



Valued Quality. Delivered.

## Application and Requirement for LED Lighting Product Certification Scheme



Present by : Samson Leong

Regional Lighting Business Manager  
Consumer & Commercial Electrical, Intertek Testing Services Hong Kong Ltd.

## Key Considerations for LEDs:

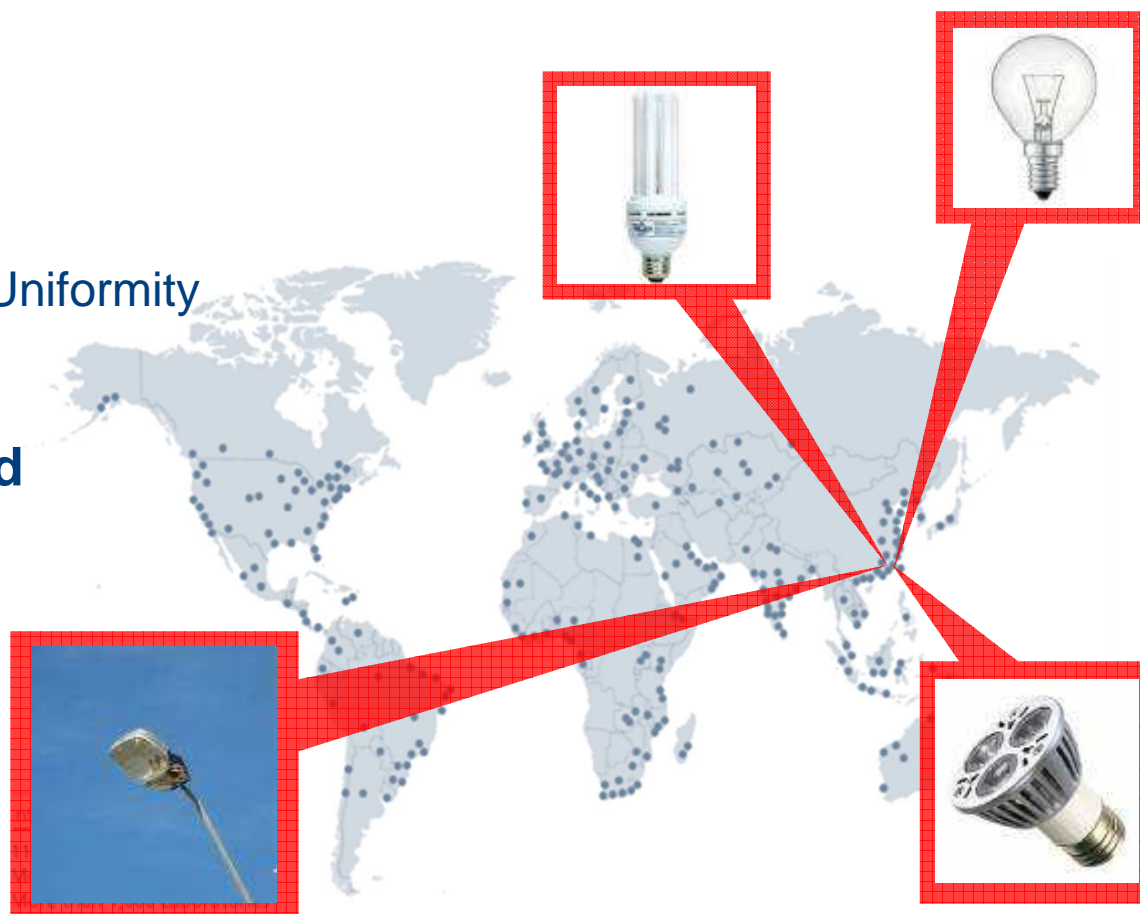
- **Performance Testing**

- Light Efficacy
- Light Distribution
- CRI and Color Spatial Uniformity
- Reliability / Life

- **Photo-biological Hazard**

- **Safety Testing**













- **EMC / FCC**



# Global Programs for LED Performance

**Intertek**

Valued Quality. Delivered.

