



Product Applications

# Guide

October 2022

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## **The Independent Pricing and Regulatory Tribunal**

Further information on IPART can be obtained from [IPART's website](#).

## **Acknowledgment of Country**

IPART acknowledges the Traditional Custodians of the lands where we work and live. We pay respect to Elders, past, present, and emerging.

We recognise the unique cultural and spiritual relationship and celebrate the contributions of First Nations peoples.

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## Overview

This document is intended to help Accredited Certificate Providers (**ACPs**) and others that are interested in product acceptance. This includes ACPs and other persons such as businesses that manufacture, supply or distribute equipment in NSW for the purposes of use in implementations under the Energy Saving Scheme (**ESS**) and Peak Demand Reduction Scheme (**PDRS**) (Non-ACPs). This document provides guidance about product requirements that apply under the *Energy Savings Scheme Rule of 2009* (**ESS Rule**) and *Peak Demand Reduction Scheme Rule of 2022* and how to apply for acceptance.

A summary of detailed lighting product requirements is provided in the Appendices.

The guide only provides information of a general nature and should not be relied upon as legal advice specific to your circumstances.

## Document control

Version number	Change description	Date published
V1.0	Initial publication to combine information from previous publications and systems: <ul style="list-style-type: none"> <li>Commercial Lighting - Lighting Requirements Guide, V2.2</li> <li>HEER - Lighting Requirements Guide, V1.4</li> <li>PIAM&amp;V and MBM Lighting Requirements Guide, V1.1</li> <li>ESS website</li> <li>ELT Portal</li> </ul>	5 September 2022
V2.0	Updated to include information for Peak Demand Reduction Scheme	14 October 2022

## Related documents

The following documents provide further information.

- [Commercial Lighting – Method Guide](#) – ESS-specific
- [Commercial Lighting – Evidence Manual](#) – ESS-specific
- [Commercial Lighting – Evidence Pack](#) – ESS-specific
- [Commercial Lighting – Calculation Tool](#) – ESS-specific
- [Commercial Lighting – Form – Product Application Checklist](#) – ESS-specific
- [HEER – Method Guide](#) – ESS-specific
- [HEER – Tool – Lighting Requirements](#) – ESS-specific
- [HEER – Form – Product Application Checklist](#) – ESS-specific
- [Form – Product application sponsorship](#) – ESS-specific
- [Method Guide – PIAM&V](#) – ESS-specific
- [Method Guide – MBM](#) – ESS-specific
- [Method Guide – Reducing Demand Using Efficiency](#) – PDRS-specific

# 1 Application process

## Key points

- We publish all accepted products on TESSA
- You apply via TESSA for lighting and via the VEU Registry for water heaters
- We will publish your product on the accepted products list if it meets requirements

## 1.1 Product acceptance

Some products must be accepted by the Scheme Administrator for use in ESS and PDRS activities. These are detailed below.

### ESS

- **Lighting** equipment (e.g. Light Emitting Diode (LED) and induction luminaires) used in:
  - The Commercial Lighting Energy Savings Formula (**Commercial Lighting**) method
  - Activity Definitions E1, E2, E3, E5, E11 and E13 of the Home Energy Efficiency Retrofits (**HEER**) method
  - The Project Impact Assessment with Measurement and Verification (**PIAM&V**) method, and
  - The Metered Baseline Methods.
- **Water heaters** used in:
  - Activity Definitions D17, D18, D19, D20 and D21 of the HEER method, and
  - Activity Definitions F16 and F17 of the Installation of High Efficiency Appliances for Businesses (**IHEAB**) method, and
- **Chimney dampers** used in Activity Definition E9 of the HEER method.

### PDRS

**Water heaters** used in Activity Definition WH1 of the Reducing Demand Using Efficiency (**RDUE**) method.

## 1.2 Accepted products list

We publish all accepted products on the accepted products list on the [TESSA portal](#). ACPs may use the products on the accepted products list in their activities. The accepted products list specifies for each product the:

- calculation method and, where relevant, the activity definition
- date the product was accepted (shown as "effective from")
- date the product was ceased to be accepted (shown as "effective to") (see section 1.3), and
- parameters for ACPs to use in energy savings and peak demand capacity calculations.

Each product must meet the equipment requirements. Some of these requirements must be met upfront and applicants need to provide information as part of the application. Other requirements must be met by ACPs at the time of an implementation. ACPs must maintain documentation demonstrating they have met equipment requirements, which will be checked as part of audits.

Products must be accepted before energy savings or peak demand capacity are calculated. While ACPs can undertake an implementation before a product is accepted, ACPs will be unable to calculate energy savings or peak demand capacity and apply to create certificates unless the product is accepted.

### 1.2.1 Lighting product acceptance for PIAM&V and MBM methods

The Scheme Administrator's policy and practice is that where a product is accepted under Commercial Lighting and/or HEER methods, it is also automatically accepted for use under PIAM&V and MBM methods.

Where a product is listed on the TESSA Portal as accepted for either or both of the Commercial Lighting or HEER methods, it may also be used for the PIAM&V and MBM methods.

### 1.2.2 Parameters

ACPs must use the parameters accepted products list (e.g., Bs, Be, LCP) current as at the implementation date of the implementation in their energy savings calculations.

For water heater products, Accredited Certificate Providers must use:

- Climate zone HP3-AU energy savings parameters for D17 and D19 implementations in BCA climate zones 2,3,4,5 or 6.
- Climate zone HP5-AU energy savings parameters for D17 and D19 implementations in BCA climate zones 7 or 8.
- AS/NZS 4234 Climate zone 3 energy savings parameters for D18, D20 and D21 implementations.
- Climate zone HP3-AU energy savings parameters for F16 and F17 implementations in BCA climate zones 2,3,4,5 or 6.
- Climate zone HP5-AU energy savings parameters for F16 and F17 implementations in BCA climate zones 7 or 8.

## 1.3 Cancelled or amended products

In some cases, we may cease to accept or amend the acceptance of a product. We notify all ACPs when a product is cancelled or amended. TESSA lists the effective to and from dates for each product.

ACPs may calculate energy savings or peak demand capacity for an implementation that involves a cancelled product if it was accepted as at the implementation date.

ACPs may not calculate energy savings or peak demand capacity if the product was cancelled before the implementation date.

## 1.4 How to apply for product acceptance

Applications can be submitted by either ACPs or Non-ACPs (e.g. businesses that manufacture, supply, or distribute lighting equipment in NSW for the purposes of use in lighting upgrades under the ESS).

### 1.4.1 Lighting and chimney dampers

**Lighting** and **chimney damper** applications are made on TESSA. Submitting your application involves entering information about your product and providing the required documents to demonstrate that the product meets the equipment requirements. See section 2.2 for application requirements.

Before applying, check that the product is not already on the Accepted Products List [on the TESSA Portal](#) for the calculation method and Activity Definition.

Applicants must check that the documents they submit meet the requirements, and that the information is consistent across all evidence submitted. If you supply inconsistent or incomplete information, it will delay your application.

For most products, you must submit verification of product performance against established standards, such as a test report from an accredited laboratory. Test reports must come from an independent third-party NATA accredited laboratory (or an equivalent body for the country where the test is conducted).

Where documents are from third parties, applicants must take steps to check the veracity of documents. Some laboratories' websites allow you to check these reports. Applicants may also contact the author of a report to check the validity.

We may refuse your application or cease acceptance of a product (see section 1.4.2) if we decide that the documentation provided is unreliable.

## 1.4.2 Water heaters

**Water heater** applications are made on the Victorian Energy Upgrades (**VEU**) online system. This is a joint application process that we have developed with the Essential Services Commission (**Commission**) in Victoria. You need to open a new VEU account if you do not have one.

See the [Commission's website](#) for information about the application process and requirements.

## 1.5 Processing applications

### 1.5.1 Lighting and chimney dampers

We will communicate with you via notifications sent through the online system TESSA or email for regular matters, and additionally may contact you by phone for any other matters. It is your obligation to keep your contact details up to date on TESSA.

We may request further information from you (in an **RFI**) if we identify issues with your application that require clarification, explanation or if information is missing. You must respond to RFIs within 90 days. We may reject your application if you do not respond within this timeframe. We generally give you up to 2 RFIs to provide the required information.

You may withdraw your application at any time.

We will refuse your application if you are unable to demonstrate that the product meets requirements.

### 1.5.2 Water heaters

Information about the application process and requirements for water heaters are on the [Essential Services Commission's website](#).



## 2 Application requirements

### Key points

- There are streamlined application pathways
- You must provide the required information with your application

### 2.1 Streamlined application pathways

We have streamlined application pathways where less information is required for:

- lighting and water heater product applications for products that have been accepted under the VEU program (**VEU streamlined pathway**), and
- HEER lighting product applications for products that have been accepted under the Commercial Lighting method (**Commercial Lighting streamlined pathway**).

Your product must be currently accepted as meeting equipment requirements. We will check that the product is listed as being currently accepted and, for lighting equipment, that the product is not an LED tube or a T5 adaptor.<sup>1</sup>

### 2.2 Required information and application submission

Applicants must provide information about the product (brand, model number and category) and supporting documents to demonstrate that the product meets the relevant equipment requirements.

Application requirements are summarised in Tables 1-6 below and in the Appendices.

Table 1 Lighting –Commercial Lighting method

Standard applications	VEU streamlined pathway
<a href="#">Product application checklist – Commercial Lighting</a> <a href="#">Sponsorship form</a> (if a Non-ACP) Product specification sheet Documents to meet safety and performance standards (see <b>Appendix A</b> )	Product specification sheet <a href="#">Sponsorship form</a> (if a Non-ACP) Products must be currently approved by the Commission as meeting the requirements of the VEU program for Activity 34.
<b>How to apply:</b> All applications must be submitted on <a href="#">TESSA</a> .	

<sup>1</sup> Generally, the requirements for lighting equipment in the VEU program are the same as the ESS, except that LED tube (lamp only) and T5 adaptors with T5 linear fluorescent lamps are not eligible in the ESS.

Table 2 Lighting –HEER method

Standard applications	Commercial Lighting streamlined pathway	VEU streamlined pathway
Product application checklist - HEER	Product application checklist – HEER	Product application checklist - HEER
Sponsorship form (if a Non-ACP)	Sponsorship form (if a Non-ACP)	Sponsorship form (if a Non-ACP)
Product specification sheet	Product specification sheet	Product specification sheet
HEER Tool	HEER Tool	HEER Tool
Documents to meet safety and performance standards (see <b>Appendix B</b> and the <b>HEER Tool</b> )	Test reports confirming that minimum colour rendering Index (CRI), luminous efficacy, downward light output are met (see <b>Appendix B</b> and the <b>HEER Tool</b> ).	Test reports for downward light output and lifetime (see <b>Appendix B</b> and the <b>HEER Tool</b> ). Products must be currently approved by the Commission as meeting the requirements of the VEU program for Activity 34.

