LIGHTING SAFETY AND PERFORMANCE REGULATION IN MALAYSIA

Iр. Francis Xavier Jacob
PRESENTATION OUTLINE

- Initiatives on Lighting
- Approval of electrical Products
  - Why the need for approval
  - Who should be concerned
  - Key Regulations
  - List of equipment requiring approval
  - Application procedures
  - Labelling requirements
  - On line application
- Energy Efficiency standards for lighting
- Recent developments
In March 2010, Energy, Green Technology and Water Minister Datuk Seri Peter Chin Fah Kui announced that the government would phase out the use of incandescent bulbs in stages leading to a complete ban.

The Government will stop import and sale of the bulbs as part of efforts to save energy.
Incandescent light bulbs, are considered less energy-efficient and, as a result, not as environmentally-friendly as compact fluorescent lamps, fluorescent tubes and LEDs.

The use of efficient bulbs would help reduce carbon dioxide emissions - Government's commitment to reduce carbon intensity by about 40% by 2020.
LIGHTING INITIATIVES

- The policy will enable the use of energy more effectively and wisely as users will be encouraged to use Compact Fluorescent Lamp (CFL) and LED.

- The Department of Standards Malaysia (Standards Malaysia), an agency under the Ministry of Science, Technology and Innovation, has adopted accelerated timeframes to hasten the adoption process of these LED standards in response to the impending policy changes.
LIGHTING INITIATIVES

- Standards Malaysia, through its technical committee, has been able to fast track the development of 12 Malaysian Standard (MS) related to LED based on the new timelines.
- The MS is expected to ensure the quality of local LED products is suitable for both export and domestic use.
- Reflects the importance that the Government places on the use of international best practices and the adoption of international standards to build a strong and competitive economy.
Global incandescent light bulb ban - opportunities for local companies to capitalise on the global movement, and to penetrate into these markets.
LIGHTING INITIATIVES

- By using standards, manufacturers can benchmark against established global specifications
- Will ensure the quality and reliability of the LED lights meets with international export requirements
- Will enhance initiatives to increase local producer's access to international markets
- Make Malaysian LED producers more globally competitive
- Establish a framework to enforce compliance and consumer protection.
The latest analysis by LED inside in its Silver Member Report: *Commercial Lighting Sector’s Light Tubes and Integrated Luminaires* estimates that the scale of the global market for all LED lighting products will reach US$25.65 billion in 2015 (LEDinside, 19 May 2015).

For the Economic Transformation Programme (ETP), the LED sub-sector is expected to be a major contributor of gross national income.
LIGHTING INITIATIVES

- Important for the MS being developed by Standards Malaysia and regulated by the Energy Commission, be adopted and eventually enforced to ensure LED players get the position they deserve in this exciting new industry
LIGHTING INITIATIVES

- Expanding LED packaging and Equipment
- Case for change
  - Malaysia has a very strong position in LED packaging among lighting companies that it can grow
  - Malaysia has many downstream SSL companies, but needs more upstream players
  - This EPP intends to stimulate organic growth within the packaging and application design segment by developing local manufacturers and attracting multinationals to invest and commence operations in Malaysia.
LIGHTING INITIATIVES

- Creating local solid state lighting champions
- Case for change
  - SSL companies are part of a larger lighting market where Malaysia has the opportunity to become a global leader
  - Certification is critical to attracting global companies, growing local champions, and increasing domestic consumption
- This EPP focuses on developing a solid state lighting (SSL) cluster in Malaysia, with the objective of driving local companies towards international competitiveness.
APPROVAL OF ELECTRICAL PRODUCTS
WHY THE NEED FOR APPROVAL

- Section 14(1)(e) and (g) of the Energy Commission Act 2001 on the Functions and Powers of the Commission

- To **regulate** all matters relating to the electricity supply industry and to **protect any person from dangers** arising from the generation, production, transmission, distribution, supply and **use of electricity** as provided under the electricity supply laws

- To **promote efficiency, economy and safety** in the generation, production, transmission, distribution, supply and **use of electricity** and in the supply of gas through pipelines and the use of gas supplied through pipelines
Consumers

- Safety requirements
- Safeguard the consumer’s interest
- Ensure the efficient use of electricity
- Consumers should only purchase:
  - any domestic equipment;
  - any equipment which is usually sold direct to the general public; or
  - any equipment which does not require special skills in its operation,
- that have been approved by the Commission
- affixed with the appropriate label.
WHO SHOULD BE CONCERNED

