

T5 Watt-Miser™ linear fluorescent lamps

Product Information

T5WattMiser™

Description

T5 Watt-Miser™ lamps are triphosphor fluorescent lamps with 16mm outer diameter for indoor applications. These new lamps offer significant energy savings versus other T5 linear fluorescent lamps.



Features

T5 Watt-Miser™ lamps consume 5% less energy compared with today's T5 lamps, without compromising lumen output, and have a 25,000 hours life.

T5 lamps are optimized to higher ambient temperature than T8 lamps, offering up to 111lm/W luminous efficacy. The peak lumen output can be reached at approximately 35°C. The elevated optimum temperature results in additional energy saving versus T8 lamps in typical indoor lighting applications.

Standard T5 lamps can be easily replaced with the new T5 Watt-Miser™ lamps in the existing lighting applications, since new electronic control gears are not required. These new lamps from GE enable even less than 6 months payback time.

GE is committed to fight against climate change. The T5 Watt-Miser™ lamps will contribute to the global effort to reduce CO₂ emission. One lamp can save 1.2-5.0 kg carbon dioxide per year depending on the type. So in addition to the lower energy bill, millions of tons of CO₂ could potentially be saved with this new lamp technology in Europe.

Product Range

T5 Watt-Miser™ lamps are available in 9 wattages and 4 standard colour temperatures. Each already known T5 lamp has its Watt-Miser™ equivalent couple. For easy identification, the stamping colour is green, and the new

product descriptions refer to the existing standard nominal wattages. E.g. a luminaire having the already-known F14W Starcoat™ T5 lamps inside, can be relamped with the new F14 Watt-Miser™.

The entire range consists of the following models:

- 2-ft F14, F24
- 3-ft F21, F39
- 4-ft F28, F54
- 5-ft F35, F49, F80

The available colour temperatures are:

- 3000K warm white
- 3500K white
- 4000K cool white
- 6500K daylight

Application areas

T5 Watt-Miser™ lamps are mostly recommended for general indoor applications, such as

- Retail
- Offices
- Schools
- Commercial
- Industrial

Compliance

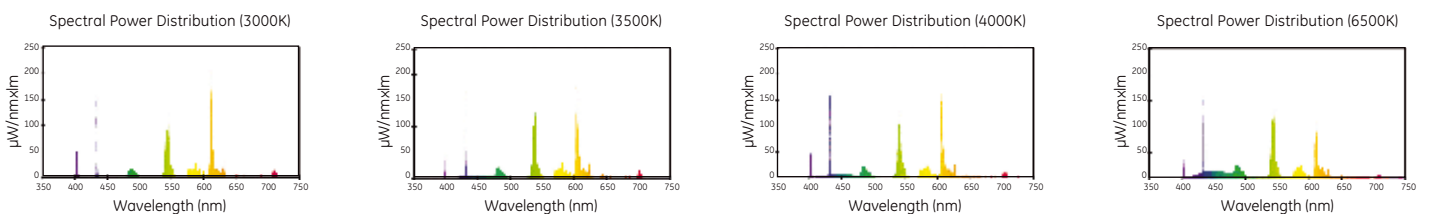
The T5 Watt-Miser™ linear fluorescent lamps comply with IEC 60061, IEC 60081 and IEC 61195