**How to apply:** All applications must be submitted on [TESSA](#).

Table 3 Lighting –PIAM&amp;V and MBM methods

Standard applications	VEU streamlined pathway
Sponsorship form (if a Non-ACP)	Sponsorship form (if a Non-ACP)
Product specification sheet	Product specification sheet
Documents to meet safety and performance standards (see <b>Appendix C</b> )	VEU program product category of the lighting equipment Products must be currently approved by the Commission as meeting the requirements of the VEU program for Activity 34.

**How to apply:** All applications must be submitted on [TESSA](#).

You **do not** have to apply for acceptance of lighting equipment as meeting the PIAM&V or MBM equipment requirements if the lighting equipment is:

- is accepted for use under the Commercial Lighting or HEER methods, or
- is within a standard equipment class (as listed and defined in Table A9.1 of Schedule A to the ESS Rule),

You **do have** to apply for acceptance if the lighting equipment is an 'other equipment class' (as listed and defined in Table A9.3 of Schedule A to the ESS Rule).<sup>2</sup>

<sup>2</sup> This equipment is also referred to as emerging lighting technologies, or ELTs.

Table 4 Water heaters –HEER method

Standard applications	VEU streamlined pathway
<p><b>Information that must be provided:</b></p> <p>See the <a href="#">Water heating and Space Heating/Cooling product application guide</a> on the Commission's product application resources webpage.</p>	<p><b>Information that must be provided:</b></p> <p>Application form:</p> <ul style="list-style-type: none"> <li>• <a href="#">Solar (Gas Boosted) Water Heater Product Application Form</a>, <b>or</b></li> <li>• <a href="#">Solar (Electric Boosted) Water Heater Product Application Form</a>, <b>or</b></li> <li>• <a href="#">Heat Pump Water Heater Product Application Form</a>.</li> </ul> <p>TRNSYS Model and modelling reports (modelled in accordance with either AS/NZS 4234:2008 and/or AS/NZS 4234:2021).</p> <p>AS/NZS2712 certificate.</p> <p>Products must be currently approved by the Commission as meeting the requirements of the VEU program for:</p> <ul style="list-style-type: none"> <li>• Activity 1D for heat pump water heaters</li> <li>• Activity 1C for solar (electric boosted) water heaters</li> <li>• Activity 1F &amp; 3B for solar (gas boosted) water heaters.</li> </ul>
<p><b>How to apply:</b> All applications must be submitted on the VEU's online system.</p>	

**Modelling requirements:**

For all applications, products must be modelled in accordance with AS/NZS 4234:2008 and/or AS/NZS 4234:2021 (see [Notice 01/2022](#)) using the TRNSYS program or extensions of the software in the TRNSYS modelling package. Our preference is for products to be modelled in accordance with AS/NZS 4234:2021.

Subject to meeting requirements, if your product has been modelled in accordance with:

- Both AS/NZS 4234:2021 and AS/NZS 4234:2008, we will only publish the AS/NZS 4234:2021 parameters for that product.
- AS/NZS 4234:2021 and the product has previously been accepted with the AS/NZS 4234:2008 parameters, we will publish the AS/NZS 4234:2021 parameters and end-date the AS/NZS 4234:2008 parameters for that product.

Table 5 Water heaters –IHEAB and RDUE methods

Standard applications
<p><b>Information that must be provided:</b></p> <p>See the following documents on the <a href="#">Commission's product application resources webpage</a>:</p> <ul style="list-style-type: none"> <li>• <a href="#">Commercial and Industrial Heat Pump Water Heater Product Application Guide</a>, and</li> <li>• <a href="#">Commercial and Industrial Heat Pump Water Heater Specifications sheet</a>.</li> </ul> <p>Products must be modelled in accordance with <a href="#">Appendix A of the Commercial and Industrial Heat Pump Water Heater Product Application Guide</a>.</p> <p>You must submit applications for products modelled in accordance with the most up to date version of AS/NZS 4234 (i.e. AS/NZS4234:2021) (see <a href="#">Notice 01/2022</a>).</p>
<p><b>How to apply:</b> All applications must be submitted on the VEU's online system.</p>

Table 6 Chimney dampers –HEER method

**Standard applications****Information that must be provided:**[Product application checklist – HEER](#)[Sponsorship form](#) (if a Non-ACP)

Product specification sheet

**How to apply:** All applications must be submitted on [TESSA](#).

### 2.2.1 Sponsorship form for non-ACPs

Where an application for lighting or chimney dampers is made by a non-ACP, the application must be sponsored by at least two ACPs to confirm that the application relates to products that will genuinely be installed as part of an ESS lighting upgrade. To sponsor a product, an authorised representative of an ACP must complete the Sponsorship Form for the product(s) and the Non-ACP must then submit the completed form with their application. Lighting suppliers or manufacturers interested in having their equipment used in ESS upgrades should contact an ACP directly.

### 2.2.2 HEER Tool

The HEER method has additional product requirements for lighting that the other methods do not have. The [HEER Tool](#) identifies equipment requirements and required documents to meet safety and performance standards and must be submitted with HEER lighting applications.

### 2.2.3 Product specification sheet

Where a product specification sheet(s) is required, it must clearly identify the brand name and model number/s.

For lighting applications, the product specification sheet must include a clear photograph of the lamp, luminaire, or Voltage Reduction Units (VRUs). The brand and model number on the specification sheet must exactly match the brand and model number on the electrical safety certificate. This must be the same brand and model number used when the product is sold or supplied to the Australian marketplace.

## 3 Lighting requirements

### Key points

- Other lighting equipment (emerging lighting technologies, or ELTs) require acceptance
- Minimum product requirements apply

### 3.1 Lighting products that require acceptance

Different equipment requirements apply depending on the equipment class of the lighting equipment, as defined by the ESS Rule.

If the lighting equipment is classed as 'standard' equipment, as listed and defined in Table A9.1 of Schedule A of the ESS Rule, you do not need to apply for product acceptance.

All other lighting equipment (emerging lighting technologies, or ELTs), as listed and defined in Table A9.3 of Schedule A of the ESS Rule, must be accepted by IPART as meeting the equipment requirements before energy savings certificates can be created for the lighting installation.<sup>3</sup>

You must select the product category in TESSA when submitting your application. Please ensure that you select the correct lighting type for the product. Definitions of product types are in Table A9.4 of the ESS Rule. If your product does not meet any of the categories defined in Table A9.4 of the ESS Rule, select the "Other Emerging Lighting Technology" category.

Other emerging lighting technologies include LED strip lighting which may be applied for under the Commercial Lighting, PIAM&V or MBM methods. See section 3.2.7 for application information and requirements.

### 3.2 Safety and performance requirements

This section outlines the key requirements that must be met across most methods, however there are some differences and those are detailed further in the Appendices.

The following equipment requirements cover both product safety and performance, and are detailed in the sections below:

- Lamp Circuit Power (**LCP**)
- Lamp Life
- Electrical Safety

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<sup>3</sup> Clause 5.4(a) of the ESS Rule lists end-user equipment that is not eligible.

- Electro-Magnetic Compatibility (EMC), and
- Power Factor.

Table 7 Lighting Requirements - Definitions

<b>LCP</b>	Lamp Circuit Power is the combined power consumption of a lamp and its driver (control gear).
<b>Electrical Safety</b>	All electrical goods sold in NSW must meet the requirements of the <i>Gas and Electricity (Consumer Safety) Act 2017 (NSW)</i> and be safe to use.
<b>Laboratory Test Report</b>	The Test Report should be completed by an independent testing laboratory, a NATA accredited laboratory (or equivalent). If you submit a Test Report from a non-Australian laboratory, you also need to submit evidence of the laboratory's appropriate accreditation. Tests are to be completed with the lamp and ballast as one unit.
<b>Australian Certificate of Approval</b>	A certificate confirming that a Declared Article meets Australian safety standards. A recognised certificate (which could be a State Approval Number, or from a recognised independent certifier) must be submitted.
<b>Certificate of Suitability</b>	A certificate from a state or territory Government Safety Regulator (e.g. Fair Trading NSW), or a JAS-ANZ endorsed certificate to evidence the electrical safety of Non-Declared Articles. A JAS-ANZ endorsed certificate is a certificate issued by a JAS-ANZ accredited certification body that displays the JAS-ANZ symbol. The certificate must reference the relevant standard.
<b>ERAC Supplier Code</b>	Supplier Code issued by ERAC. You must either supply a screenshot or registration receipt showing details of supplier, date of expiry and ERAC code.
<b>Lifetime Test Report</b>	IES LM-80 and IES TM-21 test reports issued by an independent testing laboratory, accredited by NATA (or equivalent) to perform IES LM-80 testing. If you submit a Test Report from a non-Australian laboratory, you must also submit evidence of the laboratory's accreditation. The L70 value used must be at the temperature specified by the manufacturer of the Lamp.

### 3.2.1 Lamp Circuit Power

LCP is the power drawn by a single lamp and its associated control gear. If the control gear supplies multiple lamps, then the control gear losses are assigned pro-rata to each lamp, according to the power drawn by each lamp.

Compliance with the LCP requirements must be demonstrated with a test report from a NATA accredited laboratory (or equivalent)<sup>4</sup> that evidences both the testing and result.<sup>5</sup> Laboratory test reports must provide photographic evidence of all lamps represented by the test report. Reports must be conducted with the lamp and control gear (if applicable) that the product will be supplied and installed with.

The LCP value must be measured at 240 V, 50 Hz in the laboratory test report for the product, rounded up to two decimal points (e.g., 10.81). Where the lab report has multiple measurements, we will only accept the highest value or stated average.

<sup>4</sup> An equivalent laboratory is a laboratory accredited by an organisation included in the Mutual Recognition Agreement (MRA) Network published by NATA.

<sup>5</sup> You must supply evidence of the laboratory's appropriate accreditation to perform that test. A statement/mark of accreditation on the test report is sufficient.

If you are applying for acceptance of a product under the 'LED Lamp Only – ELV' equipment class, the evidence only needs to show the brand and model of the lamp, and the nominal lamp power.

For all other equipment classes, the evidence must show the brand and model of all the lighting equipment, including the control gear/driver. Similarly, the LCP value must represent the input power to the whole luminaire, not just the output power from the control gear.

### NLP Requested (Lamp Only products)

NLP is Nominal Lamp Power, which is the power drawn by a single lamp (excluding any power consumed by control gear required to operate the lamp).

You must provide a laboratory test report as evidence of the NLP for the product. The NLP value must be measured at 240 V, 50 Hz in the laboratory test report for the product, rounded up to two decimal points e.g., 10.81. Where the lab report has multiple measurements we will only accept the highest value or stated average.

## 3.2.2 Lamp Life

ELTs must have a minimum lamp life depending on the calculation method (refer to the Appendices). You must supply evidence of the lighting equipment lamp life, as outlined below.

### Lamp life for induction lamps

For induction lamps, you must provide a manufacturer's datasheet showing the nominal lamp life.

### Lamp life for LEDs

LED lamps and LED luminaires contain an LED chip which produces the light. The Illuminating Engineering Society (**IES**) has two standards that are used to estimate the operating life of an **LED chip** used in lighting equipment:

- LM-80: This specifies the process for testing the degradation of light output from an LED chip over a limited period (e.g., 6,000 to 10,000 hours)
- TM-21: This specifies how to extrapolate the results of the LM-80 test to forecast the operating life of the LED chip.

