GE
Lighting

WORLDWIDE PARTNER

LongLast™

DATA SHEET

T5 LongLast™

Linear Fluorescent Lamps

T5 LongLast™ High Efficiency 14W, 21W, 28W, 35W
T5 LongLast™ High Output 24W, 39W, 49W, 54W, 80W

Product information

T5 LongLast™ lamps are triphosphor fluorescent lamps with 16mm outer diameter (5/8 of an inch). These lamps feature "Starcoat™ Technology" that delivers high quality triphosphor performance. GE produces two ranges of T5 LongLast™ lamps in 4 different lengths:

- High Efficiency offering high lumens per watt
- High Output offering improved lumen package

High Efficiency lamps

The High Efficiency range of T5 LongLast™ brings lumen efficacy up to 105lm/W. Combined with an extremely long service life, this range of lamps is ideally suited for commercial and retail application in both direct and combined direct/indirect luminaires.

High Output lamps

The extremely high surface illuminance of the High Output T5 LongLast™ range makes these lamps ideal for indirect luminaires. These are the best suited to uplighting systems or direct lighting in high ceiling applications, such as those in canopies or industrial situations.

Application areas

- Retail
- Office
- Schools
- Commercial
- Industrial
- Sports halls

Features

- High efficiency – up to 105 lumens per watt – for ongoing cost savings
- High lumen output – up to 7,000 lumens – for improved system efficacy and reduced number of fittings
- Very long and reliable product life – up to 36,000 hours
- High colour quality – CRI 85Ra
- Low mercury content – 2.5mg
- Reduced environmental impact (less waste) than T8 lamps
- Smaller physical dimensions for improved light output control and smaller, more aesthetic fittings
- Peak lumen output between 34-38°C
- Designed only for HF-operation – higher lamp efficacy and lower ballast losses than conventional ballasts

Compliance

GE Lighting T5 LongLast™ linear fluorescent lamps comply with IEC/EN 60061, IEC/EN 60081 and IEC/EN 61195 and IEC/EN 62471

