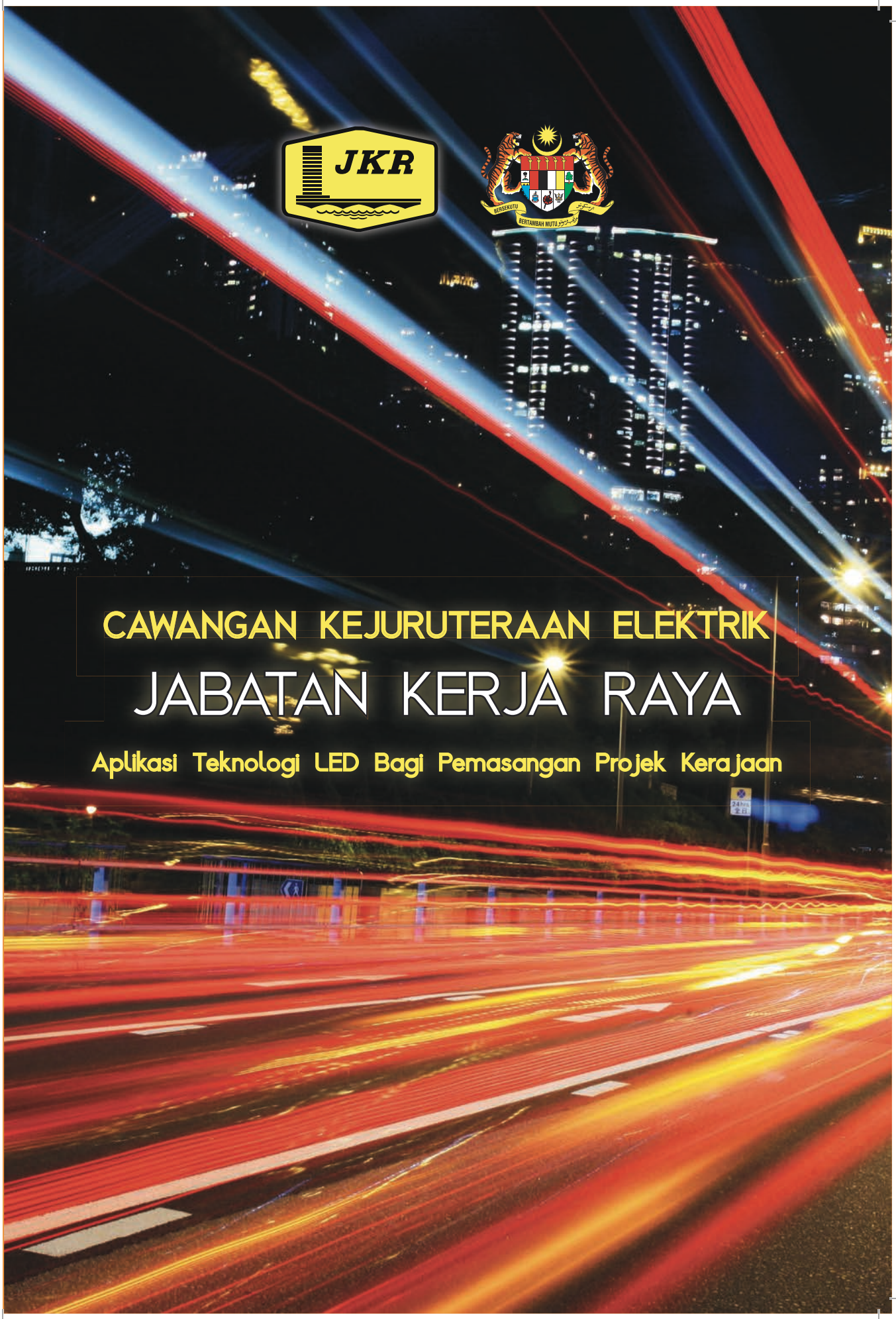

CAWANGAN KEJURUTERAAN ELEKTRIK

JABATAN KERJA RAYA

Aplikasi Teknologi LED Bagi Pemasangan Projek Kerajaan

APLIKASI TEKNOLOGI LED BAGI PEMASANGAN PROJEK KERAJAAN

CAWANGAN KEJURUTERAAN ELEKTRIK
JABATAN KERJA RAYA

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Pengenalan

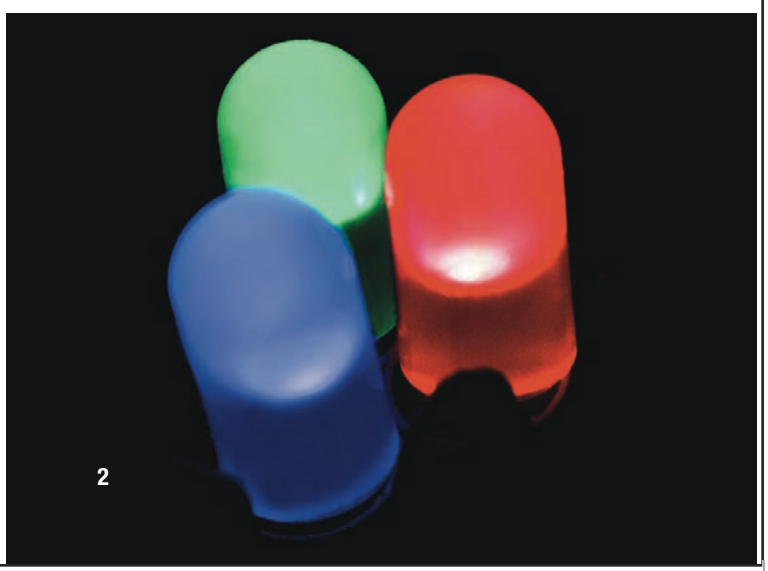
PENGENALAN

Tahun 2011 merupakan tahun pembangunan Teknologi LED bagi Cawangan Kejuruteraan Elektrik. Teknologi LED adalah Teknologi baru yang di usahakan oleh Kementerian Kerja Raya Malaysia dan Cawangan ini menyokong serta akan berkerjasama bagi memastikan aplikasi teknologi LED akan memberi impak kepada isu penjimatan tenaga, pengurusan nilai dan kebolehsenggaraan.

Sejajar dengan inisiatif Kementerian Kerja Raya Malaysia untuk mengaplikasikan penggunaan LED di dalam projek-projek kerajaan, Cawangan Kejuruteraan Elektrik telah membangunkan dokumentasi dalam bentuk spesifikasi, 'need Statement', senarai semakan dan garis panduan untuk digunakan di dalam pengurusan projek di Jabatan ini. Dokumen-dokumen yang terkandung di dalam buku ini adalah:

