GREEN CHOICE PHILIPPINES

NELP-GCP PRP2016008
LED Lighting Products

1 ENVIRONMENTAL SCENARIO

Public and private sector have been adapting and developing strategies to reduce electricity consumption and GHG emissions. One of the most applied energy conservation strategies by the government is to use energy efficient lighting systems (EELs) through the following programs, to name a few: 1) Philippine Efficient Lighting Market Transformation Project (PELMATP) in 2004-2009; 2) Philippine Energy Efficiency Project (PEEP) in 2009-2013; 3) SWITCH-The Movement; and the 4) Philippine National Energy Efficiency and Conservation Program (NEECP).

Several guidelines for lightings have been developed through PELMATP such as the Roadway Lighting Guidelines, ecolabelling standards on ballast, and Guidelines on Energy Conserving Design on Buildings. For the PEEP Project, several lighting technologies were considered for pilot projects such as fluorescent lamps, compact fluorescent lamps, light emitting diode lamps, sodium Lamps & electronic ballasts.

Life cycle assessment studies have been conducted in other countries comparing luminaire technologies for general lighting, streetlight for minor roads, and road lighting determining which of the energy efficient technologies performs better from a life cycle perspective.

A study in India compared incandescent lamp, fluorescent lamp, compact fluorescent lamp, and light emitting diode lamp. Using LCA considering eco-system quality, human health, and resources, incandescent lamp is highly inefficient across all impacts. However, for the 3 lamps, the results were comparable contrary to general perception (Sangwan, et al, 2014). In LCA studies comparing LED with HPS (Tähkämö and Halonen, 2015) and CMH (Hadi et al, 2013), both studies showed that LED street and road lights are environmentally preferable than the alternative because of low energy consumption during its use phase. However, the environmental impact of LED are mainly during its production phase which comes from fossil fuel consumption and respiratory inorganics.

With various applications for households, vehicles and community lighting, LED has been the technological choice of households and institutional purchasing. Aside from environmental concerns, major issues for consumers to consider include qualities of light (e.g. brightness, color and color quality), functionality (e.g. direction, product life), energy consumption (LaMonica, 2013).

This document provides a set of guidelines for safe and reliable LED lights for outdoor application.

2 DEFINITION OF TERMS

For the purpose of this document, the terms and definitions are given in the Standards listed in clause 4.1.1 of this document and as well as the following apply.

Correlated Colour Temperature (CCT)
The temperature of the Planckian radiator whose perceived colour most closely resembles that of a given stimulus at the same brightness and under specified viewing conditions

unit: K

Note 1 – The recommended method of calculating the correlated colour temperature of a stimulus is to determine on a chromaticity diagram the temperature corresponding to the point on the Planckian locus that is intersected by the agreed isotemperature line containing the point representing the stimulus.

Note 2 – Reciprocal correlated colour temperature is used rather than reciprocal colour temperature whenever correlated colour temperature is appropriate.

Ecolabel / Ecolabelling
Refers to the Type 1 ecolabelling programme, based on ISO 14024

International Electrotechnical Commission (IEC)
is the international standards and conformity assessment body for all fields of electrotechnology

Illuminating Engineering Society of North America (IES)

Luminous flux maintenance factor
Ratio of the luminous flux of a lamp at a given time in its life to its initial luminous flux, the lamp being operated under specified conditions

Note – This ratio is generally expressed in per cent

Light Emitting Diode **(LED)**
Solid state device embodying a p-n junction, emitting optical radiation when excited by an electric current

lumen
SI unit of luminous flux: Luminous flux emitted in unit solid angle (steradian) by a uniform point source having a luminous intensity of 1 candela

Equivalent definition. Luminous flux of a beam of monochromatic radiation whose frequency is 540 x 1012 hertz and whose radiant flux is 1/683 watt.

luminaire
apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply

Note 1 – The term lighting fitting is deprecated.

Note 2 – In the USSR, the term "фонарь" is used in public and transport lighting, and also sometimes to describe portable luminaires.

luminous efficacy of a source
quotient of the luminous flux emitted by the power consumed by the source

unit: lm · W-1

luminous efficacy of radiation
quotient of the luminous flux Φv by the corresponding radiant flux Φe

unit: lm · W -1

Note – When applied to monochromatic radiations, the maximum value of K(λ) is denoted by the symbol Km.
Km = 683 lm • W -1 for vm = 540 x 1012 Hz (λm ≈ 555 nm) for photopic vision.
K'm = 1700 lm • W -1 for λ'm = 507 nm for scotopic vision.
For other wavelengths : K(λ) = Km V(λ) and K'(λ) = K'm V'(λ).