GE imagination at work

Basic data – T5 LongLast™ High Efficiency

Lamp type	14W	21W	28W	35W
General				
Nominal Wattage [W]	14	21	28	35
Weighted Energy consumption (kWh/1000h)	15	23	31	38
Cap	G5	G5	G5	G5
Operation	high frequency	high frequency	high frequency	high frequency
Cathode	preheated	preheated	preheated	preheated
Design Temperature [°C]	35	35	35	35
Recommended Burning Position	horizontal	horizontal	horizontal	horizontal
Energy Efficiency Class	A+	A+	A+	A+
Average Mercury Content [mg]	2.5	2.5	2.5	2.5
Ordering Information (sleeved in boxes of 30)				
827 – CCT 2700K – Extra Warm White	61086	61089	61095	61099
830 – CCT 3000K – Warm White	61087	61092	61096	61100
835 – CCT 3500K – White	61090	–	–	61101
840 – CCT 4000K – Cool White	61091	61093	61102	61103
865 – CCT 6500K – Daylight	61088	61094	61098	61104
Ordering Information (40-way bulk pack)				
830 – CCT 3000K – Warm White	61066	–	61069	–
840 – CCT 4000K – Cool White	61067	61068	61070	61071
Electrical and Photometric Characteristics at 25°C				
Rated Wattage [W]	14.0	20.6	27.9	35.5
Rated Lamp Voltage [V]	86	126	166	205
Rated Lamp Current [A]	0.165	0.165	0.170	0.175
Operating Frequency [kHz]	> 20	> 20	> 20	> 20
Rated Luminous Flux [lm]	1230	1910	2640	3320
Nominal Luminous Flux [lm]	1230	1910	2640	3320
Rated Luminous Flux for 865 [lm]	1140	1770	2450	3090
Nominal Luminous Flux for 865 [lm]	1140	1770	2450	3090
Rated Efficacy [lm/W]	88	93	95	94
Rated Efficacy for 865 [lm/W]	81	86	88	87
Colour Rendering Index [Ra]	85	85	85	85
Optical Radiation Safety Class	Exempt	Exempt	Exempt	Exempt
Electrical and photometric characteristics at 35°C				
Rated Wattage [W]	13.7	20.7	27.8	34.7
Rated Lamp Voltage [V]	82	123	167	209
Rated Lamp Current [A]	0.170	0.170	0.170	0.170
Rated Luminous Flux [lm]	1350	2100	2900	3650
Nominal Luminous Flux [lm]	1350	2100	2900	3650
Rated Luminous Flux for 865 [lm]	1250	1950	2700	3400
Nominal Luminous Flux for 865 [lm]	1250	1950	2700	3400
Rated Efficacy [lm/W]	99	101	104	105
Rated Efficacy for 865 [lm/W]	91	94	97	98
Lifetime performance				
Rated Median Life – Preheat, 3 Hours Cycle [h]	30,000	30,000	30,000	30,000
Median Life – Preheat, 12 Hours Cycle [h]	36,000	36,000	36,000	36,000
Operating Mode for LSF and LLMF Data	HF preheat, 3h cycle	HF preheat, 3h cycle	HF preheat, 3h cycle	HF preheat, 3h cycle
Lamp Survival Factor				
LSF 2,000 Hours	99%	99%	99%	99%
LSF 4,000 Hours	99%	99%	99%	99%
LSF 6,000 Hours	99%	99%	99%	99%
LSF 8,000 Hours	99%	99%	99%	99%
LSF 12,000 Hours	98%	98%	98%	98%
LSF 16,000 Hours	96%	96%	96%	96%
LSF 20,000 Hours	90%	90%	90%	90%
Lamp Lumen Maintenance				
LLMF 2,000 Hours	96%	96%	96%	96%
LLMF 4,000 Hours	95%	95%	95%	95%
LLMF 6,000 Hours	94%	94%	94%	94%
LLMF 8,000 Hours	93%	93%	93%	93%
LLMF 12,000 Hours	91%	91%	91%	91%
LLMF 16,000 Hours	90%	90%	90%	90%
LLMF 20,000 Hours	89%	89%	89%	89%
Service Life – Preheat, 3 Hours Cycle [h]	20,000	20,000	20,000	20,000
Service Life – Preheat, 12 Hours Cycle [h]	23,000	23,000	23,000	23,000

Lamp type	14W	21W	28W	35W
Measuring conditions				
Frequency [kHz]	20-26	20-26	20-26	20-26
Calibration Current [A]	0.170	0.170	0.170	0.170
Voltage of HF Generator [V]	167	246	329	413
Reference Resistor [Ω]	500	725	950	1200

