COMMITTEE EL-041

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Combined Postal Ballot/Draft for Public Comment Australian/New Zealand Standard

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D.C. supplied electronic ballasts for tubular fluorescent lamps—Performance requirements (IEC 60925, Ed. 1.2:2001 MOD) (Revision of AS 2643—1991)

STANDARDS AUSTRALIA

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Combined Postal Ballot/ Draft for Public Comment
Australian/New Zealand Standard

The committee responsible for the issue of this draft comprised representatives of organizations interested in the subject matter of the proposed Standard. These organizations are listed on the inside back cover.

Comments are invited on the technical content, wording and general arrangement of the draft.

The preferred method for submission of comment is to download the MS Word comment form found at *http://www.standards.com.au/Catalogue/misc/Public%20Comment%20Form.doc*. This form also includes instructions and examples of comment submission.

When completing the comment form ensure that the number of this draft, your name and organization (if applicable) is recorded. Please place relevant clause numbers beside each comment.

Editorial matters (i.e. spelling, punctuation, grammar etc.) will be corrected before final publication.

The coordination of the requirements of this draft with those of any related Standards is of particular importance and you are invited to point out any areas where this may be necessary.

Please provide supporting reasons and suggested wording for each comment. Where you consider that specific content is too simplistic, too complex or too detailed please provide an alternative.

If the draft is acceptable without change, an acknowledgment to this effect would be appreciated.

When completed, this form should be returned to the Projects Manager, Nat Krishnan via email to **nat.krishnan@standards.org.au**.

Normally no acknowledgment of comment is sent. All comments received electronically by the due date will be put before the relevant drafting committee. Because Standards committees operate electronically we cannot guarantee that comments submitted in hard copy will be considered along with those submitted electronically. Where appropriate, changes will be incorporated before the Standard is formally approved.

If you know of other persons or organizations that may wish to comment on this draft Standard, could you please advise them of its availability. Further copies of the draft are available from the Customer Service Centre listed below and from our website at *http://www.standards.org.au/*.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Committee EL-041—Lamps and Related Equipment

Subcommittee EL-041-03—Auxiliaries for Lamps

DRAFT

Australian/New Zealand Standard

D.C. supplied electronic ballasts for tubular fluorescent lamps— Performance requirements (IEC 60925, Ed. 1.2:2001 MOD)

(To be AS/NZS 60925:200X)

Please note that this document is currently being balloted by the committee and the results of the postal ballot will be contingent on public comment received.

Comment on the draft is invited from people and organizations concerned with this subject. It would be appreciated if those submitting comment would follow the guidelines given on the inside front cover.

This document is a draft Australian/New Zealand Standard only and is liable to alteration in the light of comment received. It is not to be regarded as an Australian/New Zealand Standard until finally issued as such by Standards Australia/Standards New Zealand.

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-041, Lamps and Related Equipment to supersede AS 2643—1991, *Fluorescent lamp ballasts of the reactive type—Performance requirements*.

The objective of this Standard is to provide the lighting industry with performance requirements for d.c. supplied electronic ballasts for tubular fluorescent lamps up to 250 V.

This Standard is an adoption with national modifications and has been reproduced from IEC 60925, Ed.1.2(2001), *DC supplied electronic ballasts for tubular fluorescent lamps—Performance requirements*, and has been varied as indicated to take account of Australian/New Zealand conditions.

Variations to IEC 60925, Ed.1.2(2001) are indicated at the appropriate places throughout this standard. Strikethrough (~~example~~) identifies IEC text, tables and figures which, for the purposes of this Australian/New Zealand Standard, are deleted. Where text, tables or figures are added, each is set in its proper place and identified by shading (example). Added figures are not themselves shaded, but are identified by a shaded border.

The important variation for Australian/New Zealand conditions is that 'all ballasts specified in the Standard shall comply with the requirements of relevant Parts of AS/NZS 61347' instead of the requirements of IEC 60924.

Each Standard in Part 2 of 61347 is intended to be used in conjunction with Part 1 in order to provide a complete Standard for that specific type of control gear. Where a particular clause of Part 1 is not mentioned in Part 2, that clause applies as far as is reasonable. Where Part 2 states 'addition', 'modification' or 'replacement', the relevant requirements in Part 1 are adapted accordingly. It is to be noted that some parts of AS/NZ 61347 series differ with parts of IEC and hence equipment that confirm to IEC standard may not comply with AS/NZ counterpart.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.

