

KURSUS REKABENTUK PEMASANGAN ELEKTRIK VOLTAN RENDAH (ASAS)

KRITERIA PEMILIHAN KELENGKAPAN LAMPU

9 FEBRUARI 2021



Nurhayatie binti Mohd Zin
UPRBA2, CKE

LUMINAIRE DEFINITION

- **LUMINAIRE IS AN ELECTRICAL DEVICE THAT CONTAINS AN ELECTRIC LAMP THAT PROVIDES ILLUMINATION**



LUMINAIRE INSTALLATION AREA

➤ INTERNAL

- GENERAL LIGHTING (CEILING LIGHTING)
 - Used to provide light to an overall area
- WALL LIGHTING
 - Type of light fixture that is fixed to a wall
 - Directed upwards and outwards, rather than down
- TASK LIGHTING
 - Increased light for specific tasks in a room that may already have some ambient light



LUMINAIRE INSTALLATION AREA

➤ EXTERNAL

- COMPOUND LIGHTING
- STREET LIGHTING
- FACADE LIGHTING
- LANDSCAPE LIGHTING
- FENCE LIGHTING
- SIGNBOARD LIGHTING



KRITERIA PEMILIHAN KELENGKAPAN LAMPU

- 1. JENIS BANGUNAN**
- 2. JENIS SILING (SURFACE/ RECESSED)**
- 3. KETINGGIAN SILING**
- 4. ILLUMINANCE (LUX) – BERDASARKAN MS 1525**
- 5. MAINTENANCE FOR RELAMPING**



KRITERIA LAIN DALAM PEMILIHAN KELENGKAPAN LAMPU

1. KOS SILING PROJEK [i.e Anggaran Kos Awalan (AKA)]
2. LOKASI PROJEK
 - URBAN (BANDAR)
 - RURAL AREA (LUAR BANDAR)
3. KEPERLUAN ARKITEK
 - AESTHETIC VALUE
4. KEPERLUAN PELANGGAN
 - PENYELENGGARAAN
 - KETERSEDIAAN LAMPU DI PASARAN TEMPATAN



INTERNAL LIGHTING



FLUORESCENT LUMINAIRE



2X28W (T5) (1200mmX600mm MODULE)
RECESSED TYPE FOR SUSPENDED CEILING



3X14W (T5) (600mmX600mm MODULE)
RECESSED TYPE FOR PLASTER CEILING

FLUORESCENT LUMINAIRE



1 x 28W (T5) wall mounted
bare channel

BARE CHANNEL

VANDAL PROOF (WIRE MESHGUARD)



DAIKON DIFFUSER



WEATHERPROOF



BARE CHANNEL



'KELUAR' SIGN

WALL MOUNTED



RECESSED MOUNTED

'KELUAR' SIGN

- Dipasang pada arah tempat/pintu keluar bangunan
- Kedudukan dan bilangan lampu ini perlu mendapat kelulusan Jabatan Bomba
- c/w 3 hours battery back up and approved by Jabatan Bomba



EMERGENCY LIGHT

JENIS RECESSED



JENIS RECESSED



JENIS SURFACE



WALL MOUNTED
(BIG OPEN AREA – TIADA
DALAM JMAL)

EMERGENCY LIGHT

- Diperlukan semasa terputus bekalan elektrik
- Dipasang di tempat yang strategik
- Kedudukan dan bilangan lampu ini perlu mendapat kelulusan Jabatan Bomba
- c/w 3 hours battery back up and approved by Jabatan Bomba



COMPOUND LIGHTING



COMPOUND LIGHTING

- Ketinggian tiang 3.5m sehingga 6m
- Menggunakan lampu jenis HPSV/LED
- Jarak antara tiang sekurang-kurangnya 15m sehingga 20m
- Litar compound lighting hendaklah berselang seli
- Menggunakan 2 jenis timer switch untuk penjimatan tenaga
- Tempat letak kereta, laluan jalanraya dalam kawasan kompleks/pejabat



ROAD LIGHTING



ROAD LIGHTING

- Menggunakan lampu jenis HPSV/LED
- Ketinggian tiang 10m sehingga 12m
- Jenis tiang Hot Dipped Galvanised
- Keperluan adalah untuk aspek keselamatan jalanraya; keutamaan kepada kawasan persimpangan, atas jambatan dan kawasan konflik
- Rujuk Specification of Road Lighting Installation (L-S20)