Lumen maintanence may vary for lamps with colour temperature ≥ 5000K

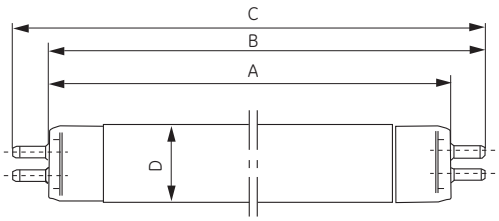
Basic data – T5 LongLast™ High Output

Lamp type	24W	39W	49W	54W	80W
General					
Nominal wattage [W]	24	39	49	54	80
Weighted Energy Consumption (kWh/1000)	25	42	54	59	89
Cap	G5	G5	G5	G5	G5
Operation	high frequency	high frequency	high frequency	high frequency	high frequency
Cathode	preheated	preheated	preheated	preheated	preheated
Design Temperature [°C]	35	35	35	35	35
Recommended Burning Position	horizontal	horizontal	horizontal	horizontal	horizontal
Energy Efficiency Class for 830, 835, 840	A+	A+	A+	A+	A
Energy Efficiency Class for 865	A	-	A+	A+	-
Average Mercury Content [mg]	2.5	2.5	2.5	2.5	2.5
Ordering Information (sleeved in boxes of 30)					
830 – CCT 3000K – Warm White	61105	61108	61119	61110	78708
835 – CCT 3500K – White	61106	–	61121	–	–
840 – CCT 4000K – Cool White	61097	61109	61122	61111	78709
865 – CCT 6500K – Daylight	61107	–	78707	61118	–
Ordering Information (40-way bulk pack)					
840 – CCT 4000K – Cool White	61081	61082	61084	61083	61085
Electrical and Photometric Characteristics at 25°C					
Rated Wattage [W]	22.5	38.0	49.2	54.1	79.8
Rated Lamp Voltage [V]	77	118	195	120	152
Rated Lamp Current [A]	0.295	0.325	0.255	0.455	0.530
Operating Frequency [kHz]	> 20	> 20	> 20	> 20	> 20
Rated Luminous Flux [lm]	1750	3200	4450	4460	6150
Nominal Luminous Flux [lm]	1750	3200	4450	4460	6150
Rated Luminous Flux for 865 [lm]	1600	2950	4100	4100	5850
Nominal Luminous Flux for 865 [lm]	1600	2950	4100	4100	5850
Rated Efficacy [lm/W]	78	84	90	82	77
Rated Efficacy for 865 [lm/W]	71	78	83	76	73
Colour Rendering Index [Ra]	85	85	85	85	85
Optical Radiation Safety Class	Exempt	Exempt	Exempt	Exempt	Exempt
Electrical and Photometric Characteristics at 35°C					
Rated Wattage [W]	22.5	38.0	49.3	53.8	80.0
Rated Lamp Voltage [V]	75	112	191	118	145
Rated Lamp Current [A]	0.300	0.340	0.260	0.460	0.555
Rated Luminous Flux [lm]	2000	3500	4900	5000	7000
Nominal Luminous Flux [lm]	2000	3500	4900	5000	7000
Rated Luminous Flux for 865 [lm]	1900	3330	4650	4750	6650
Nominal Luminous Flux for 865 [lm]	1900	3330	4650	4750	6650
Rated Efficacy [lm/W]	89	92	99	93	88
Rated Efficacy for 865 [lm/W]	84	88	94	88	83

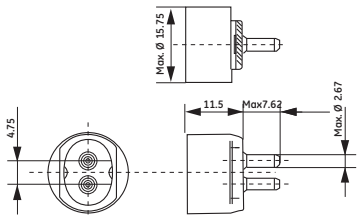
Lamp type	24W	39W	49W	54W	80W
Lifetime Performance					
Rated Median Life - Preheat, 3 Hours Cycle [h]	30,000	30,000	30,000	30,000	30,000
Median Life - Preheat, 12 Hours Cycle [h]	36,000	36,000	36,000	36,000	36,000
Operating Mode for LSF and LLMF Data	HF preheat, 3h cycle	HF preheat, 3h cycle	HF preheat, 3h cycle	HF preheat, 3h cycle	HF preheat, 3h cycle
Lamp Survival Factor					
LSF 2,000 Hours	99%	99%	99%	99%	99%
LSF 4,000 Hours	99%	99%	99%	99%	99%
LSF 6,000 Hours	99%	99%	99%	99%	99%
LSF 8,000 Hours	99%	99%	99%	99%	99%
LSF 12,000 Hours	98%	98%	98%	98%	98%
LSF 16,000 Hours	96%	96%	96%	96%	96%
LSF 20,000 Hours	90%	90%	90%	90%	90%
Lamp Lumen Maintenance					
LLMF 2,000 Hours	96%	96%	96%	96%	96%
LLMF 4,000 Hours	95%	95%	95%	95%	95%
LLMF 6,000 Hours	94%	94%	94%	94%	94%
LLMF 8,000 Hours	93%	93%	93%	93%	93%
LLMF 12,000 Hours	91%	91%	91%	91%	91%
LLMF 16,000 Hours	90%	90%	90%	90%	90%
LLMF 20,000 Hours	89%	89%	89%	89%	89%
Service Life - Preheat, 3 Hours Cycle [h]	20,000	20,000	20,000	20,000	20,000
Service Life - Preheat, 12 Hours Cycle [h]	23,000	23,000	23,000	23,000	23,000
Measuring Conditions					
Frequency [kHz]	20-26	20-26	20-26	20-26	20-26
Calibration Current [A]	0.300	0.340	0.255	0.460	0.550
Voltage of HF Generator [V]	150	224	390	235	290
Reference Resistor [Ω]	250	330	765	255	260