(b) A full point should be substituted for a comma when referring to a decimal marker.

In this Standard, the following print types are used:

– requirements proper: in arial type;

– *test specifications: in italic type;*

– explanatory matter: in smaller arial type.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the annex to which they apply. A 'normative' annex is an integral part of a Standard, whereas an 'informative' annex is only for information and guidance.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard

D.C. supplied electronic ballasts for tubular fluorescent lamps— Performance requirements (IEC 60925, Ed. 1.2:2001 MOD)

Section one – General performance requirements

1 Scope

This standard specifies general performance requirements for electronic ballasts for use on d.c. supplies having rated voltages not exceeding 250 V, associated with fluorescent lamps complying with IEC 60081. It shall be read in conjunction with AS/NZS 61347.1, AS/NZS 61347.2.4, AS/NZS 61347.2.5, AS/NZS 61347.2.6, and AS/NZS 61347.2.7 ~~IEC 60924~~.

Performance requirements for electronic ballasts for general, public transport and aircraft lighting are specified in Sections Two, Three and Four of this standard.

NOTE 1 In order to obtain satisfactory performance of fluorescent lamps with d.c. supplied electronic ballasts, it is necessary that certain features of their designs be properly co-ordinated. It is essential, therefore, that specifications for them be written in terms of measurement made against some common base-line of reference, which must be reasonably permanent and reproducible.

NOTE 2 These conditions may be fulfilled by reference ballasts. Moreover, the testing of ballasts for fluorescent lamps will, in general, be made with reference lamps and, in particular, by comparing results obtained on such lamps with ballasts to be tested and with a reference ballast as specified in IEC 60921.

1.1 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

References to international standards that are struck through in this clause are replaced by references to Australian or Australian/New Zealand Standards that are listed immediately thereafter and identified by shading. Any Australian or Australian/New Zealand Standard that is identical to the International Standard it replaces is identified as such.

~~IEC 60081, *Tubular fluorescent lamps for general lighting service*~~

AS/NZS 4782.1, *Double-capped fluorescent lamps—Performance specifications—General (IEC 60081:2000, MOD)*

IEC 60571, *Electronic equipment used on rail vehicles*

~~IEC 60921, *Ballast for tubular lamps: Performance requirements*~~

AS/NZS 60921, *Ballasts for tubular fluorescent lamps—Performance requirements (IEC 60921:1988, MOD)*

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~~IEC 60924:1988, *Starting devices (other than glow starters):General and safety requirements*~~

AS/NZS 61347.1, *Lamp controlgear—General and safety requirements (IEC 61347-1:2000, MOD)*

AS/NZS 61347.2.1, *Lamp controlgear—Particular requirements for starting devices (other than glow starters)*

AS/NZS 61347.2.4, *Lamp controlgear—Particular requirements for d.c. supplied electronic ballasts for general lighting*

AS/NZS 61347.2.5, *Lamp controlgear—Particular requirements for d.c. supplied electronic ballasts for public transport*

AS/NZS 61347.2.6, *Lamp controlgear—Particular requirements for d.c. supplied electronic ballasts for aircraft lighting*

IEC 61347.2.7, *Lamp controlgear—Particular requirements for d.c. supplied electronic ballasts for emergency lighting*

IEC 61547*, Equipment for general lighting purposes—EMC immunity requirements*

2 Definitions

2.1
starting aid
either a conductive strip affixed to the outer surface of a lamp, or a conductive plate which is spaced an appropriate distance from a lamp. A starting aid can only be effective when it has an adequate potential difference from one end of the lamp

2.2
ballast lumen factor
the ratio of the light output of the lamp when the ballast under test is operated at its design voltage, compared with the light output of the same lamp operated with the appropriate reference ballast supplied at its rated voltage and frequency

2.3
reference ballast
a special inductive-type ballast designed for the purpose of providing comparison standards for use in testing ballasts, and for the selection of reference lamps. It is essentially characterized by a stable voltage-to-current ratio, which is relatively uninfluenced by variations in current, temperature and the magnetic surroundings (see annex B)

2.4
symmetrical inverter
a definition is under consideration

2.5
asymmetrical inverter
a definition is under consideration

3 General note on tests

Tests shall be made under the conditions specified in annex A.

