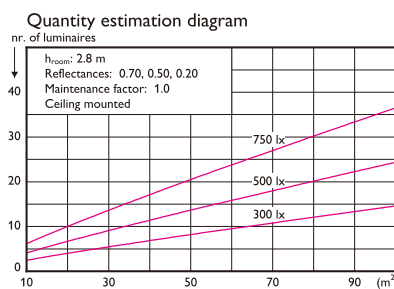
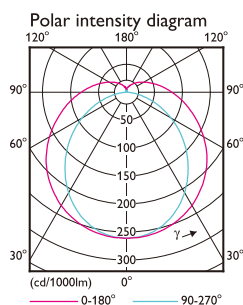
Room Index k	Reflectances (%) for ceiling, walls and working plane (CIE)									
	0.80	0.80	0.70	0.70	0.70	0.50	0.50	0.30	0.30	0.00
0.60	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
0.80	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.25	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.50	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
2.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
2.50	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
3.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
4.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
5.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00

Luminance Table

Plane Cane	0.0	15.0	30.0	45.0	60.0	75.0	90.0
45.0	10547	10485	10536	10785	11389	12717	15588
50.0	9899	9830	9835	10010	10515	11766	14831
55.0	9255	9191	9176	9270	9660	10773	13990
60.0	8645	8575	8543	8556	8814	9740	13051
65.0	8063	8007	7938	7895	7996	8684	11975
70.0	7526	7457	7409	7316	7260	7600	10749
75.0	7068	6989	6941	6802	6608	6484	9226
80.0	6663	6577	6532	6354	6025	5389	7140
85.0	6306	6260	6153	5990	5567	4416	4192
90.0	6007	5970	5918	5736	5250	3809	1849

9290018139 1 x MAScon LEDtube IA 1200mm UO 16.5W865 T8

1 x 2500 lm



Utilisation factor table

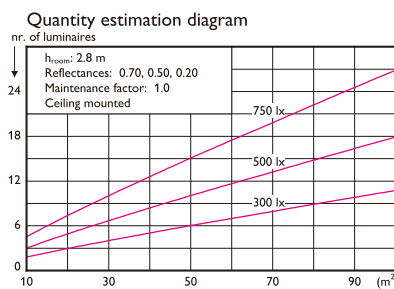
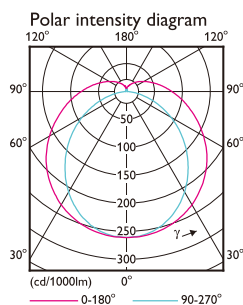
Room Index k	Reflectances (%) for ceiling, walls and working plane (CIE)									
	0.80	0.80	0.70	0.70	0.70	0.50	0.50	0.30	0.30	0.00
0.60	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
0.80	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.25	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.50	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
2.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
2.50	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
3.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
4.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
5.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00

Luminance Table

Plane Cane	0.0	15.0	30.0	45.0	60.0	75.0	90.0
45.0	10547	10485	10536	10785	11389	12717	15588
50.0	9899	9830	9835	10010	10515	11766	14831
55.0	9255	9191	9176	9270	9660	10773	13990
60.0	8645	8575	8543	8556	8814	9740	13051
65.0	8063	8007	7938	7895	7996	8684	11975
70.0	7526	7457	7409	7316	7260	7600	10749
75.0	7068	6989	6941	6802	6608	6484	9226
80.0	6663	6577	6532	6354	6025	5389	7140
85.0	6306	6260	6153	5990	5567	4416	4192
90.0	6007	5970	5918	5736	5250	3809	1849

9290018140 1 x MAScon LEDtube IA 1500mm UO 25.5W830 T8

1 x 3400 lm

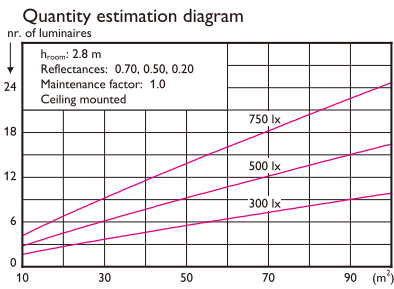
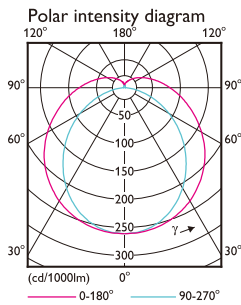