For the LED chip you must provide:

- Item 1 - an IES LM-80 test report issued by a laboratory accredited by NATA (or equivalent<sup>6</sup>) to test against IES LM-80, and
- Item 2 - evidence of the laboratory's accreditation with NATA or an equivalent accreditation body (which must show the name of the laboratory, the accreditation organisation, and show that the laboratory is accredited to test against IES LM-80), and

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<sup>6</sup> An equivalent laboratory is a laboratory accredited by an organisation included in the Mutual Recognition Agreement (MRA) Network published by NATA.

- Item 3 - an IES TM-21 test report using the results from the LM-80 report. This report is usually included as an appendix or section of the LM-80 report, or contained in an In-situ Temperature Measurement Test (ISTMT) report.

For the lamp or luminaire you must provide:

- Item 4 - a declaration from the lamp or luminaire manufacturer and / or a test report from a laboratory (e.g., an ISTMT report) that states:
  - the brand and model of your lamp or luminaire and the brand and model of all LED chips used in your lamp or luminaire
  - the in-situ case temperature of the LED chip in the product when it is installed in the lamp or luminaire and operating normally, and
  - the in-situ drive current of the LED chip in the product when it is installed in the lamp or luminaire and operating normally.

You must enter the 'lamp lifetime', and this figure must be either:

- the 'Reported L70' in the TM-21 or IES LM-80 report for the test condition with a case temperature and drive current equal to or greater than the case temperature and drive current of the LED chip in your lamp or luminaire, or
- the 'Reported L70' from the 'interpolation'<sup>7</sup> in the TM 21 or IES LM-80 report using your actual case temperature.

Additional guidance and a worked example is provided in Appendix D.

### Asset Lifetime (Induction)

If you are applying for an electro-magnetic induction lamp, the Asset Lifetime figure to be entered is the value specified by the manufacturer and must be clearly displayed on the Specification Sheet.

### 3.2.3 Electrical safety

You must demonstrate that your product complies with the NSW electrical safety requirements. There are **three options** that could apply. Choose the option that is appropriate for your product.

- If the control gear being used with the product is a declared article (refer below) you must attach an Australian Certificate of Approval for the control gear/driver that is produced by either NSW Fair Trading or another certification body listed as a Recognised External Approval Scheme (**REAS**).<sup>8</sup> Please note that we do not accept certificates of approval or approval marks that are issued outside Australia.

<sup>7</sup> The 'interpolation' from a TM-21 report further refines a 'projected' lifetime between two of the case temperatures tested in the LM-80 report using the specific in-situ case temperature and in-situ drive current of the LED chip(s) when installed in the luminaire.

<sup>8</sup> Refer: [www.fairtrading.nsw.gov.au/help-centre/online-tools/approved-electrical-articles-register](http://www.fairtrading.nsw.gov.au/help-centre/online-tools/approved-electrical-articles-register).



- If the control gear being used with the product is **not** a declared article, you must attach an *Australian Certificate of Suitability* for your luminaire. We will accept either:
  - a Certificate of Suitability issued by NSW Fair Trading or another certification body listed as a REAS, or
  - a JAS-ANZ endorsed Certificate of Suitability that complies with JAS-ANZ's *Policy 06/13 – Certification of Non-Declared Articles classified as Emerging Lighting Technologies in the ESS*.<sup>9</sup>
- If you are only applying for acceptance of an Extra Low Voltage (**ELV**) lamp, and the application does not include the control gear/driver, you do not need to supply an electrical safety certificate.

Declared articles are as per the published NSW electrical safety requirements for a power supply.<sup>10</sup> A power supply (e.g., control gear) is a declared article if it:

- provides an output not exceeding 50 volts AC or 120 volts ripple free DC, and
- is a type to provide supply to separate luminaires.

The control gear is considered separate to the luminaire if:

- a person can easily separate the electrical connection between the control gear and the luminaire, and
- a person can easily separate the physical connection between the control gear and the luminaire.

Therefore, if the control gear provides an output not exceeding 50 volts AC or 120 volts ripple free DC, and is of a type to supply separate luminaires, the control gear is a declared article and you will also need to supply a Certificate of Approval for the control gear.

The brand name and model number must exactly match the brand name (or trade name) on the electrical safety certificate you provide in your application. This brand name will be the same name used when supplying the product to the Australian marketplace, as required by NSW safety certifiers.

### 3.2.4 Electro Magnetic Compatibility

You must provide documentation showing that your lighting equipment meets the EMC requirements of the *Radio Communications Act 1992* (Cth). This is administered by the Australian Communication and Media Authority (**ACMA**). The Electrical Regulatory Authorities Council (**ERAC**) maintains the Database of Responsible Suppliers.<sup>11</sup>

Information accepted as evidence of compliance with electrical safety and EMC regulatory arrangements is:

- a Responsible Supplier Code issued by ERAC, and

<sup>9</sup> Refer: [www.jas-anz.org/australian-and-new-zealand-electrical-equipment-safety-system-equipment-safetyrules](http://www.jas-anz.org/australian-and-new-zealand-electrical-equipment-safety-system-equipment-safetyrules).

<sup>10</sup> Refer: [www.fairtrading.nsw.gov.au/help-centre/online-tools/approved-electrical-articles-register](http://www.fairtrading.nsw.gov.au/help-centre/online-tools/approved-electrical-articles-register).

<sup>11</sup> Refer: [equipment.erac.gov.au/Public/](http://equipment.erac.gov.au/Public/).

- an ACMA Declaration of Conformity. It is a mandatory record keeping requirement under the Radio Communications Act 1992 for the responsible supplier to keep a Declaration of Conformity. For this reason, and to simplify the assessment process, this is the only piece of evidence we will accept.

You are **not** required to provide the actual EMC test report on which the Declaration of Conformity is based.

### 3.2.5 Power Factor

You must supply evidence of the true power factor of the lighting equipment in a test report from a NATA accredited laboratory (or equivalent)<sup>12</sup> that evidence both the testing and result (this is usually on the same report as the LCP).<sup>13</sup>

The power factor for the equipment must be above the acceptable limits, i.e., 0.9 for LED Lamp Only-ELV, and 0.55 for all other types.

### 3.2.6 Series applications

If your application is for a series of related products, the supporting documentation provided must cover all the products in that application.

In some cases, we may accept an application where the brand name and/or model number you submit is different to those in the supporting documentation, but only if you provide a signed reconciliation statement from the manufacturer to confirm the products are the same. This manufacturer's declaration must reconcile the brand and model numbers, along with a letter signed by the applicant confirming its relevance to the application.

However, the supporting safety certificate must always list the correct Brand and Model Number. The products must share the same LED chip.

In some circumstances, you may submit one test report to represent several similar products. Each test report must identify the brand and model of the product to which it applies.

### 3.2.7 Strip lights

Strip lights can be used in lighting upgrades under the Commercial Lighting, PIAM&V and MBM methods.

For Commercial Lighting applications, compliance with the LCP must be provided. Compliance with the LCP requirements must be demonstrated by providing a test report from a NATA accredited laboratory (or equivalent) that evidences both the testing and result.

<sup>12</sup> If the test report is issued by a non-Australian laboratory, you must supply evidence of the laboratory's appropriate accreditation to perform that test.

<sup>13</sup> True power factor means power factor that includes both the phase distortion due to inductance and capacitance and harmonic distortion.

Since strip light lengths and types vary, the strip light must be tested at the length that it is intended to be installed. The test report must clearly indicate the LCP for the length that was tested in metres. All strip lighting products must be tested with the associated driver.

If you want to install a strip light at varying lengths, you must apply for product acceptance for each length with the LCP specified for each length.

When submitting an application for product acceptance, select the "Other Emerging Lighting Technology" product type and enter the strip length in meters in the product data submission.

Energy savings calculations must use the LCP for the installation length as published accepted products list. ACPs must have evidence to demonstrate the LCP used in the calculations and the lengths of lighting installed. An auditor must be able to easily reconcile the length, model number and LCP. Strip lighting implementations may be subject to on site verification during audit.

Clause 9.4.1(c) of the ESS Rule specifies compliance requirements and standards. Performance requirements must also be met (e.g. surfaces are lit, glare is controlled, shadowing work areas avoided, and minimum illuminance and safe movement met).

# Appendices

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## A Lighting equipment requirements – Commercial Lighting

This section sets out the requirements for Commercial Lighting. Table A9.4 of the ESS Rule outlines the equipment requirements and minimum performance requirements for Commercial Lighting.

Table A.1 Safety and performance requirements

Parameter	Requirement
Lamp Circuit Power/Nominal Lamp Power (LCP/NLP)	<ul style="list-style-type: none"><li>• Independent test report from an accredited lab that confirms LCP/NLP</li><li>• Represents the input power to the whole luminaire, not just the output power from the control gear.</li></ul>
Safety	<ul style="list-style-type: none"><li>• Australian Certificate of Approval, or</li><li>• Australian Certificate of Suitability</li></ul>
Power Factor	<ul style="list-style-type: none"><li>• <math>\geq 0.55</math> for luminaires; or</li><li>• <math>\geq 0.9</math> for LED Lamp Only</li></ul>
Lifetime	<ul style="list-style-type: none"><li>• L70 (70% of initial Downward Light Output) at least <b>30,000 hours</b></li></ul>
Electro-magnetic compatibility (EMC)	<ul style="list-style-type: none"><li>• ERAC Responsible Supplier Code, and</li><li>• ACMA Declaration of Conformity</li></ul>

Table A.2 Equipment and evidence requirements

		Specifications	LCP/NLP /Output Voltage	Lifetime			Electrical Safety		Electromagnetic Compatibility (EMC)		Power Factor
Required Documentation		Data/Specification Sheet (N.B required for each product or component)	Laboratory Test Report	Lifetime Test Report - LM-80-08 and TM-21 ( $L_{70} \geq 30,000$ hrs)	Manufacturer's chip declaration or ISTMT	Data / Specification Sheet	Australian Certificate of Approval	Certificate of Suitability	ERAC Responsible Supplier Code	ACMA Declaration of Conformity	Laboratory Test Report
Category	Relevant Australian Standard										
LED Lamp only-ELV		Yes	NLP	Yes	Yes						PF $\geq 0.9^3$
LED Lamp only-240V Self Ballasted	AS/NZS 62560	Yes	NLP	Yes	Yes		lamp		Yes	Yes	PF $\geq 0.55$
Induction Luminaire	AS/NZS 60598.1	Yes	NLP			Yes		for luminaire <sup>1</sup>	Yes	Yes	PF $\geq 0.55$
LED lamp and driver	AS/NZS 61347.1 and IEC 61347.2.13	Yes	LCP	Yes	Yes		for control gear, if control gear is a declared article <sup>2</sup>	for luminaire <sup>1</sup> , if control gear is not a declared article <sup>2</sup>	Yes	Yes	PF $\geq 0.55$
Modified Luminaire - LED Linear Lamp	AS/NZS 60598.2.1 or AS/NZS 60598.2.2										
LED Luminaire-fixed type	AS/NZS 60598.2.1										
LED Luminaire - Linear Lamp	AS/NZS 60598.2.1 or AS/NZS 60598.2.2										
LED Luminaire-floodlight	AS/NZS 60598.2.5										
LED Luminaire-recessed	AS/NZS 60598.2.2										
LED Luminaire-high/lowbay	AS/NZS 60598.2.1										

