
Guidelines for Provision of Data for Assessment of LED Luminaires

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1 GENERAL

This document provides an overview of information required to allow Council to assess the suitability of LED luminaires for possible use on their road lighting network. The council may request additional information or independent reports to support the data provided.

Council gives no commitment to using a particular product even if all of the required data has been provided to Council.

Appendix A is a chart showing an overview of the information required. Appendix B is a Summary Check list of the information required.

2 LED ATTRIBUTES

2.1 Energy Savings or Life Cycle Costs

If energy savings are being promoted ensure the total circuit wattage is used in any calculations. For example a 48 unit LED fixture may consist of 48 x 1 watt LED's and a driver wattage of 10W giving a total system wattage of 58W.

Similarly a 70W metal halide lamp will have a system wattage of the lamp wattage plus control gear wattage of 4W giving a total system wattage of 74W.

Whole of life costs for the scheme should be used to ensure best value technology (BVT) is being used. There is a life cycle calculator available on the Right Light web site www.rightlight.govt.nz.

2.2 Reliability

Reliability includes design flaws, manufacturing defects, wear and tear and end of life failure.

ALL components must be matched to ensure the luminaire has an expected life of 20 years plus. These typically include lenses, visor, gaskets, luminaire body, compatible materials etc. We also need to know the expected life of the actual LEDs and driver for example. Provide details on how these expected lives have been derived.

If there is a distinct advantage over why a particular component is manufactured then the luminaire supplier must highlight this fact and make us aware of this advantage. Any supporting data, trial or case study may be helpful in confirming this fact.

Warranty periods will be considered as part of the acceptance process. Warranties maybe a combination of replacement parts, labour and installation or replacement parts only.

3 LUMINAIRE CRITERIA

3.1 Colour Preference

Why is white light preferred?

There is an allowance within AS/NZS 1158 for reduced lighting levels when using white light (good colour rendering) instead of yellow high pressure sodium lighting for sub categories P3 and P4. It is generally accepted that the eye is more sensitive to white light at low light levels.

Recommendation - Colour temperature of 3000 K - 4500 K and a colour rendering index of higher than Ra 70.

3.2 Lumen Depreciation

Lumen depreciation rate over say 25,000 hours, 50,000 hours & 100,000 hours should be provided. The approved method of measuring lumen depreciation should comply with IESNA's - LM-80 standard.

Lumen depreciation in LED is dependent on ambient operating temperature and driver current. It is helpful to provide the following information with LED lumen depreciation:

- Driver Current
- Ambient operating temperature (25°C) as per LM80.
- Initial lumen output

Data for an LED fixture should be configured at 25°C ambient operating temperature. If additional average ambient operating temperature data is available this should also be provided for consideration.

3.3 Measurement Procedures

Approved method of describing procedures and precautions in measurements of LED's is explained within IESNA's - LM79. This information includes:

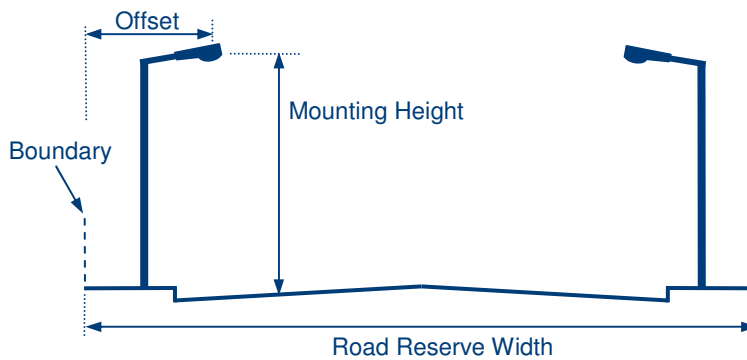
- Total luminous flux
- Electrical power, voltage, current and power factor
- Efficacy (lumens/watt)
- Chromaticity

4 PERFORMANCE

4.1 Performance and Design Spacing

How does new technology compare with existing technology? In order to compare new LED technology with existing (as a minimum) we ask the luminaire supplier to provide calculations for P3 & P4 subcategory using the following criteria and the sketch below:

- Mounting height 6.0m & 7.5m
- Offset 1.7m & 4.4m
- Single sided and staggered arrangements
- 16m, 18m & 20m road reserve widths
- Tilt of 10°
- Spill light into adjoining environment
- Maintenance factor 0.7. *(Please note: lumen depreciation should be confirmed and a higher value may be used for actual design projects provided supporting data is supplied with this submission but for this exercise please use a maximum value of 0.7)*



AS/NZS 1158 provides the technical parameters required for compliance with various lighting subcategories.