Lumen maintanence may vary for lamps with colour temperature ≥ 5000K

Dimensions



Cap-G5
IEC 60061 Data sheets 7004-52-5



Dimensions measured on finished lamps

		F14, F24	F21, F39	F28, F54	F35, F49, F80
A Max – Base to Base	[mm]	549	849	1149	1449
B Min – Pin to Base	[mm]	553,7	853,7	1153,7	1453,7
B Max – Pin to Base	[mm]	556,1	856,1	1156,1	1456,1
C Max – Pin to pin	[mm]	563,2	863,2	1163,2	1463,2
D Max – Outer Diameter	[mm]	17	17	17	17

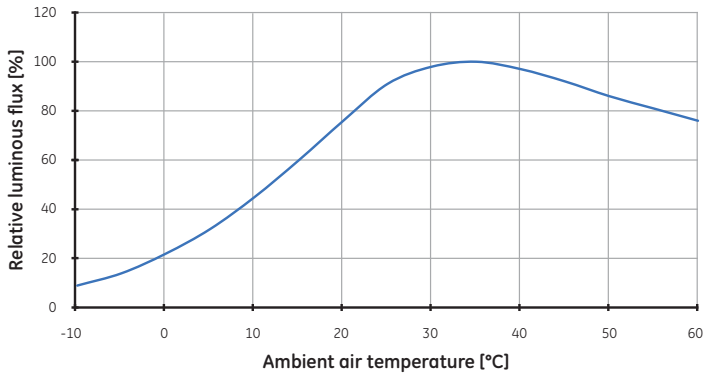
Influence of ambient air temperature on light output

T5 LongLast™ lamps are designed to reach their maximum luminous flux at an ambient air temperature of 34-38°C, typically 35°C under reference conditions. The light output and the electrical characteristics of a low-pressure mercury vapour lamp are determined by the saturated mercury vapour pressure inside the tube. As the cold spot is near the metal cap, the cap temperature is a good indication how close the Hg vapour pressure is to the optimum. A cap temperature of approx. 42-46°C corresponds to conditions resulting in maximum light output in a stabilized T5 lamp. The mercury vapour pressure is related to the temperature of the so called cold spot, the coldest part of the lamp where the excess liquid mercury is deposited. The cold spot is behind the electrode on the monogrammed side in a T5 lamp. The diagram below shows the typical relative luminous output of a long T5 lamp as function of ambient air temperature in horizontal burning position under reference conditions. Please note, burning position, air flow, radiating heat sources, characteristics of the control gear, etc. also affect the thermal conditions.

Test conditions:

- thermal chamber with ± 2°C accuracy
- draught-free air
- constant lamp current
- horizontal burning position

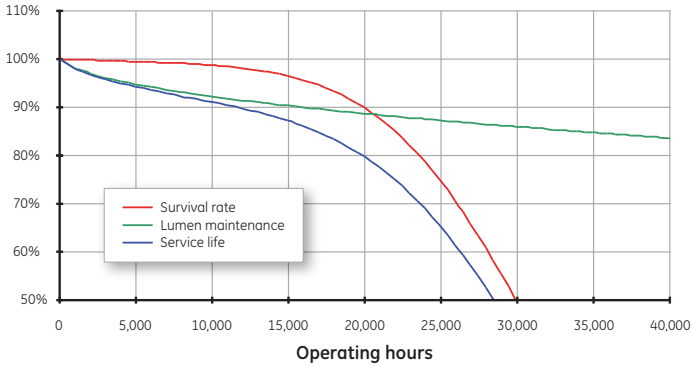
Ambient Air Temperature [°C]	Relative Luminous Flux [%]
-10	9
-5	14
0	22
5	32
10	45
15	60
20	76
25	91
30	98
35	100
40	97
45	92
50	86
55	81
60	76