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All ballasts specified in this standard shall comply with the requirements of relevant Parts of 61347~~IEC 60924~~.

Conformity with IEC 61547 may be declared by the manufacturer and need not form part of third party approval to this standard.

4 Marking

Non-mandatory information which may be made available by the manufacturer:

a) Ballast lumen factor.

b) Rated output frequency (at the design voltage, with and without the lamp operating).

c) Limits of the ambient temperature range within which the ballast will operate suitably at the declared rated voltage range.

5 Starting

It may be expected that ballasts complying with this standard, when associated with lamps which comply with IEC 60081, will provide satisfactory starting (not hot restarting) of the lamp with an air temperature immediately around the lamp of between 10 °C and 35 °C at the minimum of the rated voltage range; and operation between 10 °C and 50 °C at other voltages within the rated voltage range.

The lamp electrical characteristics, on the lamp data sheets in IEC 60081, apply to lamps operated with a reference ballast at its rated voltage, in an ambient temperature of 25 °C.

Ballasts shall provide reliable starting of the appropriate lamps over the limits of the ambient temperature range declared by the manufacturer.

Compliance is checked by the tests of clauses 6 and 7 unless evidence of satisfactory lamp life can be given by the manufacturer.

6 Open-circuit voltage at terminations of lamp

A ballast when operated at any voltage within its rated voltage range shall provide an open-circuit voltage at the lamp terminations such that:

a) the minimum r.m.s. voltage across the lamp is at least that shown in the third column of table 1;

b) the peak voltage across the lamp does not exceed that shown in the fourth or fifth column of table 1;

c) the minimum peak voltage from one end of the lamp to the starting aid shall be at least that shown in the sixth column of table 1.

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Table 1 – Open circuit voltage for lamps with either high or low resistance cathodes (with cathode preheating)

Rated lamp wattage	Nominal dimensions of the lamp	Open-circuit voltage at lamp terminations			Voltage to starting aid
		Minimum r.m.s.	Maximum V peak		Minimum peak
			Symmetrical inverter	Asymmetrical inverter	
W	mm	V	V	V	V
4	150 × 15	100	550	700	290
6	224 × 15	100	550	700	290
8	300 × 15	100	550	700	290
13	525 × 15	200	550	700	290
15T8	450 × 25	180	550	700	260
20	590 × 38	180	550	700	260
30T8	900 × 25	205	550	700	300
30T12	900 × 38	200	550	700	290
40	1 200 × 38	205	550	700	300
65	1 500 × 38	[a]	[a]	[a]	[a]

[a] Values under consideration.

When ballasts are designed to operate lamps in parallel circuits, the relevant requirements shall be met for each separate lamp, independent of the number of lamps inserted. Lamps operated with electronic ballasts complying with this standard require a starting aid as specified in IEC 60081 except in the case of lamps with a diameter of 16 mm maximum where the starting aid shall be positioned 7 mm from the lamp.

During these tests each lamp cathode shall be replaced by a resistor having the same value as the substitution resistor on the relevant lamp data sheet of IEC 60081.

NOTE The maximum values in table 1 are higher than those recommended in IEC 60081 because of the greater voltage range of the supply voltage. This may lead to a decreased useful lamp life.

7 Pre-heating conditions

7.1 Minimum voltage across lamp cathode

With a resistor of the objective value specified on the relevant lamp data sheet of IEC 60081, substituted for each lamp cathode and when operated at any voltage within the rated voltage range, the ballast shall deliver a voltage at each resistor of at least 3,05 V r.m.s. for low resistance cathode lamps and of at least 6,5 V r.m.s. for high resistance cathode lamps.

7.2 Maximum voltage across lamp cathode

a) Ballasts for lamps with low resistance cathodes

With a resistor of the objective value specified on the relevant lamp data sheet of IEC 60081 substituted for each lamp cathode and when operated at any voltage within the rated voltage range, the ballast shall deliver a voltage at each resistor not exceeding 6,5 V r.m.s.

b) Ballasts for lamps with high resistance cathodes

With a resistor of the objective value specified on the relevant lamp data sheet of IEC 60081, substituted for each lamp cathode and when operated at any voltage within the rated voltage range, the ballast shall deliver a voltage at each resistor not exceeding 11,0 V r.m.s.