This is a minimum requirement with calculations providing maximum design spacing.

In order for this maximum design spacing to be utilised Council has an Infrastructure Design Standard (IDS) with a minimum spacing requirement that must also be complied with to minimise the number of columns and luminaires installed.

4.2 Spill Light

It is advantageous for a residential area to have some light spill or back light to provide a level of comfort for pedestrians and therefore reduce the “fear of crime”.

As a guide, 50% of E_{ph} 3m inside the property boundary is considered the target level. The upper limit is 1 lux vertical (E_{ve}) at 1.5m above the ground 10m behind the property line. Calculation points to be equally spaced for a distance $S/2$ either side of the luminaire.

The luminaire supplier is to provide an illuminance calculation based on the above design criteria to indicate spill light.

4.3 Maintenance Factor

Maintenance factor of any luminaire is derived from a combination of lumen depreciation multiplied by lamp survival factor, multiplied by luminaire maintenance factor or:

$$MF = LLD \times LSF \times LMF.$$

LLD - lumen depreciation factor, which is information provided by the luminaire supplier (compliant with LM80) taking into account the survival rate, operating temperature, driver current, and colour temperature etc.

LSF – lamp survival factor (expected minimum life of 20 years for all componentry).

LMF – luminaire maintenance factor is dependent on the ingress protection of the luminaire, pollution category of the street and the cleaning interval of the luminaire. This information can be derived from Table F1 within AS/NZS 1158.3.1.

5 COMPATIBILITY

It is important that new LED luminaires can be installed onto existing columns and outreach arms.

If there is flexibility in the way the luminaire is attached this may be considered an advantage e.g. Does the luminaire accommodate a range of spigot sizes? Is it capable of both side entry mounting and pole top attachment? Is a spigot adaptor required?

Typically our existing side entry mount is 32mm or 42mm outside diameter and our pole top attachment is typically 76mm outside diameter. Please confirm suitability to these.

An adjustable tilt is an advantage to allow the luminaire to be used on a number of different road situations. Ideally an adjustable tilt of + or - 10° in incremental steps of 5° is desirable.

Our preference is that an LED product is a standard product that is capable for use via any independent dimming and or central management system (CMS). The CMS could be radio frequency (RF) or power signal carrier. If a specific driver is required and it has a cost component please indicate this cost differential.

6 COMPLIANCE

All luminaires must comply with all sections and parts of AS/NZS 1158 series which is a joint Australia / New Zealand standard for Lighting Roads and Public Spaces. Refer to the web site www.standards.co.nz.

All photometric data provided must be supported by an independent test report from a laboratory which is accredited by NATA or IANZ or an overseas laboratory that is accredited under a mutual recognition agreement with at least one of these bodies.

Every luminaire submitted for consideration must be electrically tested and be fully compliant with Electricity (Safety) Regulations 2010. This will be confirmed via a completed Supplier Declaration of Conformity (SDoC) form available from the Energy Safety website: www.energysafety.govt.nz.

