Greenhouse and Energy Minimum Standards (Incandescent Lamps for General Lighting Services) Determination 2024

I, Josh Wilson, Assistant Minister for Climate Change and Energy, make the following determination.

Dated 10 September 2024

Josh Wilson
Assistant Minister for Climate Change and Energy

Contents

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Part 1—Preliminary

1 Name

This instrument is the *Greenhouse and Energy Minimum Standards (Incandescent Lamps for General Lighting Services) Determination 2024.*

2 Commencement

(1) Each provision of this instrument specified in column 1 of the table commences, or is taken to have commenced, in accordance with column 2 of the table. Any other statement in column 2 has effect according to its terms.

Commencement information		
Column 1	**Column 2**	**Column 3**
Provisions	**Commencement**	**Date/Details**
1. The whole of this instrument	The day after the end of the period of 12 months beginning on the day this instrument is registered.	

Note: This table relates only to the provisions of this instrument as originally made. It will not be amended to deal with any later amendments of this instrument.

(2) Any information in column 3 of the table is not part of this instrument. Information may be inserted in this column, or information in it may be edited, in any published version of this instrument.

(3) To avoid doubt, for the purposes of paragraph 34(b) of the Act, this instrument comes into force on the day specified by column 2 of the table.

3 Authority

This instrument is made under sections 23 and 35 of the *Greenhouse and Energy Minimum Standards Act 2012*.

4 Schedule 3

Each instrument that is specified in Schedule 3 to this instrument is amended or repealed as set out in the applicable items in that Schedule, and any other item in that Schedule has effect according to its terms.

5 This instrument revokes and replaces the old determination

For the purposes of section 35 of the Act, this instrument revokes and replaces the *Greenhouse and Energy Minimum Standards (Incandescent Lamps for General Lighting Services) Determination 2016*.

Note: Subsection 35(2) of the Act provides that, when a GEMS determination is revoked and replaced, the revoked determination ceases to be in force immediately before the replacement determination comes into force.

6 Definitions—standards and other instruments referred to in this instrument

(1) In this instrument:

Airworthiness Design Requirements Manual means the Airworthiness Design Requirements Manual DASDRM S3CH7, published by the Australian Government Defence Aviation Safety Authority (DASA).

AS/NZS 4934.1:2014 means *Australian/New Zealand Standard AS/NZS 4934.1:2014 – Incandescent lamps for general lighting services – Part 1: Test methods – Energy performance*.

AS 4934.2:2021 means *Australian Standard 4934.2:2021 – Incandescent lamps for general lighting services, Part 2: Energy performance and marking requirements*.

CIE 015 means CIE 015:2018 Colorimetry, published by Commission Internationale de L'Eclairage (CIE).

Civil Aviation Safety Regulations means the *Civil Aviation Safety Regulations 1998*.

Defence Aviation Safety Authority Regulation (DASR) 139 – Aerodromes means the *Defence Aviation Safety Regulation (DASR) 139 – Aerodromes*, published by the Australian Government Defence Aviation Safety Authority (DASA).

IEC 60061-1 means the *International Electrotechnical Commission - Lamp caps and holders together with gauges for the control of interchangeability and safety. Part 1: Lamp caps*.

Note: IEC 60061-1 includes all amendments up to and including IEC 60061-1:1969/AMD62:2022.

IEC 60630 means *International Electrotechnical Commission - Maximum lamp outlines for incandescent lamps*.

Note: IEC 60630 includes all amendments up to and including IEC 60630 1994/Amdt 7 2014.

IEV-845 means IEC 60050-845:2020 Ed.2, *International Electrotechnical Vocabulary* (IEV) – Part 845: Lighting, published by the International Electrotechnical Commission (IEC).

ILV means the International Lighting Vocabulary (ILV), 2nd Edition, published by Commission Internationale de L'Eclairage (CIE).

Part 139 (Aerodromes) Manual of Standards means *Part 139 (Aerodromes) Manual of Standards* 2019, made under regulation 139.005 of the Civil Aviation Safety Regulations.

Note: At the time this instrument was made, the texts of instruments mentioned in this section were available as follows:

- AS and AS/NZS standards—at www.standards.org.au;
- CIE standards—from the Commission Internationale de L'Eclairage (International Commission on Illumination) at www.cie.co.at;
- IEC standards— from the International Electrotechnical Commission at https://webstore.iec.ch/;
- DASA instruments—at https://dasa.defence.gov.au;
- Commonwealth regulations and instruments made under them—at www.legislation.gov.au.

