EcoProfile 061106 CFL

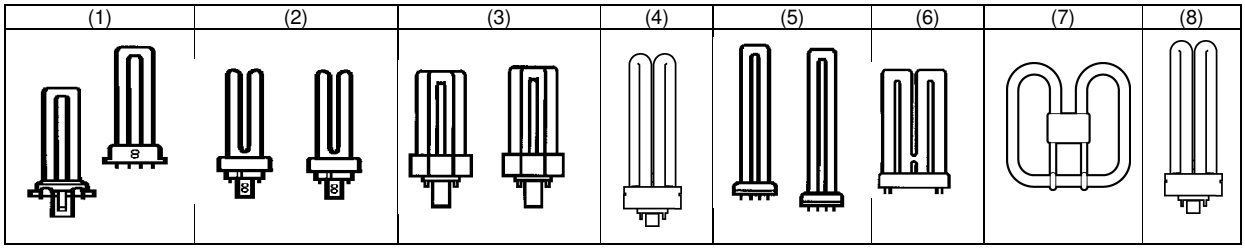
Non Ballasted Single Capped Compact Fluorescent Lamps for General Lighting Applications

1. Definitions

Non-Ballasted Single Capped Compact Fluorescent Lamps

Non-Ballasted Single Capped Fluorescent Lamps are high energy-efficient low-pressure discharge lamps with a fluorescent phosphor coating to transform the mercury UV radiation into visible light. There are different main families of compact fluorescent lamps with plug-in 2 pin base or 4 pin base:

(1) Small single parallel tube, lamp cap G23 (2 pin) or 2G7 (4pin)
(2) Double parallel tubes, lamp cap G24d (2 pin) or G24q (4 pin)
(3) Triple parallel tubes, lamp cap GX24d (2 pin) or GX24q (4 pin)
(4) Four parallel tubes, lamp cap GX24q (4 pin)
(5) Long single parallel tube, lamp cap 2G11 (4 pin)
(6) 4 legs in one plane, lamp cap 2G10 (4 pin)
(7) Single flat plane tube, lamp cap GR8 (2 pin), GR10q (4 pin) or GRY10q3 (4 pin)
(8) Four or three parallel T5 tubes, lamp cap 2G8 (4 pin)



General Lighting

General Lighting Lamps are lamps for general use in private, commercial & industrial application areas with the following characteristics:

- General Lighting sources provide a level of visible light in the range of 400 to 800 nm.
- They are classified by the energy label and universally available.
- They are highly standardised and interchangeable.
- Long life lamps are to be preferred.

For general lighting applications it is only possible to use lamps based on the standard IEC/EN 60901. Exceptions to this rule (lamps used for special applications) are listed in *Annex 2*.

2. Minimum Performance Standards

2.1. Efficacy Standard

Efficacy (lm/W) is the amount of light emitted by a lamp. It is measured in lumen (lm) for each Watt (W) of power consumed. The efficacy is the key indicator for efficient power consumption. The minimum lumen per wattage values are outlined in *Annex I.*

2.2. Colour Rendering Standard

***Colour Rendering* (Ra)** is the ability of lamps to render colours faithfully. It is measured on the Ra index. The index runs from 20 (indicative of severe colour distortion) until 100 (no colour distortion).

For General Lighting Applications the Minimum Colour Rendering [Ra] is ≥ 80.

3. Testing requirements and conditions for the Minimum Performance Standards

Non-Ballasted Single Capped Compact Fluorescent Lamps have to comply with the requirements as described in *Annex 3* (based on standard EN 50285).

4. Lamp Performance Standard

For Non-Ballasted Single Capped Compact Fluorescent lamps with plug-in base in the European market, the performance standard IEC / EN 60901 and *Annex 1*, in addition to the essential requirements of the CE Directive, shall be the criteria to obtain the CE mark (*At present, the CE Directive requires compliance with product safety and EMC standards.)*. Lamps listed in *Annex 2* (for special applications, generally low volumes) are exempt from this rule.