FACADE LIGHTING



LANDSCAPE LIGHTING

BOLLARD LIGHT



UP LIGHT



FENCE LIGHTING



LUMINAIRE COMPONENTS

FLUORESCENT (T8)	FLUORESCENT (T5)	LED
LAMP	LAMP	LAMP
MAGNETIC BALLAST + CAPACITOR	HIGH FREQUENCY ELECTRONIC BALLAST -dimmable/non-dimmable	DRIVER (dimmable/non- dimmable) + SPD
ALUMINIUM REFLECTOR	ALUMINIUM REFLECTOR (FULL)	ALUMINIUM REFLECTOR + DIFFUSER (FROSTED TEMPERED GLASS)

LUMINAIRES SPECIFICATION

- Shall conform to the relevant parts of MS IEC 60598
- Shall be approved by Suruhanjaya Tenaga and JKR
- Internal wiring shall be of heat resistant insulated coloured cables
- All components shall be able to withstand a voltage range **+10% to -6%** of rated voltage

FLUORESCENT LUMINAIRES – TUBULAR TYPE (T8 LAMP)

- Comply with **MS IEC 60598-1** and **MS IEC 60598-2** or **MS IEC 60590-2-2**
- Housing made from mild steel sheet with thickness $\geq 0.5\text{mm}$
- The watt loss of the magnetic ballast $\leq 6\text{W}$
- 1 no. magnetic ballast is for 1 no. of tube
- Dry, Self-healing, Aluminium Metalised Polypropylene Capacitor
- Power factor corrected ≥ 0.9 using dry type capacitor



FLUORESCENT LUMINAIRES – TUBULAR TYPE (T5 LAMP)

- High frequency electronics ballast, the ballast shall comply with MS IEC 61347-1, MS IEC 61347-2-3 and MS IEC 60929, BS EN 55015 for radio frequency interference suppression and MS IEC 61000-3-2 for harmonics distortion.



FLUORESCENT LUMINAIRES – TUBULAR TYPE (T5 LAMP)

- The power loss of the high frequency electronic ballast $\leq 3W$
- Power factor corrected > 0.95 for high frequency electronic ballast
- The electronic ballast shall have 5 year warranty from the manufacturer
- High Frequency Electronic Ballast :-
 - 2 no. of electronic ballast for 2 tubes (eg. 2 x 28W)
 - 2 nos. electronic ballast for 3 tubes (eg. 3 x 28W)

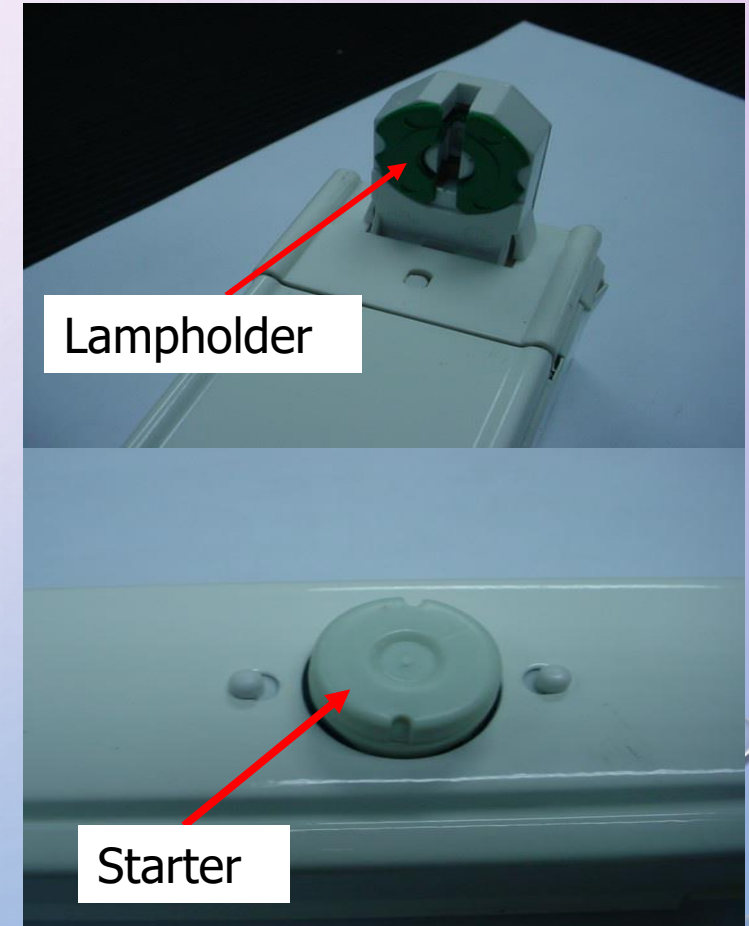
FLUORESCENT LUMINAIRES - TUBULAR TYPE

- Internal wiring shall be heat resistant cable marked with the word 'HR 105 °C'.
- Brass direct pressure type earth terminal
- All components in the luminaire shall be guaranteed for ≥ 2000 hour life



