

# India

## An LED Overview

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**Asia-Pacific  
Economic Cooperation**



**Australian Government**  

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**Department of Climate Change  
and Energy Efficiency**

# Background

- Limited availability of LED technology in India
- High initial cost of LEDs that makes the pay-back period very long
- Absence of National standards for LEDs, as a result industry is prone to import sub standard products
- Lack of testing protocols, facilities and accredited laboratories at the national level
- No incentive either to set up manufacturing facilities in India
- Consumer awareness very low

# Why LED

- Virtually no risk of environmental contamination hence environment friendly
- No risk of personal exposure to hazardous materials
- Virtually no risk of fire/smoke
- No personal exposure to Ultraviolet radiation
- Artwork and other sensitive items are not degraded as a result of exposure to Ultraviolet radiation
- No concern about how often you turn on/off your lights
- Long life compared to other light sources
- No wasted time or electricity
- Very effective in cold temperatures usage and compared to CFLs
- Annual saving potential 12318750 million Wh

# LED Lighting Focus

- Down lighters
- Street Lighting for Secondary Roads
- General Lighting

# Steps Initiated for LED

- Preparing National Standards for LED
- Government Procurement
- Lab Capacity Building

# Awareness Program

- Workshops / Seminars
- Exhibitions by the Industry Association
- Articles and advertisements in special magazines
- Media publicity

# National Standardisation

- Separate technical committee to deal with lamps, control-gears and lamps caps/holders
- Members from industry, industry association, laboratory, academicians, R&D institutions, consumer organizations, regulatory bodies, other government bodies, professional bodies.

# National Standardisation Process

- Approval of new subject by national committee
- Preparation of preliminary draft standard
- Circulation to members of national committee for comments
- Discussion on the draft standard and comments by the members of the technical committee
- Draft standard in wide circulation for public comments
- Discussion by the national committee
- Approval of draft standard by consensus
- Publication of standards



# Indian Standards on LEC

- Terms and definitions for LEDs and LED modules in general lighting
- Self Ballasted LED-Lamps for General Lighting Services, Part 1 Safety Requirements
- Self Ballasted LED-Lamps for General Lighting
- Services Part 2 Performance Requirements
- LED Modules for General Lighting- Part 1, Safety Requirements
- LED Modules for General Lighting -Part 2,Performance Requirements
- Lamp Control gear-Part 2 Particular Requirements, Section 13, D.C. or A.C. Supplied Electronic Control-gear for LED Modules

# Indian Standards on LED – contd.

- DC or AC Supplied Electronic Control Gear for LED Modules - Performance Requirements
- Method of Measurement of Lumen Maintenance of Solid State Light (LED) Sources
- Method Of Electrical and Photometric Measurements of Solid- State Lighting (LED)
- LED Luminaries for General Lighting purposes- Performance Requirements
- Photo biological Safety
- Indian standards are based on IEC publications
- Method of measurement for electrical, photometric and color characteristics are base on IESNA standards

# Steps Initiated for LEDs in India

- Draft Indian standards have been approved for publication in July 2011
- Preparing specifications for led products
- Government procurement guidelines
- Lab capacity building
- Awareness programs - *Workshops / Seminars, Articles and advertisements in special magazines, Exhibitions by the Industry Association, Media publicity*
- LED Lighting focus - *Down lighters, Street Lighting for Secondary Roads, General Lighting*

# Self-Ballasted LED-Lamps

## Part 1 - Performance

- Rated wattage upto 60 W
- Rated voltage upto 250 V
- Tests
  - Cap interchangeability
  - Bending moment
  - Marking
  - Protection against accidental contacts with live parts
  - Insulation resistance and electric strength
  - Torsion test of unused lamps

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# Self-Ballasted LED-Lamps

## Part 1 - Performance

- Torsion test of used lamps
- Cap temperature rise test
- Resistance to heat
- Resistance to flame
- Fault conditions
- Creepage distances and clearances
- Selection of lamps and sampling
- Conditions of compliance
- Classification of tests (acceptance and type)

# SELF-BALLASTED LED-LAMPS

## PART 2 - PERFORMANCE

- Marking
- Dimension
- Luminous flux
- Lamp wattage
- Centre beam intensity
- Beam angle
- Correlated Colour Temperature (CCT)
- Colour rendition index (CRI)

# Self-Ballasted LED-Lamps

## Part 2 - Performance

- Lumen maintenance
- Endurance test for ballast
- Harmonics
- Conducted and radiated emission
- Selection of lamps for testing
- Criteria for compliance
- Classification of tests (acceptance and type)

# LED Module - Safety

- Marking
- Terminals
- Provisions for protective earthing
- Protection against accidental contact with live parts
- Moisture resistance
- Electric strength
- Fault conditions



# LED Module - Safety

- Conformity testing during manufacture
- Construction
- Creepage distances and clearances
- Screws current carrying parts and connections
- Resistance to heat, fire and tracking
- Resistance to corrosion
- Heat management
- Classification of tests (acceptance and type)

# LED Module - Performance

- Marking
- Dimension
- Module power
- Luminous flux
- Luminous intensity distribution
- Peak intensity
- Beam angle

# LED Module - Performance

- Correlated Colour Temperature (CCT)
- Colour Rendering Index (CRI)
- Life
- Lumen maintenance
- Endurance
- Temperature cycle test
- Supply switching test
- Accelerated operation life test

# LED Module - Performance

- Radiated and conducted emission
- Sampling plan

# Methods of Electrical and Photometric Measurements

- General test Conditions
  - Air temperature
  - Mounting of sample
  - Air movement
  - Power supply characteristics
  - Stabilization of sample under test
  - Operating orientation
  - Electrical settings
  - Electrical instrumentation and calibration uncertainties

# Method of Electrical And Photometric Measurements

- Test methods for total luminous flux measurement
  - Integrating Sphere with a Spectroradiometer
  - Integrating Sphere with a Photometer Head
  - Goniophotometer
- Luminous intensity distribution
- Luminous efficacy
- Colour characteristics

# Method of Measurement of Lumen Maintenance

- Test Conditions
  - Sample marking
  - Sampling procedure
- Environmental condition
  - Vibration
  - Temperature
  - Humidity
  - Airflow
  - Operation orientation

# Method of Measurement of Lumen Maintenance

- Electrical and thermal conditions
  - Input voltage
  - Voltage wave shape
  - Input current regulation
  - Case temperature
- Measurement procedure
  - Instrumentation
  - Photometry measurement
  - Photometry measurement temperature



# Method of Measurement of Lumen Maintenance

- Lumen Maintenance Testing Method
  - Lumen Maintenance Testing Duration and Interval
  - Operating Cycle
  - Recording failure

# Lamp Control Gear – Safety

- Marking
- Protection against accidental contact with live parts
- Terminals
- Provisions for protective earthing
- Moisture resistance and insulation
- Electric strength
- Thermal endurance test for windings of ballasts

# Lamp Control Gear - Safety

- Fault conditions
- Transformer heating
- Construction
- Creepage distances and clearances
- Screws, current-carrying parts and connection
- Resistance to heat, fire and tracking
- Resistance to corrosion

**THANK YOU**

**PAPER FROM:**

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