Standards, Regulations and Labelling Requirements for Lighting Products

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Content of Presentation

- Lighting Products with National Standards in Sri Lanka
- Features of Energy Labelling Programme
- Energy Labelling Criteria for CFLs
- Requirements in Energy Labelling Standards
- Star Rating Criteria
- Test Facilities
- Regulations for Energy Labelling CFLs
- Issues
- Recycling CFLs
Lighting Products

- Compact Fluorescent Lamp
- Tubular Fluorescent Lamp
- Ballast
- LED Lamps

Lighting Products with National Standards

Sixth lites.asia workshop – Delhi, India, 2-3 October 2012
# National Standards for Lighting Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Performance and Safety Standards</th>
<th>Energy Labelling Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact Fluorescent Lamps (CFLs)</td>
<td>SLS 1231:2002 Specification for Self ballasted lamps for General Lighting Services (Integral type compact fluorescent lamps)</td>
<td>SLS1225:2002 Energy efficiency rating for Self ballasted lamps (Integral type compact fluorescent lamps)</td>
</tr>
<tr>
<td>Tubular Fluorescent Lamps</td>
<td>SLS 566:1996 Tubular Fluorescent Lamps</td>
<td>Energy Efficiency Rating for Double capped Tubular Fluorescent Lamps (SLS number not yet given)</td>
</tr>
<tr>
<td>LED Lamps</td>
<td>IEC62560 Self Ballasted LED Lamps for General Lighting greater than 50 V – Safety Requirements (to be adopted as SLS standard)</td>
<td>Not yet done</td>
</tr>
</tbody>
</table>

| Already implemented      | Expected implementation in 2013                                                                                                                                                |
Energy Labelling Criteria

- Major Performance Criteria for CFLs
  - Efficacy
  - Lumen maintenance
  - Power Factor
  - Markings
  - Colour
Features of Energy Labelling Programme

- Minimum efficiency levels are determined
- Mandatory
  - from Government gazette.
  - presence of the e-label with the appliance is mandatory.
  - ban products which do not earn at least single star.

- Institutions involved
  - Sri Lanka Standards Institution
    - Publish Standards, implementation
  - Sri Lanka Sustainable Energy Authority
    - Regulations, Surveillance
Requirements in SLS 1225:2002

- **Lamp wattage**
  
  The initial wattage of the lamp ≤115% of rated wattage

- **Rated Average Life**
  
  Rated average lamp Life ≥ 6000 h

- **Efficacy**

- **Power Factor**
  
  Power factor > 0.5

- **Luminous Flux**
  
  Initial luminous flux ≥ 90% of rated of value

- **Lumen maintenance**
  
  Lumen output after 2000 h ≥ 80% of initial lumen output
## Star Rating Criteria

<table>
<thead>
<tr>
<th>Performance Grading (PG)</th>
<th>Star Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG &gt; 70</td>
<td>Five Stars</td>
</tr>
<tr>
<td>65 &lt; PG ≤ 70</td>
<td>Four Stars</td>
</tr>
<tr>
<td>58 &lt; PG ≤ 65</td>
<td>Three Stars</td>
</tr>
<tr>
<td>54 &lt; PG ≤ 58</td>
<td>Two Stars</td>
</tr>
<tr>
<td>50 ≤ PG ≤ 54</td>
<td>One Star</td>
</tr>
</tbody>
</table>

\[ PG = E \times A + Pf \times 100 \times B + CCC \]

- **E** - Efficacy (Light Efficiency)
- **PF** - Power factor
- **CCC** - Colour Correction Coefficient

\[ A = 0.9, B = 0.1 \] (weighting factors)
Test Facilities for Lighting Products

- National Engineering Research and Development Centre (NERDC)

- Regional Centre for Lighting (RCL)

- Sri Lanka Standards Institution (SLSI)
CFL Regulation

Mandatory requirements
- controlling manufacture, import, store, sales and distribution of CFLs not conforming with the standards.
- energy label appearing on the container of the CFL.