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In those cases, however where this voltage exceeds 11,0 V r.m.s. a regulation check shall be made using a resistor of a value derived from the value of nominal running current of the lamp prescribed on the relevant lamp data sheet of IEC 60081 and substituted in the following equation:

$$R = \frac{11}{2{,}1 \times I_n} \ \Omega$$

where I_n = nominal running current of the lamp.

For lamps not specified in IEC 60081, the values declared by the lamp manufacturer shall be used.

When the ballast is operated at any voltage within its rated voltage range, the current passed by each resistor shall not exceed 2,1 times the nominal value I_n shown on the relevant lamp data sheet of IEC 60081.

c) Ballasts for both high and low resistance cathode lamps

These ballasts shall comply with the requirements of item b).

8 Lamp current and luminous flux

The ballasts shall limit the arc current delivered to a reference lamp to a value not exceeding 125 % of that delivered to the same lamp when operated with a reference ballast. The ballast under test shall be operated at its design voltage and the appropriate reference ballast shall be operated at its rated voltage and frequency.

Under the same conditions, the ratio of the luminous flux shall be not less than 95 % of the declared ballast lumen factor.

NOTE Any test circuit corresponding to that of figure 1 can be used to make the measurements; but caution is needed regarding capacitance effects, resistors should be non-inductive, and instruments should be suitable for the frequencies involved.

Reference lamps shall be measured and selected as outlined in IEC 60921 and have the characteristics specified on the appropriate lamp data sheets in IEC 60081.

When measured in accordance with the requirements for reference ballasts given in IEC 60921, reference ballasts shall have the characteristics specified both in that publication and on the appropriate lamp data sheets in IEC 60081.

9 Supply current

At the design voltage, the supply current shall not differ by more than ±15 % from the value marked on the ballast when the latter is operated with a reference lamp.

The supply shall be of low resistance and low inductance (applicable only when batteries are remote from the ballast).

For ballasts (other than electronic ballasts for general lighting) supplied from central systems any r.m.s. a.c. current component of the d.c. input current shall not exceed 10 % unless otherwise declared by the manufacturer. This is determined by measuring the voltage across a non-inductive resistor in series with the input to the ballast. The d.c. voltage drop across the resistor shall not exceed 2 % of the design voltage.

If a manufacturer declares that an a.c. component of the d.c. input current higher than 10 % is permitted, the endurance test shall be carried out with an r.m.s. design voltage of the waveform as declared.

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10 Maximum current in any lead (with cathode preheating)

The current flowing in any one of the cathode terminations shall not exceed the value given in IEC 60081 on the relevant lamp data sheet.

Compliance is checked with an appropriate reference lamp in circuit and with the ballast in normal operation and at a supply voltage equal to the maximum of the rated voltage range. The procedure of IEC 60921 *but with non-inductive resistors is used.*

11 Lamp operating current waveform

The waveform of the current supplied in the steady state to a reference lamp, associated with a ballast supplied at its design voltage, shall be such that the peak current does not exceed 1,7 times nominal lamp operating current as specified on the relevant lamp data sheet of IEC 60081or 3,0 times measured r.m.s. lamp current, whichever is the lower.

12 Stable operation (dimming ballasts only)

During stable operation of the lamp a sufficient electrode temperature shall be ensured. This condition is fulfilled if the r.m.s. value of the lamp current is equal to or greater than *x* % of the reference current over the dimming range. In cases where the lamp current is less than *y* % of the reference current the heating of the electrodes shall continue during operation.

NOTE *x* and *y* are under consideration.

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Section two – Particular performance requirements for d.c. supplied electronic ballasts for general lighting

13 Scope

This section specifies particular performance requirements for electronic ballasts intended for operation from transient and surge free power sources e.g. the leisure market, use in caravans etc., operated directly from batteries without charging equipment.

For the purpose of this section the general performance requirements of section one apply, subject to the following modifications.

14 Temperature cycling and endurance test

The ballast shall be mounted in accordance with the manufacturer's instructions (including heat sink, if specified) and operated in association with (an) appropriately rated lamp(s) at the maximum voltage of the rated voltage range, and subjected to a temperature cycling test and endurance test as follows:

a) The temperature cycling test is carried out for 1 h at the lower limit of the ambient temperature range, followed by 1 h at the upper limit of the ambient temperature range. Five such temperature cycles are carried out.

b) The endurance test is then carried out for a total period of 200 h, at the ambient temperature which produces t_c. At the end of this time, and after cooling to room temperature, the ballast shall start and operate an appropriate lamp for 15 min.