Area	Mandatory Program	Voluntary Program
North American	CEC	 
Europe	 ErP Directive	  
Asian Countries	 CNS15630 	   

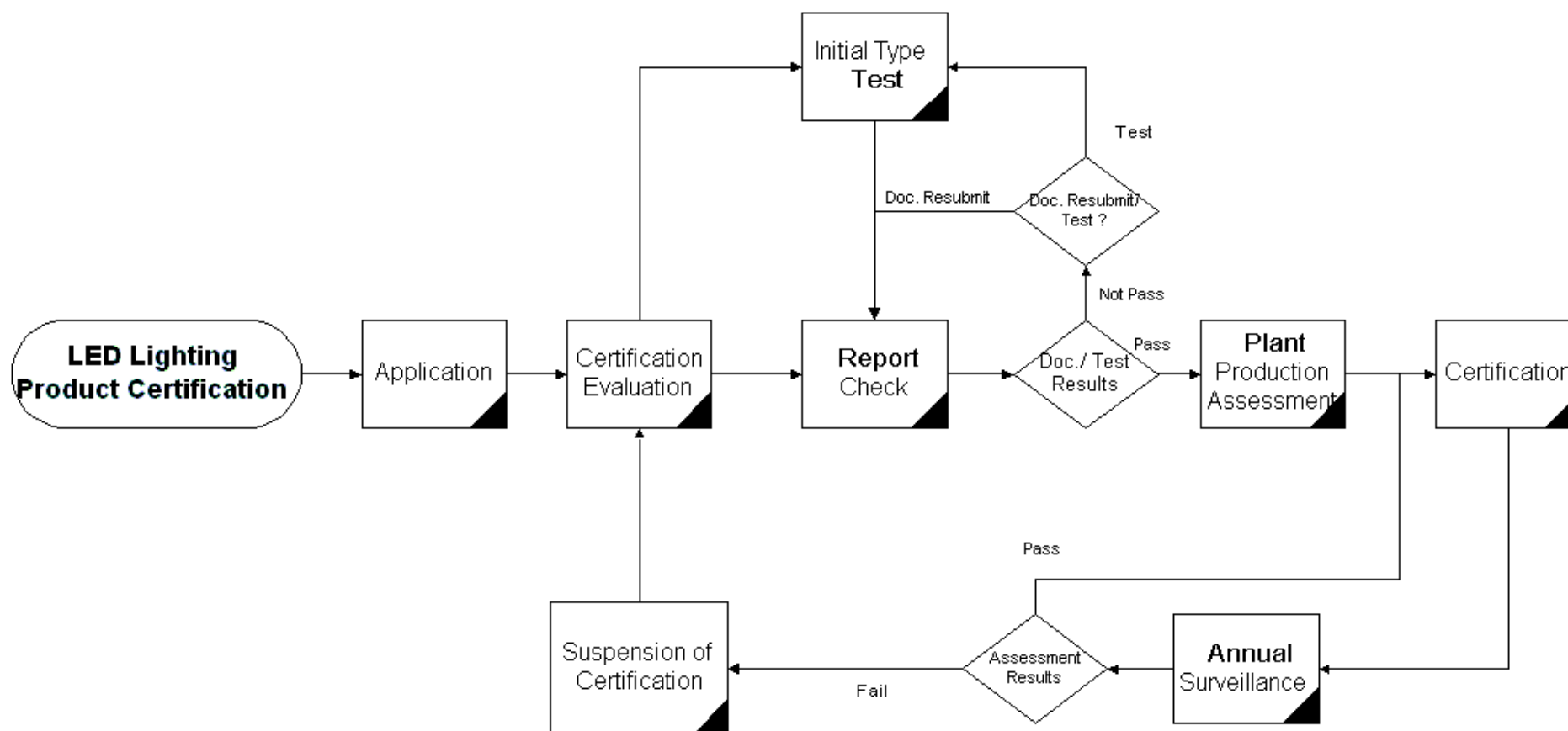
# LED Lighting Product Certification Scheme

- **Flow of Application and Certification**
- **General Requirements for 3 LED products**
- **Specific Requirements for**
  - **Bulkhead Type LED Light Fittings**
  - **LED Downlight**
  - **LED Floodlight**
- **Evaluation Methods of Conformity**
  - **Initial Type Tests**
  - **Plant Production Control**
  - **Surveillance Assessment** (*Further explanation in next presentation*)

# Flow of Application and Certification



Valued Quality. Delivered.