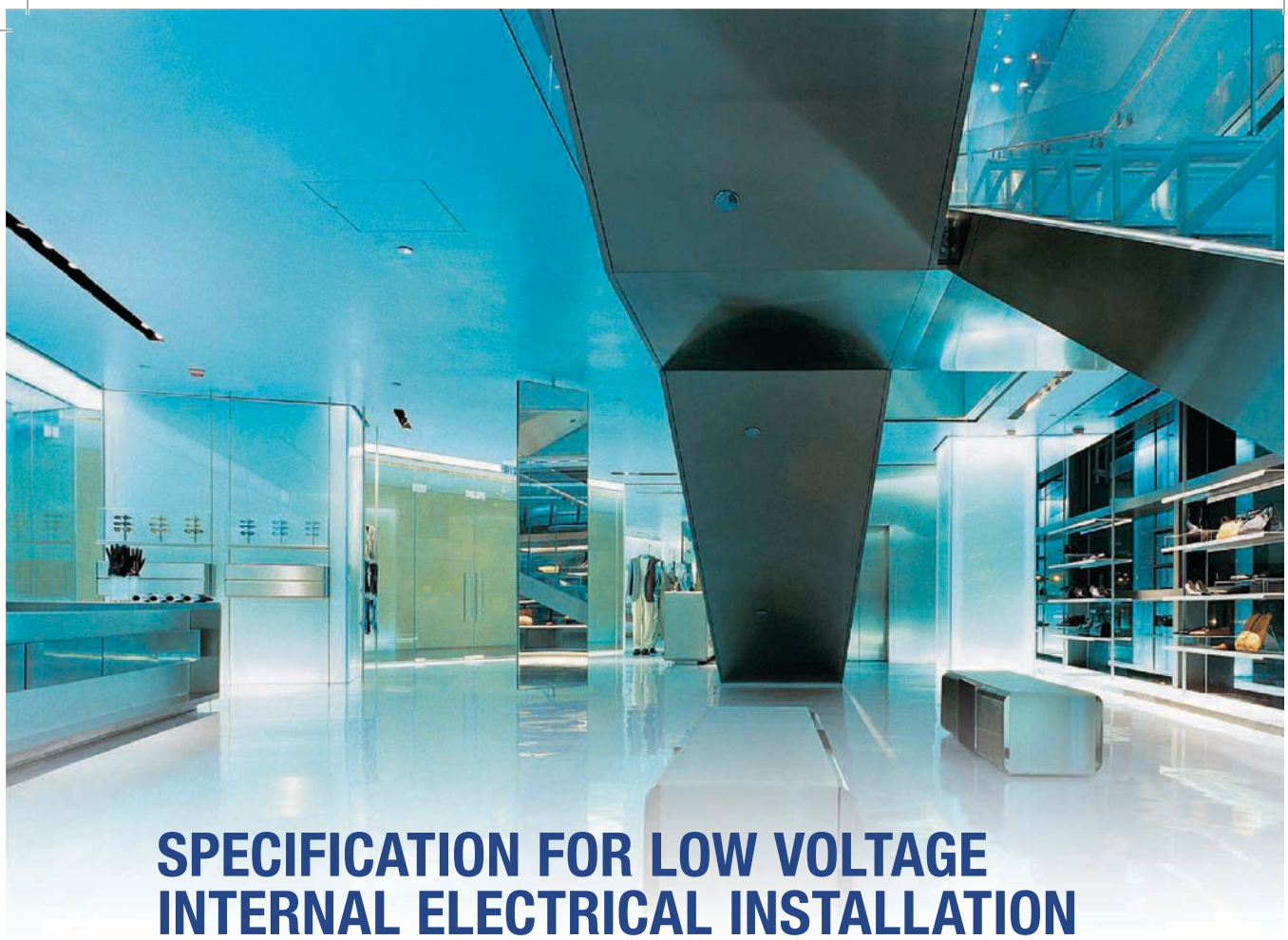
1. Specification for Low voltage Internal Electrical Installation
2. Specification for Road lighting Installation
3. Need Statements of Road Works for Design and Build Projects
4. Checklist for Street Lighting – LED induction
5. Checklist on Outdoor Luminaires
6. Registered Product
7. List of reference standard (LED Luminaires)

Buku ini juga bertujuan untuk menyampaikan inisiatif-inisiatif yang telah dan akan dilaksanakan oleh Cawangan Kejuruteraan Elektrik dalam usaha untuk mengaplikasikan Teknologi LED di dalam projek-projek Kerajaan. Adalah di harapkan segala usaha ini dapat menyumbang kepada kesejahteraan Rakyat dan Negara.



Specification

For Low Voltage Internal Electrical Installation



SPECIFICATION FOR LOW VOLTAGE INTERNAL ELECTRICAL INSTALLATION

This section of the Specification describes and specifies requirements for the supply, delivery, installation, testing, commissioning, handing over in approved working order and maintenance during the Defects Liability Period of the whole electrical installation in accordance with the Specification, Supplementary Notes, Bill of Quantities, Conditions of Contract and Drawings.