(2) Each reference to a document in subsection (1) is taken to be a reference to that document as in force or existing on the day this instrument is made.

7 Definitions—other expressions used in this instrument

Note 1: A number of expressions used in this instrument are defined in section 5 of the Act, including the following:

- category A product;
- covered by;
- family of models;
- GEMS;
- GEMS labelling requirements;
- GEMS level requirements;
- model;
- product classes

Note 2: Many of the following definitions are based on ILV (the International Lighting Vocabulary) or IEV-845 (the part of the International Electrotechnical Vocabulary that deals with lighting). Where the definition of an expression below differs from the ILV or IEV definition, the definition in this instrument takes precedence.

In this instrument:

Act means the *Greenhouse and Energy Minimum Standards Act 2012*.

Australian/New Zealand Standard means a standard that is jointly published by Standards Australia and Standards New Zealand, is applicable in both countries and denoted by the letters "AS/NZS" and identifying numbers and/or letters.

carbon filament lamp means a vacuum, or inert gas-filled lamp, whose luminous element is a filament of carbon, housed in a glass envelope.

chromaticity coordinates means the x and y coordinates represented on the 1931 CIE colour space given in CIE 015.

general lighting services means substantially uniform lighting of an area without provision for special local requirements.

Note: This is the same meaning as in IEV-845.

incandescent lamp means a tungsten filament lamp or a carbon filament lamp or a tungsten halogen lamp.

initial values, for an incandescent lamp, means the photometric and electrical parameters of the lamp, measured after the initial ageing period.

lumen maintenance factor means the ratio of the luminous flux of a lamp at a given time in its operational life to the initial value of its luminous flux, the lamp being operated under specified conditions.

luminaire means an apparatus which distributes, filters or transforms the light transmitted from at least one source of optical radiation and which includes, except the sources themselves, all the parts necessary for fixing and protecting the sources and, where necessary, circuit auxiliaries together with the means for connecting them to the power supply.

luminous flux ($\boldsymbol{\Phi}_{\mathrm{v}}$) means the change in luminous energy with time, as given by the following formula:

$$\Phi_{\mathrm{v}} = \frac{\mathrm{d}Q_{\mathrm{v}}}{\mathrm{d}t}$$

where:

$\boldsymbol{Q}_{\mathrm{v}}$ is the luminous energy emitted, transferred or received.

t is time.

median lamp life, for a model of a lamp, means the duration in operating hours after which 50% of a representative group of lamps have survived when operated under specified test conditions.

Note 1: This is often referred in product catalogues as “average lamp life”.

Note 2: This is the same meaning as in subclause 1.3.6 AS/NZS 4934.1:2014.

product class 1 means the product class mentioned in item 1 of the table in section 13.

product class 2 means the product class mentioned in item 2 of the table in section 13.

tungsten filament lamp means a vacuum, or inert gas-filledlamp whose luminous element is a filament of tungsten, housed in a glass envelope.

Note: This is the same meaning as in subclause 1.3.13 AS/NZS 4934.1:2014.

tungsten halogen lamp means a gas-filled lamp containing halogen or a halogen compound and a tungsten filament, housed in a quartz envelope, which is optionally housed in a second outer envelope.

Note: This is the same meaning as in subclause 1.3.14 AS/NZS 4934.1:2014.

8 Families of models

(1) For the purposes of section 28 of the Act, for a particular product class covered by this instrument, 2 or more models are in the same family of models if:
  (a) they are members of a family that has been declared to the GEMS Regulator; and
  (b) the requirements of this section are satisfied in relation to the models and the family.

(2) For the purposes of paragraph (1)(b), the models must:
  (a) be in the same product class; and
  (b) be of a single brand; and
  (c) rely on the same test report that sets out the results of testing conducted in accordance with Part 3 and Part 5; and
  (d) for the purposes of complying with Part 3 and Part 5, have the same:
    (i) overall size; and
    (ii) geometric form factor; and
    (iii) other dimensions, components or component arrangements that may affect performance; and
    (iv) wattage; and
    (v) median lamp life; and
    (vi) lumen maintenance factor.

Number of models in the family

(4) For the purposes of paragraph (1)(b), the family must not contain more than 8 models.