# Flow of Application and Certification



Valued Quality. Delivered.

## Application:

- Application Form
- Quality Manual and document for assessment
- Nominate a person as representative and formal contact for this program
- Payment

## Certification Evaluation:

- Initial Type Test, Report Check: (Annex A)
  - CBTL under IECEE, and/or,
  - HKAS/ MRA Partner accredited lab.
  - ISO/IEC 17025
- Plant Production Assessment
  - Components
  - Production Processes
    - e.g. Doc under ISO 9001 system, production equipment, production on-line testing equipment, etc.
  - Finished products
    - Manufacturer should be ISO 9001 certified by HKAS or MRA partner

## Certification:

Certificate will be issued after completion of evaluations followed by certification agreement establishment.

Certificate includes the following information:

- Included name and address of Certification Body, Supplier, Manufacturer;
- Product information: Name, Model No.,
- Conformed Requirements
- Cert. Information: Cert. No., Issues date, Authorized signature, etc.

# **Requirements**

## **For**

### **Bulkhead Type LED Light Fittings**

### **LED Downlight**

### **LED Floodlight**

# General LED Lighting Product Requirements



Valued Quality. Delivered.

## Three Major Areas

### 1. Safety Requirement

- IEC 60598-1 with particular requirements for specific product
- IEC 62471 – Photobiological Safety

### 2. EMC Requirement

- CISPR 15 / EN 55015
- IEC 61000-3-2, IEC 61000-3-3
- IEC 61547 Surge immunity

### 3. Performance Requirement

- IES LM-79
- IES LM-80, TM-21
- Thermal Test (*For LM80 Setup*)

# Safety Requirements



Valued Quality. Delivered.

## End Product Safety

60570

60598-1

60598-2-1, 2, 5

62560

## Component Safety

61347-1

61347-2-13

62031

## Performance

62471

62471-2

# Photo-biological Hazard / Safety

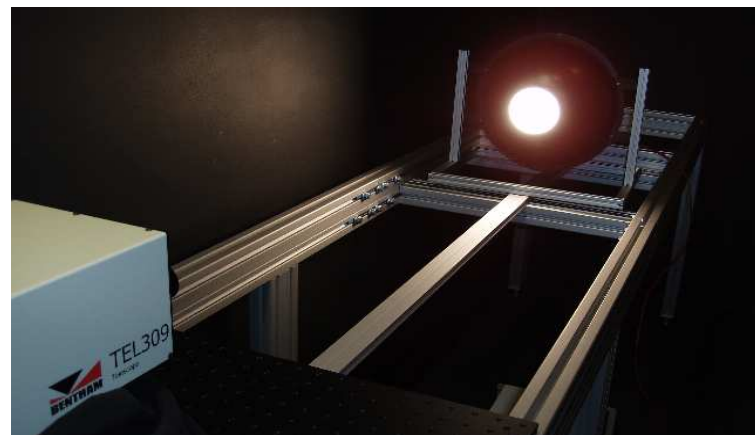
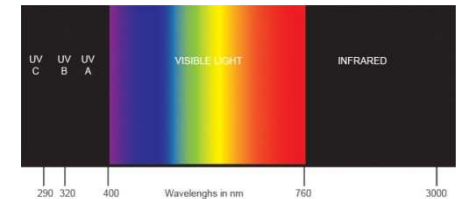


Valued Quality. Delivered.

