

“India Centric Standards and LED Products and R&D for Product Test”

BRICS Cooperative Activities

**4th Meeting of
BRICS Solid State Lighting Collaboration Working Group**

Hangzhou, China

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Organizer: Secretariat of BRICS SSL WG

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Agenda

- Back Ground
- Indian Standards
- Critical Components
- Research Project Details
- Researchers Team
- Way forward Research Plan
- Summary

Background

- LED lamps are energy saving ,long life and widely used as the next generation lighting.
- Promotion of energy efficient and environmentally safe lighting by Government (Prime Minister Narendra Inaugurated “Prakash Path” – “way to light,” and UJALA Scheme by EESL)
- Reliability assessment and Lifetime prediction for LED lamps has gained significant research interest in implementing of green Lighting.
- Indian standards are harmonize w.r.t IEC standards. India is a developing country and conditions are different than developed country like High temperature , Humidity dust , voltage variation etc hence its important to proposed project is a joint cooperative research project focusing India conditions w.r.t development of reliability assessment



Self ballasted LED lamp

•Safety Requirement

- **IEC/EN 62560** – Safety requirements
- **IS:16102- 1** – Safety requirements

Performance Requirement

- **IEC/PAS 62612**– Performance requirements
- **IS 16102-2** – Performance requirements



Luminaires

Luminaire Safety

- **IEC 60598-1 – Ed. 7.0** – General requirements and tests **All relevant parts 2 of IEC–** Particular requirements
- **IS: 10322 -1 ,2, 3 and 4** – General requirements and tests **All relevant section of part 5 of IS–** Particular requirements

Luminaire Performance

- **IEC/PAS 62722-1 – Ed. 1.0** – General requirements
- **IEC/PAS 62722-2-1 – Ed. 1.0** – Particular requirements for LED luminaires
- **IS 16107- 1** – General requirements
- **IS 16107 -2 – Sec 1** – Particular requirements for LED luminaires



Controlgears

Controlgear Safety

- **IEC 61347-1 – Ed. 2.0** – General and safety requirements
- **All relevant parts 2** – Particular requirements
- **IS: 15885 -1** – General and safety requirements
- **All relevant parts 2** – Particular requirements

Controlgear Performance

- **IEC/EN 62384** – Performance requirements LED control gear
- **IS 16104** – Performance requirements LED control gear

Photobiological safety

•Photobiological Safety

- **IEC 62471 – Ed. 1.0** – Photobiological safety of lamps and lamp system
- **IS 16108** – Photobiological safety of lamps and lamp system
- **IEC/TR 62471-2 – Ed. 1.0** – Photobiological safety of lamps and lamp systems - Part 2: Guidance on manufacturing requirements relating to non-laser optical radiation safety
- **IEC/TR 62778 – Ed. 1.0** – Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires

Mandatory BIS CRS for Lighting Products



- ❑ **Self - Ballasted LED Lamps for General Lighting Services (IS 16102-1):2012**



- ❑ **Fixed General Purpose LED Luminaires including Fancy Lights (IS 10322 Part5/Sec1):2012**



- ❑ **DC or AC Supplied Electronic Control Gear for LED Modules (IS 15885 Part 5/Sec 13): 2012**

Critical Components



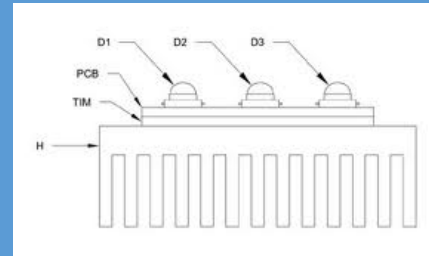
LED Module



Control Gear



Optics



Thermal management

Proposed Research Project Details

Scope : Perform fundamental work on the reliability tests as per ISA recommended procedure .

Sample Size: Table 1 Minimum sample quantity requirement of the accelerating depreciation test

Lighting Product	Sample Qty.
LED spotlight, LED downlight, and LED light bulb	12
LED streetlight, LED tunnel light	3

Accelerating temperature:

Table 2 Determination of the Accelerating Test Temperature

Item	Testing Temperature(°C)	Permitted Accelerating Test Temperature(°C)
0	25	N/A
1	40	35±3
2	50	45±3
3	60	55±3

Research Project Details

- Monitor and record the life , depreciation in lumen and colour shift .
- Apply FMEA on the failed samples used in local condition.
- Enumerate the major failure modes to cause reliability failure of the LED lamps and investigate the root causes.

Proposed Project Duration : 1 Years

Researcher Team

Name	Organization	Title	Degree	Specialty
(Leader) Shyam Sujan	Electric Lamp and component Manufacture Association of India (ELCOMA)	Secretary General	B.Sc.	Lighting Device Research
(Researcher) Gautam Brahmbhatt	Electrical Research and Development Association (ERDA)	Group Head	M.E- Electrical Power Engg.	Lighting Research , Certification and Testing
(Researcher) Bhavana Kasturia	LEDVANCE	Asst. VP – Quality	Master Of Engineering (Digital Techniques & Instrumentation)	Lighting Device Research





Integrating SPhere



Type 'C' Goniophotometer



Environmental Chambers

The special features of Environmental & Humidity chambers

1. Temperature range : -60°C to $+150^{\circ}\text{C}$	4. Humidity range : 20% RH to 95% RH
2. Accuracy for temperature : $\pm 1^{\circ}\text{C}$	5. Accuracy of Relative Humidity : $\pm 2\%$
3. Temperature gradient : 100°C/h for 25°C to 85°C	6. Temperature gradient : 200°C/h for 0°C to -40°C

Way Forward – Research Plan

- Identifying , Selecting , and availability of samples for research .
- Prepare details project proposal
(Include Project Plan , Methodology, Project cost , Project Timeline , funding agency , Identifying roles and responsibilities of research team , Recording formats and Report Formats etc)
- Feedback form ISA Experts , BRICS Countries.

Summary

The LED technology has developed intensely over the last few years and the subject of intense research and development. LED lamps are of greater significance in the context of need for electrical energy conservation , longer life , pollution control world over. With every passing day market is flooded with number of innovative LED luminaire. For good lighting design it is important to have right amount of light in right direction and in right colour.

Compliance of products to reliability and life requirements is very important. This research project will evaluate “ Accelerated Ageing Test Method” .