Note: For the purposes of paragraph (2)(c), a single test report may be used for a family registration that contains models exhibiting different efficacies (for example, frosted and clear models), provided that it shows the results for the model with the lowest efficacy of the family, so that it confirms that all the models meet the initial efficacy requirement outlined in section 16.

9 Product category

For the purposes of section 29 of the Act, the products covered by this instrument are category A products.

10 Limited grandfathering

For the purposes of section 31 of the Act, the limited grandfathering period for product class 1 and 2 in the table at section 13 of this instrument ends at the end of the period of 5 years that begins on the day this instrument comes into force.

11 Registrations affected by this instrument

For the purposes of paragraph 36(1)(b) of the Act, this instrument affects the registration of the models registered against the *Greenhouse and Energy Minimum Standards (Incandescent Lamps for General Lighting Services) Determination 2016* that are specified in Schedule 1.

Note 1: If a model's registration is not affected, the model is taken to be registered against this instrument. See section 36 of the Act.

Note 2: If a model's registration is affected, the model's registration against the *Greenhouse and Energy Minimum Standards (Incandescent Lamps for General Lighting Services) Determination 2016* ceases to be in force. See section 48 of the Act.

Part 2—Products covered by this instrument

12 Purpose of Part

For the purposes of subsections 23(1) and (2) of the Act, this Part specifies:

(a) one or more classes of products that are covered by this instrument; and

(b) one or more classes of products that are not covered by this instrument.

13 Classes of products that are covered by this instrument

This instrument covers incandescent lamps that:

(a) are designed to produce a visible, optical radiation used in general lighting services; and

(b) are supplied or used as individual lamps or as part of a luminaire; and

(c) are listed in the product classes set out in the following table:

Product classes

Column 1	Column 2	Column 3
Product class	**Products covered by class**	**Product class characteristics**
1	Mains voltage incandescent lamps	This product class comprises products with the following attributes: (a) rated voltage >140 V a.c. or d.c.; (b) cap: E13, E14, E26, E27, BA15d, B15d, B22d, GU10, or GZ10 (as described in IEC 60061-1).
2	11-13 volt incandescent lamps	This product class comprises products with the following attributes: (a) rated voltage ≥11V and ≤13V a.c. or d.c.; (b) cap: G4, GY6.35, GU4, GZ4, GU5.3, GX5.3 or G53 (as described in IEC 60061-1).

Note 1: This subsection reflects the scope specified in clause 1.1.2 of AS 4934.2:2021 and clause 1.1 of AS/NZS 4934.1:2014.

Note 2: Products that are not covered by these classes are not covered by this instrument. In addition, section 14 sets out classes of products that are not covered.

14 Classes of products that are not covered by this instrument

This instrument does not cover incandescent lamps specified in Schedule 2.

Part 3—GEMS level requirements

15 Purpose of Part

For the purposes of paragraph 24(1)(a) of the Act, this Part specifies GEMS level requirements in accordance with section 25 of the Act for the product classes covered by this instrument.

16 GEMS level requirements

Energy use and greenhouse gas production

(1) Products in product class 1 must satisfy the following initial efficacy requirement:

$$\text{Mean value of the initial values for efficacy} \geq \frac{1}{\frac{0.24}{\sqrt{L}} + 0.0103}$$

where:

L is the mean measured initial values for the luminous flux of the products, in lumens.

(2) Products in product class 2 must satisfy the following initial efficacy requirement:

$$\text{Mean value of the initial values for efficacy} \geq 2.8 \times \ln L - 4.0$$

where:

L is the mean measured initial values for the luminous flux of the products, in lumens.

17 Testing requirements

(1) In order to determine whether products in product class 1 or product class 2 meet the requirements specified in section 16, tests must be conducted in accordance with the requirements in section 2 of AS/NZS 4934.1:2014.

(2) A test report must show conformance to AS 4934.2:2021 in accordance with AS/NZS 4934.1:2014 for each model tested. The test report must contain the applicable information in Appendix A of AS 4934.2:2021.

(3) Test measurements must only be recorded following the required duration for ageing, which is 100 ±1 h unless the lamp manufacturer specifies a lesser duration. Lamps that fail prior to 100 h must not be included in the mean and must be replaced with another lamp.

(4) The minimum sample size required for testing is 10.

Part 4—GEMS labelling requirements

18 Purpose of Part

For the purposes of paragraph 24(1)(b) of the Act, this Part specifies GEMS labelling requirements in accordance with section 26 of the Act for the product classes covered by this instrument.