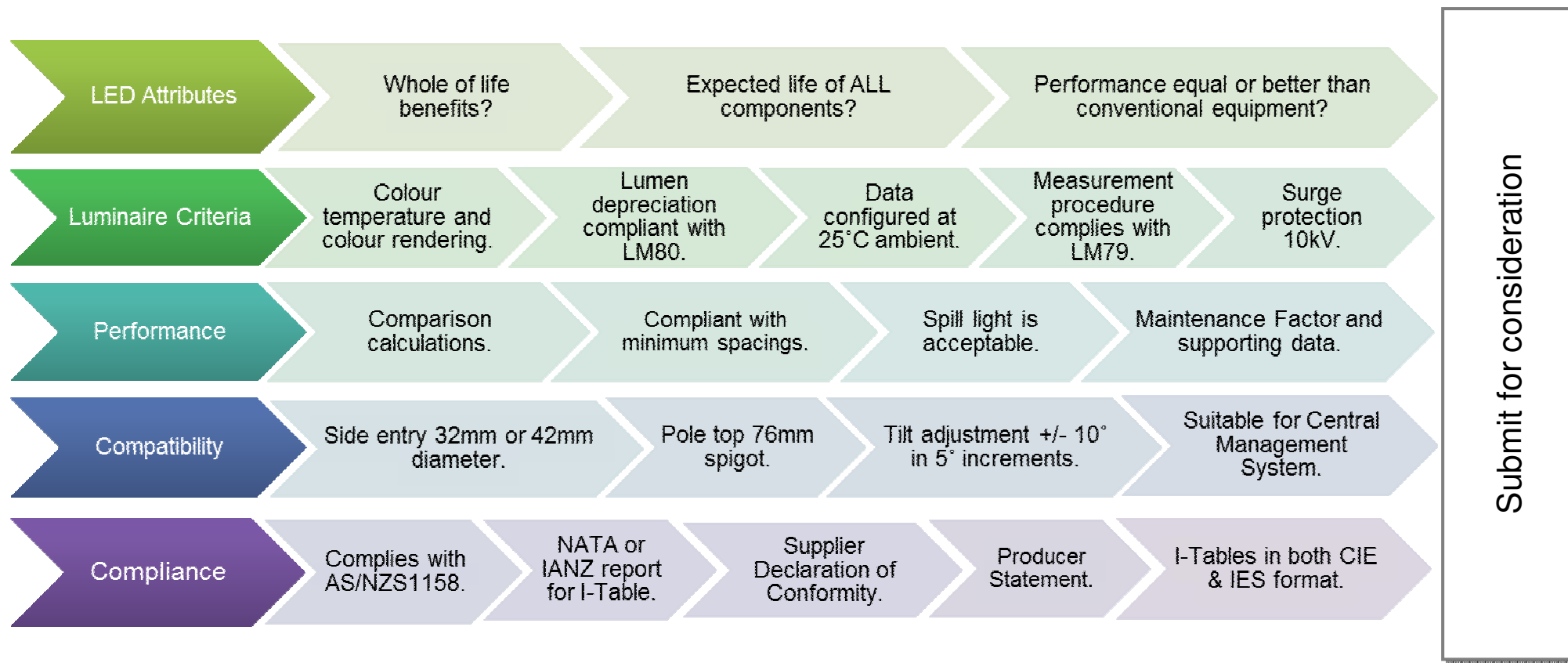
A Producer Statement (PS) from the luminaire manufacture with reference to complying standards must be provided. Appendix C shows a Sample producer statement.

Recommendation the following support data must be provided for each specific luminaire.

- NATA (National Association of Testing Authorities, Australia) or IANZ (International Accreditation New Zealand) laboratory test report or a report from an international laboratory that is accredited under a mutual recognition agreement with at least one of these bodies.
- Declaration of Conformity.
- Producer Statement for Luminaire Manufacture.

Appendix A

Flow Chart – Data to enable assessment of LED Luminaires



Appendix B Summary Check List

Proposed Luminaire Description: _____

Number of LED's: _____ **System Wattage:** _____

Colour temperature of LED's: _____ **Driver Current:** _____

Ambient operating temperature: _____ **Lumen output:** _____

IP Rating: _____ **Colour Finish:** _____

Dimensions: _____ **Wind area:** _____

Weight: _____ **System Efficacy:** _____

1. Is the luminaire fully compliant with all parts of AS/NZS 1158.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
2. Photometric data provided has been verified by an independent laboratory and has an accompanying NATA or IANZ test report.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
3. I-Tables are provided in IES and CIE format.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4. Producer Statement (PS) for luminaire manufacture with reference to complying standards has been provided.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
5. Lumen depreciation data including ambient operating temperature is provided and confirmation that the method in determining this is compliant with IESNA's LM80.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
6. Supporting data such as total flux, electrical power, efficacy and chromaticity is compliant with IESNA's LM79.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
7. Environmental and maintenance issues such as water ingress, column attachment, replacement parts, access, glare and upward waste light, recyclable etc., have been considered.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
8. Quick reference table based on set criteria for P3 & P4 comparison with existing technology is completed and is attached.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
9. Proposed luminaire is compatible with existing lighting columns, and outreach arms. Is the luminaire capable of being side mounted onto 32mm or 42mm spigot? State spigot diameter _____.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