Utilisation factor table

Room Index k	Reflectances (%) for ceiling, walls and working plane (CIE)									
	0.80	0.80	0.70	0.70	0.70	0.50	0.50	0.30	0.30	0.00
0.60	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
0.80	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.25	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
1.50	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
2.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
2.50	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
3.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
4.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00
5.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.00

Luminance Table

Plane Cane	0.0	15.0	30.0	45.0	60.0	75.0	90.0
45.0	11475	11414	11477	11757	12424	13885	17038
50.0	10770	10702	10715	10914	11475	12853	16224
55.0	10069	10007	9998	10109	10545	11753	15320
60.0	9405	9337	9310	9333	9625	10653	14310
65.0	8773	8719	8652	8614	8736	9505	13154
70.0	8188	8120	8077	7984	7935	8327	11838
75.0	7689	7612	7567	7425	7227	7113	10202
80.0	7250	7164	7123	6939	6594	5921	7954
85.0	6861	6818	6711	6544	6097	4864	4762
90.0	6535	6504	6456	6269	5756	4212	2513



Utilisation factor table

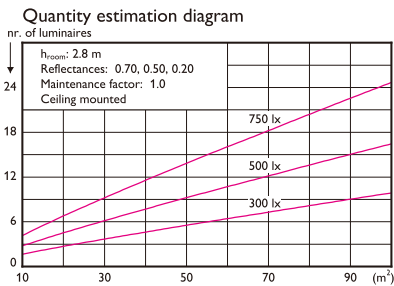
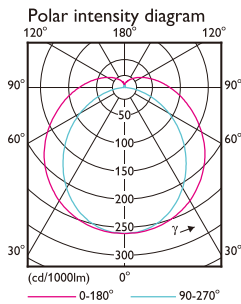
Room Index k	Reflectances (%) for ceiling, walls and working plane (CIE)											
	0.80	0.80	0.70	0.70	0.70	0.70	0.50	0.50	0.30	0.30	0.00	0.00
0.60	0.44	0.41	0.42	0.41	0.40	0.33	0.32	0.27	0.30	0.26	0.23	0.23
0.80	0.53	0.50	0.52	0.50	0.49	0.41	0.39	0.34	0.37	0.33	0.29	0.29
1.00	0.62	0.57	0.59	0.57	0.55	0.48	0.46	0.40	0.43	0.39	0.35	0.35
1.25	0.70	0.64	0.67	0.64	0.62	0.54	0.52	0.47	0.49	0.45	0.41	0.41
1.50	0.76	0.69	0.73	0.70	0.67	0.60	0.57	0.52	0.54	0.50	0.45	0.45
2.00	0.85	0.76	0.82	0.78	0.74	0.68	0.64	0.60	0.61	0.57	0.52	0.52
2.50	0.92	0.81	0.88	0.83	0.79	0.73	0.69	0.65	0.66	0.63	0.57	0.57
3.00	0.96	0.84	0.92	0.87	0.82	0.77	0.73	0.69	0.70	0.66	0.61	0.61
4.00	1.03	0.89	0.98	0.92	0.86	0.82	0.78	0.75	0.74	0.71	0.66	0.66
5.00	1.07	0.92	1.02	0.95	0.89	0.85	0.81	0.78	0.77	0.75	0.69	0.69

Ceiling mounted

Luminance Table

Plane	0.0	15.0	30.0	45.0	60.0	75.0	90.0
Ceiling							
45.0	12487	12421	12490	12794	13520	15110	18541
50.0	11721	11647	11661	11877	12487	13987	17656
55.0	10958	10890	10880	11001	11475	12814	16672
60.0	10235	10160	10131	10156	10474	11593	15573
65.0	9547	9488	9415	9374	9506	10344	14315
70.0	8911	8837	8789	8689	8635	9062	12882
75.0	8368	8283	8235	8080	7864	7741	11102
80.0	7889	7796	7751	7551	7175	6444	8656
85.0	7466	7420	7303	7122	6635	5293	5183
90.0	7112	7077	7025	6822	6264	4583	2730

(cd/m<sup>2</sup>)