19 GEMS labelling requirements

The following information must be included on the packaging of a product covered by this instrument:

(a) the light output in lumens of the product, with the rated value being no more than the mean measured initial value times 1.1, rounded to the nearest 10 lumens;

(b) the power in watts of the product, with the rated value being no less than the mean measured value times 0.9 rounded to the nearest watt, and no more than the mean measured value times 1.1, rounded to the nearest watt;

(c) the median lamp life of the product, with the marked value being no be more than the median measured value as calculated from the medium lamp life test value times 1.1 rounded to the nearest 100 hours.

20 Testing requirements

In order to rate products in product class 1 and product class 2 against criteria specified in section 19, tests must be conducted in accordance with the requirements in section 2 of AS/NZS 4934.1:2014.

21 Impact of replacement determination

A GEMS labelling requirement of this instrument (the ***revoked requirement***) is taken to be complied with if:

(a) this instrument is revoked in accordance with paragraph 35(1)(a) of the Act; and

(b) another GEMS determination (the ***replacement determination***) is made in accordance with paragraph 35(1)(b) of the Act; and

(c) a transitional GEMS labelling requirement (the ***replacement requirement***) of the replacement determination provides that, if the replacement requirement is complied with, the revoked requirement is taken to be complied with.

Part 5—Other requirements

22 Purpose of Part

For the purposes of subsection 24(2) of the Act, this Part specifies other requirements in accordance with section 27 of the Act for product classes covered by this instrument.

23 Other requirements

Lumen maintenance factor

(1) For products in product class 1 and product class 2, when measured at 75% of rated median lamp life, the mean lumen maintenance factor must be at least 80%.

Minimum median lamp life

(2) For products in product class 1 and product class 2, the minimum median lamp life is 2000 hours.

Product performance—product class 2

(3) Products in product class 2 must satisfy the maximum wattage requirements in clause 2.6 of AS 4934.2:2021.

24 Testing requirements

(1) In order to determine whether products in product class 1 and product class 2 meet the requirements specified in section 23, tests must be conducted in accordance with the requirements in section 2 of AS/NZS 4934.1:2014.

(2) For the purposes of subsection 23(1), lamps that fail prior to 75% of rated median lamp life must not be included in the mean.

(3) The minimum sample sizes required for testing are as follows:
   (a) for lumen maintenance factor—10;
   (b) for minimum median lamp life—20;
   (c) for maximum wattage—10.

Schedule 1—Registrations affected by this instrument

Note: See section 11.

1 Table 1—Registrations affected by this instrument

The following table sets out the models whose registration is affected by this instrument.

Brand	Model Identifier	Registration Number
PHILIPS	ClassicHalo 28W B22 240V P45 FR, ClassicHalo 28W E14 240V P45 FR, Philips Halogen Lustre FROSTED	AIN0342
PHILIPS	ClassicHalo 28W E27 240V P45 CL, Philips Halogen Lustre CLEAR, ClassicHalo 28W B15 240V P45 CL, ClassicHalo 28W B22 240V P45 CL	AIN0341
PHILIPS	ClassicHalo 28W B15 240V B35 CL, ClassicHalo 28W B22 240V B35 CL, ClassicHalo 28W E14 240V B35 CL, Philips Halogen Candles	AIN0340
PHILIPS	ClassicHalo 28W B15 240V B35 FR, ClassicHalo 28W B22 240V B35 FR, ClassicHalo 28W E14 240V B35 FR, Philips Halogen Candles Frosted	AIN0339
OSRAM	64543A FRECO 46W B22D, 64543A FRECO 46W E27, Classic A Frosted ECO 46W	AIN0338
OSRAM	64544 A ECO FR 57W B22D, 64544 A ECO FR 57W E27, Classic A Frosted ECO 57W	AIN0337
OSRAM	64547 A ECO 77W B22D, 64547 A ECO 77W E27, Classic A ECO Clear 77W	AIN0336
OSRAM	64543 A ECO 46W B22D, 64543 A ECO 46W E27, Classic A ECO Clear 46W	AIN0335
OSRAM	64544 A ECO 57W B22D, 64544 A ECO 57W E27, Classic A ECO Clear 57W	AIN0334
OSRAM	64547 A ECO FR 70W B22D, 64547 A ECO FR 70W E27, Classic A ECO Frosted 70W	AIN0333
OSRAM	Halogen Classic 28W, CLAS B CL 28W 240V E14 10X2 AU OSRAM, CLAS B FR 28W 240V E14 10X2 AU OSRAM, CLAS B CL 28W 240V B15 10X2 AU OSRAM, CLAS B FR 28W 240V B15 10X2 AU OSRAM	AIN0331
OSRAM	CLAS B CL 28W 240V E27 10X2 AU OSRAM, CLAS B CL 28W 240V B22D 10X2 AU OSRAM, CLAS P CL 28W 240V B22D 10X2 AU OSRAM, Halogen Classic 28W, CLAS P CL 28W 240V E27 10X2 AU OSRAM	AIN0330
Brilliant Lighting	21070, 21069, GLS	AIN0304