		Specifications	LCP/NLP /Output Voltage	Lifetime			Electrical Safety		Electromagnetic Compatibility (EMC)		Power Factor
Required Documentation		Data/Specification Sheet (N.B required for each product or component)	Laboratory Test Report	Lifetime Test Report - LM-80-08 and TM-21 ( $L_{70} \geq 30,000$ hrs)	Manufacturer's chip declaration or ISTMT	Data / Specification Sheet	Australian Certificate of Approval	Certificate of Suitability	ERAC Responsible Supplier Code	ACMA Declaration of Conformity	Laboratory Test Report
Category	Relevant Australian Standard										
LED Luminaire-streetlight	AS/NZS 60598.1 and AS/NZS 1158.6 or IEC 60598-2-3	Yes	LCP	Yes	Yes		for control gear, if control gear is a declared article <sup>2</sup>	for luminaire <sup>1</sup> , if control gear is not a declared article <sup>2</sup>	Yes	Yes	PF $\geq 0.55$
LED Luminaire-emergency lighting <sup>4</sup>	AS/NZS 60598.2.22										
LED Luminaire-hospital use	AS/NZS 60598.2.25										
Voltage Reduction Unit	AS/NZS 60335.1	Yes	Output Voltage					Yes	Yes	Yes	

1. A **luminaire** is defined as an apparatus that distributes, filters or transforms the light emitted from a light source, including Lamps, Control Gear and all components necessary for fixing and protecting the Lamps, including the troffer.

2. The **control gear** is a declared article under the published NSW electrical safety requirements if it provides an output not exceeding 50 volts AC or 120 volts ripple free DC, **and** is a type to provide supply to separate luminaires.

3. The **Power Factor Test** must be conducted on a transformer designed for ELV Halogen Lamps (minimum 35W). The reported power factor must be the "true" power factor (e.g., include the effects of Harmonic distortion).

4. **Emergency Lighting** with multiple power modes must be tested at full output power.

## B Lighting equipment requirements – HEER

This section sets out the equipment requirements for Activity Definitions E1, E2, E3, E5, E11 and E13 of Schedule E of the ESS Rule.

Products related to Activity Definition E4 (Replace a T8 or T12 luminaire with a T5 luminaire) **do not require acceptance**, as T5 linear fluorescent luminaires are considered 'standard' equipment (refer to Table A9.1 of the ESS Rule).

The equipment requirements for the HEER method are different to those for the Commercial Lighting and other methods. **Lighting products accepted for use under the Commercial Lighting method are not automatically accepted for use under the HEER method.** The tables in this appendix list all equipment requirements that apply for each activity and specify the test reports to evidence the parameters in table B.1. Some equipment requirements must be met either at the time of product acceptance, or at the time of implementation.

Table B.1 Additional HEER safety and performance requirements

Parameter	Requirement
Minimum Colour Rendering Index (CRI)	Average $\geq 80$
Luminous efficacy	$\geq 48$ lumens/watt
Downward Light Output	$\geq 462$ lumens
Lifetime	L70 (70% of initial Downward Light Output) at least <b>20,000 hours</b> <sup>14</sup>
Electro-magnetic compatibility (EMC)	Compliance with AS/NZS CISPR 15:2011

<sup>14</sup> The lifetime for HEER activities varies based on lighting type. Most lighting equipment require at least 20,000 hours.



## Activity Definition E1 – Replace halogen downlight with an LED luminaire and/or lamp

This section outlines the equipment requirements that apply to Activity Definition E1 of the HEER method for each of the following eligible equipment classes:

LED Lamp Only – 240V Self Ballasted (Table B.2)

LED Lamp Only – Extra Low Voltage (**ELV**) (Table B.3)

LED Luminaire – recessed (Table B.4), and

LED Lamp and Driver (Table B.5).

### E1: LED Lamp Only – 240V Self Ballasted

**Description:** A self-ballasted LED Lamp as defined by AS/NZS 62560 Self-ballasted LED lamps for general lighting services by voltage > 50 V. These Lamps are connected directly to a 240V supply.

**Relevant Australian safety standard:** AS/NZS 62560: Self-ballasted LED-lamps for general lighting services by voltage > 50 V – Safety specifications.

Table B.2 Activity Definition E1 – Equipment Class: LED Lamp Only – 240V Self Ballasted

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lamp Circuit Power ( <b>LCP</b> )	LCP (as Published by the Scheme Administrator)			
Minimum true power factor	≥ 0.55	<ul style="list-style-type: none"> <li>Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform IES LM-79 (if required)</li> </ul>	At time of product acceptance	10
Minimum Colour Rendering Index ( <b>CRI</b> )	Average ≥ 80			
Luminous efficacy	≥ 48 lumens/watt			
Initial Downward Light Output	≥ 462 lumens			
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at 15,000 hrs	<ul style="list-style-type: none"> <li>Test report using IES LM-84-14 from a Laboratory that is accredited by National Association of Testing Authorities (NATA) or equivalent body and accredited to perform IES LM-84-14, <b>and</b></li> <li>IES TM-28-14 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-84-14</li> </ul>	At time of product acceptance	10
Electro-magnetic compatibility ( <b>EMC</b> )	Compliance with AS/NZS CISPR 15:2011	<ul style="list-style-type: none"> <li>Test report using AS/NZS CISPR 15:2011 from a laboratory accredited by NATA or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform AS/NZS CISPR 15:2011</li> </ul>	At time of product acceptance	5
Safety	Lamp complies with relevant Australian safety standard (AS/NZS 62560)	<ul style="list-style-type: none"> <li>Certificate of approval to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme.</li> </ul> </li> </ul> <p><i>Note: Certificate must be issued for the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates.</i></p>	At time of product acceptance	N/A

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Dimmer Compatibility	If the lamp is to be installed in a dimmable circuit, demonstrated compatibility with the dimmer	<ul style="list-style-type: none"><li>• Test report demonstrating compatibility of lamp with the dimmer, <b>and</b></li><li>• Electrician declaration that the installed dimmer is a compatible model listed in the above test report</li></ul>	At time of implementation	1
Beam Angle	Beam angle consistent with existing lamp	<ul style="list-style-type: none"><li>• Declaration by the purchaser confirming that they are satisfied with the light distribution of the upgraded lamps</li></ul>	At time of implementation	N/A

## E1: LED Lamp Only – ELV

**Description:** An LED Lamp that runs off an existing Extra-low voltage lighting converter (ELC) designed for retrofitting into an existing Luminaire or Lamp holder. These are typically used as a replacement for ELV Tungsten halogen Lamps

**Relevant Australian safety standard:** Not applicable

Table B.3 Activity Definition E1 - Equipment Class: LED Lamp Only – ELV

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Nominal Lamp Power ( <b>NLP</b> )	NLP (as Published by the Scheme Administrator)			
Minimum true power factor	Demonstrated combined lamp circuit power of lamp and a compatible electronic transformer must be $\geq 0.7$ <i>Note: The test must be conducted with an Electronic type Extra Low Voltage lighting converter designed for halogen lamps</i>	<ul style="list-style-type: none"> <li>Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform IES LM-79 (if required)</li> </ul>	At time of product acceptance	10
Minimum Colour Rendering Index ( <b>CRI</b> )	Average $\geq 80$	<i>Please note: NLP does not include power consumption of control gear. Test reports should ensure that control gear power consumption is not included.</i>		
Luminous efficacy	$\geq 52$ lumens/watt			
Initial Downward Light Output	$\geq 462$ lumens			
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at 15,000 hrs	<ul style="list-style-type: none"> <li>Test report using IES LM-84-14 from a Laboratory that is accredited by National Association of Testing Authorities (NATA) or equivalent body and accredited to perform IES LM-84-14, <b>and</b></li> <li>IES TM-28-14 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-84-14</li> </ul>	At time of product acceptance	10

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Electro-magnetic compatibility (EMC)	Compliance with AS/NZS CISPR 15:2011	<ul style="list-style-type: none"> <li>Test report using AS/NZS CISPR 15:2011 from a laboratory accredited by NATA or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform AS/NZS CISPR 15:2011</li> </ul>	At time of product acceptance	5
Safety	N/A (Lamp is Extra Low Voltage)	<ul style="list-style-type: none"> <li>N/A</li> </ul>	N/A	N/A
Transformer Compatibility	Lamp must be compatible with electronic transformer	<ul style="list-style-type: none"> <li>Test report demonstrating compatibility of the lamp and the electronic transformer with which it will be installed, <b>and</b></li> <li>Electrician declaration that installed electronic transformer is a compatible model listed in the above test report</li> </ul>	At time of implementation	1
Dimmer Compatibility	If the lamp is to be installed in a dimmable circuit, demonstrated compatibility with the dimmer	<ul style="list-style-type: none"> <li>Test report demonstrating dimming compatibility of lamp with the electronic transformer/dimmer combination, <b>and</b></li> <li>Electrician declaration that the installed electronic transformer/dimmer combination is a compatible combination listed in the above test report</li> </ul>	At time of implementation	1
Beam Angle	Beam angle consistent with existing lamp	<ul style="list-style-type: none"> <li>Declaration by the purchaser confirming that they are satisfied with the light distribution of the upgraded lamps</li> </ul>	At time of implementation	N/A
Minimum true power factor	Combined power factor of lamp and installed electronic transformer $\geq 0.7$	<ul style="list-style-type: none"> <li>Declaration by electrician who performed or supervised the installation</li> </ul>	At time of implementation	N/A

## E1: LED Luminaire – recessed

**Description:** An LED Luminaire intended for use as a recessed luminaire as defined in AS/NZS 60598.2.2 Luminaires – Particular requirements – Recessed luminaires.

### Relevant Australian safety standard:

- Luminaire: AS/NZS 60598.2.2 Luminaires - Particular requirements - Recessed luminaires.
- Control Gear: AS/NZS 61347.1 Lamp control gear – General and safety requirements, and AS/NZS 61347.2.13 Lamp control gear – Particular requirements for DC. or AC. supplied electronic control gear for LED modules.