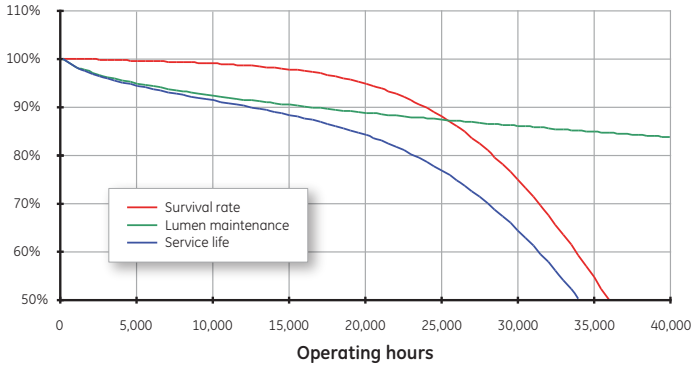
Lamp life and lumen maintenance

Cathodes of a fluorescent lamp lose their electron-emissivity during life due to various degradation processes like evaporation and sputtering. When the deterioration reaches a certain level, the cathode fails. Typical lifetime characteristics given below are based on GE Lighting's data. The declared lamp life is the median life defined by the time when 50% of the lamps from a large sample batch would have failed. Real lifetime figures may depend on the actual application. For instance improper cathode preheat, too high operating current, or too low operating current without additional cathode heating might reduce the expected life. The lumen maintenance graph below shows the luminous output throughout life. The main causes of the light depreciation are deterioration of phosphor coating and lamp blackening due to the deposition of evaporated emission mixture on the glass tube. These effects are unavoidable. Service life is reached when the light level in an installation drops down to 80% of the initial value. The service life curve is drawn as the product of the survival and the lumen maintenance curves.

Life expectancy and lumen maintenance
T5 LongLast™ – 3 hours cycles



Life expectancy and lumen maintenance
T5 LongLast™ – 12 hours cycles



Recommendations for measuring T5 LongLast™ lamps

For initial readings, the lamps shall be aged for 100 hours. Before measurement, conditioning is also required. Conditioning is completed when the excess mercury has been collected at the cold spot. Such conditioning may take up to 20 hours which can be part of the 100 hour aging. Avoid touching the hot glass surface, rotating or shaking the lamp. During handling and transportation keep the cold chamber (monogrammed side) at the lowest point. If the lamps are switched off for more than 12 hours, they shall be burnt for at least 4 additional hours with cold chamber down. Place the lamp into the test system in horizontal position.

Before measuring the luminous flux, the lamp shall be continuously burnt for one hour. Stability shall be checked by monitoring the luminous flux. The measured luminous flux can be considered stable if the relative change is less than 0.5% over a 5 minute period.

Dimming

Dimming is done by the control of the discharge current. In dimming mode, the optimum cathode temperature shall be maintained by additional cathode heating current. All GE T5 lamps are given a seasoning burn-in at the end of the assembly line. This is sufficient cathode preparation for dimming, no additional burn-in at full power is required before using the lamp for the first time.

Please note that after transportation and installation, the mercury is scattered in the tube. For stabilized operation, the excess mercury should be migrated to the cold spot. This may take up to 20 hours of full-power operation. The stabilization time becomes even longer if the lamps are dimmed.

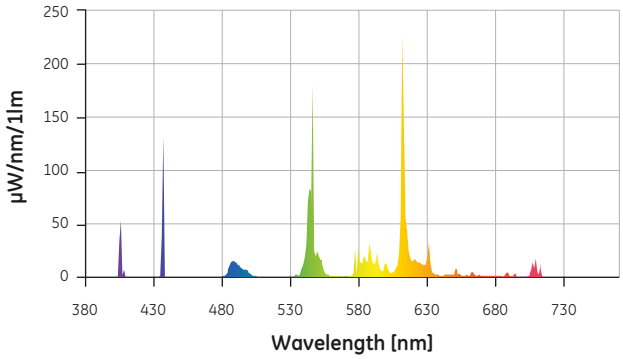
Emergency operation

In emergency operation, lamps are typically underdriven running at low power. To save battery life, emergency inverters may not apply additional cathode heating which would be necessary to maintain the proper cathode temperature.