Schedule 2—Products not covered by this instrument

Note: See section 14.

1 Aeronautical lamps

Aircraft lamps

(1) This instrument does not cover incandescent lamps that:
  (a) are designed to operate on an aircraft; and
  (b) satisfy the requirements of:
    (i) the airworthiness standards in subsections 23.001(1), 25.001(1), 27.001(1) and 29.001(1) of the Civil Aviation Safety Regulations; or
    (ii) Section 3, Chapter 7 (Lighting Systems) of the Airworthiness Design Requirements Manual.

Note 1: The provisions of the Civil Aviation Safety Regulations mentioned in subparagraph (b)(i) refer to the European Aviation Safety Agency certification specifications and US Federal Aviation Administration airworthiness standards for aircraft.

Note 2: The GEMS Regulator may request evidence that such lamps comply with the approval requirements mentioned in paragraph (b) (among other things).

Aeronautical ground lights

(2) This instrument does not cover lamps that:
  (a) are designed as aeronautical ground lights (within the meaning of Part 139 (Aerodromes) Manual of Standards); and
  (b) meet the requirements that apply to such lights under one or more of the following:
    (i) Part 139 (Aerodromes) Manual of Standards;
    (ii) the Defence Aviation Safety Authority Regulations, (DASR 139) – Aerodromes.

Note 1: Aeronautical ground lights are also used for aerodromes, heliports and obstacles (objects that project through protected surfaces or are otherwise determined to be a hazard of aircraft safety).

Note 2: The GEMS Regulator may request evidence that aeronautical ground lights comply with the requirements specified in paragraph (b) (among other things).

2 Other exclusions

(1) This instrument does not cover the following:
  (a) high temperature lamps;
  (b) infrared heat lamps;
  (c) low power decorative lamps.

(2) In this clause:

high temperature lamp means a lamp designed to be capable of operating at rated voltage in a 250°C oven for a minimum of 200 h, with no melting of solder and no oxidation on or near the lamp pinch area and no degradation of cement if present.

Example: Oven lamps.

Note: A test report documenting correct operation at these temperatures may provide evidence of this attribute.

infrared heat lamp means a lamp with all of the following attributes:
  (a) infrared lamp designed solely for the purpose of heating;

(b) cap: E27 (as described in IEC 60061-1);
(c) shape: R63, R75, R125 (as described in IEC 60630);
(d) rated power: 50, 100, ≥ 150 W;
(e) either of the following:
    (i) Correlated Colour Temperature (CCT) that satisfies the following formula:

$$CCT < 2{,}500\ K$$

    (ii) chromaticity coordinates that satisfy the following:

$$-2.31x^2 + 2.3653x - 0.1 < y < -2.3172x^2 + 2.3653x - 0.28$$

Note 1: Subparagraphs (i) and (ii) have the effect of excluding lamps which either have a CCT of less than 2500 K, or have x, y coordinates which are located some distance away from the black body locus.

Note 2: This subclause reflects the exclusions in clause 1.1.3 of AS 4934.2:2021.

Note 3: For the lamps listed in this subclause, it is recommended that packaging and accompanying product information state clearly and prominently their purpose and that they are not intended for general purpose illumination.

low power decorative lamp means a lamp with the following attributes:
(a) the lamp has a rated voltage >140 V a.c. or d.c.;
(b) cap: E13, E14, E26, E27, BA15d, B15d, or B22d (as described in IEC 60061-1);
(c) shape: round (P), candle (B), pigmy (S), tubular (T), globe (G) or pilot lamps (as described in IEC 60630);
(d) rated power < 10 W.

Schedule 3—Repeals

Greenhouse and Energy Minimum Standards (Incandescent Lamps for General Lighting Services) Determination 2016

1 The whole of the instrument

Repeal the instrument.