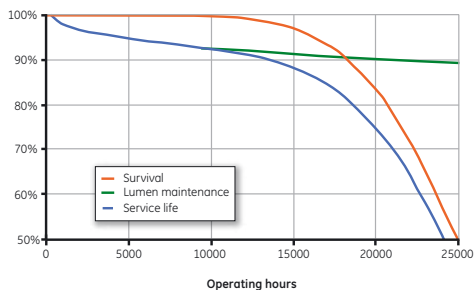
Basic data

Actual Watt	Nominal Watt	Length (mm)	Product description	CCT K	CRI Ra	Rated avg life at 3-hr cycle (hours)	Rated avg life at 12-hr cycle (hours)	Rated peak lumens (lm)	Pack Qty	Energy Class	Product Code
13,0	14	549	F14/T5/830/GE/WATT-MISER/SL 1-30	3000	85	25000	30000	1350	30	A	88364
13,0	14		F14/T5/835/GE/WATT-MISER/SL 1-30	3500	85	25000	30000	1350	30	A	88363
13,0	14		F14/T5/840/GE/WATT-MISER/SL 1-30	4000	85	25000	30000	1350	30	A	88362
13,0	14		F14/T5/865/GE/WATT-MISER/SL 1-30	6500	85	25000	30000	1250	30	A	88361
19,7	21	849	F21/T5/830/GE/WATT-MISER/SL 1-30	3000	85	25000	30000	2100	30	A	88360
19,7	21		F21/T5/835/GE/WATT-MISER/SL 1-30	3500	85	25000	30000	2100	30	A	88358
19,7	21		F21/T5/840/GE/WATT-MISER/SL 1-30	4000	85	25000	30000	2100	30	A	88357
19,7	21		F21/T5/865/GE/WATT-MISER/SL 1-30	6500	85	25000	30000	1950	30	A	88359
21,4	24	549	F24/T5/830/GE/WATT-MISER/SL 1-30	3000	85	25000	30000	2000	30	A	88352
21,4	24		F24/T5/835/GE/WATT-MISER/SL 1-30	3500	85	25000	30000	2000	30	A	88351
21,4	24		F24/T5/840/GE/WATT-MISER/SL 1-30	4000	85	25000	30000	2000	30	A	88350
21,4	24		F24/T5/865/GE/WATT-MISER/SL 1-30	6500	85	25000	30000	1900	30	A	88349
26,4	28	1149	F28/T5/830/GE/WATT-MISER/SL 1-30	3000	85	25000	30000	2900	30	A	88345
26,4	28		F28/T5/835/GE/WATT-MISER/SL 1-30	3500	85	25000	30000	2900	30	A	88346
26,4	28		F28/T5/840/GE/WATT-MISER/SL 1-30	4000	85	25000	30000	2900	30	A	88356
26,4	28		F28/T5/865/GE/WATT-MISER/SL 1-30	6500	85	25000	30000	2700	30	A	88341
33,0	35	1449	F35/T5/830/GE/WATT-MISER/SL 1-30	3000	85	25000	30000	3650	30	A	88355
33,0	35		F35/T5/835/GE/WATT-MISER/SL 1-30	3500	85	25000	30000	3650	30	A	88342
33,0	35		F35/T5/840/GE/WATT-MISER/SL 1-30	4000	85	25000	30000	3650	30	A	88354
33,0	35		F35/T5/865/GE/WATT-MISER/SL 1-30	6500	85	25000	30000	3400	30	A	88353
36,1	39	849	F39/T5/830/GE/WATT-MISER/SL 1-30	3000	85	25000	30000	3500	30	A	88348
36,1	39		F39/T5/835/GE/WATT-MISER/SL 1-30	3500	85	25000	30000	3500	30	A	88347
36,1	39		F39/T5/840/GE/WATT-MISER/SL 1-30	4000	85	25000	30000	3500	30	A	88344
36,1	39		F39/T5/865/GE/WATT-MISER/SL 1-30	6500	85	25000	30000	3330	30	A	88334
46,8	49	1449	F49/T5/830/GE/WATT-MISER/SL 1-30	3000	85	25000	30000	4900	30	A	88343
46,8	49		F49/T5/835/GE/WATT-MISER/SL 1-30	3500	85	25000	30000	4900	30	A	88339
46,8	49		F49/T5/840/GE/WATT-MISER/SL 1-30	4000	85	25000	30000	4900	30	A	88336
46,8	49		F49/T5/865/GE/WATT-MISER/SL 1-30	6500	85	25000	30000	4650	30	A	88340
51,1	54	1149	F54/T5/830/GE/WATT-MISER/SL 1-30	3000	85	25000	30000	5000	30	A	88328
51,1	54		F54/T5/835/GE/WATT-MISER/SL 1-30	3500	85	25000	30000	5000	30	A	88338
51,1	54		F54/T5/840/GE/WATT-MISER/SL 1-30	4000	85	25000	30000	5000	30	A	88337
51,1	54		F54/T5/865/GE/WATT-MISER/SL 1-30	6500	85	25000	30000	4750	30	A	88333
76,0	80	1449	F80/T5/830/GE/WATT-MISER/SL 1-30	3000	85	25000	30000	7000	30	A	88329
76,0	80		F80/T5/835/GE/WATT-MISER/SL 1-30	3500	85	25000	30000	7000	30	A	88330
76,0	80		F80/T5/840/GE/WATT-MISER/SL 1-30	4000	85	25000	30000	7000	30	A	88332
76,0	80		F80/T5/865/GE/WATT-MISER/SL 1-30	6500	85	25000	30000	6650	30	A	88331

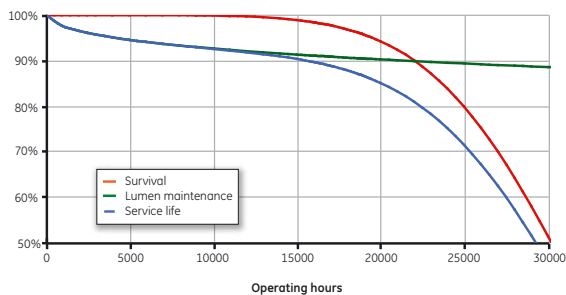
Spectral power distribution



Life and lumen maintenance curves at a 3hr switching cycle



Life and lumen maintenance curves at a 12hr switching cycle



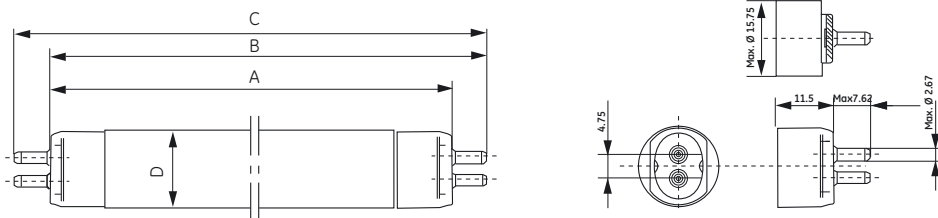
Hours	Survivals	Lumens
5,000	>99%	94%
10,000	99%	92%
15,000	97%	91%
20,000	83%	90%
25,000	50%	89%

Typical values

Service life curve is defined as the product of the survival rate and the lumen maintenance. The rated value is at 80%.

Dimension

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

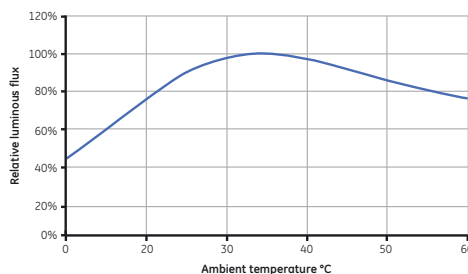


Dimensions measured on finished lamps

		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 temperature on light output

Lamp performance parameters, such as luminous output, lamp voltage and power depend on the mercury vapour pressure in the discharge tube. The mercury vapour pressure is affected by the thermal conditions determined by factors such as burning position, air flow, radiating heat sources, etc. T5 lamps produce the maximum lumen output at approximately 35°C ambient temperature. It is approximately equivalent to 45°C cap temperature which can be more easily measured in a luminaire. For maximum performance, the use of electronic control gears with cathode cut-off technology is recommended.



Typical values

t_a (°C)	L%	t_a (°C)	L%
10	45%	40	97%
15	60%	45	92%
20	76%	50	86%
25	90%	55	81%
30	98%	60	76%
35	100%		

Information for control gear manufacturers and OEMs

	Lamp current mA	Lamp power W	Lamp voltage V	Luminous flux at 25°C lm	Peak luminous flux lm	Efficacy at peak lumens lm/W
F14 Watt-Miser	170	13,0	78	1230	1350	104
F21 Watt-Miser	170	19,7	117	1910	2100	107
F24 Watt-Miser	300	21,4	71	1750	2000	94
F28 Watt-Miser	170	26,4	159	2640	2900	110
F35 Watt-Miser	170	33,0	199	3320	3650	111
F39 Watt-Miser	340	36,1	106	3200	3500	97
F49 Watt-Miser	260	46,8	181	4450	4900	105
F54 Watt-Miser	460	51,1	112	4460	5000	98
F80 Watt-Miser	555	76,0	138	6450	7000	92