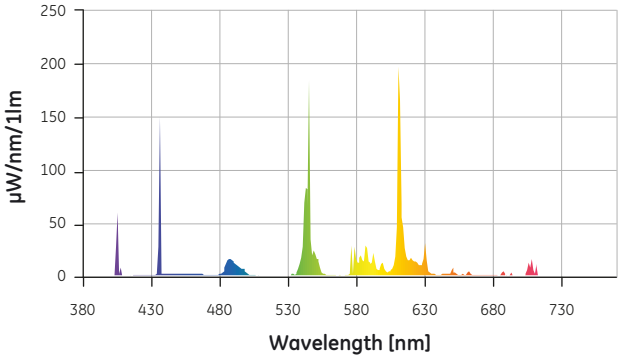
Such unfavourable conditions result in accelerated blackening and shorter life over a longer period in emergency mode. In a typical application, the emergency lighting system is tested for a short period on a regular basis. The cummulative impact on lamp life can generally be considered low.

Spectral power distribution

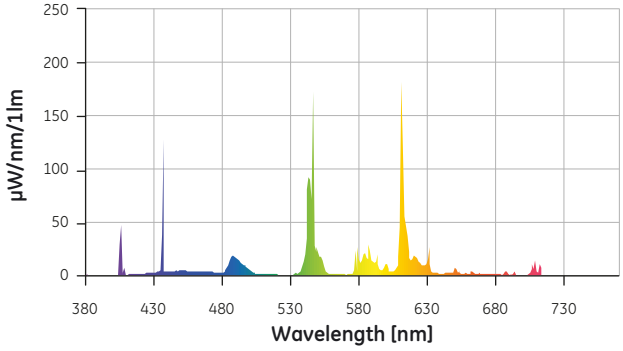
Spectral power distribution 2700K



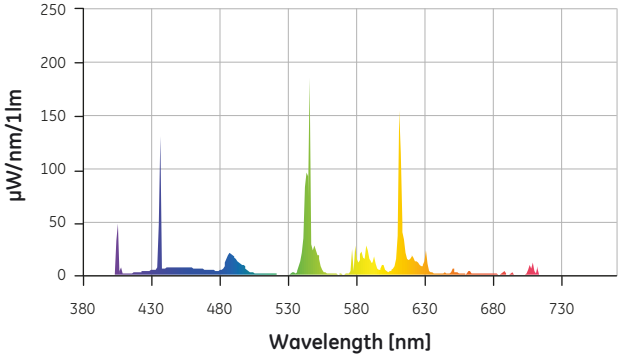
Spectral power distribution 3000K



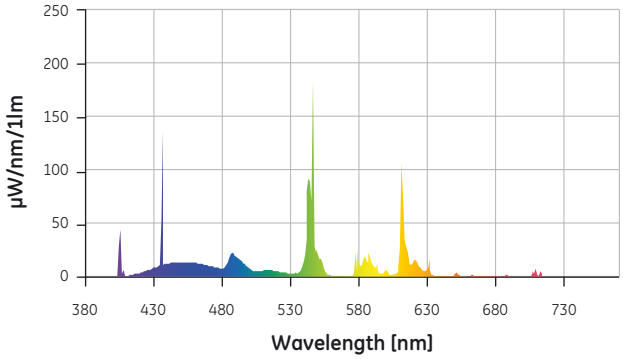
Spectral power distribution 3500K



Spectral power distribution 4000K



Spectral power distribution 6500K



Colour specification according to CIE 1931

CCT [K]		X	Y	CRI
Nominal	Rated			[Ra]
2700	2720	0.463	0.420	85
3000	2940	0.440	0.403	85
3500	3450	0.409	0.394	85
4000	4040	0.380	0.380	85
6500	6400	0.313	0.337	85