Consumers

- Approved electrical equipment
  - that have met the specified safety requirements and efficient use of electricity, help to prevent fire, electric shock, explosion, radiation and other hazards that could result in injuries or deaths to humans and/or damages to properties.
Manufacturers, Importers, Exhibitors, Sellers and Advertisers

Manufacturers, importers, exhibitors, sellers and advertisers of any electrical equipment prescribed under sub regulation 97(1), of the Electricity Regulations 1994 must ensure that their obligations under the said Regulations are fulfilled.
Electricity Supply Act 1990
Section 2: Equipment

Includes any item for such purposes as generation, conversion, transmission, distribution or utilisation of electrical energy such as machines, transformers, apparatus, measuring instruments, protective devices, wiring materials, accessories and appliances
Electricity Regulations 1994
Regulation 97(1):
No person shall manufacture, import, display, sell or advertise-
(a) any domestic equipment;
(b) any equipment which is usually sold direct to the general public; or
(c) any equipment which does not require special skills in its operation,
unless the equipment is approved by the Commission.
Regulation 97(2):
A Certificate of Approval to manufacture, import, display, sell or advertise the equipment shall be in Form V and W respectively as prescribed in the First Schedule.
**Regulation 98:**
Where an equipment has been approved for manufacture, import, display, sale or advertisement by the Commission, the person to whom a Certificate of Approval has been issued under regulation 97 may required by the Commission to mark or label the equipment and he shall do so in the manner to be determined by the Commission.
Regulation 99(1):
Any application for a Certificate of Approval of any equipment referred to in regulation 97 shall be made to the Commission in the manner to be determined by the Commission.
Regulation 101:
(1) The Commission may at any time by notice in writing require a person who manufactures, imports, displays, sells or advertises any equipment to deliver, with such time as be specified in the notice, samples of the equipment for an a test thereof.
Regulation 101:
(2) If any equipment is, in the opinion of the Commission, unsafe or dangerous or likely to become unsafe or dangerous to use, the Commission may prohibit the manufacture, import, display, advertisement or sale of the equipment and may direct the person in sub regulation (1) to withdraw immediately all the equipment from use or sale and where necessary may seize and remove such equipment.
(3) The Commission shall nor be liable to any loss or damage caused to any equipment delivered or seized and removed under sub regulation (1) or (2), as the case may be.
Regulation 106:
Renewal of a Certificate of Approval issued under Regulation 97, shall be made not less than 14 days before the date of expiry of the Certificate.
Regulation 107:
(1) No Certificate of Approval issued under Regulation 97, shall be transferred by the holder of the Certificate to any other person except with the written permission of the Commission.
(2) The holder of a Certificate of Approval issued under Regulation 97, shall obtain approval from the Commission in writing for any change of name or address in connection with the business and the Certificate shall be amended or replaced without payment of any fee.
Regulation 122:
Unless otherwise made an offence under the Act, a person who contravenes or fails to comply with any of the provisions of these Regulations shall be guilty of an offence and shall, on conviction, be liable to a fine not exceeding five thousand Ringgit Malaysia or to imprisonment for a term not exceeding one year or to both.
Electrical equipment in the following categories:

- any domestic equipment;
- any equipment which is usually sold direct to the general public; or
- any equipment which does not require special skills in its operation,

Should be approved by the Commission pursuant to the Electricity Regulations 1994.

Applicable safety and performance standards for the said electrical equipment, can be obtained from the Commission.
1. Plug Top/Plug (15A and below)
2. Switch and Dimmer
3. Socket outlet (15A and below)
4. Fluorescent lamp holder/starter holder
5. Ceiling rose
6. Bayonet cap and multiway adaptor
7. Lamp fitting (*)
8. Capacitor for fluorescent lamp
9. Ballast/controlgear/driver for lamp
10. Circuit breaker including a.c. current operated earth leakage circuit breaker and miniature circuit breaker
11. Portable luminaire lamp (**)
12. Kettle including heating elements (if imported separately) (***)
13. Kitchen machine
14. Toaster/oven (cooking appliance)
15. Rice cooker
16. Refrigerator
17. Immersion water heater
EQUIPMENT REQUIRING APPROVAL

18. Water heater (including heating elements if supplied separately)
19. Washing machine (****)
20. Fan (*****)
21. Hand operated hair dryer/hair care/skin care (******)
22. Iron
23. Shaver
24. Vapourisor
25. Vacuum cleaner
26. Hi-fidelity set (*******)
27. Video and visual display unit
28. Audio and video player unit
29. Massager
30. Air conditioner (up to 4 hp)
31. Christmas light
32. Domestic power tools (portable type)
33. Adoptor/charger
34. Wire/cable/cord (non-armoured) 0.5mm$^2$ to 35mm$^2$
New equipment added with effect from 1 January 2013:

(*)

- Batten Luminaries (excluding Tube/Bulb),
- Luminaries with self-ballasted florescent lamp,
- Self-ballasted Compact Florescent Lamp (CFL) with Edison screw or bayonet caps,
- LED lamp controlgear for use on d.c. supplies up to 250V and on a.c. supplies up to 1000V,
- D.c. or a.c. supplied electronic controlgear for LED modules,
- LED Lampholder (connectors for LED-modules),
- LED Modules for general lighting (e.g. double capped self-ballasted LED lamp),
- Self-ballasted single capped LED-lamps for general lighting services by voltage > 50V
EQUIPMENT REQUIRING APPROVAL

(**)
- Night Lamp integral with direct in plug,
- Portable LED Lamp

(***):
- Bottle Warmer
- Sterillizer
- Water Dispenser/Filter

(****) Dish Washer and other utensils

(******) Decorative fan (applies to their separate regulators and fan without blade)

(*******) Ionic Facial Sauna or similar to it

(********) Audio/Video Recorder up to 4 channels.
## 4. FLUORESCENT LAMPHOLDER/ STARTER HOLDER

<table>
<thead>
<tr>
<th>Description of Regulated Goods</th>
<th>Detail of Product</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(a) LAMPHOLDER</strong> An electrical device which hold turbular fluorescent lamp but does not include - A lampholder which by design is restricted to specific appliances</td>
<td>Lampholder for Tubular Fluorescent Lamp</td>
<td>Domestic Standards: MS IEC 60400: 1999 or MS IEC 60400: 2006</td>
</tr>
<tr>
<td><strong>(b) STARTERHOLDER</strong> An electric device which hold a glow starter but does not include a starterholder which by design is restricted to specific appliances</td>
<td>Starterholder for Tubular Fluorescent Lamp</td>
<td>MS IEC 60400: 1999 or MS IEC 60400: 2006</td>
</tr>
</tbody>
</table>

**Relevant International Standards**: IEC 60400:1991 or IEC 60400:2004
## 5. CEILING ROSE

<table>
<thead>
<tr>
<th>Description of Regulated Goods</th>
<th>Detail of Product</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>An electrical device which is a terminal for connection to a lampholder via a cable.</td>
<td>Ceiling Rose</td>
<td>Domestic Standards</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MS 770:1982</td>
</tr>
</tbody>
</table>
### 6. BAYONET CAP AND MULTIWAYS ADAPTOR

<table>
<thead>
<tr>
<th>Description of Regulated Goods</th>
<th>Detail of Product</th>
<th>Standards</th>
</tr>
</thead>
</table>
| An electrical device which holds a bayonet cap lamp, bayonet cap adaptor, but does not include a lampholder, which by design, is restricted to specific appliances or a lampholder which is for incorporation in industrial equipment | - Bayonet Cap Adaptor  
- Bayonet Cap Lampholder  
- Bayonet Lamp Cap | MS 769:1982  
No corresponding foreign standard |
# Equipment Requiring Approval

## 7. Fluorescent Lampfitting Excluding Tubes if Imported Separately

<table>
<thead>
<tr>
<th>Description of Regulated Goods</th>
<th>Detail of Product</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Domestic Standards</strong></td>
</tr>
</tbody>
</table>
| (a) An electrical device which: | Fixed General Purpose Luminary | MS IEC 60598-1: 2003  
                                 |                   | MS IEC 60598-2-1: 1997  
                                 |                   | or MS IEC 60598-1: 2003  
                                 |                   | MS IEC 60598-2-1: 2006  | IEC 60598-1:1999 IEC  
                                 |                   | 60598-2-1: 1979 or  
                                 |                   | IEC 60598-1:1999 IEC  
                                 |                   | 60598-2-1: 2003       |
| (b) An electrical device which: | Recessed Luminary | MS IEC 60598-1: 2003  
                                 |                   | 60598-2-2: 1997       |
| (c) An electrical device which: | Glow-starter for Tubular | MS IEC 60155: 1996  
                                 |                   | Fluorescent          | IEC 60155:1993       |

- Provides illumination;
- Incorporate electric light sources for operation from supply voltage up to 1000V.
- Is for starting preheat type fluorescent lamps;
- Is a glow-start type; and
- Has an enclosure of insulating material.
### 8. CAPACITOR FOR FLUORESCENT LAMP