Utilisation factor table

Room Index k	Reflectances (%) for ceiling, walls and working plane (CIE)											
	0.80	0.80	0.70	0.70	0.70	0.70	0.50	0.50	0.30	0.30	0.00	0.00
0.60	0.44	0.41	0.42	0.41	0.40	0.33	0.32	0.27	0.30	0.26	0.23	0.23
0.80	0.53	0.50	0.52	0.50	0.49	0.41	0.39	0.34	0.37	0.33	0.29	0.29
1.00	0.62	0.57	0.59	0.57	0.55	0.48	0.46	0.40	0.43	0.39	0.35	0.35
1.25	0.70	0.64	0.67	0.64	0.62	0.54	0.52	0.47	0.49	0.45	0.41	0.41
1.50	0.76	0.69	0.73	0.70	0.67	0.60	0.57	0.52	0.54	0.50	0.45	0.45
2.00	0.85	0.76	0.82	0.78	0.74	0.68	0.64	0.60	0.61	0.57	0.52	0.52
2.50	0.92	0.81	0.88	0.83	0.79	0.73	0.69	0.65	0.66	0.63	0.57	0.57
3.00	0.96	0.84	0.92	0.87	0.82	0.77	0.73	0.69	0.70	0.66	0.61	0.61
4.00	1.03	0.89	0.98	0.92	0.86	0.82	0.78	0.75	0.74	0.71	0.66	0.66
5.00	1.07	0.92	1.02	0.95	0.89	0.85	0.81	0.78	0.77	0.75	0.69	0.69

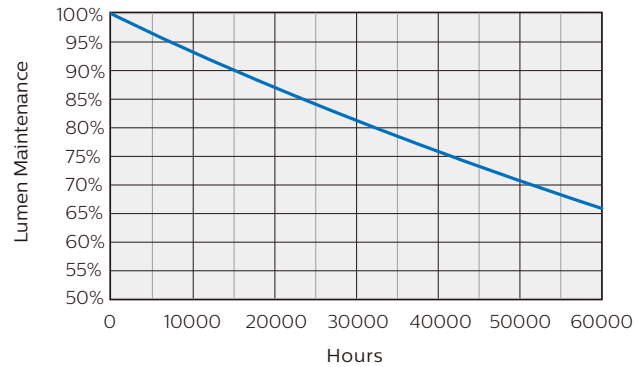
Ceiling mounted

Luminance Table

Plane	0.0	15.0	30.0	45.0	60.0	75.0	90.0
Ceiling							
45.0	12487	12421	12490	12794	13520	15110	18541
50.0	11721	11647	11661	11877	12487	13987	17656
55.0	10958	10890	10880	11001	11475	12814	16672
60.0	10235	10160	10131	10156	10474	11593	15573
65.0	9547	9488	9415	9374	9506	10344	14315
70.0	8911	8837	8789	8689	8635	9062	12882
75.0	8368	8283	8235	8080	7864	7741	11102
80.0	7889	7796	7751	7551	7175	6444	8656
85.0	7466	7420	7303	7122	6635	5293	5183
90.0	7112	7077	7025	6822	6264	4583	2730

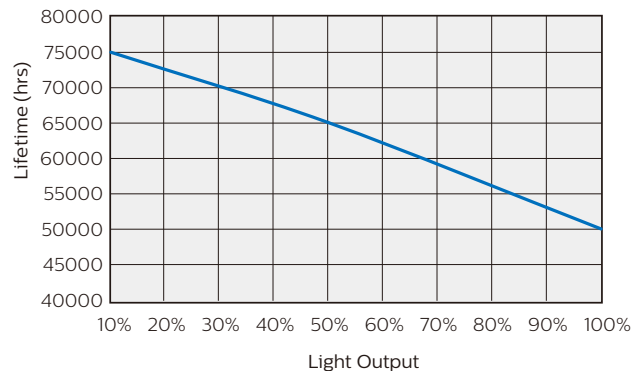
(cd/m<sup>2</sup>)

## Lifetime and Lumen Maintenance



Philips MasterConnect LEDtube EM/Mains T8 has a lifetime of 50,000 hours. This is defined as the number of hours when 50% of a large group of identical lamps drop below 70% of its initial lumen.