## Photo-biological safety

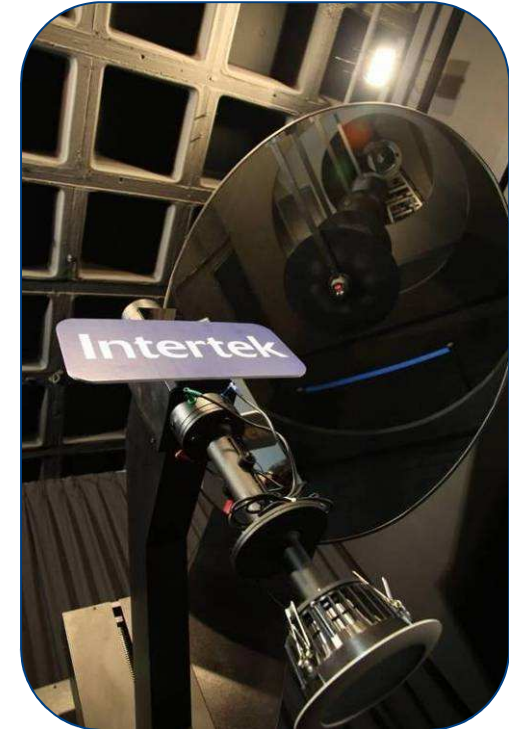
The Spectroradiometer system were introduced, which can measure a light source with spectral range **200-1700nm. (From UVC to IRB)**, and can be further expanded to **3000nm**.

With the Spectroradiometer system (**Double Monochromator**), we can perform the LED photo-biological safety testing (i.e. **EN 62471**) and Ultra-Violet radiation measurement according to different requirement (e.g. ErPs directvie)



## IESNA LM 79: Approved Method: Electrical and Photometric Measurements of Solid State Lighting

- Minimum Luminous Efficacy
- Minimum Light Output
- Power Factor
- CCT
- CRI
- Duv Tolerance (Color)
- Chromaticity coordinates
- Luminous Intensity Distribution
- Min Center Beam Intensity
- Color Spatial Uniformity
- Electrical Measurements



## IES LM80: Approved Method: Measuring Lumen Maintenance of LED Light Sources

Focus on LED modules, arrays and devices :

*Capable to test for LED component with rated power up to 150W !*

1. At Least 6000 Hours Lumen Maintenance with data collection at a minimum of every 1000 hours
2. Electrical and Thermal Management (55°C, 85°C, and temperature selected by Manufacturer)



# Specific Requirements for Bulkhead Type LED Light Fittings



Valued Quality. Delivered.

Evaluation Category	Standards / requirements	Initial Assessment
		Type Test/ Evaluation
Safety	IEC 60598-2-1 associated with IEC 60598-1	Yes <sup>1</sup>
Performance	IES LM-79 Photometric measurement	Yes <sup>2</sup>
Supplementary requirements	See Note 4	Yes <sup>3</sup>

# Specific Requirements for Bulkhead Type LED Light Fittings



Valued Quality. Delivered.

Performance shall be complied with:

- a) Color rendering index (CRI): not less than 75;
- b) Correlated color temperature (CCT): 4,000K (nominal) [3,985K (target) +/-275K tolerance];
- c) Chromaticity of LEDs: variation within 0.007 on the CIE1976 (u', v') diagram.

## Supplementary Requirements :

- a) Light diffuser test:
  - i. Impact test: 6.5Nm, at 25degC, without visible damage; and
  - ii. Glow wire test: 850degC.
- b) Verification of circuit design and configuration of the LEDs:
  - i. Single LED fails open or short circuit, a minimum of 80% of the remaining LEDs shall maintain operation. and
  - ii. assess circuit/connection diagram as per above requirement
- c) Determine lumen, efficiency, PF and harmonic for product with integrated/ separate dimmer v.s. the quoted values at each dimming setting.
- d) The light fittings comply with the following performance requirements:
  - i. Luminance efficacy: Minimum 70lumen/watt at 100% full lumen output;
  - ii. Overall operating power factor of the luminaries  $\geq 0.85$ ;
  - iii. Total Harmonic Distortion (THD): Maximum 15%.

# Specific Requirements for LED Downlight



Valued Quality. Delivered.