National Ecolabelling Programme-Green Choice Philippines **(NELP-GCP)**
The type 1 ecolabelling programme of the Philippines, based on ISO 14024

lighting chain
luminaire comprising an assembly of series-connected lamps, parallel-connected lamps or series/parallel-connected lamps and interconnecting insulated conductors

Note 1 to entry: For lighting chains with non-standardised lamps (e.g. lamps of the push-in type) the lamps are regarded as part of the chain.
Note 2 to entry: For lighting chains with non-removable lamps, the lamps are regarded as part of the chain.
Note 3 to entry: A lighting chain may incorporate control devices (e.g. flasher units, see 20.7.8).
Note 4 to entry: Unless otherwise stated, references to lamps within this standard also refer to LEDs.

self-ballasted LED-lamp
unit which cannot be dismantled without being permanently damaged, provided with a lamp cap and incorporating a LED light source and any additional elements necessary for stable operation of the light source

double-capped retrofit LED lamp
tubular LED lamp which can be used as a replacement for double-capped fluorescent lamps without requiring any internal modification in the luminaire and which, after installation, maintains the same level of safety of the replaced lamp in the luminaire

Bureau of Philippine Standard (DTI – BPS)

Department of Energy (DOE)

3 SCOPE

This document establishes requirements for Light Emitting Diode (“LED lighting”) intended to replace incandescent lamps, decorative lamps, fluorescent lamps, halogen lamps, street lighting lamps, and others.

This scope also applies for LED general lighting purposes, streetlight, lighting chains and other products to be connected to a utilization voltage of 230V and 60Hz.

4 GREEN CHOICE PHILIPPINES REQUIREMENTS

4.1 QUALITY PERFORMANCE

The product shall comply with the performance requirements of the relevant Philippine National Standard for its intended application or other internationally acceptable standard, amendments and addendum.

4.1.1 For LED Modules

	Product Application	Performance and Safety Standard Title
4.1.1.	PNS IEC 62031:2015 (IEC PUB. 2012)	LED modules for general lighting - Safety specifications
4.1.4.	PNS IEC PAS 62717:2013 (IEC PUB. 2011)	LED modules for general lighting - Performance requirements
4.1.9.	PNS IEC 61347-2-13:2012 (IEC PUB. 2016)	Lamp controlgear - Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules
4.1.10.	PNS IEC 62384: 2014 (IEC PUB. 2011)	DC or AC supplied electronic control gear for LED modules - Performance requirements
4.1.11.	IEC 62442-3:2014 (NOT YET ADOPTED)	Energy performance of lamp controlgear - Part 3: Controlgear for halogen lamps and LED modules - Method of measurement to determine the efficiency of the controlgear

4.1.2 For Self-Ballasted LED Lamps

	Product Application	Product Application	Performance and Safety Standard Title
4.1.2.	Self-ballasted LED-lamps (performance)	IEC 62560:2012 (IEC PUB. 2011)	Self-ballasted LED-lamps for general lighting services by voltage > 50 V - Safety specifications
4.1.3.	Self-ballasted LED-lamps (safety)	PNS IEC 62612:2014 (IEC PUB. 2013)	Self-ballasted LED lamps for general lighting services with supply voltages > 50 V – Performance requirements

4.1.3 For Double-capped

	Product Application	Product Application	Performance and Safety Standard Title
4.1.5.	All Double-capped (safety)	PNS IEC 62776:2015 (IEC PUB. 2014)	Double-capped LED lamps designed to retrofit linear fluorescent lamps - Safety specifications

4.1.4 For Luminaire

	Product Application	Product Application	Performance and Safety Standard Title
4.1.6.	Luminaire (performance)	**IEC 62722-2-1:2014**	Luminaire performance - Part 2-1: Particular requirements for LED luminaires
4.1.7.	Luminaire - road and street lighting	PNS IEC 60598-2-3:2015 (IEC PUB. 2011)	Luminaires - Part 2-3: Particular requirements - Luminaires for road and street lighting
4.1.8.	Luminaire - lighting chains	PNS IEC 60598-2-20:2015 (IEC **PUB.** 2014)	Luminaires - Part 2-20: Particular requirements - Lighting chains

For products to be distributed in the Philippines, the product shall have the following specifications.

Parameters	**Self-ballasted LED**	**Double capped LED**	**Street Lighting LED**
Power input, W	≥4 to ≤28	≥10 to ≤28	≤ 250
Voltage rating, V	230	* dependent on controlgear	230
Frequency, Hz	60	60	60
Initial luminous flux	not less 10% of claimed	not less 10% of claimed	not less 10% of claimed
Efficacy	90	90	100
Lumen maintenance, %	L90 @ 25% of life	L90 @ 25% of life	L70 @ 10,000 hrs
CCT, K	2720, 2940, 3450, 4040, 5000, 6400	2720, 2940, 3450, 4040, 5000, 6400	≥2700
CRI	80 ± 10	80 ± 10	80 ± 10
Mechanical resistance			IK 06
Degrees of protection			IP 66
Surge protection			10 KV
Warranty	2 years	2 years	3 years

4.2 ENVIRONMENTAL PERFORMANCE

4.2.1 Compliance to Environmental Regulations

The applicant is required to comply with relevant local environmental legislations. This includes but not limited to production process, transport, and end-of-life aspect of the product.

4.2.2 Hazardous Substances

The applicant is required to comply with relevant local or international standards on the restriction of the use of certain hazardous substances in electrical and electronic equipment for lead (Pb), mercury (Hg), Hexavalent Chromium ($Cr6^{+}$), Polybrominated biphenyls (PBB) and Polybrominated diphenyl ether (PBDE), and not more than 100 ppm of Cadmium (Cd) by weight of homogeneous material.

5 PERIOD OF VALIDITY

The product criteria is valid for three years from the date of its approval unless otherwise revised or withdrawn by the NELP-GCP Board, if proven necessary at any period of time.

6 REFERENCES

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