Table B.4 Activity Definition E1 - Equipment Class: LED Luminaire - recessed

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lamp Circuit Power ( <b>LCP</b> )	LCP (as Published by the Scheme Administrator)			
Minimum true power factor	≥ 0.55			
Minimum Colour Rendering Index ( <b>CRI</b> )	Average ≥ 80	<ul style="list-style-type: none"> <li>• Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body, <b>and</b></li> <li>• Documentation showing the laboratory is accredited to perform IES LM-79 (if required)</li> </ul>	At time of product acceptance	10
Luminous efficacy	≥ 48 lumens/watt			
Initial Downward Light Output	≥ 462 lumens			

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at 15,000 hrs	<b>Option 1</b> <ul style="list-style-type: none"> <li>Test report using IES LM-84-14 from a Laboratory that is accredited by National Association of Testing Authorities NATA or equivalent body and accredited to perform IES LM-84-14, <b>and</b></li> <li>IES TM-28-14 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-84-14</li> </ul>	At time of product acceptance	10
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at 15,000 hrs	<b>Option 2</b> <ul style="list-style-type: none"> <li>IES LM-80-08 or ANSI/IES LM-80-15 test report from a Laboratory that is accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15, <b>and</b></li> <li>Manufacturer's declaration stating that the brand and model of the LED chip tested in the IES LM-80-08 or ANSI/IES LM-80-15 report is identical to that supplied with the luminaire, <b>and</b></li> <li>In-situ temperature measurement test (ISTMT) report conducted on one sample using Section 12.4.1 of IEC 60598.1 (or equivalent) or Clause 14 of ANSI/UL 1598 from a laboratory accredited by NATA or equivalent body to perform that test. The ISTMT must be conducted in accordance with Annex A of IES LM-84-14 (the testing laboratory does not have to be accredited to LM-84-14). The ISTMT report must include: <ul style="list-style-type: none"> <li>Statement that the ISTMT was conducted in accordance with Annex A of IES LM-84-14 (the laboratory does not have to be accredited to IES LM-84-14)</li> <li>The brand and model of the LED chip(s)</li> <li>The forward current of the LED chip(s)</li> <li>Clear photos identifying the product and the exact position of the thermocouple.</li> </ul> </li> <li>Manufacturer's declaration stating the brand, model and forward current of the LED chip(s) when used under normal operating conditions in Australia, <b>and</b></li> <li>IES TM-21-11 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15. The IES TM-21-11 test report must be based on the IES LM-80-08 or ANSI/IES LM-80-15 test report and the L<sub>70</sub> value must use the temperature and forward current reported in the ISTMT report or a higher temperature and/or forward current</li> </ul> <p><i>Note: ISTMT reports must be issued in the exact brand and model as the product applied for. Brand/model reconciliation documents are not accepted for ISTMT reports.</i></p>	At time of product acceptance	10

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Electro-magnetic compatibility (EMC)	Compliance with AS/NZS CISPR 15:2011	<ul style="list-style-type: none"> <li>Test report using AS/NZS CISPR 15:2011 from a laboratory accredited by NATA or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform AS/NZS CISPR 15:2011</li> </ul>	At time of product acceptance	5
Safety	Luminaire complies with relevant Australian safety standard (AS/NZS 60598.2.2, AS/NZS 61347.1, AS/NZS 61347.2.13)	<ul style="list-style-type: none"> <li>Certificate of suitability for Luminaire to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme, <b>or</b></li> </ul> </li> <li>JAS-ANZ endorsed certificate showing compliance to relevant Australian safety standard</li> </ul> <p><i>Note: Certificate must be issued in the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates.</i></p>	At time of product acceptance	N/A
	If Control Gear is Independent	<ul style="list-style-type: none"> <li>Certificate of approval for Control Gear to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme</li> </ul> </li> </ul>	At time of product acceptance	N/A
Dimmer Compatibility	If the luminaire is to be installed in a dimmable circuit, demonstrated compatibility with the dimmer	<ul style="list-style-type: none"> <li>Test report demonstrating compatibility of luminaire with the dimmer, <b>and</b></li> <li>Electrician declaration that the installed dimmer is a compatible model listed in the above test report</li> </ul>	At time of implementation	1
Beam Angle	Beam angle consistent with existing lamp	<ul style="list-style-type: none"> <li>Declaration by the purchaser confirming that they are satisfied with the light distribution of the upgraded lamps</li> </ul>	At time of implementation	N/A



## E1: LED Lamp and Driver

**Description:** An LED-reflector Lamp and matching LED Driver intended as an alternative to a Mirrored Reflector Halogen Lamp.

**Relevant Australian safety standards:** Control Gear: AS/NZS 61347.1 Lamp control gear – General and safety requirements, and AS/NZS 61347.2.13 Lamp control gear – Particular requirements for DC or AC supplied electronic control gear for LED modules.

Table B.5 Activity Definition E1 - Equipment Class: LED Lamp and Driver

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lamp Circuit Power (LCP)	LCP (as Published by the Scheme Administrator)			
Minimum true power factor	$\geq 0.55$	<ul style="list-style-type: none"> <li>Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform IES LM-79 (if required)</li> </ul> <p><i>Note: The test must be conducted with the driver the lamp is supplied with. The lamp will only be approved for installation with the same driver it was tested with.</i></p>	At time of product acceptance	10
Minimum Colour Rendering Index (CRI)	Average $\geq 80$			
Luminous efficacy	$\geq 48$ lumens/watt			
Initial Downward Light Output	$\geq 462$ lumens			
Lifetime	$L_{70}$ (70% of initial Downward Light Output) at 15,000 hrs	<b>Option 1</b> <ul style="list-style-type: none"> <li>Test report using IES LM-84-14 from a Laboratory that is accredited by National Association of Testing Authorities NATA or equivalent body and accredited to perform IES LM-84-14, <b>and</b></li> <li>IES TM-28-14 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-84-14</li> </ul>	At time of product acceptance	10

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at 15,000 hrs	<p><b>Option 2</b></p> <ul style="list-style-type: none"> <li>• IES LM-80-08 or ANSI/IES LM-80-15 test report from a Laboratory that is accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15, <b>and</b></li> <li>• Manufacturer's declaration stating that the brand and model of the LED chip tested in the IES LM-80-08 or ANSI/IES LM-80-15 report is identical to that supplied with the lamp, <b>and</b></li> <li>• In-situ temperature measurement test (ISTMT) report conducted on one sample using Section 12.4.1 of IEC 60598.1 (or equivalent) or Clause 14 of ANSI/UL 1598 from a laboratory accredited by NATA or equivalent body to perform that test. The ISTMT must be conducted in accordance with Annex A of IES LM-84-14 (the testing laboratory does not have to be accredited to LM-84-14)</li> </ul> <p>The ISTMT report must include:</p> <ul style="list-style-type: none"> <li>– Statement that the ISTMT was conducted in accordance with Annex A of IES LM-84-14 (the laboratory does not have to be accredited to IES LM-84-14)</li> <li>– The brand and model of the LED chip(s)</li> <li>– The forward current of the LED chip(s)</li> <li>– Clear photos identifying the product and the exact position of the thermocouple.</li> </ul> <ul style="list-style-type: none"> <li>• Manufacturer's declaration stating the brand, model and forward current of the LED chip(s) when used under normal operating conditions in Australia, <b>and</b></li> <li>• IES TM-21-11 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15. The IES TM-21-11 test report must be based on the IES LM-80-08 or ANSI/IES LM-80-15 test report and the L<sub>70</sub> value must use the temperature and forward current reported in the ISTMT report or a higher temperature and/or forward current</li> </ul> <p><i>Note: ISTMT reports must be issued in the exact brand and model as the product applied for. Brand/model reconciliation documents are not accepted for ISTMT reports.</i></p>	At time of product acceptance	10
Electro-magnetic compatibility (EMC)	Compliance with AS/NZS CISPR 15:2011	<ul style="list-style-type: none"> <li>• Test report using AS/NZS CISPR 15:2011 from a laboratory accredited by NATA or equivalent body, <b>and</b></li> <li>• Documentation showing the laboratory is accredited to perform AS/NZS CISPR 15:2011</li> </ul>	At time of product acceptance	5

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Safety	Control gear complies with relevant Australian safety standard (AS/NZS 61347.1, AS/NZS 61347.2.13)	If Control Gear is built-in: <ul style="list-style-type: none"> <li>• Certificate of suitability for Control Gear to relevant Australian safety standard issued by:               <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme, <b>or</b></li> </ul> </li> <li>• JAS-ANZ endorsed certificate showing compliance to relevant Australian safety standard</li> </ul> <i>Note: Certificate must be issued in the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates.</i>	At time of product acceptance	N/A
		If Control Gear is Independent: <ul style="list-style-type: none"> <li>• Certificate of approval for Control Gear to relevant Australian safety standard issued by:               <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme</li> </ul> </li> </ul>	At time of product acceptance	N/A
Dimmer Compatibility	If the lamp and driver is to be installed in a dimmable circuit, demonstrated compatibility with the dimmer	<ul style="list-style-type: none"> <li>• Test report demonstrating compatibility of lamp and driver with the dimmer, <b>and</b></li> <li>• Electrician declaration that the installed dimmer is a compatible model listed in the above test report</li> </ul>	At time of implementation	1
Beam Angle	Beam angle consistent with existing lamp	<ul style="list-style-type: none"> <li>• Declaration by the purchaser confirming that they are satisfied with the light distribution of the upgraded lamps</li> </ul>	At time of implementation	N/A

## Activity Definition E2 – Replace a linear halogen floodlight with a high efficiency lamp

This section outlines the equipment requirements that apply to Activity Definition E2 of the HEER method for the following eligible equipment class:

- LED Luminaire - Floodlight (Table B.6).

### E2: LED Luminaire – Floodlight

**Description:** An LED Luminaire intended for use as a floodlight as defined in AS/NZS 60598.2.5 Luminaires – Particular requirements – Floodlights.

#### Relevant Australian safety standards:

- Luminaire: AS/NZS 60598.2.5 Luminaires – Part 2.2: Particular requirements – Floodlights.
- Control Gear: AS/NZS 61347.1 Lamp control gear – General and safety requirements, and AS/NZS 61347.2.13 Lamp control gear – Particular requirements for DC, or AC supplied electronic control gear for LED modules.