Evaluation Category	Performance Standard / requirements	Initial Assessment
		Type Test/ Evaluation
Safety	<ul style="list-style-type: none"> <li>- IEC 60598-2-1 associated with IEC 60598-1 for surface mounted application</li> <li>- IEC 60598-2-2 associated with IEC 60598-1 for recessed mounted application</li> </ul>	Yes <sup>1</sup>
Performance	IES LM-79 Photometric measurement	Yes <sup>2</sup>
Supplementary requirements	See Note 4	Yes <sup>3</sup>

# Specific Requirements for LED Downlight



Valued Quality. Delivered.

Performance shall be complied with:

- a) Color rendering index (CRI): not less than 80;
- b) Correlated color temperature (CCT): 2,700K, 3,000K, 3,500K, 4,000K or 5,000K [7-step chromaticity quadrangles];
- c) Chromaticity of LEDs: variation within 0.007 on the CIE1976 (u', v') diagram;
- d) Min. 345 lu for aperture  $\leq 4.5$  inches or 575 lu for aperture  $> 4.5$  inches. (Min 75% of total lumens in 0-60deg zone).

## Supplementary Requirements :

- a) Determine lumen, efficiency, PF and harmonic for product with integrated/ separate dimmer v.s. the quoted values at each dimming setting.
- b) The light fittings comply with the following performance requirements:
  - i. Luminance efficacy: Minimum 60 lumen/watt at 100% full lumen output;
  - ii. Power Factor  $\geq 0.85$ ;
  - iii. Total Harmonic Distortion (THD): Maximum 15%.

# Specific Requirements for LED Floodlight



Valued Quality. Delivered.

Evaluation Category	Performance Standard / requirements	Initial Assessment
		Type Test/ Evaluation
Safety	IEC 60598-2-5 associated with IEC 60598-1	Yes <sup>1</sup>
Performance	IES LM-79 Photometric	Yes <sup>2</sup>
Supplementary requirements	See Note 4	Yes <sup>3</sup>

# Specific Requirements for LED Floodlight



Valued Quality. Delivered.

Performance shall be complied with:

- a) Color rendering index (CRI): not less than 75;
- b) Chromaticity of LEDs: variation within 0.007 on the CIE1976 (u', v') diagram.

## Supplementary Requirements :

- a) Verification of circuit design and configuration of the LEDs:
  - i. Single LED fails open or short circuit, a minimum of 80% of the remaining LEDs shall maintain operation. and
  - ii. assess circuit/connection diagram as per above requirement
- b) The light fittings comply with the following performance requirements:
  - i. Luminance efficacy: Minimum 70 lumen/watt at 100% full lumen output;
  - ii. Power Factor  $\geq 0.85$ ;
  - iii. Total Harmonic Distortion (THD): Maximum 15%.

# Local Support

**Intertek**

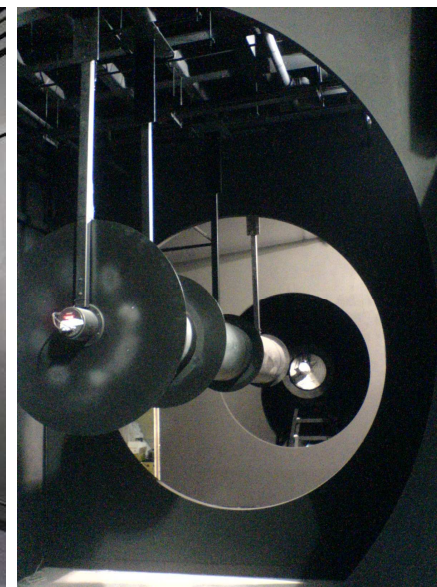
Valued Quality. Delivered.

## Qualified LED lighting products:

- Testing;
- Certification;
- Surveillance

## This requires

- Certification Bodies
- Accredited Laboratories
- Long history with excelled experiences



Intertek Testing Services HK Ltd. – Consumer & Commercial Electrical

Mr. Samson Leong – Regional Lighting Business Manager (Asia Pacific)

Mobile: +852 6738 9048 / +86 159 2076 4687

Office Tel: +852 2173 8491

email: [samson.leong@intertek.com](mailto:samson.leong@intertek.com)

**Intertek**

Valued Quality. Delivered.

**Valued Quality. Delivered.**