5. Control gear

It is recommended to use electronic control gear to operate all 4 pin lamps listed in *Annex 1* to gain maximum performance, lifetime and efficacy.

The applied ballasts have to be in consensus with the Directive 2000/55/EC. They shall comply with the safety standards IEC / EN 61347 and the performance standard IEC/EN 60929.

6. WEEE

Non-Ballasted Single Capped Compact Fluorescent Lamps with plug-in base have to fulfil the demands of WEEE (Waste of Electrical and Electronic Equipment Directive 2002/96/EC) and have to be in consensus with National Laws in the European Union and to be marked accordingly.

7. Maximum Hazardous Substances Content (RoHS)

Non-Ballasted Single Capped Compact Fluorescent Lamps with plug-in have to fulfill the targets set by the EU Directive RoHS (2002/95/EC).

8. Lamp Safety requirements

Non-Ballasted Single Capped Compact Fluorescent Lamps have to comply with the safety requirements as described in the IEC/EN 61199.

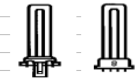
Addendum: This document is Best Available Technology (BAT) as of present day, 2006. Should new technologies introduced on the market, not be covered by *Annex I*; this Eco-Profile should be updated.

ANNEX 1 - *Minimum Lumen per Watt values for non Ballasted Single Capped Compact Fluorescent Lamps (according IEC/EN 60901)*

Based on 100h Minimum Value IEC 60901 (90% of 100h initial)

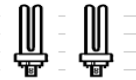
Type	Small single parallel tube, lamp cap G23 (2Pin) or 2G7 (4pin)						
Wattage	**5**	**7**	**9**	**11**			
nominal light output (lm) for Tc < 5000K (e.g. 827, 830, 835, 840)	**250**	**400**	**600**	**900**			
nominal light output (lm) for Tc ≥ 5000K (e.g. 850, 865)	**225**	**360**	**540**	**810**			
minimum efficacy (lm/W) for Tc < 5000K (e.g. 827, 830, 835, 840)	**45**	**51**	**60**	**74**			
minimum efficacy (lm/W) for Tc ≥ 5000K (e.g. 850, 865)	**41**	**46**	**54**	**66**			

Cap G23 (2pin) or 2G7 (4pin)
Small single parallel tube



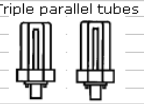
Type	Double parallel tubes, lamp cap G24d (2 pin) or G24q (4 pin)						
Wattage	**10**	**13**	**18**	***26***			
nominal light output (lm) for Tc < 5000K (e.g. 827, 830, 835, 840)	**600**	**900**	**1200**	**1710**			
nominal light output (lm) for Tc ≥ 5000K (e.g. 850, 865)	**540**	**810**	**1080**	**1540**			
minimum efficacy (lm/W) for Tc < 5000K (e.g. 827, 830, 835, 840)	**54**	**62**	**60**	**59**			
minimum efficacy (lm/W) for Tc ≥ 5000K (e.g. 850, 865)	**49**	**56**	**54**	**53**			

Cap G24d (2pin) or G24q (4pin)
Double parallel tubes



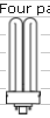
Type	Triple parallel tubes, lamp cap GX24d (2 pin) or GX24q (4 pin)						
Wattage	**13**	**18**	***26***	***32***	**42**	**57**	**70**
nominal light output (lm) for Tc < 5000K (e.g. 827, 830, 835, 840)	**900**	**1200**	**1710**	**2400**	**3200**	**4300**	**5200**
nominal light output (lm) for Tc ≥ 5000K (e.g. 850, 865)	**810**	**1080**	**1539**	**2160**	**2880**	**3870**	**4680**
minimum efficacy (lm/W) for Tc < 5000K (e.g. 827, 830, 835, 840)	**62**	**60**	**59**	**68**	**69**	**68**	**67**
minimum efficacy (lm/W) for Tc ≥ 5000K (e.g. 850, 865)	**56**	**54**	**53**	**61**	**62**	**61**	**60**