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Section three – Particular performance requirements for d.c. supplied electronic ballasts for public transport lighting

15 Scope

This section specifies particular performance requirements for electronic ballasts intended for operation from power sources likely to have attendant transients and surges, e.g. for road and railway vehicles, tramcars, and boats used for public transport.

For the purpose of this section the general performance requirements of Section One apply, subject to the following modifications specified below.

16 Marking

16.1 Indication of test procedure according to clause 17 if appropriate, symbol: "SP".

In addition the following information shall be made available by the manufacturer.

16.2 Indication of permissible waveform distortion of the d.c. input current related to the maximum voltage of the rated voltage range.

17 Starting test procedure for electronic ballasts with symbol "SP"

This test may be specified by the manufacturer in place of clause 15.

The ballast shall be designed so that the appropriate lamp(s) achieve(s) sufficient switchings.

Compliance is checked as follows:

A new lamp shall achieve at least 100 000 switchings when the ballast is operated at design voltage in an ambient temperature according to A.1.1 of annex A. The switching cycle is: 3 s "ON", 12 s "OFF". If this test fails it is repeated with a new lamp. After this test a further test is made to see if the same lamp starts at the lowest voltage of the rated voltage range at both the lower limit and the higher limit of the ambient temperature range.

18 Temperature cycling and endurance test

The ballast shall be mounted in accordance with the manufacturer's instructions (including heat sink, if specified) and operated in association with an appropriately rated lamp(s) at the maximum voltage of the rated voltage range, and subjected to a temperature cycling test and endurance test as follows:

a) The temperature cycling test is carried out for 1 h at the lower limit of the ambient temperature range, followed by 1 h at the upper limit of the ambient temperature range. Five such temperature cycles are carried out.

b) The endurance test is then carried out for a total period of 200 h at the ambient temperature which produces t_c. At the end of this time, and after cooling to room temperature, the ballast shall start and operate an appropriate lamp for 15 min.

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19 Fuse

The ballast shall incorporate a replaceable fuse to protect the power supply from excess fault current.

Compliance is checked by inspection.

20 Acoustic noise

When operating over the rated voltage range and with a lamp operating, the ballast shall comply with the following requirements:

a) at and above an operating frequency of 18 kHz: no requirements;

b) below an operating frequency of 18 kHz: requirements under consideration.

21 Vibration

Requirements for vibration tests are under consideration with regard to the corresponding requirements of IEC 60571.

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Section four – Particular performance requirements for d.c. supplied electronic ballasts for aircraft lighting

22 Scope

This section specifies particular performance requirements for electronic ballasts intended for operation from power sources likely to have attendant transients and surges, such as in aircraft.

For the purpose of this section the general performance requirements of section one apply, subject to the following modifications specified below.

23 Marking

The following information shall be made available by the manufacturer:

Indication of permissible waveform distortion of the d.c. input current related to the maximum voltage of the rated voltage range.

24 Temperature cycling and endurance test

The ballast shall be mounted in accordance with the manufacturer's instructions (including heat sink, if specified) and operated in association with (an) appropriately rated lamp(s) at the maximum voltage of the rated voltage range, and subjected to a temperature cycling test and an endurance test as follows:

a) The temperature cycling test is carried out for 1 h at the lower limit of the ambient temperature range, followed by 1 h at the upper limit of the ambient temperature range. Five such temperature cycles are carried out.

b) The endurance test is then carried out for a total period of 200 h, at the ambient temperature which produces t_c. At the end of this time, and after cooling to room temperature, the ballast shall start and operate an appropriate lamp for 15 min.

25 Fuse

The ballast shall incorporate a replaceable fuse to protect the power supply from excess fault current.

Compliance is checked by inspection.

26 Vibration

Requirements are under consideration.