Extraordinary Gazette No.1611/10 of the Democratic Socialist Republic of Sri Lanka dated 22nd July 2009

Requirements in Energy Labelling Standard for Tubular Fluorescent Lamps

- **Lamp wattage**
  The initial wattage of the lamp ≤105% + 0.5 W of rated wattage

- **Rated Average Life**
  Life to 50% failure ≥ rated life

- **Efficacy**

- **Luminous Flux**
  Initial luminous flux ≥ 95% of rated value

- **Lumen maintenance**
  Lumen output after 2000 h ≥ 85% of initial lumen output
The star rating shall be assigned based on the efficacy values after 100 h and 2000 h of operation of the lamp.

Efficacy calculated as

\[
\text{Efficacy (E)} = \frac{\text{Measured luminous flux (lm)}}{\text{Rated wattage of lamp (W)}}
\]
Requirements
- Ballasts shall meet the requirements of SLS 1150 Part 1 (identical to IEC 61347-2-8:2006) or IEC 61347-2-8:2006
- Ballast Factor $\geq 0.70$ for magnetic ballasts and
  $\geq 0.8$ for electronic ballasts

Performance Criteria
- Ballast Factor
- Power Loss
LED Lamps

IEC62560 Self Ballasted LED Lamps for General Lighting greater than 50 V – Safety Requirements is to be adopted as SLS standard)

Intend to adopt IEC standard for Performance of LEDs when it is finalized
Issues

- More test facilities required to avoid queues for testing
- High awareness of the consumer required
- Systematic surveillance required
- Pricing control of lamps
Future

- Develop energy standards for labelling LED lamps
- Accreditation laboratory facilities
- Incentive schemes for promotion manufacture/import of high energy efficient lamps
- Instructions/guidelines for maximum Mercury limits of CFLs
- MEPS for luminaire
CFL Recycling

- Plant established in 2011
- Possibility of extracting hard metals, separation of substances not available
- Maximum throughput of one million CFLs per month
- Collection of used CFLs done at sales centres, in development stage
Thank You
Star Rating Criteria for Tubular Fluorescent Lamps

The star rating shall be assigned based on the efficacy values after 100 h and 2000 h of operation of the lamp.

<table>
<thead>
<tr>
<th>Efficacy after 100 h</th>
<th>1 star</th>
<th>2 stars</th>
<th>3 stars</th>
<th>4 stars</th>
<th>5 stars</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 ≤ E ≤ 65</td>
<td>65 ≤ E ≤ 72</td>
<td>72 ≤ E ≤ 82</td>
<td>82 ≤ E ≤ 90</td>
<td>90 ≤ E</td>
<td></td>
</tr>
<tr>
<td>Efficacy after 2000 h</td>
<td>50 ≤ E ≤ 55</td>
<td>55 ≤ E ≤ 62</td>
<td>62 ≤ E ≤ 72</td>
<td>72 ≤ E ≤ 80</td>
<td>80 ≤ E</td>
</tr>
</tbody>
</table>

The overall star rating is the average value of two star ratings, rounded off to the nearest integer (<0.5 to the lower level and ≥0.5 to higher level).
Details in the Energy Label

Number of stars

Rated power

Energy Consumption Per month

Permission granted to use this label only on ......................... Brand compact fluorescent lamp of model ......................

Actual Power ............ Watts

Actual power consumption
Marking - CFLs

- Rated Wattage
- Rated Voltage
- Rated Luminous Flux
- Model Number

- Rated Average Life
- Brand Name

on the lamp

on the lamp or container
Marking – Tubular Fluorescent Lamps

- Rated Wattage  
- Brand Name  
- Model Number

- Rated Luminous Flux  
- Colour Temperature  
- Colour Rendering Index

on the lamp

on the lamp or container
Energy Performance of Ballasts

Power Loss Adjusted for Standard Illumination

\[ \frac{P_m}{BF} \]

\( P_m \) – Measured Power loss of Ballast

\( BF \) – Ballast Factor