Cap GX24d (2pin) or GX24q (4pin)
Triple parallel tubes



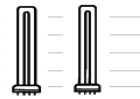
Type	Four parallel tubes, lamp cap GX24q (4 pin)	
Wattage	**57**	**70**
nominal light output (lm) for Tc < 5000K (e.g. 827, 830, 835, 840)	**4300**	**5200**
nominal light output (lm) for Tc ≥ 5000K (e.g. 850, 865)	**3870**	**4300**
minimum efficacy (lm/W) for Tc < 5000K (e.g. 827, 830, 835, 840)	**68**	**67**
minimum efficacy (lm/W) for Tc ≥ 5000K (e.g. 850, 865)	**61**	**55**

Cap GX24q (4pin)
Four parallel tubes



Type	Long single parallel tube, lamp cap 2G11 (4 pin)						
Wattage	**18**	**24**	**36**	**36**	**40**	**55**	**80**
nominal light output (lm) for Tc < 5000K (e.g. 827, 830, 835, 840)	**1200**	**1800**	**2900**	**2900**	**3300**	**4500**	**6000**
nominal light output (lm) for Tc ≥ 5000K (e.g. 850, 865)	**1080**	**1620**	**2610**	**2610**	**2970**	**4050**	**5400**
minimum efficacy (lm/W) for Tc < 5000K (e.g. 827, 830, 835, 840)	**60**	**68**	**73**	**73**	**74**	**74**	**68**
minimum efficacy (lm/W) for Tc ≥ 5000K (e.g. 850, 865)	**54**	**61**	**65**	**65**	**67**	**66**	**61**

Cap 2G11 (4pin)
Long single parallel tube



Type	4 legs in one plane, lamp cap 2G10 (4 pin)		
Wattage	**18**	**24**	**36**
nominal light output (lm) for Tc < 5000K (e.g. 827, 830, 835, 840)	**1100**	**1700**	**2800**
nominal light output (lm) for Tc ≥ 5000K (e.g. 850, 865)	**990**	**1530**	**2520**
minimum efficacy (lm/W) for Tc < 5000K (e.g. 827, 830, 835, 840)	**55**	**64**	**70**
minimum efficacy (lm/W) for Tc ≥ 5000K (e.g. 850, 865)	**50**	**57**	**63**

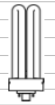
Cap 2G10 (4pin)
4 legs in one plane

Type	Single flat plane tube, lamp cap GR8 (2 pin), GR10q (4 pin) or GRY 10q3 (4 pin)					
Wattage	**10**	**16**	**21**	**28**	**38**	**55**
nominal light output (lm) for Tc < 5000K (e.g. 827, 830, 835, 840)	**650**	**1050**	**1350**	**2050**	**2700**	**3200**
nominal light output (lm) for Tc ≥ 5000K (e.g. 850, 865)	**585**	**945**	**1215**	**1845**	**2430**	**2880**
minimum efficacy (lm/W) for Tc < 5000K (e.g. 827, 830, 835, 840)	**59**	**59**	**58**	**66**	**64**	**52**
minimum efficacy (lm/W) for Tc ≥ 5000K (e.g. 850, 865)	**53**	**53**	**52**	**59**	**58**	**47**

Cap GR8 (2 pin), Cap GR10q (4pin) or GRY 10q3 (4 pin)
Single flat bent tube

Type	Four or three parallel T5 tubes, lamp cap 2G8 (4 pin)			
Wattage	**60**	**82**	**85**	**120**
nominal light output (lm) for Tc < 5000K (e.g. 827, 830, 835, 840)	**4000**	**6150**	**6000**	**9000**
nominal light output (lm) for Tc ≥ 5000K (e.g. 850, 865)	**3600**	**5535**	**5400**	**8100**
minimum efficacy (lm/W) for Tc < 5000K (e.g. 827, 830, 835, 840)	**60**	**68**	**64**	**68**
minimum efficacy (lm/W) for Tc ≥ 5000K (e.g. 850, 865)	**54**	**61**	**57**	**61**