Unless specified elsewhere, all equipment, switchgears, apparatus, appliances and accessories for low voltage electrical installation shall be rated for operation on a 240/415 V, 3 phase, 4 wire, 50 Hz system with solidly earthed neutral. The specification is majorly briefing on installation of electrical equipment such as switchboard, Surge Protection Devices (SPD), Distribution Boards, Earthing, Switchgears, Protection Relays, Conduit Wiring and necessity of switchroom.

Generally, this section also emphasized on proper procedure of installation for wiring system shall be either surface wiring, concealed wiring, surface conduit wiring or concealed conduit wiring as indicated in the Drawings and/or Bill of Quantities. The wiring systems is compulsory comply with MS IEC 364-5-52. Selection types of luminaires including Incandescent Luminaries, Fluorescent Luminaries, Self Contained Emergency Luminaries, LED Luminaries and labelling methodology for electrical equipment also stated on the chapter.

The LED Luminaries shall comply with IEC 60598, IES LM-79-08, IEC 62471, IEC 61547, IEC 61000-3-2, and BS EN 55015 which shall have two separate components comprising of a electronic LED driver and optical system.

Final section of specification described types of testing should be delivered on site consisting on test Instruments should be used and proper procedure should be followed for ensured serviceability and maintainability of electrical installation then resulting to avoid from any injury and fatality happens to the users.

Specification

for Road Lighting Installation

SPECIFICATION FOR ROAD LIGHTING INSTALLATION

This section of the Specification describes and specifies requirements for the supply, delivery, storage, assembly, installation, erection, testing, commissioning, handing over in approved working order and maintenance during the Defects Liability Period of the Road Lighting .

The Road Lighting Installation shall include all lu sminaires, fittings, brackets, spigots, other supporting devices, columns, feeder pillars, bases, cables, switchgears and all necessary ancillary equipment, foundations, ducting and all other necessary equipment for a complete road lighting system.

Application of LED luminaires for road lighting is taken into consideration in an addendum. The addendum describes the standards requirement of road LED lighting manufacturers need to comply with, construction and components as well as its warranty. This specification explains that LED luminaire shall comply with and be tested to the nineteen (19) IEC Standards with different items in LED must comply to the respective standards.

There are two different warranties describe in this specification i.e. system warranty and performance warranty. Manufacturer shall provide 5 years for complete system warranty and maintenance free luminaire. Meanwhile performance warranty or Luminance test shall be carried out every six (6) months during defect liability period.

Need Statements

of Road Works for Design and Build Projects

NEED STATEMENTS OF ROAD WORKS FOR DESIGN AND BUILD PROJECTS

Electrical Works Brief is part of the Need Statement of Road Works for Design and Built Project. The Electrical Works Brief contains General Condition of Contract, General instruction to tenderers, Electrical System installation requirement in Road Lighting as well as the guarantee and maintenance of the installation. In detail the brief describe the contractor's role and responsibility to design, supply, install, test and commission. The contractor is also required to perform repair works and replace all defective and faulty during defect liability period.

The brief specifies Electrical Services as low voltage system and lighting system ie. street lighting. Low voltage System covers main supply, underground cables, ducting, switchboard, wiring and cabling. Lighting installation comprises mainly street lighting, traffic signal system, Tunnel lighting, high mast lighting, highway lighting, pedestrian bridge, bus stop, column and earthing system.

Contractor's submission must include declaration of compliance to requirements of electrical works brief. Design compliance criteria is a full checklist that guide the contractor in preparing their technical submission. It enables the scope of work for street lighting, traffic light and existing system available to be described thoroughly.

