

CRITERIA FOR SELECTING LED LUMINAIRES

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159353C

Degree of Master of Science

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University of Moratuwa
Sri Lanka

February 2020

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Thesis/Dissertation submitted in partial fulfilment of the requirements for the degree
Master of Science in Electrical Installations

Department of Electrical Engineering

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Sri Lanka

February 2020

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Dr. Asanka S. Rodrigo

Abstract

Fluorescent tubes and compact fluorescent lamps (CFL) were the dominant artificial light source for so many years in domestic, commercial and industrial contexts. In the recent years Light Emitting Diodes (LEDs) have gained much popularity with the proven energy and economic benefits and are now used in almost every lighting application. Other benefits include compact size, long service life, ease of maintenance and instant-on quality. Ease of dimming and controlling of LEDs set forth further energy savings. Currently there is an increasing trend for using LED luminaires in many commercial buildings and this has led to form a huge demand for LED luminaires and a huge market competition between the lighting solution suppliers.

When the LED bulbs were first introduced to the Sri Lankan market, the retail market was flooded with many low-quality products and most of the domestic consumers could not reap the maximum benefit. Same goes for the LED luminaires. Since these LED luminaires are used in thousands of quantities in commercial buildings hoping to last for decades, if not wisely chosen, huge performance and economic losses have to be endured.

With the absence of a national guideline to choose LED fixtures there is an ambiguity among lighting designers and clients when choosing the most suitable luminaire from the wide range of LED luminaires available in Sri Lankan market. Therefore, the intention of this research was to develop general criteria that can be used for choosing the most suitable LED luminaire for a given building.

Worldwide building codes and rating systems were studied to identify the minimum performance level expected from the LED luminaires in other countries. LED luminaires in Sri Lankan and foreign markets were technically evaluated. Technical specifications of LED luminaires were obtained from manufacturers' websites and the market prices were obtained from suppliers.

Findings of this research include the evolution of lighting requirements imposed by building codes, performance status of LED luminaires available in Sri Lanka market, general criteria for choosing LED luminaires and justification of the proposed criteria with an example application.

Keywords: *light-emitting diode (LED), solid-state lighting, Luminaire, Lighting design, Lamp lumen depreciation, energy savings*

Acknowledgement

I express my heartfelt gratitude to Dr. Asanka Rodrigo, who has rendered continuous support in completing this study. His guidance, motivation and knowledge helped me in completing this research and writing of this dissertation.

I would also thank all the lecturers of the Department of Electrical Engineering, Faculty of Engineering, University of Moratuwa for the continuous support given through progress reviews to successively complete this research.

I would like to express my sincere thanks to all my colleagues for their kind help, supports and encouragements given to overcome difficulties during the period I conducted this research.

Finally, I would like to express my sincere gratitude to my family and friends who continuously motivated me to complete this research successfully.

R.M.L. Chamari

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List of Abbreviations

Abbreviation	Description
ASHRAE	The American Society of Heating, Refrigerating and Air-Conditioning Engineers
CCT	Correlated Colour Temperature
CRI	Colour Rendering Index
IES	Illumination Engineering Society
kVA	Kilovolt-ampere
kW	Kilowatt
kWh	Kilowatt-hour
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LLMF	Lamp Lumen Maintenance Factor
LMF	Luminaire Maintenance Factor
LPD	Lighting Power Density
MEP	Minimum Energy Performance
MF	Maintenance Factor
PF	Power Factor
RMF	Room Maintenance Factor
UF	Utilization Factor
USGBC	U.S. Green Building Council