



Standards, Regulations and Labelling Requirements for Lighting Products

Irosha S. Kalugalage

Sri Lanka Sustainable Energy Authority



Content of Presentation

2

- 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

3

Compact Fluorescent Lamp



Tubular Fluorescent Lamp



**Lighting
Products**
with National
Standards

Ballast



LED Lamps



National Standards for Lighting Products

4

Product	Performance and Safety Standards	Energy Labelling Standards
Compact Fluorescent Lamps (CFLs)	SLS 1231:2002 Specification for Self ballasted lamps for General Lighting Services (Integral type compact fluorescent lamps)	SLS1225:2002 Energy efficiency rating for Self ballasted lamps (Integral type compact fluorescent lamps)
Tubular Fluorescent Lamps	SLS 566:1996 Tubular Fluorescent Lamps	Energy Efficiency Rating for Double capped Tubular Fluorescent Lamps (SLS number not yet given)
Ballasts	SLS 1150: 2011 Ballasts for Tubular Fluorescent Lamps	SLS 1200:2012 Energy Efficiency Rating for Fluorescent Lamp Ballasts
LED Lamps	IEC62560 Self Ballasted LED Lamps for General Lighting greater than 50 V – Safety Requirements (to be adopted as SLS standard)	Not yet done

Already implemented

Expected implementation in 2013

Energy Labelling Criteria

5

■ Major Performance Criteria for CFLs

Efficacy

Lumen maintenance

Power Factor

Markings

Colour



Features of Energy Labelling Programme

6

- 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

7

- Lamp wattage

The initial wattage of the lamp $\leq 115\%$ of rated wattage

- Rated Average Life

Rated average lamp Life ≥ 6000 h

- Efficacy

- Power Factor

Power factor > 0.5

- Luminous Flux

Initial luminous flux $\geq 90\%$ of rated of value

- Lumen maintenance

Lumen output after 2000 h $\geq 80\%$ of initial lumen output

Star Rating Criteria

8

Performance Grading (PG)	Star Rating
PG>70	Five Stars ★★★★★
65<PG≤70	Four Stars ★★★★
58<PG≤65	Three Stars ★★★
54<PG≤58	Two Stars ★★
50≤PG≤54	One Star ★



$$PG = E \times A + Pf \times 100 \times B + CCC$$

E - Efficacy (Light Efficiency)

PF - Power factor

CCC - Colour Correction Coefficient

A = 0.9, B = 0.1 (weighting factors)

Test Facilities for Lighting Products

9

- National Engineering Research and Development Centre (NERDC)



- Regional Centre for Lighting (RCL)



- Sri Lanka Standards Institution (SLSI)

Regulations

10

■ 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

http://www.energy.gov.lk/pdf/gazette/1611_10_English.pdf

Requirements in Energy Labelling Standard for Tubular Fluorescent Lamps

11

- **Lamp wattage**
The initial wattage of the lamp $\leq 105\% + 0.5$ W of rated wattage
- **Rated Average Life**
Life to 50% failure \geq rated life
- **Efficacy**
- **Luminous Flux**
Initial luminous flux $\geq 95\%$ of rated of value
- **Lumen maintenance**
Lumen output after 2000 h $\geq 85\%$ of initial lumen output



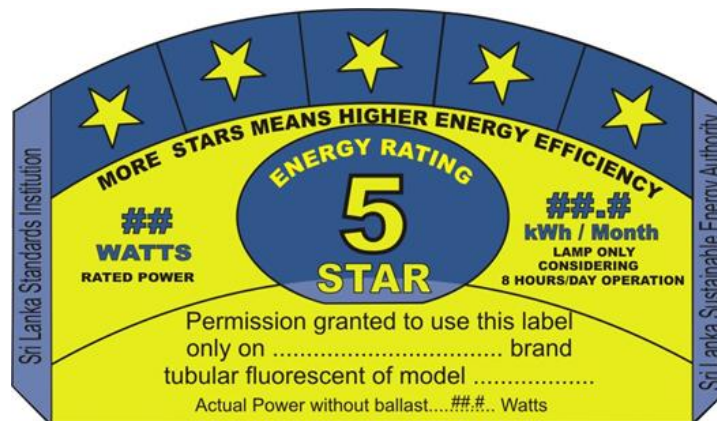
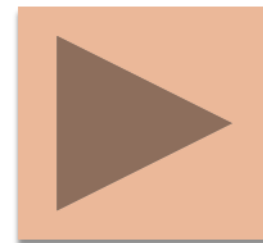
Star Rating Criteria for Tubular Fluorescent Lamps

12

- 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

$$\text{Efficacy (E)} = \frac{\text{Measured luminous flux (lm)}}{\text{Rated wattage of lamp (W)}}$$