	P_{min} W	Q_{min} J	$R_{sub,min}$ Ω	P_{max} W	Q_{max} J	$R_{sub,max}$ Ω	Max. non-ignition voltage $t < t_{start}$ V_{rms}	Min. ignition voltage $t > t_{start}$ V_{rms}	$R_{sub,OCV}$ Ω
F14 Watt-Miser	0.8	0.9	30	1.5	1.8	40	130	275	30...90
F21 Watt-Miser	0.8	0.9	30	1.5	1.8	40	200	390	30...90
F24 Watt-Miser	0.9	1.5	8	1.8	2.5	10.5	130	350	8...24
F28 Watt-Miser	0.8	0.9	30	1.5	1.8	40	240	530	30...90
F35 Watt-Miser	0.8	0.9	30	1.5	1.8	40	275	700	30...90
F39 Watt-Miser	0.9	1.5	8	1.8	2.5	10.5	175	390	8...24
F49 Watt-Miser	0.9	1.1	12	1.8	2.2	16	225	625	12...36
F54 Watt-Miser	1.0	2.2	4.8	1.8	3.8	6.5	240	620	4.8...14.4
F80 Watt-Miser	1.0	2.2	4.5	1.9	4.2	6	250	750	4.5...13.5

While P describes the heat loss of the cathode. During longer preheating, the cathode loses more heat to its surrounding. Parameters for the current controlled and the voltage controlled modes, can be derived from the formula. Ignition voltage (OCV_{min}) is defined for starting at -15°C ambient temperature.

	X_{min} A^2	Y_{min} A	X_{max} A^2	Y_{max} A	I_D A
F14 Watt-Miser	0.045	0.295	0.055	-0.075	0.015...0.130
F21 Watt-Miser	0.045	0.295	0.055	-0.075	0.015...0.130
F24 Watt-Miser	0.220	0.650	0.270	-0.165	0.035...0.280
F28 Watt-Miser	0.045	0.295	0.055	-0.075	0.015...0.130
F35 Watt-Miser	0.045	0.295	0.055	-0.075	0.015...0.130
F39 Watt-Miser	0.220	0.650	0.270	-0.165	0.035...0.280
F49 Watt-Miser	0.120	0.480	0.150	-0.120	0.025...0.210
F54 Watt-Miser	0.415	0.890	0.505	-0.225	0.050...0.385
F80 Watt-Miser	0.495	0.970	0.605	-0.245	0.055...0.420

Electrical and photometric characteristics

Rated electrical characteristics are valid at 35°C ambient temperature after 100 hours burning. Lumen and efficacy values are valid for colour temperatures 3000K, 3500K and 4000K.

Starting requirements

Starting requirements comply with IEC 60081. Suitable preheating of the cathodes prior to ignition is essential for long lamp life. The preheating requirement can be given by the following formula:

$E = Q + P \cdot t$ for 0.4...3.0s starting times. E is the energy dissipated on a suitably chosen substitution resistor R_{sub} . Q represents the necessary thermal energy to raise the cathode temperature.

Dimming

Dimming is done by reducing the discharge current. As a result, the electron emissivity of the cathodes will decrease. Since it may have a negative impact on lamp life, additional cathode heating should be applied by the electronic control gear.

$I_{LH}^2 + I_{LL}^2 = X - Y \cdot I_D$, where I_{LH} and I_{LL} are the currents in the lead-in wires to the cathode; I_D is the discharge current.

Recommendation for measuring T5 lamps

In order to minimise stabilisation time, handle T5 lamps in vertical position with the "cold spot" at the lowest point as much as possible. During testing, the luminous flux of the lamp should be stabilised. Stable light output is reached when all the liquid mercury is in the cold chamber. Before measuring, T5 lamps should be seasoned for approx. 100 hours in a vertical position with the cold chamber (stamp side) at the lowest point. If the lamps are switched off for more than 12 hours, they are to be burnt for at least 4 additional hours with cold chamber down. Placing the lamps into the test system the cold chamber should be kept at the lowest point as much as possible. After placing the lamp within the test system and before measuring the stable luminous flux, lamps should be continuously burnt for one hour. Stability should be checked by monitoring the luminous flux. The measured luminous flux may be considered stable if the relative change in light output is less than 0.5% over a 5 minute period.