<table>
<thead>
<tr>
<th>Description of Regulated Goods</th>
<th>Detail of Product</th>
<th>Standards</th>
</tr>
</thead>
</table>
## 9. BALLAST FOR FLUORESCENT LAMP

<table>
<thead>
<tr>
<th>Description of Regulated Goods</th>
<th>Detail of Product</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>An electrical device which is for controlling the magnitude of current flowing through the discharge path of fluorescent lamp,</td>
<td>Ballast for Tubular Fluorescent Lamp</td>
<td>Domestic Standards</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relevant International Standards</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IEC 61347-1:2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IEC 61347-2-8:2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IEC 60921:1988 with modification</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MS IEC 61347-1:2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MS IEC 61347-2-8:2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MS 141:PT.2: 1993</td>
</tr>
</tbody>
</table>
## EQUIPMENT REQUIRING APPROVAL

### 13. TABLE LAMPS HAVING ACCESSIBLE METAL PART

<table>
<thead>
<tr>
<th>Description of Regulated Goods</th>
<th>Detail of Product</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>- is a household type;</td>
<td>- Electric Table Lamp</td>
<td>MS IEC 60598-2-4: 2003 &lt;br&gt; IEC 60598-2-4:1997</td>
</tr>
<tr>
<td>- provides illumination or for decorative purposes, produces light;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- is fitted with a supply flexible cord, an appliance inlet socket or a power supply unit with integral pins for insertion into a socket outlet;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- is for standing on a table or floor, or is fitted with a clamp or similar for attachment to vertical or horizontal surfaces;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- is for use with tungsten filament, tubular fluorescent or other discharge lamps; and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- is constructed to represent a model, person or animal and by its likely to be treated by a child as a toy; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- has metal parts which are required to be earthed or double insulated from live parts (excluding live parts of an all insulate lampholder)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Equipment Requiring Approval

#### 13. Table Lamps Having Accessible Metal Part

<table>
<thead>
<tr>
<th>Description of Regulated Goods</th>
<th>Detail of Product</th>
<th>Standards</th>
</tr>
</thead>
</table>
| (b) An electrical appliance which: | Electric Hand Lamp | MS IEC 60598-1: 1997  
| • is for inspection purposes using illumination;  
| • holds an incandescent or discharge lamp; and  
| • is hand held;  
| but does not include -  
| • hand lamp with a magnification facility | | MS IEC 60598-2-8:1998  
| | | IEC 60598-1:1996  
| | | IEC 60598-2-8: 1996 |
APPLICATION PROCEDURES

➢ The applicant is required to complete the relevant form to be attached together with:
  ➢ A processing fee;
  ➢ Test report including the list of components;
  ➢ Instruction manual;
  ➢ Technical specification and catalogue; and
  ➢ Submit a sample of the product, if requested.

➢ The guideline for completing form, together with the flow chart for the process for obtaining the Certificate of Approval (COA) is available at the Commission.
APPLICATION PROCEDURES

Type Test Report

- The type test reports recognised by the Commission are:-
  1) SIRIM Berhad (SIRIM) or laboratories under Laboratory Accreditation Scheme of Malaysia (SAMM) by Standards Malaysia; or
  2) Laboratory under the IECEE CB Scheme. The list of the laboratory is available from their website http://www.cbscheme.org. The CB test report need to be accompanied by the CB test certificate; or
  3) Laboratories (in the scope of its’ accreditation) which are accredited by the accreditation body that have signed the Asia Pacific Laboratory Accreditation Cooperation (APLAC) MRA – http://www.aplac.org. The test reports need to be accompanied with conformation letter from Standards Malaysia; or
APPLICATION PROCEDURES

Type Test Report

4) Laboratories (in the scope of its’ accreditation) listed as Designated Testing Laboratory under ASEAN Sectoral Mutual Recognition Agreement for Electrical and Electronic Equipment.

- For items (2), (3) and (4), testing should include the national deviation in Malaysia. Failing which, additional tests need to be carried out by SIRIM; for example, to test voltage rating at 240V for single phase or at 415V for three phase and the frequency at 50 Hz. (iii) Test report must be either Bahasa Malaysia or English language.
APPLICATION PROCEDURES

Annual Fee

- An annual fee shall be paid upon approval of the COA.