Energy Labelling of Ballasts

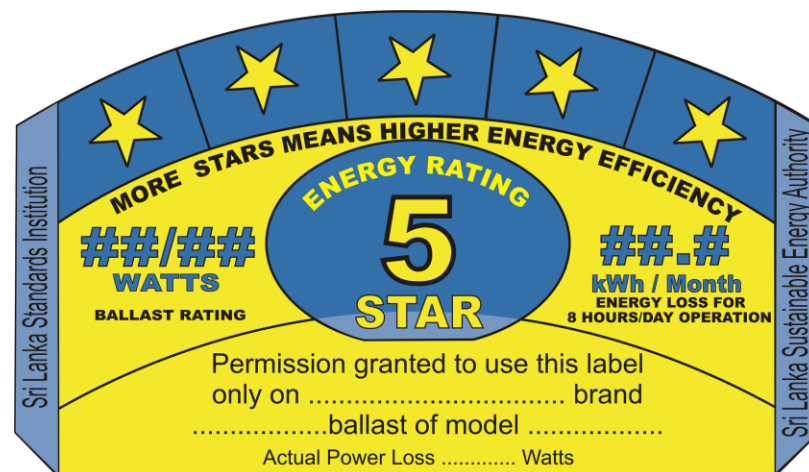
13

■ 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 ≥ 0.70 for magnetic ballasts and ≥ 0.8 for electronic ballasts

■ Performance Criteria

- Ballast Factor
- Power Loss



LED Lamps

14

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

15

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

Future

16

- 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

17

- 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

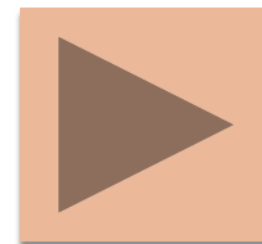
Star Rating Criteria for Tubular Fluorescent Lamps

19

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

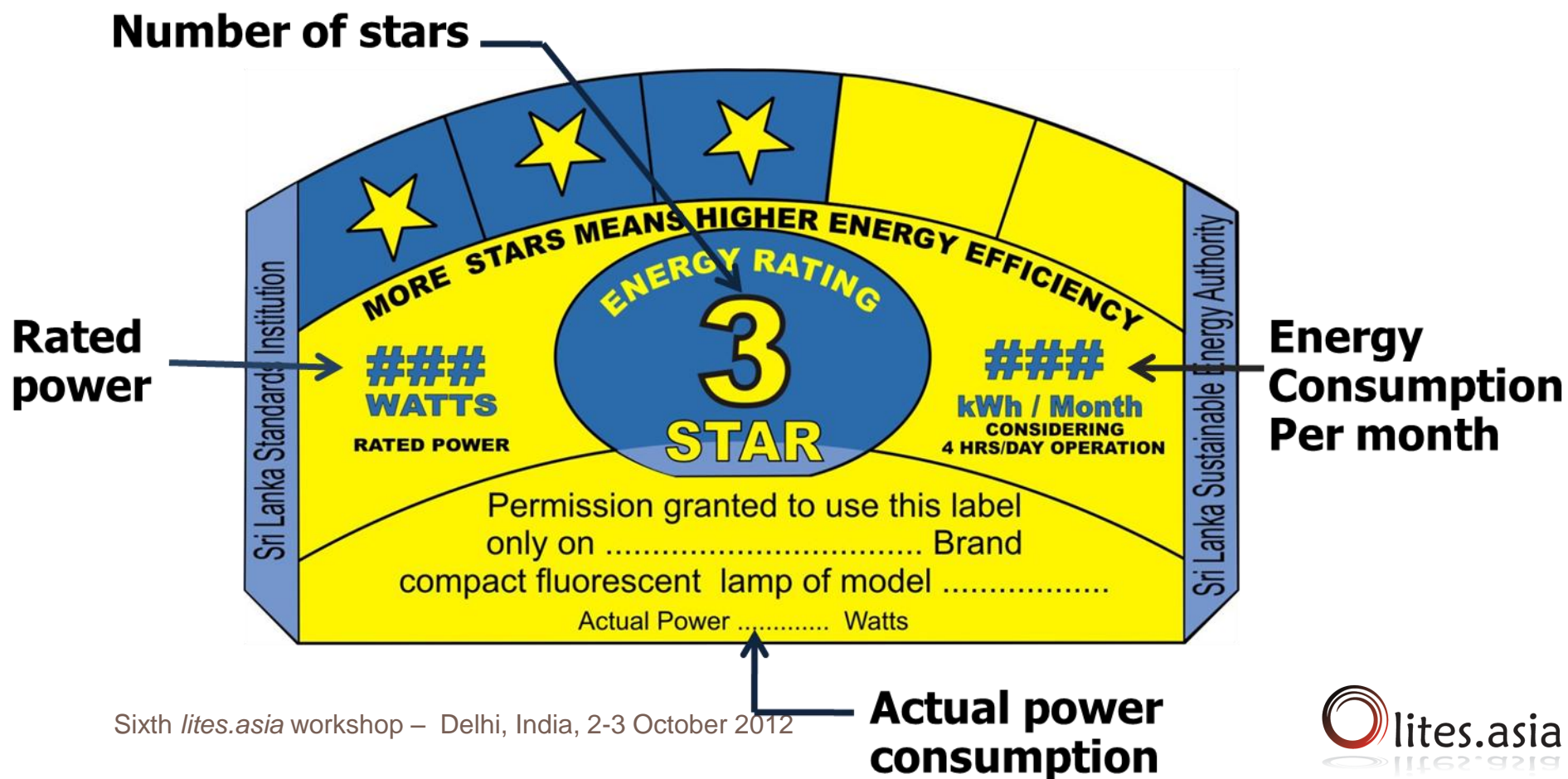
	1 star	2 stars	3 stars	4 stars	5 stars
Efficacy after 100 h	$60 \leq E \leq 65$	$65 < E \leq 72$	$72 < E \leq 82$	$82 < E \leq 90$	$90 < E$
Efficacy after 2000 h	$50 \leq E \leq 55$	$55 < E \leq 62$	$62 < E \leq 72$	$72 < E \leq 80$	$80 < E$