Cap 2G8 (4pin)
Four or three parallel T5 tubes



Remark:

For special applications like lamp operation at low (outdoor) or especially high (hot fixtures) ambient temperatures, lamp manufactures have optimized their lamps for maximizing lumen output under these special conditions. These lamps don't fulfill the data mentioned above at 25°C, but at an ambient temperature for that the lamp design has been optimized.
Therefore these lamps have an optimized efficiency in a special temperature range. It is recommended that manufacturers indicate lamps for special applications on the packing. (t.b.d.)

Note 1: - **'Nominal light Output'** - Use for calculation of life cycle analysis (TCO – total cost of ownership)

Note 2: - **'Minimum Efficacy'** - Must be used for the minimum efficacy to pass the CE Mark.

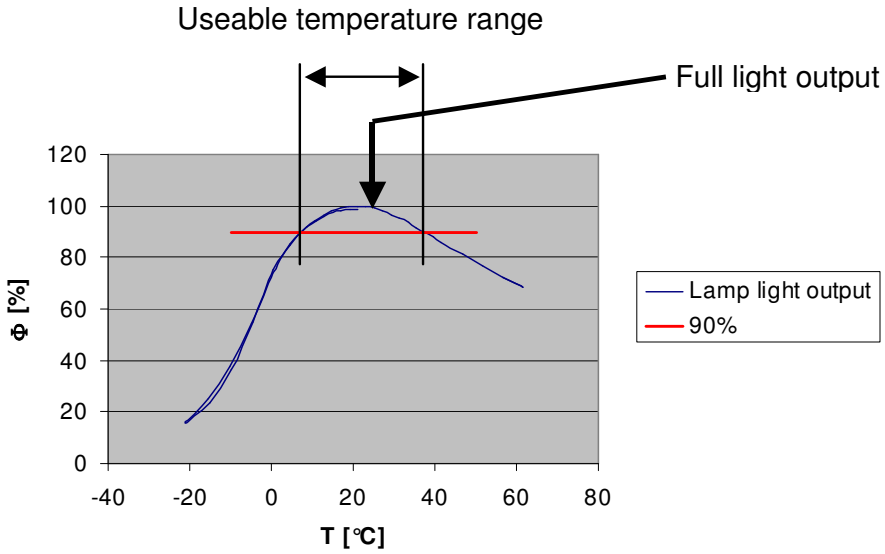
Annex 2: *Lamps not used for general lighting but for special applications and thus excluded from performance criteria specified in Annex 1:*

- Colour Rendering Index ≥ 90
- Coloured lamps
- Visible blue spectral lamps (e.g. range of 400-550nm)
- UV lamps
- Sun tanning lamps
- Disinfection lamps
- Medical/Therapy lamps
- Pet care lamps
- Lamps for food lighting, bakeries
- Lamps for special temperature applications (please see explanation below)
- Long single parallel tube, lamp cap 2G11, 34W