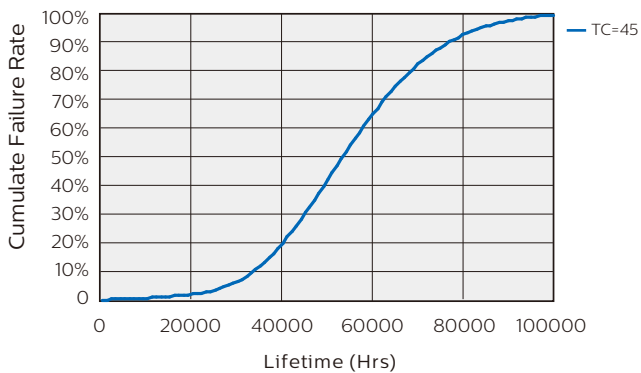
## Lifetime and Dimming



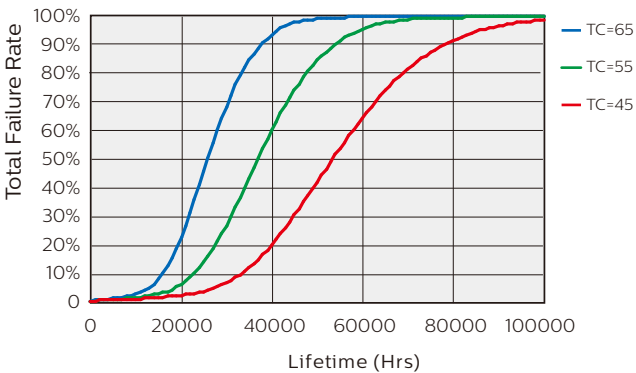
Dimming can help extend lifetime (ie: dimming 30% can extend lifetime by 9,000hrs)

# Lifetime and Failure Rate

Lifetime vs. Failure rate @Ta 25°C

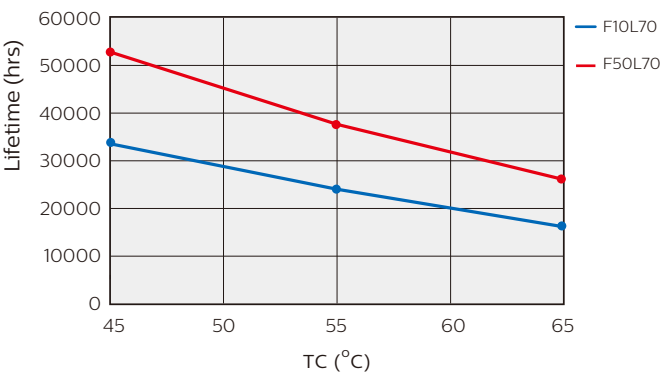
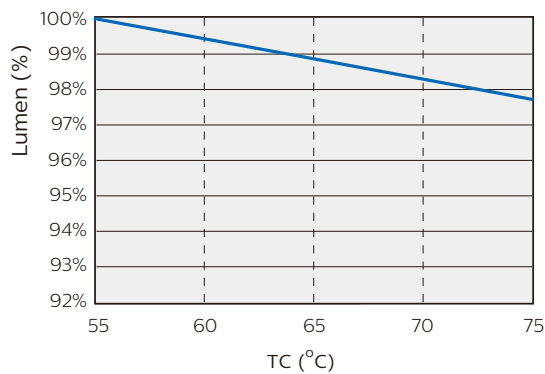