D. Requirement For Manufacturing

- Electrical equipment that have been approved for manufacturing shall enter the SIRIM’s Product Certification Scheme (PCS) using the relevant application form. The flow chart of the PCS is available. The electrical equipments shall be affixed with the label issued by SIRIM. Application for the purchase of SIRIM’s label is by means of the relevant form.

E. Requirement For Importing

- Electrical equipments that have been approved for importing into Malaysia shall comply with the consignment test by SIRIM for every batch within the validity of the COA. The flow chart of the consignment test is available. The electrical equipment shall be affixed with the label issued by SIRIM. Application for the purchase of SIRIM’s label is by means of the relevant form.
LABELLING REQUIREMENTS

Objective and rationale

- Labeling or marking of regulated electrical equipment will enable consumers to differentiate between the approved and non-approved regulated electrical equipment. It also serves as a deterrent and a means to check for non-approved regulated electrical equipment in the market.

Where to affix SIRIM label or SIRIM Certification Mark

- The SIRIM label or SIRIM Certification Mark shall be affixed on the regulated electrical equipment itself with legible manner. The SIRIM label cannot be affixed on the packaging.
LABELLING REQUIREMENTS

Labeling or Marking

- All regulated electrical equipment approved by the Commission must be labeled in accordance with regulation 98 of the Electricity Regulations 1994. SIRIM Certification Mark is used on electrical equipment that is too small to be affixed with SIRIM label such as lampholder, starterholder and glow starter. The manufacturers participating in SIRIM Label Licensing Programmed also use the SIRIM Certification Mark. The Manufacturer, importer, exhibitor, seller or advertiser is responsible to ensure that the regulated electrical equipment is affixed with appropriate label or SIRIM Certification Mark whichever is applicable. The Commission will conduct surveillance/enforcement from time to time on manufacturers’ or importers’ premises and distributors’ outlets.
Online application for COA has been introduced
Registration with Dagang Net DNT needed before the applicant can gain access to the online system.
Applicant will obtain the Login ID to access the system
DNT will impose the following fees:
- Registration fee
- Stamp duty
- Access fee
- Transaction fee
Application for equipment for personal use is exempted from the registration fees.
Based on Lamp efficacy in Lumens per Watt (L/W)
Performance Testing Standards

- MS IEC 60969:2006 (Self-ballasted lamps for general lighting services – Performance requirements) for fluorescent lamps.
- LM 79 (IESNA Approved Method for the Electrical and Photometric Measurements of LED Products) for LED lights
- MS IEC 62612:2012(P) (Self-ballasted LED lamps for General Lighting Services – Performance requirements)
**Safety Testing Standards**

- **MS IEC 61347-1:2012 (P)** LED General and safety for lamp controlgear for use on dc supplies up to 250V and or ac supplies up to 1000V

- **MS IEC 61347-2-13:2011(P)** Lamp controlgear: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules

- **MS IEC 60838-1:2008 and MS IEC 60838-2-2:2008** LED Lampholder (Connectors for LED modules)

- **MS IEC 62031:2011 with MS IEC 60061-2: 2005** LED Modules for general lighting (eg. Double capped selfballasted LED lamp)

- **MS IEC 62560:2012 (P)** Self-ballasted single capped LED-lamps for general lighting services by voltage > 50V
## LIGHTING EE STANDARDS

### EE Performance Criteria

<table>
<thead>
<tr>
<th>Lighting Type</th>
<th>Efficacy (Lumen/watt)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CFL-i (Self ballasted)</strong></td>
<td></td>
</tr>
<tr>
<td>&lt; 9</td>
<td>55</td>
</tr>
<tr>
<td>9-15</td>
<td>60</td>
</tr>
<tr>
<td>16-24</td>
<td>60</td>
</tr>
<tr>
<td>≥25</td>
<td>60</td>
</tr>
<tr>
<td><strong>CFL (Non integrated lamps)</strong></td>
<td></td>
</tr>
<tr>
<td>≤10</td>
<td>60</td>
</tr>
<tr>
<td>11-26</td>
<td>65</td>
</tr>
<tr>
<td>≥27</td>
<td>85</td>
</tr>
<tr>
<td><strong>LED Lamp</strong></td>
<td>55</td>
</tr>
<tr>
<td><strong>Incandescent Lamp</strong></td>
<td>20</td>
</tr>
</tbody>
</table>
Other Available Malaysian Standards (for LED):