Table B.6 Activity Definition E2 - Equipment Class: LED Luminaire – Floodlight

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lamp Circuit Power ( <b>LCP</b> )	LCP (as Published by the Scheme Administrator)			
Minimum true power factor	≥ 0.55	<ul style="list-style-type: none"> <li>Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform IES LM-79 (if required)</li> </ul>	At time of product acceptance	10
Minimum Colour Rendering Index ( <b>CRI</b> )	Average ≥ 80			

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at 3,650 hrs	<b>Option 1</b> <ul style="list-style-type: none"> <li>Test report using IES LM-84-14 from a Laboratory that is accredited by National Association of Testing Authorities NATA or equivalent body and accredited to perform IES LM-84-14, <b>and</b></li> <li>IES TM-28-14 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-84-14</li> </ul>	At time of product acceptance	10
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at 3,650 hrs	<b>Option 2</b> <ul style="list-style-type: none"> <li>IES LM-80-08 or ANSI/IES LM-80-15 test report from a Laboratory that is accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15, <b>and</b></li> <li>Manufacturer's declaration stating that the brand and model of the LED chip tested in the IES LM-80-08 or ANSI/IES LM-80-15 report is identical to that supplied with the luminaire, <b>and</b></li> <li>In-situ temperature measurement test (ISTMT) report conducted on one sample using Section 12.4.1 of IEC 60598.1 (or equivalent) or Clause 14 of ANSI/UL 1598 from a laboratory accredited by NATA or equivalent body to perform that test. The ISTMT must be conducted in accordance with Annex A of IES LM-84-14 (the testing laboratory does not have to be accredited to LM-84-14) The ISTMT report must include: <ul style="list-style-type: none"> <li>Statement that the ISTMT was conducted in accordance with Annex A of IES LM-84-14 (the laboratory does not have to be accredited to IES LM-84-14)</li> <li>The brand and model of the LED chip(s)</li> <li>The forward current of the LED chip(s)</li> <li>Clear photos identifying the product and the exact position of the thermocouple.</li> </ul> </li> <li>Manufacturer's declaration stating the brand, model and forward current of the LED chip(s) when used under normal operating conditions in Australia, <b>and</b></li> <li>IES TM-21-11 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15. The IES TM-21-11 test report must be based on the IES LM-80-08 or ANSI/IES LM-80-15 test report and the L<sub>70</sub> value must use the temperature and forward current reported in the ISTMT report or a higher temperature and/or forward current</li> </ul> <p><i>Note: ISTMT reports must be for the same exact brand and model as the product applied for. Brand/model reconciliation documents are not accepted for ISTMT reports.</i></p>	At time of product acceptance	10

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Electro-magnetic compatibility (EMC)	Compliance with AS/NZS CISPR 15:2011	<ul style="list-style-type: none"> <li>Test report using AS/NZS CISPR 15:2011 from a laboratory accredited by NATA or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform AS/NZS CISPR 15:2011</li> </ul>	At time of product acceptance	5
Safety	Luminaire complies with relevant Australian safety standard (AS/NZS 60598.2.5)	<ul style="list-style-type: none"> <li>Certificate of suitability for Luminaire to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme, <b>or</b></li> </ul> </li> <li>JAS-ANZ endorsed certificate showing compliance to relevant Australian safety standard</li> </ul> <p><i>Note: Certificate must be issued in the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates.</i></p>	At time of product acceptance	N/A
	If Control Gear is Independent, Control Gear complies with relevant Australian safety standard (AS/NZS 61347.1, AS/NZS 61347.2.13)	<ul style="list-style-type: none"> <li>Certificate of approval for Control Gear to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme</li> </ul> </li> </ul>	At time of product acceptance	N/A
Dimmer Compatibility	If the lamp is to be installed in a dimmable circuit, demonstrated compatibility with the dimmer	<ul style="list-style-type: none"> <li>Test report demonstrating compatibility of lamp with the dimmer, <b>and</b></li> <li>Electrician declaration that the installed dimmer is a compatible model listed in the above test report</li> </ul>	At time of implementation	1
Light Output	As specified in Table E2.1 of the ESS Rule	<ul style="list-style-type: none"> <li>Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body</li> </ul>	At time of implementation	1
Beam Angle	Beam angle consistent with existing lamp	<ul style="list-style-type: none"> <li>Declaration by the purchaser confirming that they are satisfied with the light distribution of the upgraded lamps</li> </ul>	At time of implementation	N/A

## Activity Definition E3 – Replace a parabolic aluminised reflector (PAR) lamp with efficiency luminaire and/or lamp

This section outlines the equipment requirements that apply to Activity Definition E3 of the HEER method for the following eligible classes of equipment:

- LED Lamp Only – 240V Self Ballasted (Table B.7), and
- LED Luminaire – Floodlight (Table B.8).

### E3: LED Lamp Only – 240V Self Ballasted

**Description:** A self-ballasted LED Lamp as defined by AS/NZS 62560 Self-ballasted LED lamps for general lighting services by voltage > 50 V. These Lamps are connected directly to a 240V supply.

**Relevant Australian safety standard:** AS/NZS 62560: Self-ballasted LED-lamps for general lighting services by voltage > 50 V – Safety specifications.

Table B.7 Activity Definition E3 - Equipment Class: LED Lamp Only – 240V Self Ballasted

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lamp Circuit Power ( <b>LCP</b> )	LCP (as Published by the Scheme Administrator)			
Minimum true power factor	≥ 0.55	<ul style="list-style-type: none"> <li>• Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body, <b>and</b></li> <li>• Documentation showing the laboratory is accredited to perform IES LM-79 (if required)</li> </ul>	At time of product acceptance	10
Minimum Colour Rendering Index ( <b>CRI</b> )	Average ≥ 80			
Luminous efficacy	≥ 45 lumens/watt			

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at least 12,000 hrs	<ul style="list-style-type: none"> <li>Test report using IES LM-84-14 from a Laboratory that is accredited by National Association of Testing Authorities NATA or equivalent body and accredited to perform IES LM-84-14, <b>and</b></li> <li>IES TM-28-14 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-84-14</li> </ul>	At time of product acceptance	10
Electro-magnetic compatibility (EMC)	Compliance with AS/NZS CISPR 15:2011	<ul style="list-style-type: none"> <li>Test report using AS/NZS CISPR 15:2011 from a laboratory accredited by NATA or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform AS/NZS CISPR 15:2011</li> </ul>	At time of product acceptance	5
Safety	Lamp complies with relevant Australian safety standard (AS/NZS 62560)	<ul style="list-style-type: none"> <li>Certificate of approval to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme.</li> </ul> </li> </ul> <p><i>Note: Certificate must be issued in the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates.</i></p>	At time of product acceptance	N/A
Dimmer Compatibility	If the lamp is to be installed in a dimmable circuit, demonstrated compatibility with the dimmer	<ul style="list-style-type: none"> <li>Test report demonstrating compatibility of lamp with the dimmer, <b>and</b></li> <li>Electrician declaration that the installed dimmer is a compatible model listed in the above test report</li> </ul>	At time of implementation	1
Light Output	As specified in Table E3.1 of the ESS Rule	<ul style="list-style-type: none"> <li>Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body</li> </ul>	At time of implementation	1
Beam Angle	Beam angle consistent with existing lamp	<ul style="list-style-type: none"> <li>Declaration by the purchaser confirming that they are satisfied with the light distribution of the upgraded lamps</li> </ul>	At time of implementation	N/A



## E3: LED Luminaire – Floodlight

**Description:** An LED Luminaire intended for use as a floodlight as defined in AS/NZS 60598.2.5 Luminaires – Particular requirements – Floodlights.

**Relevant Australian safety standards:**

- Luminaire: AS/NZS 60598.2.5 Luminaires – Particular requirements – Floodlights.
- Control Gear: AS/NZS 61347.1 Lamp control gear – General and safety requirements, and AS/NZS 61347.2.13 Lamp control gear – Particular requirements for DC or AC supplied electronic control gear for LED modules.

Table B.8 Activity Definition E3 - Equipment Class: LED Luminaire – Floodlight

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lamp Circuit Power ( <b>LCP</b> )	LCP (as Published by the Scheme Administrator)			
Minimum true power factor	≥ 0.55	<ul style="list-style-type: none"> <li>• Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body, <b>and</b></li> <li>• Documentation showing the laboratory is accredited to perform IES LM-79 (if required)</li> </ul>	At time of product acceptance	10
Minimum Colour Rendering Index (CRI)	Average ≥ 80			
Luminous efficacy	≥ 45 lumens/watt			
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at least 12,000 hrs	<b>Option 1</b> <ul style="list-style-type: none"> <li>• Test report using IES LM-84-14 from a Laboratory that is accredited by National Association of Testing Authorities NATA or equivalent body and accredited to perform IES LM-84-14, <b>and</b></li> <li>• IES TM-28-14 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-84-14</li> </ul>	At time of product acceptance	10

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at least 12,000 hrs	<p><b>Option 2</b></p> <ul style="list-style-type: none"> <li>• IES LM-80-08 or ANSI/IES LM-80-15 test report from a Laboratory that is accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15, <b>and</b></li> <li>• Manufacturer's declaration stating that the brand and model of the LED chip tested in the IES LM-80-08 or ANSI/IES LM-80-15 report is identical to that supplied with the lamp, <b>and</b></li> <li>• In-situ temperature measurement test (ISTMT) report conducted on one sample using Section 12.4.1 of IEC 60598.1 (or equivalent) or Clause 14 of ANSI/UL 1598 from a laboratory accredited by NATA or equivalent body to perform that test. The ISTMT must be conducted in accordance with Annex A of IES LM-84-14 (the testing laboratory does not have to be accredited to LM-84-14)</li> </ul> <p>The ISTMT report must include:</p> <ul style="list-style-type: none"> <li>– Statement that the ISTMT was conducted in accordance with Annex A of IES LM-84-14 (the laboratory does not have to be accredited to IES LM-84-14)</li> <li>– The brand and model of the LED chip(s)</li> <li>– The forward current of the LED chip(s)</li> <li>– Clear photos identifying the product and the exact position of the thermocouple.</li> </ul> <ul style="list-style-type: none"> <li>• Manufacturer's declaration stating the brand, model and forward current of the LED chip(s) when used under normal operating conditions in Australia, <b>and</b></li> <li>• IES TM-21-11 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15. The IES TM-21-11 test report must be based on the IES LM-80-08 or ANSI/IES LM-80-15 test report and the L<sub>70</sub> value must use the temperature and forward current reported in the ISTMT report or a higher temperature and/or forward current</li> </ul> <p><i>Note: ISTMT reports must be issued in the exact brand and model as the product applied for. Brand/model reconciliation documents are not accepted for ISTMT reports.</i></p>	At time of product acceptance	10
Electro-magnetic compatibility (EMC)	Compliance with AS/NZS CISPR 15:2011	<ul style="list-style-type: none"> <li>• Test report using AS/NZS CISPR 15:2011 from a laboratory accredited by NATA or equivalent body, <b>and</b></li> <li>• Documentation showing the laboratory is accredited to perform AS/NZS CISPR 15:2011</li> </ul>	At time of product acceptance	5

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Safety	Luminaire complies with relevant Australian safety standard (AS/NZS 60598.2.5)	<ul style="list-style-type: none"> <li>• Certificate of suitability for Luminaire to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme, <b>or</b></li> </ul> </li> <li>• JAS-ANZ endorsed certificate showing compliance to relevant Australian safety standard</li> </ul> <p><i>Note: Certificate must be issued in the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates.</i></p>	At time of product acceptance	N/A
	If Control Gear is Independent	<ul style="list-style-type: none"> <li>• Certificate of approval for Control Gear to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme</li> </ul> </li> </ul>	At time of product acceptance	N/A
Dimmer Compatibility	If the lamp is to be installed in a dimmable circuit, demonstrated compatibility with the dimmer	<ul style="list-style-type: none"> <li>• Test report demonstrating compatibility of lamp with the dimmer, <b>and</b></li> <li>• Electrician declaration that the installed dimmer is a compatible model listed in the above test report</li> </ul>	At time of implementation	1
Light Output	As specified in Table E3.1 of the ESS Rule	<ul style="list-style-type: none"> <li>• Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body</li> </ul>	At time of implementation	1
Beam Angle	Beam angle consistent with existing lamp	<ul style="list-style-type: none"> <li>• Declaration by the purchaser confirming that they are satisfied with the light distribution of the upgraded lamps</li> </ul>	At time of implementation	N/A

## Activity Definition E5 – Replace a T8 or T12 luminaire with a LED luminaire

This section outlines the equipment requirements that apply to Activity Definition E5 of the HEER method for the following eligible classes of equipment:

- LED Luminaire - Linear Lamp (Table B.9).

### E5: LED Luminaire – Linear Lamp

**Description:** An LED Luminaire intended for use as an alternative to a linear fluorescent Luminaire, where the Luminaire houses a matching Linear LED tube or a linear array of integrated LEDs. Where the Luminaire uses a Linear LED tube, the Luminaire must not be compatible with a linear fluorescent Lamp.

#### Relevant Australian safety standards:

- Luminaire: AS/NZS 60598.2.1 Luminaires - Particular requirements - Fixed general purpose luminaires.
- Control Gear: AS/NZS 61347.1 Lamp control gear – General and safety requirements, and AS/NZS 61347.2.13 Lamp control gear – Particular requirements for DC or AC supplied electronic control gear for LED modules.

Table B.9 Activity Definition E5 - Equipment Class: LED Luminaire – Linear Lamp

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lamp Circuit Power (LCP)	LCP (as Published by the Scheme Administrator)	<ul style="list-style-type: none"> <li>Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform IES LM-79 (if required)</li> </ul>	At time of product acceptance	10
Minimum true power factor	≥ 0.55			
Minimum Colour Rendering Index (CRI)	Average ≥ 80			

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at least 20,000 hrs	<b>Option 1</b> <ul style="list-style-type: none"> <li>Test report using IES LM-84-14 from a Laboratory that is accredited by National Association of Testing Authorities NATA or equivalent body and accredited to perform IES LM-84-14, <b>and</b></li> <li>IES TM-28-14 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-84-14</li> </ul>	At time of product acceptance	10
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at least 20,000 hrs	<b>Option 2</b> <ul style="list-style-type: none"> <li>IES LM-80-08 or ANSI/IES LM-80-15 test report from a Laboratory that is accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15, <b>and</b></li> <li>Manufacturer's declaration stating that the brand and model of the LED chip tested in the IES LM-80-08 or ANSI/IES LM-80-15 report is identical to that supplied with the lamp, <b>and</b></li> <li>In-situ temperature measurement test (ISTMT) report conducted on one sample using Section 12.4.1 of IEC 60598.1 (or equivalent) or Clause 14 of ANSI/UL 1598 from a laboratory accredited by NATA or equivalent body to perform that test. The ISTMT must be conducted in accordance with Annex A of IES LM-84-14 (the testing laboratory does not have to be accredited to LM-84-14)</li> <li>The ISTMT report must include: <ul style="list-style-type: none"> <li>Statement that the ISTMT was conducted in accordance with Annex A of IES LM-84-14 (the laboratory does not have to be accredited to IES LM-84-14)</li> <li>The brand and model of the LED chip(s)</li> <li>The forward current of the LED chip(s)</li> <li>Clear photos identifying the product and the exact position of the thermocouple.</li> </ul> </li> <li>Manufacturer's declaration stating the brand, model and forward current of the LED chip(s) when used under normal operating conditions in Australia, <b>and</b></li> <li>IES TM-21-11 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15. The IES TM-21-11 test report must be based on the IES LM-80-08 or ANSI/IES LM-80-15 test report and the L<sub>70</sub> value must use the temperature and forward current reported in the ISTMT report or a higher temperature and/or forward current</li> </ul> <p><i>Note: ISTMT reports must be issued in the exact brand and model as the product applied for. Brand/model reconciliation documents are not accepted for ISTMT reports.</i></p>	At time of product acceptance	10
Electro-magnetic compatibility (EMC)	Compliance with AS/NZS CISPR 15:2011	<ul style="list-style-type: none"> <li>Test report using AS/NZS CISPR 15:2011 from a laboratory accredited by NATA or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform AS/NZS CISPR 15:2011</li> </ul>	At time of product acceptance	5

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Safety	Luminaire complies with relevant Australian safety standard (AS/NZS 60598.2.1)	<ul style="list-style-type: none"> <li>• Certificate of suitability to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme, <b>or</b></li> </ul> </li> <li>• JAS-ANZ endorsed certificate showing compliance to relevant Australian safety standard</li> </ul> <p><i>Note: Certificate must be issued in the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates</i></p>	At time of product acceptance	N/A
	If Control Gear is independent	<ul style="list-style-type: none"> <li>• Certificate of approval to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme</li> </ul> </li> </ul> <p><i>Note: Certificate must be issued in the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates.</i></p>	At time of product acceptance	N/A
Dimmer Compatibility	If the lamp is to be installed in a dimmable circuit, demonstrated compatibility with the dimmer	<ul style="list-style-type: none"> <li>• Test report demonstrating compatibility of lamp with the dimmer, <b>and</b></li> <li>• Electrician declaration that the installed dimmer is a compatible model listed in the above test report</li> </ul>	At time of implementation	1
Light Output	As specified in Table E5.1 of the ESS Rule	<ul style="list-style-type: none"> <li>• Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body.</li> </ul>	At time of implementation	1

## Activity Definition E11 – Replace an Edison screw or bayonet lamp with an LED lamp for general lighting purposes

This chapter specifies the equipment requirements that apply to Activity Definition E11 of the HEER method for the following eligible equipment class:

- LED Lamp Only – 240V Self Ballasted (Table B.10).

The information required to identify the minimum lumen output required for this activity is provided in section 4.5.2 of this document.

### E11: LED Lamp Only – 240V Self Ballasted

**Description:** A self-ballasted LED Lamp as defined by AS/NZS 62560 Self-ballasted LED lamps for general lighting services by voltage > 50 V. These Lamps are connected directly to a 240V supply.

**Relevant Australian safety standard:** AS/NZS 62560: Self-ballasted LED-lamps for general lighting services by voltage > 50 V – Safety specifications.

Table B.10 Activity Definition E11 - Equipment Class: LED Lamp Only – 240V Self Ballasted

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Base (socket type)	The lamp must have an Edison screw or bayonet base.	<ul style="list-style-type: none"> <li>• Product specification sheet</li> </ul>	At time of product acceptance	N/A
Lamp Circuit Power (LCP)	LCP (as Published by the Scheme Administrator)			
Minimum true power factor	≥ 0.55	<ul style="list-style-type: none"> <li>• Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body, <b>and</b></li> </ul>	At time of product acceptance	10
Minimum Colour Rendering Index (CRI)	Average ≥ 80	<ul style="list-style-type: none"> <li>• Documentation showing the laboratory is accredited to perform IES LM-79 (if required)</li> </ul>		

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at 8,400 hrs	<ul style="list-style-type: none"> <li>Test report using IES LM-84-14 from a Laboratory that is accredited by National Association of Testing Authorities NATA or equivalent body and accredited to perform IES LM-84-14, <b>and</b></li> <li>IES TM-28-14 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-84-14</li> </ul>	At time of product acceptance	10
Electro-magnetic compatibility (EMC)	Compliance with AS/NZS CISPR 15:2011	<ul style="list-style-type: none"> <li>Test report using AS/NZS CISPR 15:2011 from a laboratory accredited by NATA or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform AS/NZS CISPR 15:2011</li> </ul>	At time of product acceptance	5
Safety	Lamp complies with relevant Australian safety standard (AS/NZS 62560)	<ul style="list-style-type: none"> <li>Certificate of approval to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme.</li> </ul> </li> </ul> <p>Note: Certificate must be issued in the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates.</p>	At time of product acceptance	N/A
Dimmer Compatibility	If the lamp is to be installed in a dimmable circuit, demonstrated compatibility with the dimmer	<ul style="list-style-type: none"> <li>Test report demonstrating compatibility of lamp with the dimmer, <b>and</b></li> <li>Electrician declaration that the installed dimmer is a compatible model listed in the above test report</li> </ul>	At time of implementation	1
Light Output	The same or higher than the existing equipment, as defined in Table 4.5.2 of this document	<ul style="list-style-type: none"> <li>Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body</li> </ul>	At time of implementation	1



## Minimum Light Output for Activity E11

For Activity E11, ACPs must ensure that the Light Output (measured in lumens) of the new lighting equipment is the same or higher than the existing lighting equipment it is replacing. This will be checked as part of any audit conducted of the ACP.

To ensure that ACPs meet this requirement, they must:

- check the type of the existing lighting equipment and its LCP
- refer to Table B.11 and note the minimum Light Output required for the new lighting equipment, and
- ensure that the new lighting equipment they install has a Light Output that is the same, or higher than this.

Table B.11 Activity Definition E11 - Minimum Light Output for LED Lamp Only – 240V Self Ballasted to replace different types of lighting equipment

Existing equipment – LCP (Watts)			New equipment – Minimum Light Output (lumens)
Incandescent	Halogen	CFL <sup>15</sup>	LED Lamp Only – 240V Self Ballasted
25 ≤ 39	18 ≤ 27	4 ≤ 6	250
40 ≤ 59	28 ≤ 41	7 ≤ 10	500
60 ≤ 74	42 ≤ 51	11 ≤ 14	800
75 ≤ 99	52 ≤ 69	15 ≤ 18	1100
100 or above	70 or above	19 ≤ 23	1500

<sup>15</sup> Compact fluorescent light

## Activity Definition E13 – Replace a T5 luminaire with a LED luminaire

This section outlines the equipment requirements that apply to Activity Definition E13 of the HEER method for the following eligible classes of equipment:

- LED Luminaire - Linear Lamp (Table B.12).

### E13: LED Luminaire – Linear Lamp

**Description:** An LED Luminaire intended for use as an alternative to a linear fluorescent Luminaire, where the Luminaire houses a matching Linear LED tube or a linear array of integrated LEDs. Where the Luminaire uses a Linear LED tube, the Luminaire must not be compatible with a linear fluorescent Lamp.

#### Relevant Australian safety standards:

- Luminaire: AS/NZS 60598.2.1 Luminaires - Particular requirements - Fixed general purpose luminaires.
- Control Gear: AS/NZS 61347.1 Lamp control gear – General and safety requirements, and AS/NZS 61347.2.13 Lamp control gear – Particular requirements for DC. or AC supplied electronic control gear for LED modules.