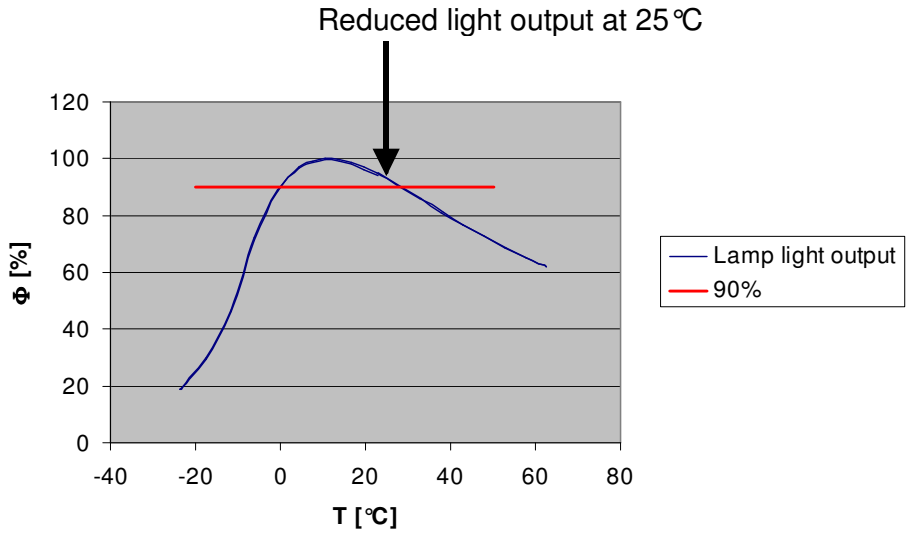
Explanation for special temperature applications

Fluorescent lamps in general have a strong dependency of their light output from the Hg vapour pressure in the lamp and therefore from the lamp ambient temperature.

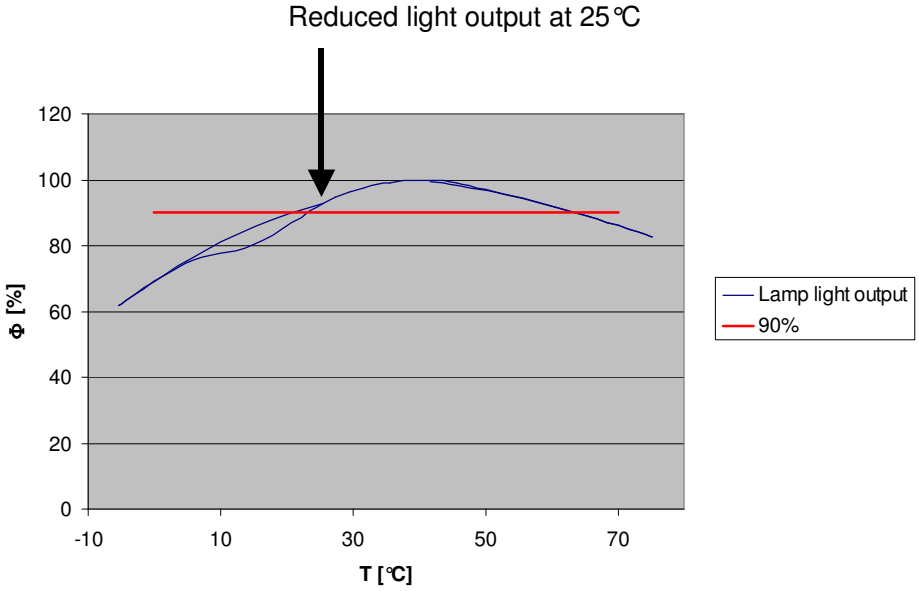
There are designs of special lamps with maximum light output in a temperature range defined



according to the customer needs (e.g. outdoor application).



There are lamps that use amalgam for Hg vapour pressure control, which increases the usable temperature range of the lamp (e.g. hot fixture application).



Annex 3: *Testing requirements and conditions for the Minimum Performance Standards (based on standard EN 50285)*

1. Test conditions
Lamps shall be tested in accordance with the relevant clauses of the standards listed below.

- For single-capped fluorescent lamps IEC/EN 60901

2. Verification
The minimum sample size shall be twenty lamps. The sample shall be representative of a manufacturer's production. This can be achieved by randomly selecting lamps from at least four different points of sale.

The results of the tests shall comply with requirements given in *Annex 1*. If the results do not comply with these requirements, the manufacturer's test records shall be requested.