- MS IEC 60598-1:2012(P) Luminaires – Part 1: General Requirements and Tests
- MS IEC 62384:2012(P) – DC or AC Supplied Electronic Controlgear for LED Modules – Performance Requirements
- MS IEC 62504:2012(P) – General Lighting: LEDs and LED Modules – Terms and Definitions
- MS IEC 62717:2012(P) – LED Modules for General Lighting: Performance Requirements
- MS IEC 62722-1:2012(P) – Luminaires Performance: Part 1 – General
- MS IEC 62722-2-1:2012(P) – Luminaires Performance: Part 2-1: Particular Requirements for LED Luminaires
MS 2598: 2014 : Minimum Energy Performance Standards (MEPS) for Lamps

a) T5 and T8 double capped fluorescent lamps

- the performance testing standard shall be in accordance with MS IEC 60081;
- the endurance parameters tested shall not be less than 80 % of the initial lumen output value and the failure rate of not more than 10% of sample population after 2 000 h operation; and
- the MEPS values are as shown in the Table below

<table>
<thead>
<tr>
<th>Type</th>
<th>Lamp rating (W)</th>
<th>MEPS (lm/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T8</td>
<td>≥ 18 to &lt; 30</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>≥ 31</td>
<td>80</td>
</tr>
<tr>
<td>T5</td>
<td>≥ 14 to &lt; 15</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>≥ 15</td>
<td>80</td>
</tr>
</tbody>
</table>
b) self ballasted single capped lamps (compact fluorescent lamps - CFL) for general lighting services;

- the performance testing standards shall be in accordance with MS IEC 60969;
- the endurance parameters tested shall be not less than 80% of the initial lumen output value and the failure rate of not more than 10% of sample population after 2 000 h operation; and
- the MEPS values are as shown in the Table below.

<table>
<thead>
<tr>
<th>Lamp rating (W)</th>
<th>Minimum efficacy (lm/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 9</td>
<td>46</td>
</tr>
<tr>
<td>≥ 9 to &lt; 15</td>
<td>52</td>
</tr>
<tr>
<td>≥ 15 to &lt; 25</td>
<td>55</td>
</tr>
<tr>
<td>≥ 25</td>
<td>62</td>
</tr>
</tbody>
</table>
c) single capped fluorescent lamps (non-integrated compact fluorescent lamps) and circular fluorescent lamps for general lighting services

- the performance testing standards shall be in accordance with MS IEC 60901;
- the endurance parameters tested shall be not less than 80% of the initial lumen output value and the failure rate of not more than 10% of sample population after 2,000 h operation; and
- the MEPS values are as shown in the Table below.

<table>
<thead>
<tr>
<th>Lamp rating (W)</th>
<th>Minimum efficacy (lm/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10</td>
<td>46</td>
</tr>
<tr>
<td>≥ 10 to &lt; 19</td>
<td>55</td>
</tr>
<tr>
<td>≥ 19 to &lt; 27</td>
<td>59</td>
</tr>
<tr>
<td>≥ 27</td>
<td>70</td>
</tr>
</tbody>
</table>
d) self ballasted Light Emitting Diode (LED) lamps for general lighting services

- the performance testing standards shall be in accordance with MS 62612 (P);
- LED lamps shall be tested for 6 000 h according with MS 62612(P) with minimum 70 % of the initial lumen output value and the failure rate of not more than 10% of the sample population;
- the endurance parameters for testing as with i), shall be not less than 80 % of the initial lumen output value and the failure rate of not more than 10% of the sample population after minimum 1 000 h operation; and
- the MEPS value for lamps of different terminals are as shown in the Table below.

<table>
<thead>
<tr>
<th>Lamp cap type (as in MS IEC 60061-1)</th>
<th>Minimum efficacy (lm/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G13</td>
<td>75</td>
</tr>
<tr>
<td>GU10</td>
<td>50</td>
</tr>
<tr>
<td>E27 or B22d</td>
<td>60</td>
</tr>
<tr>
<td>E14</td>
<td>60</td>
</tr>
</tbody>
</table>
RECENT DEVELOPMENTS

e) filament tungsten incandescent lamps

- the performance testing standard shall be as accordance with MS IEC 60064;
  and
- the MEPS value will be 20 lumen per watt.
CONCLUSIONS

- Efforts to phase out incandescent bulbs being undertaken – will be done in phases
- Legislation for this is in place
- There is a need to provide alternatives for the incandescent bulbs – CFL and LED lighting
- Industry has to prepare itself to assist in this and to take the opportunities
- Standards (Safety and Performance) will play an important role to enable this
THANK YOU

Ir. Francis Xavier Jacob
Email: fxjac2000@yahoo.com