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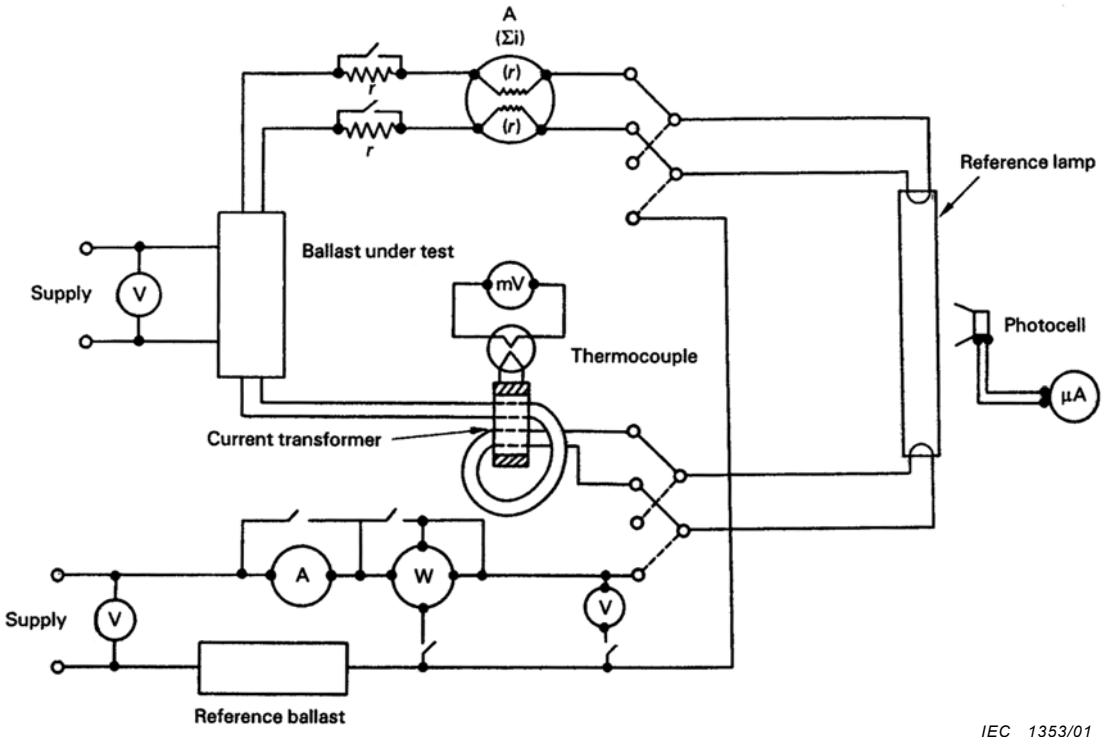

Figure 1 – Measurement of lamp power and current output (lamps without starter)

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Annex A

Tests

A.1 General requirements

Tests are type tests. One ballast shall be submitted to all tests.

A.1.1 Ambient temperature

Tests shall be made in a draught-free room and at an ambient temperature within the range 20 °C to 27 °C.

For those tests which require constant lamp performance, the ambient temperature around the lamp shall be within the range 23 °C to 27 °C and shall not vary by more than 1 °C during the test.

A.1.2 Supply voltage and frequency

a) Test voltage and frequency

Unless otherwise specified, the ballast to be tested shall be operated at its design voltage and the reference ballast at its rated voltage and frequency.

b) Stability of supply and frequency

For the majority of the tests the supply voltage, and where appropriate for the reference ballasts the frequency, shall be maintained constant within ±0,5 %. However, during the actual measurement, the voltage shall be adjusted to within ±0,2 % of the specified testing value.

c) Supply voltage waveform for reference ballast only

The total harmonic content of the supply voltage shall not exceed 3 %. Harmonic content is defined as the root-mean-square (r.m.s.) summation of the individual components using the fundamental as 100 %.

A.1.3 Magnetic effects

Unless otherwise specified, no magnetic object shall be allowed within 25 mm of the face of the reference ballast or the ballast under test.

A.1.4 Mounting and connection of reference lamps

In order to ensure that reference lamps repeat their electrical values with the greatest consistency, it is recommended that the lamps be mounted horizontally and allowed to remain permanently in their test lampholders. So far as the identification of ballast terminals will permit, reference lamps should be connected in circuit maintaining the polarity of the connections used during ageing.

A.1.5 Reference lamp stability

a) A lamp shall be brought to a condition of stable operation before carrying out measurements. No swirling shall be present.

b) The characteristics of a lamp shall be checked immediately before and immediately after each series of tests.