Checklist

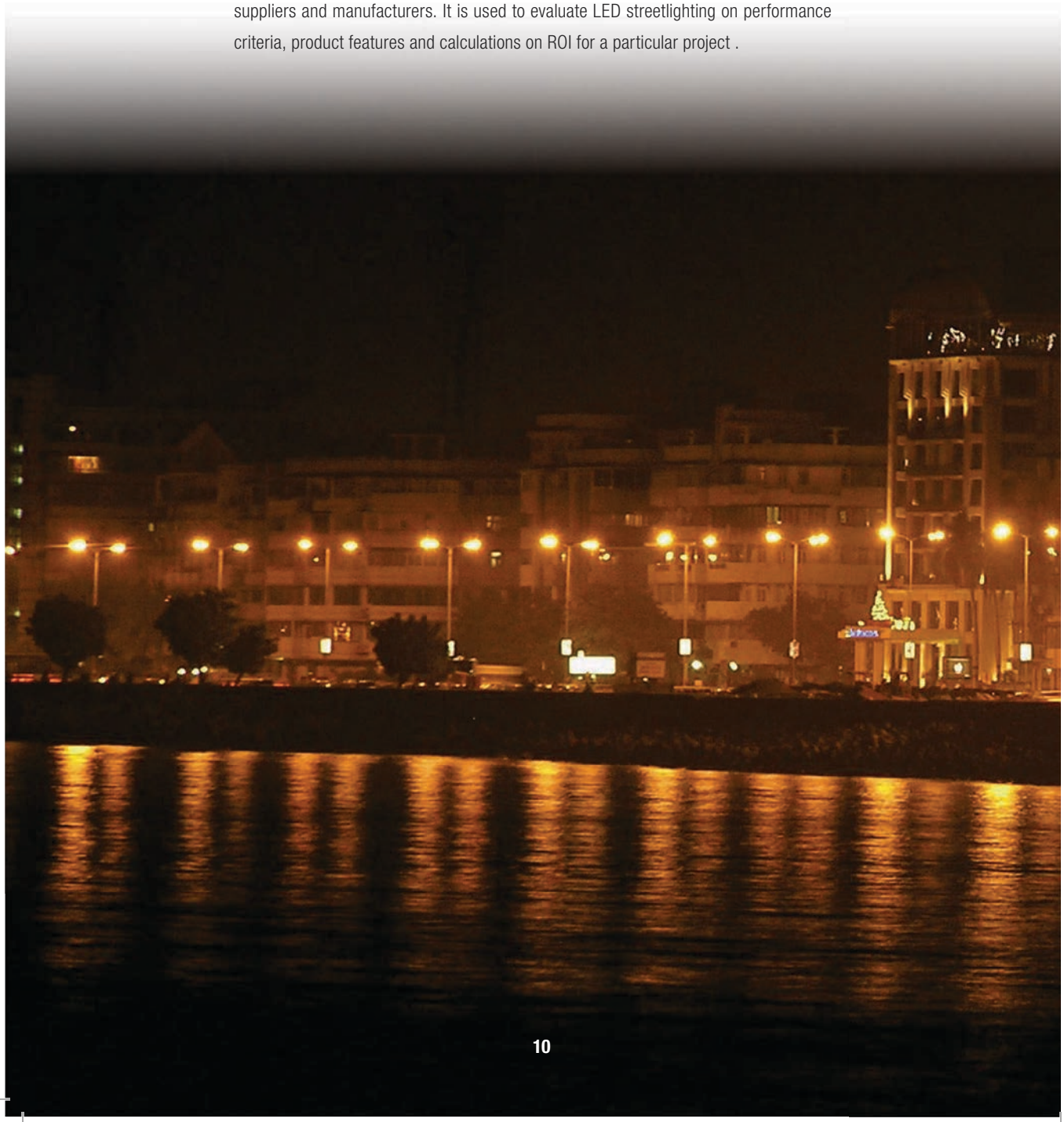
for LED Street Lighting

CHECKLIST FOR LED STREET LIGHTING

Checklist for LED Street Lighting covers:-

1) Performance Criteria
2) Product features
3) Return of Investment (ROI)

The checklist is a product technical information which is required from consultants, suppliers and manufacturers. It is used to evaluate LED streetlighting on performance criteria, product features and calculations on ROI for a particular project .



Checklist

on Outdoor Luminaires

CHECKLIST ON OUTDOOR LED LUMINAIRES

This checklist is a product technical information form which is used to evaluate outdoor LED luminaires for Cawangan Kejuruteraan Elektrik. It is used for product evaluation by comparing outdoor luminaires capacity with specifications in order to register the product. The checklist must be completed by the manufacturers / distributors based on test reports, catalogs, and technical data as well as document submission for further reference.

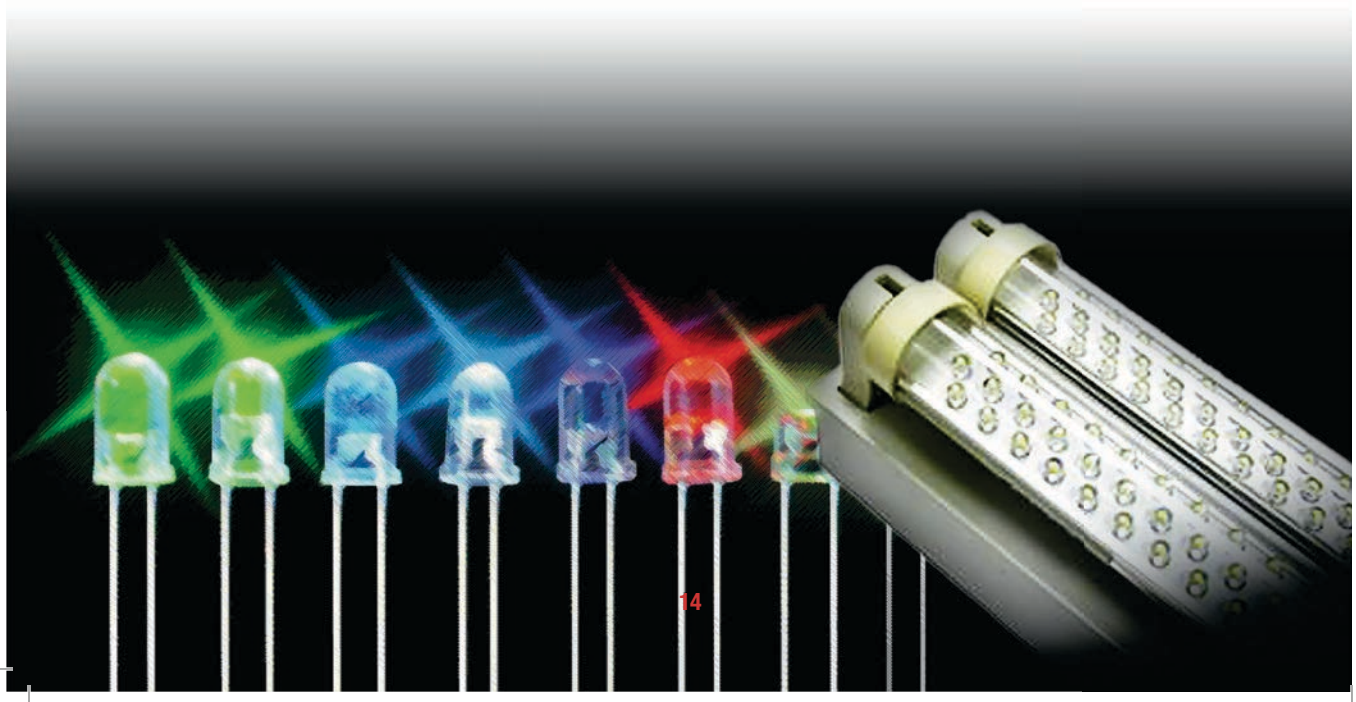
Registration of

LED Luminaires

REGISTRATION OF LED LUMINARES

The registration process starts with submission of documents by the manufacturers and distributors. The applicants with complete documentation and technical data will be shortlisted. The minimum requirement for the applicants to register their LED product includes 1) product safety 2) product construction 3) photometry test report (CIE 27) and 4) traceable data.