FLUORESCENT LUMINAIRES - TUBULAR TYPE

- All fluorescent tube shall be provided with its own magnetic ballast
- The starter shall comply with MS IEC 60155
- The lampholders shall comply with MS IEC 60400, Made of Polycarbonate Material, Flame Retardent and rated at 500V (refer L-S1)



FLUORESCENT LUMINAIRES - DOWNLIGHT TYPE FLUORESCENT LUMINAIRE (CFL)

- Shall comply with MS IEC 60598 and relevant part of IEC 60598 or equivalent
- 2 Separate Components :-
 - i. Electrical Control Gears
 - ii. Optical System

Can be separate housing or Integral



Electrical Control Gears



Optical System

FLUORESCENT LUMINAIRES - DOWNLIGHT TYPE

FLUORESCENT LUMINAIRE

- Control gear housing shall be made from:-
 - i.Extruded Aluminium or Mild Steel
 - ii.Thickness $> 0.8\text{mm}$
 - iii.Dissipate Heat/Heat Sink
 - iv.Rubber Grommets at Cable Entry





LED LUMINAIRES - DOWNLIGHT TYPE LED LUMINAIRES

- Shall comply with IEC 60598, IES LM-79-08, IES LM-80-08, IEC 62471, IEC 61547, IEC 61000-3-2, BS EN 55015
- 2 Separate Components :-
 - i. LED Control Gear
 - ii. Optical System
- Diameter = 100mm, 160mm and 200mm

LED LUMINAIRES - DOWNLIGHT TYPE LED LUMINAIRES

- Electronic LED driver shall be made from:-
 - i. Steel
 - ii. Thickness $\geq 0.8\text{mm}$.
 - iii. Dissipate Heat/Heat Sink
 - iv. Rubber Grommets At Cable Entry

LED LUMINAIRES - DOWNLIGHT TYPE LED LUMINAIRES

- Wiring within the electronic LED driver shall be heat resistant cable marked with the word 'HR 105 °C'.
- Brass direct pressure type earth terminal
- Hook done by luminaire manufacturer

LED LUMINAIRES - DOWNLIGHT TYPE CFL OR LED LUMINAIRES

- The reflector shall be made of polished aluminium (iridescent free) with thickness $\geq 1\text{mm}$.
- The ring shall be from die-cast aluminium with thickness $\geq 1.5\text{mm}$.
- The support shall be made from mild steel with thickness $\geq 1.5\text{mm}$ (CFL only)

LED LUMINAIRES - DOWNLIGHT TYPE LED LUMINAIRES

- The LED shall be high power type
- Efficiency $\geq 20\text{W/lumen}$ (refer L-S1)
- Heat dissipation/ heat sink
- Housing – aluminium
- Lens / Diffuser – frosted TEMPERED glass

LAMPS

- Tubular fluorescent lamp shall comply with MS IEC60081 and MS IEC 61195
- Bi-pin type

PROPRIETARY CODE	POWER (WATT)	MIN. LUMENS (AFTER 100 HOURS)	NOMINAL COLOUR TEMP. (KELVIN)
T8	18	1300	4000 & 6500
T8	36	3250	4000 & 6500
T5	14	1100	4000 & 6500
T5	28	2400	4000 & 6500
CFL	18	1200	4000 & 6500
CFL	26	1800	4000 & 6500

Lamp characteristics for tubular fluorescent

SUMBER RUJUKAN



<https://jmal.jkr.gov.my/emalv3/>



L-S1 - SPECIFICATION FOR LOW
VOLTAGE INTERNAL ELECTRICAL
INSTALLATION



GARIS PANDUAN DAN PERATURAN
BAGI PERANCANGAN BANGUNAN
(EPU GUIDELINE) EDISI 2015



**SEKIAN,
TERIMA KASIH**