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A.1.6 Instrument characteristics

a) Potential circuits

Potential circuits of instruments connected across the lamp shall not pass more than 3 % of the nominal running current.

b) Current circuits

Instruments connected in series with the lamp shall have a sufficiently low impedance such that the voltage drop shall not exceed 2 % of the objective lamp voltage.

Where measuring instruments are inserted into parallel heating circuits, the total impedance of the instruments shall not exceed 0,5 Ω.

c) R.M.S. measurements

Instruments shall be essentially free from errors due to waveform distortion and shall be suitable for the operating frequencies. Care shall be taken to ensure that the earth capacitance of instruments does not disturb the operation of the ballast under test. It may be necessary to ensure that the measuring point of the circuit under test is at earth potential.

A.1.7 Inverter power sources

Where ballasts are intended for use from battery supplies it is permissible to substitute a d.c. power source other than a battery, provided that the source impedance is equivalent to that of a battery.

NOTE A non-inductive capacitor of appropriate rated voltage and with a capacitance of at least 50 µF, connected across the supply terminals of the ballast under test normally provides a source impedance simulating that of a battery.

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Annex B

Reference ballasts

When measured in accordance with the requirements for reference ballasts given in IEC 60921, reference ballasts shall have those characteristics specified both in that publication and on the appropriate lamp data sheets in IEC 60081.

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Annex C

Reference lamps

Reference lamps shall be measured and selected as outlined in IEC 60921 and have the characteristics specified on the appropriate lamp data sheets in IEC 60081.

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Annex D
(informative)

A guide to quoting product life and failure rate

D.1 To allow the lifetime and failure rate of different electronic products to be meaningfully compared by a user it is recommended that the data defined in clauses D.2 and D.3 are provided by the manufacturer in a product catalogue.

D.2 The maximum surface temperature, symbol t_l (t-lifetime) of the electronic product or the maximum part temperature which affects product life, measured under normal operating conditions and at the nominal voltage or at the maximum of the rated voltage range, that allows a life of 50 000 h to be achieved.

NOTE In some countries, like Japan, a life of 40 000 h should be applied.

D.3 The failure rate, if the electronic product is operated continuously at the maximum temperature t_l (defined in clause D.2). Failure rate should be quoted in units of failure in time (fit).

D.4 For the method used to obtain the information given in clauses D.2 and D.3 (mathematical analysis, reliability test etc.), the manufacturer should, on request, provide a comprehensive data file containing the details of the method.

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** END OF DRAFT **

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PREPARATION OF JOINT AUSTRALIAN/NEW ZEALAND STANDARDS

Joint Australian/New Zealand Standards are prepared by a consensus process involving representatives nominated by organizations in both countries drawn from all major interests associated with the subject. Australian/New Zealand Standards may be derived from existing industry Standards, from established international Standards and practices or may be developed within a Standards Australia, Standards New Zealand or joint technical committee.

During the development process, Australian/New Zealand Standards are made available in draft form in order that all interests concerned with the application of a proposed Standard are given the opportunity to submit views on the requirements to be included. Copies of this draft are available through the National Sales Centre, free call 1300 65 46 46.

The following interests are represented on the committee responsible for this draft Australian/ New Zealand Standard:

Association of Consulting Engineers, Australia

Australian Chamber of Commerce and Industry

Australian Electrical and Electronic Manufacturers Association

Consumer Federation of Australia

Electrical Compliance Testing Association of Australia

Electrical Regulatory authorities council (Australia)

Energy Efficiency and Conservation Authority of New Zealand

Illuminating Engineering Society of Australia and New Zealand

International Accreditation of NZ (IANZ)

Ministry of Economic Development, New Zealand

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Standards Australia

Standards Australia is an independent company, limited by guarantee, which prepares and publishes most of the voluntary technical and commercial standards used in Australia. These standards are developed through an open process of consultation and consensus, in which all interested parties are invited to participate. Through a Memorandum of Understanding with the Commonwealth government, Standards Australia is recognized as Australia's peak national standards body.

Standards New Zealand

The first national Standards organization was created in New Zealand in 1932. The Standards Council of New Zealand is the national authority responsible for the production of Standards. Standards New Zealand is the trading arm of the Standards Council established under the Standards Act 1988.

Australian/New Zealand Standards

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International Involvement

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