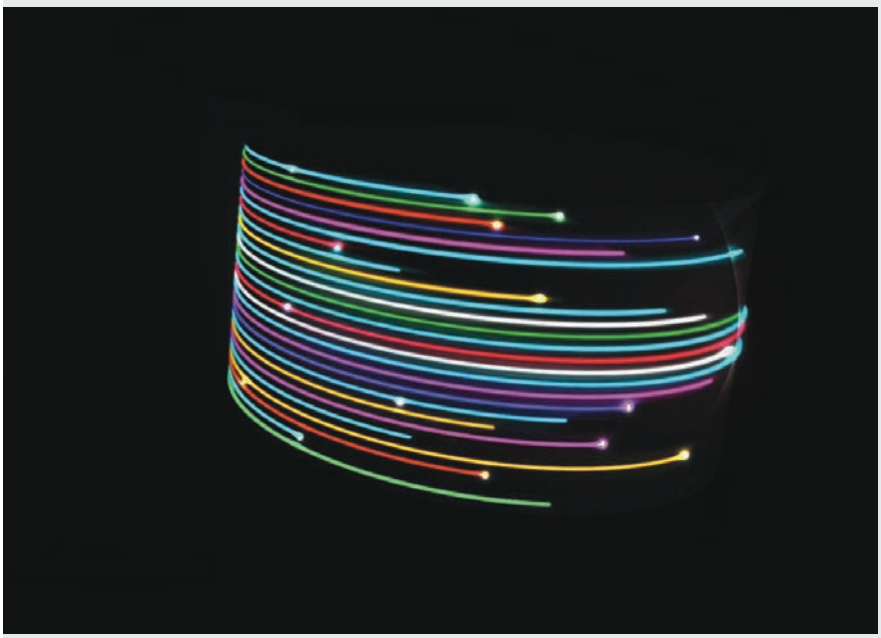
To date, a total of twenty one (21) companies have shown their interest to register their LED luminaires and associated gears. The twenty one (21) companies comprise of four (4) manufacturers and seventeen (17) distributor representatives in Malaysia.



List
of Reference Standards

LIST OF REFERENCE STANDARDS

The lists presents compilation of LED standards from international organisation and bodies to act as reference and guide in the development of specification on LED technology in Jabatan Kerja Raya, Malaysia. International organisations include IEC (International Electrotechnical Commission), IES ((Illuminating Engineering Society), IESNA (Illuminating Engineering Society of North America) and also MS IEC (Malaysian Standard adopted from IEC standard).



Perancangan

Masa Hadapan

PERANCANGAN MASA HADAPAN

Dengan segala kelebihan yang ada sebagai future lighting, CKE khususnya akan terus berusaha menggapai cita-cita untuk memastikan teknologi LED sentiasa berkembang dengan menggalakkan, memperbanyakkan serta meluaskan lagi penggunaan lampu LED di dalam projek-projek kerajaan.

Di samping itu, CKE sebagai badan perundingan teknikal kerajaan akan terus memastikan spesifikasi dan garispanduan yang tersedia sentiasa ditambahbaik daripada semasa ke semasa selari dengan perkembangan teknologi LED.

Justeru, bagi mencapai hasrat-hasrat tersebut, pelbagai lapangan bidang kajian yang berkaitan keberkesanan LED akan diberi perhatian oleh CKE sewajarnya terutamanya melibatkan penggunaan lampu masa hadapan ini di dalam projek-projek kerajaan.

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