Lifetime vs. Failure Rate vs. Tcase

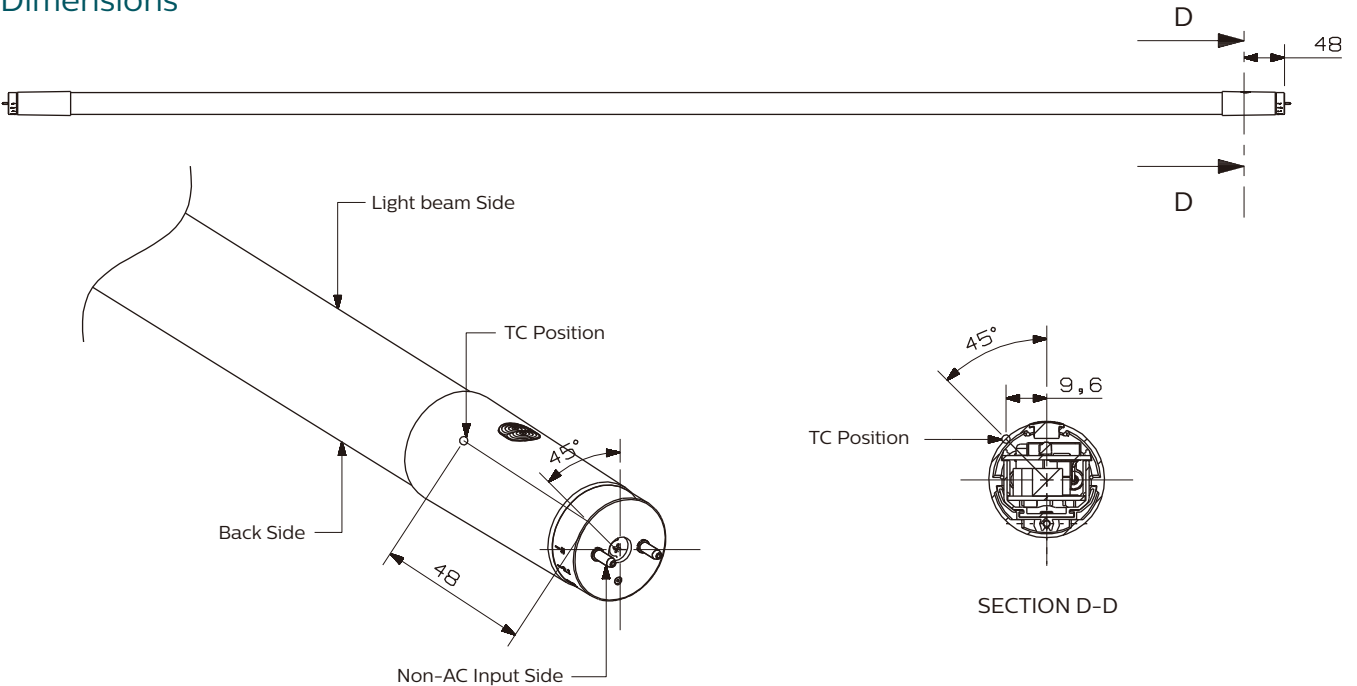


# Temperature

Operating temperature	Toperating	min -20°C	max +45°C
Storage temperature	Tstorage	min -40°C	max +65°C

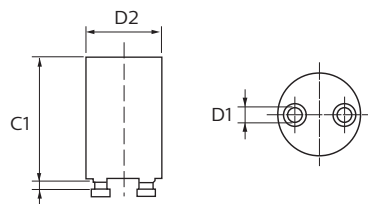


# Dimensions



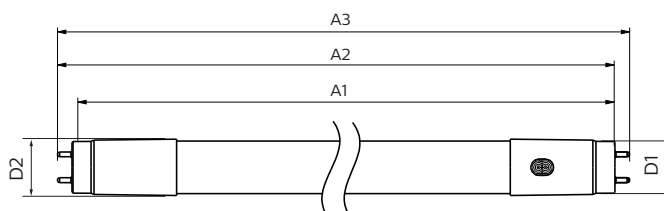


EMP



## Dimensions (mm)

Product	A1	A2	A3	C1	D1	D2
1200mm	1198.1	1205.2	1212.3	-	25.6	27.8
1500mm	1498.7	1505.8	1512.9	-	25.6	27.8
EMP	-	-	-	34.5	3.0	21.5



## Technical Specification

Product Number	Product Description	Lamp Wattage	Equivalent Fluo Wattage	Voltage	Lumen Output Typical	Cap	CRI Typical*	Color Temp.	Lifetime	Beam Angle	Length	Stand-by power	RF range
10NC		( W )	( W )	( V )	( lm )			( K )	( hrs )	( ° )	( mm )	( W )	( m )
9290018137	MAScon LEDtube IA 1200mm UO 16.5W830 T8	16.5	36	220-240	2300	G13	83	3000	50000	160	1200	≤ 0.6	12
9290018138	MAScon LEDtube IA 1200mm UO 16.5W840 T8	16.5	36	220-240	2500	G13	83	4000	50000	160	1200	≤ 0.6	12
9290018139	MAScon LEDtube IA 1200mm UO 16.5W865 T8	16.5	36	220-240	2500	G13	83	6500	50000	160	1200	≤ 0.6	12
9290018140	MAScon LEDtube IA 1500mm UO 25.5W830 T8	25.5	58	220-240	3400	G13	83	3000	50000	160	1500	≤ 0.6	12
9290018141	MAScon LEDtube IA 1500mm UO 25.5W840 T8	25.5	58	220-240	3700	G13	83	4000	50000	160	1500	≤ 0.6	12
9290018142	MAScon LEDtube IA 1500mm UO 25.5W865 T8	25.5	58	220-240	3700	G13	83	6500	50000	160	1500	≤ 0.6	12

\* Minimum CRI is 80.