Table B.12 Activity Definition E13 – Equipment Class: LED Luminaire – Linear Lamp

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lamp Circuit Power (LCP)	LCP (as Published by the Scheme Administrator)	<ul style="list-style-type: none"> <li>• Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body, <b>and</b></li> <li>• Documentation showing the laboratory is accredited to perform IES LM-79 (if required)</li> </ul>	At time of product acceptance	10
Minimum true power factor	≥ 0.55			
Minimum Colour Rendering Index (CRI)	Average ≥ 80			

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at least 20,000 hrs	<b>Option 1</b> <ul style="list-style-type: none"> <li>Test report using IES LM-84-14 from a Laboratory that is accredited by National Association of Testing Authorities NATA or equivalent body and accredited to perform IES LM-84-14, <b>and</b></li> <li>IES TM-28-14 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-84-14</li> </ul>	At time of product acceptance	10
Lifetime	L <sub>70</sub> (70% of initial Downward Light Output) at least 20,000 hrs	<b>Option 2</b> <ul style="list-style-type: none"> <li>IES LM-80-08 or ANSI/IES LM-80-15 test report from a Laboratory that is accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15, <b>and</b></li> <li>Manufacturer's declaration stating that the brand and model of the LED chip tested in the IES LM-80-08 or ANSI/IES LM-80-15 report is identical to that supplied with the lamp, <b>and</b></li> <li>In-situ temperature measurement test (ISTMT) report conducted on one sample using Section 12.4.1 of IEC 60598.1 (or equivalent) or Clause 14 of ANSI/UL 1598 from a laboratory accredited by NATA or equivalent body to perform that test. The ISTMT must be conducted in accordance with Annex A of IES LM-84-14 (the testing laboratory does not have to be accredited to LM-84-14)</li> <li>The ISTMT report must include: <ul style="list-style-type: none"> <li>Statement that the ISTMT was conducted in accordance with Annex A of IES LM-84-14 (the laboratory does not have to be accredited to IES LM-84-14)</li> <li>The brand and model of the LED chip(s)</li> <li>The forward current of the LED chip(s)</li> <li>Clear photos identifying the product and the exact position of the thermocouple.</li> </ul> </li> <li>Manufacturer's declaration stating the brand, model and forward current of the LED chip(s) when used under normal operating conditions in Australia, <b>and</b></li> <li>IES TM-21-11 test report from a laboratory accredited by NATA or equivalent body and accredited to perform IES LM-80-08 or ANSI/IES LM-80-15. The IES TM-21-11 test report must be based on the IES LM-80-08 or ANSI/IES LM-80-15 test report and the L<sub>70</sub> value must use the temperature and forward current reported in the ISTMT report or a higher temperature and/or forward current</li> </ul> <p><i>Note: ISTMT reports must be issued in the exact brand and model as the product applied for. Brand/model reconciliation documents are not accepted for ISTMT reports.</i></p>	At time of product acceptance	10
Electro-magnetic compatibility (EMC)	Compliance with AS/NZS CISPR 15:2011	<ul style="list-style-type: none"> <li>Test report using AS/NZS CISPR 15:2011 from a laboratory accredited by NATA or equivalent body, <b>and</b></li> <li>Documentation showing the laboratory is accredited to perform AS/NZS CISPR 15:2011</li> </ul>	At time of product acceptance	5

Parameter	Requirement	Documentation Requirement	Documentation Required	Minimum test sample size
Safety	Luminaire complies with relevant Australian safety standard (AS/NZS 60598.2.1)	<ul style="list-style-type: none"> <li>• Certificate of suitability to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme, <b>or</b></li> </ul> </li> <li>• JAS-ANZ endorsed certificate showing compliance to relevant Australian safety standard</li> </ul> <p><i>Note: Certificate must be issued in the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates</i></p>	At time of product acceptance	N/A
	If Control Gear is independent	<ul style="list-style-type: none"> <li>• Certificate of approval to relevant Australian safety standard issued by: <ul style="list-style-type: none"> <li>– NSW Fair Trading or an equivalent state regulator, <b>or</b></li> <li>– an Independent certifier recognised by NSW Fair Trading as a Recognised External Approval Scheme</li> </ul> </li> </ul> <p><i>Note: Certificate must be issued in the exact brand and model as the product applied for. Brand/model reconciliation is not accepted for safety certificates.</i></p>	At time of product acceptance	N/A
Dimmer Compatibility	If the lamp is to be installed in a dimmable circuit, demonstrated compatibility with the dimmer	<ul style="list-style-type: none"> <li>• Test report demonstrating compatibility of lamp with the dimmer, <b>and</b></li> <li>• Electrician declaration that the installed dimmer is a compatible model listed in the above test report</li> </ul>	At time of implementation	1
Light Output	As specified in Table E5.1 of the ESS Rule	<ul style="list-style-type: none"> <li>• Test report using IES LM-79 or other methodology from a laboratory accredited by National Association of Testing Authorities (NATA) or equivalent body.</li> </ul>	At time of implementation	1

## C Lighting equipment requirements – PIAM&V and MBM

This section sets out the equipment requirements for the PIAM&V and MBM methods.

Table C.1 Equipment and evidence requirements

Required Documentation		Specifications	Electrical Safety	
Category	Relevant Australian Standard	Data/Specification Sheet	Australian Certificate of Approval	Certificate of Suitability
LED Lamp only - ELV	Not applicable			
LED Lamp only - 240V Self Ballasted	AS/NZS 62560	Yes	For lamp	
Induction Luminaire	AS/NZS 60598.1	Yes		For luminaire <sup>1</sup>
LED lamp and driver	AS/NZS 61347.1 and IEC 61347.2.13	Yes	for control gear, if control gear is a declared article <sup>2</sup>	for luminaire, <sup>1</sup> if control gear is not a declared article <sup>2</sup>
Modified Luminaire - LED Linear Lamp	AS/NZS 60598.2.1or AS/NZS 60598.2.2			
LED Luminaire - fixed type	AS/NZS 60598.2.1			
LED Luminaire - Linear Lamp	AS/NZS 60598.2.1or AS/NZS 60598.2.2			
LED Luminaire - floodlight	AS/NZS 60598.2.5			
LED Luminaire - recessed	AS/NZS 60598.2.2			
LED Luminaire - high/lowbay	AS/NZS 60598.2.1			

Required Documentation		Specifications	Electrical Safety	
Category	Relevant Australian Standard	Data/Specification Sheet	Australian Certificate of Approval	Certificate of Suitability
LED Luminaire - streetlight	AS/NZS 60598.1 and AS/NZS 1158.6 or IEC 60598-2-3	Yes	for control gear, if control gear is a declared article <sup>2</sup>	for luminaire, <sup>1</sup> if control gear is not a declared article <sup>2</sup>
LED Luminaire - emergency lighting <sup>3</sup>	AS/NZS 60598.2.22			
LED Luminaire - hospital use	AS/NZS 60598.2.25			
Voltage Reduction Unit	AS/NZS 60335.1	Yes		Yes

1 A luminaire is defined as an apparatus that distributes, filters or transforms the light emitted from a light source, including Lamps, Control Gear and all components necessary for fixing and protecting the Lamps, including the troffer.

2 The control gear is a declared article under the published NSW electrical safety requirements if it provides an output not exceeding 50 volts AC or 120 volts ripple free DC, **and** is a type to provide supply to separate luminaires.

3 Emergency Lighting with multiple power modes must be tested at full output power.

## D LED lamp life tests – Commercial Lighting

This section provides further detail about the IES test standards that relate to the estimation of LED lamp life, and how the test results need to be applied when submitting an ESS ELT product application.

### LED lamp life tests

#### LM-80-08: Measuring Lumen Maintenance of LED Light Sources:

- LM-80-08 is a test method for measuring the degradation of light output (measured in lumens) from an LED chip over time (lumen maintenance).
- The measurement period is typically between 6,000 and 10,000 hours.
- Tests are done for different case temperatures and drive currents. LM-80 requires only two test temperatures, one of which must be either 55°C or 85°C.
- The outputs of the LM-80-08 report are used in the TM-21-11 calculations.

#### TM-21-11: Projecting Long Term Lumen Maintenance of LED Light Sources:

- TM-21-11 specifies the process for using the results from the LM-80-08 test to project a lifetime for a lamp or luminaire using the LED chip tested.

#### Value for lamp life:

The value you enter must be the 'Reported  $L_{70}$ '<sup>16</sup> from the TM-21-11 report for the test conditions that correspond to the operation of the same LED chip in your lamp or luminaire, namely the test conditions where:

- the drive current tested is greater than, or equal to the in-situ drive current,<sup>17</sup> and
- the case temperature tested is greater than, or equal to the in-situ case temperature.<sup>18</sup>

To be accepted for use in the ESS, the lamp life must be at least 30,000 hours.

<sup>16</sup> The TM-21-11 method applies limitations to the 'calculated' and 'projected lifetime' based on the number of samples in the LM-80-08 test. For example, a test with 20 or more samples is limited to six times the duration of the LM-80-08 test. As such, a test of 20 samples for 6,000 hours is limited to (6,000 hours x 6 = 36,000 hours). This limited lifetime is the 'Reported  $L_{70}$ '. For the 'Reported  $L_{70}$  (Dk)' result, ( $L_{70}$  refers to 70% lumen maintenance, Dk relates to the duration of the LM-80-08 test eg, 6k is a 6,000 hour test).

<sup>17</sup> The in-situ drive current is the current delivered to each individual LED chip when it is installed in the lamp or luminaire and operating normally (and not the total current delivered to the lamp or luminaire). An increase in the drive current decreases lamp life.

<sup>18</sup> The in-situ case temperature is the case temperature of each individual LED chip when it is installed in the lamp or luminaire and operating normally (and not the case temperature from the LM-80-08 test). An increase in the case temperature decreases lamp life.

## Lamp life requirements - example

**An applicant applies for acceptance of an LED floodlight Australian Highbays, model HB-0150W that uses the following LED chip:**

- Brand: LED Chips International and Model: LCI -2150.

**The applicant uploads:**

- an LM-80-08 report for the LED chip
- evidence that laboratory performing the LM-80-08 test was accredited by an accreditation body to conduct such a test
- a TM-21-11 report which references the LM-80-08 report, and
- a manufacturer's declaration from the floodlight manufacturer stating:
  - the brand and model of the floodlight (Australian Highbays, HB-0150W),
  - the brand and model number of the LED Chip used in the floodlight (LED Chips International LCI-2150),
  - the in-situ case temperature of the chip, as tested in the floodlight: 60°C, and
  - the in-situ drive current of the chip, as tested in the floodlight: 120mA.

### D.1 Lamp life

**The TM-21-11 report lists results for a minimum of two case temperatures, one of which must be either 55°C or 85°C:**

Case temperature	Drive current	'Reported L <sub>70</sub> '	Applicability of result for this floodlight
55 °C	150 mA	>42,000 hours	Invalid, as the case temperature tested is less than the in-situ case temperature of 60°C
85 °C	150 mA	>36,000 hours	Valid
105 °C	150 mA	27,000 hours	

**The applicant enters a value of 36,000 hours in the Lamp Life, corresponding to the LM-80-08 test at 85°C case temperature and 150mA drive current.**

### D.2 Checks for lamp life evidence

**The applicant checks the following information before submission of the application:**

- The luminaire in the manufacturer's declaration matches the product in its ESS application.
- The LED Chip in the luminaire matches the LED chip in the LM-80-08 test.
- The laboratory producing the LM-80-08 report is accredited to NATA or equivalent to conduct LM-80-08 tests.



- The TM-21-11 test uses results from the LM-80-08 report provided in the application.
- The in-situ case temperature and drive current in the manufacturer's declaration are for each individual LED chip when it is installed in the luminaire and operating normally (and not the case temperature and drive current at which the LM-80-08 test was conducted).
- The test drive current is greater than, or equal to the in-situ drive current.
- The test case temperature is greater than, or equal to the in-situ case temperature.
- The reported Lamp Life is the 'Reported  $L_{70}$ ' value not the 'Calculated  $L_{70}$ ' or 'Projected  $L_{70}$ '.
- A valid 'Reported  $L_{70}$ ' value has been reported in the Lamp Life field.

The valid 'Reported  $L_{70}$ ' result is equal to or greater than 30,000 hours.

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