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

20



Marking - CFLs

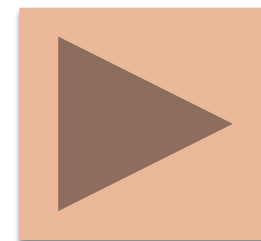
21

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

on the lamp

- Rated Average Life
- Brand Name

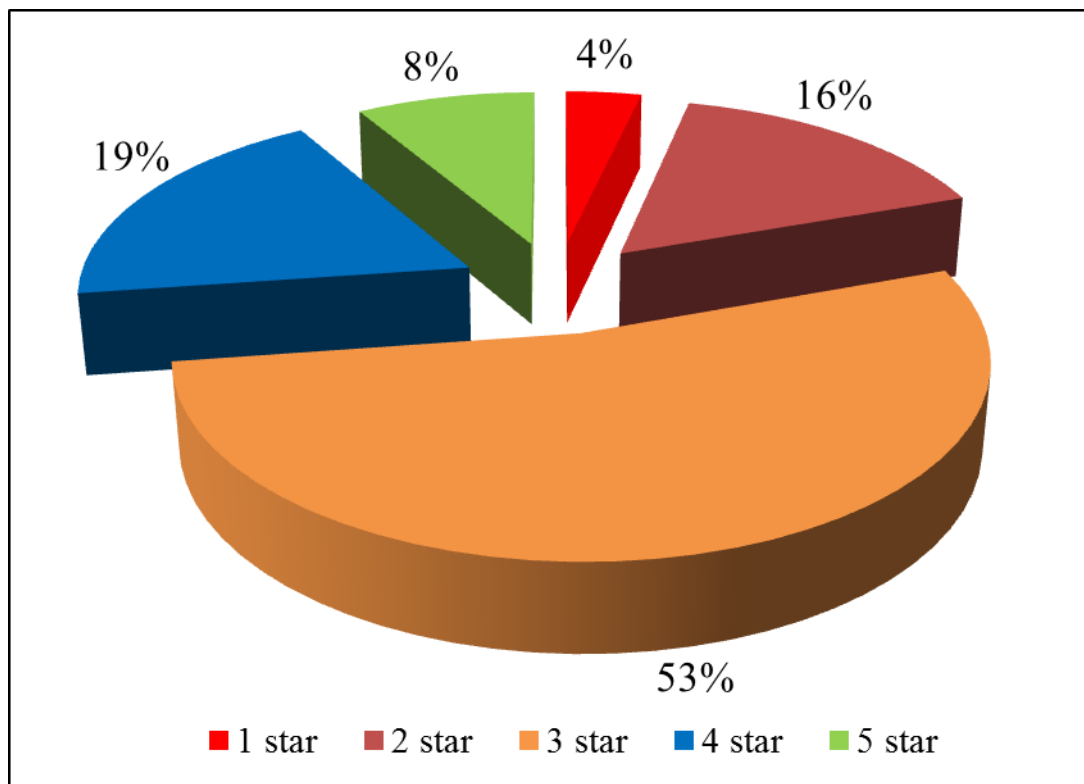
on the lamp or
container



Marking – Tubular Fluorescent Lamps

22

- Rated Wattage
 - Brand Name
 - Model Number
- } on the lamp
-
- Rated Luminous Flux
 - Colour Temperature
 - Colour Rendering Index
- } on the lamp or container



Energy Performance of Ballasts

24



Power Loss Adjusted for Standard Illumination

$$= \frac{P_m}{BF}$$

P_m – Measured Power loss of Ballast

BF – Ballast Factor