## Approbation & Certificates

Philips MasterConnect LEDtube EM/Mains T8 strictly follows applicable legislation and standard. The product complies with **CE**, **KEMA**, **TUV**, **RoHS** and **REACH**.



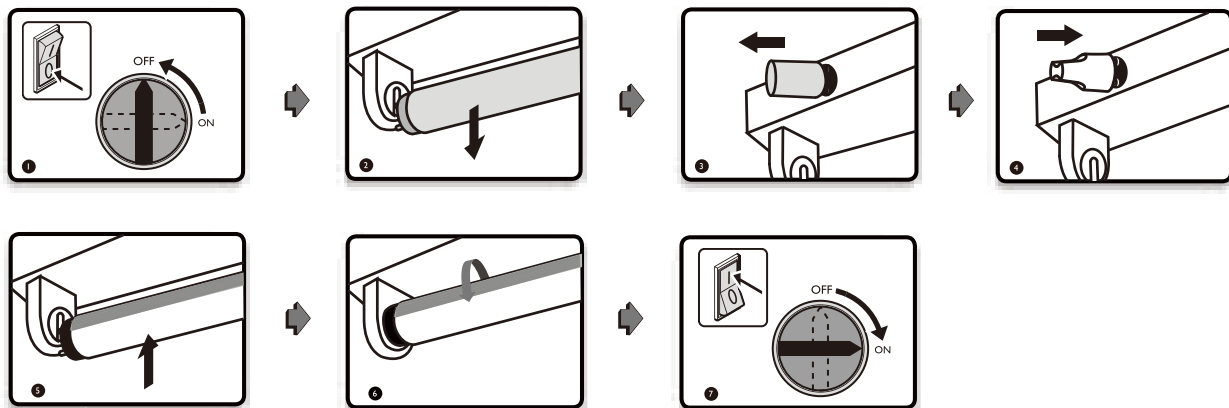
## Application Notes

- Product is dimmable by wireless control
- Suitable for damp locations
- Reliable operation between -20 °C to + 45 °C ambient temperature
- Not intended for use in emergency luminaires
- Modifications to the product void the limited warranty. For warranty information, please see [www.lighting.philips.com](http://www.lighting.philips.com)
- You are required to read and understand the Quick Installation Guide and all warnings, cautions and other materials related to installation before commencing installation work.

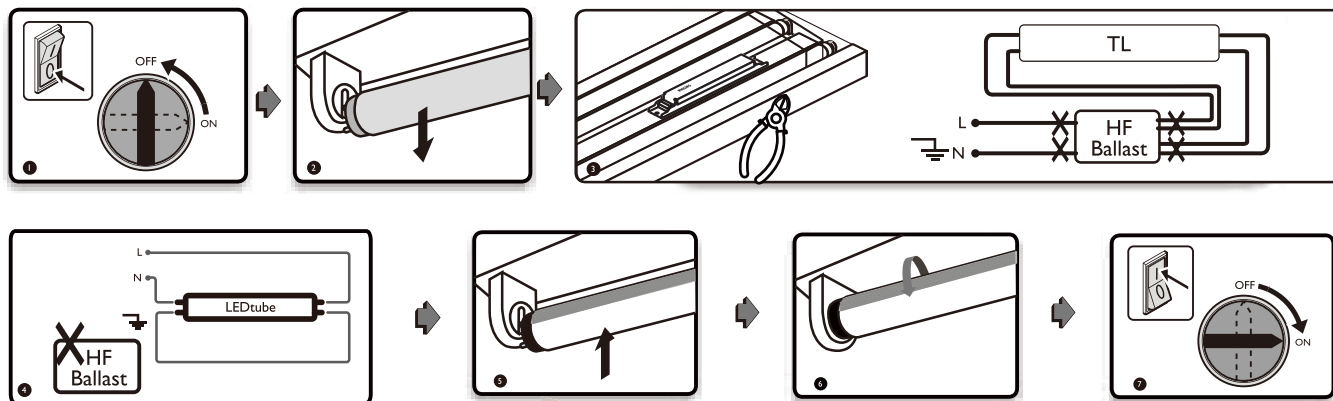


## Installation Guide

- EM ballast based system



- HF ballast based system



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05/2018  
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