10. Is the luminaire capable of being top mounted onto a 76mm spigot.	Yes <input type="checkbox"/> No <input type="checkbox"/>
11. Is the luminaire capable of adjustable tilt angles between +10° and -10° If not what is the adjustable tilt range _____.	Yes <input type="checkbox"/> No <input type="checkbox"/>
12. Is the luminaire suitable for dimming (what range) _____ and is it compatible with an independent RF central management system.	Yes <input type="checkbox"/> No <input type="checkbox"/>
13. Is there a luminaire warranty period _____ years? Are all items covered?	Yes <input type="checkbox"/> No <input type="checkbox"/>
14. Is the solder used in the PCB design lead free and (RoHS) Restriction of Hazardous Substance Directive compliant?	Yes <input type="checkbox"/> No <input type="checkbox"/>
15. Has the luminaire been tested for vibration or any impact testing? If so what are its results _____.	Yes <input type="checkbox"/> No <input type="checkbox"/>
16. Does the luminaire include surge protection of 10kV?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p>17. For budget purposes indicate trade cost per order <u>INCLUDING</u> freight into Christchurch.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> <div style="background-color: #d3d3d3; width: 150px; height: 80px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <div style="background-color: #d3d3d3; width: 100px; height: 50px; margin: 0 auto;"></div> </div> <p>1 - 10 units.</p> <p>\$</p> </div> <div style="text-align: center;"> <div style="background-color: #d3d3d3; width: 150px; height: 80px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <div style="background-color: #d3d3d3; width: 100px; height: 50px; margin: 0 auto;"></div> </div> <p>11 - 50 units.</p> <p>\$</p> </div> <div style="text-align: center;"> <div style="background-color: #d3d3d3; width: 150px; height: 80px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <div style="background-color: #d3d3d3; width: 100px; height: 50px; margin: 0 auto;"></div> </div> <p>50 - 100 units.</p> <p>\$</p> </div> <div style="text-align: center;"> <div style="background-color: #d3d3d3; width: 150px; height: 80px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <div style="background-color: #d3d3d3; width: 100px; height: 50px; margin: 0 auto;"></div> </div> <p>More than 100 units.</p> <p>\$</p> </div> </div>	

Other information for consideration

Information provided by:

Company: _____

Name: _____

Date: _____

Signature: _____

Position: _____

Contact telephone number: _____

Email: _____

Company Logo, Letterhead, Name and Address.

Sample: - Producer Statement for Luminaire Manufacture

Date:

Luminaire Model Reference:

General

Confirmation that the complete luminaire including ALL associated componentry is FULLY compliant with AS/NZS1158 series of standards, in particular AS/NZS1158.6. Copies of relevant test reports are available on request and include:

- IP Testing
- Wind Testing
- Impact Testing
- Copper content
- Quality Control procedures

Luminaire.

Confirmation that the LED performance is compliant with IESNA – LM79 and LM80.

Confirmation that all the following characteristics have been addressed:

- Power Management
 - protection from electrical transients
 - driver current control
- Thermal Management
 - maximize performance, reliability and life expectancy
 - ensure all other component temperatures do not exceed limits
- Optical Management
 - light output is correctly shaped and directed towards the desired area
- Assembly integrity
 - overall housing provides protection from dust, moisture, vibration and other environmental effects.

Optics.

Photometric performance is supported by an independent NATA or IANZ laboratory report.

I-Tables are provided in both CIE and IES formats.

Materials and components

Identify key material components and applicable standards.

Component	Standard	Manufacturer
Main body - steel		
Main body - aluminium		
LED'S		
LED assembly		
LED lens		
Driver		
Glass visor		
Acrylic visor		
Gasket		
Terminations		
Screw fixings		
Mounting Adapter		
Surface finish		
Other		

Quality Assurance

Our production factory has the following recognised plant and procedures that are fully utilized during manufacture e.g. ISO 9001.

Electrical Safety

Electrical Safety of the luminaire is compliant with the Electricity (Safety) Regulations 2010 and is supported with a Supplier Declaration of Conformity (SDoC).

Signature:

Name:

Title: