

AS 3963—1991

Australian Standard<sup>®</sup>

---

**a.c. supplied electronic ballasts for  
tubular fluorescent lamps—  
Performance requirements**

---

[Title allocated by Defence Cataloguing Authority:  
BALLAST, LAMP—PERFORMANCE REQUIREMENTS (NSC 6250)]

This Australian Standard was prepared by Committee LG/3, Auxiliaries for Discharge Lamps. It was approved on behalf of the Council of Standards Australia on 28 June 1991 and published on 16 September 1991.

---

The following interests are represented on Committee LG/3:

Association of Consulting Engineers Australia  
Australian Electrical and Electronic Manufacturers Association  
Confederation of Australian Industry  
Electricity Supply Association of Australia  
Illuminating Engineering Societies of Australia  
Ministry of Housing and Construction, Vic.  
Public Works Department, N.S.W.  
Railways of Australia Committee  
Regulatory Authorities (electrical)

---

**Review of Australian Standards.** To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications, this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

---

Australian Standard<sup>®</sup>

---

**a.c. supplied electronic ballasts for  
tubular fluorescent lamps—  
Performance requirements**

---

First published as AS 3963—1991.

## PREFACE

This Standard was prepared by the Standards Australia Committee on Auxiliaries for Discharge Lamps. It specifies performance requirements for electronic ballasts designed for use with tubular fluorescent lamps having characteristics as specified by either –

- (a) AS 1201: *Tubular fluorescent lamps for general lighting service*;
- (b) IEC 901: *Single-capped fluorescent lamps—Safety and performance requirements*; or
- (c) the manufacturer of the ballast.

Electrical safety requirements are not included herein, but are covered by AS 3134 (Int), *Approval and test specification — a.c. supplied electronic ballasts for tubular fluorescent lamps*.

This Standard, other than in editorial presentation, closely follows IEC 929, *a.c. supplied electronic ballasts for tubular fluorescent lamps—Performance requirements*. Acknowledgment is made of the assistance received from this source.

## CONTENTS

	<i>Page</i>
1 SCOPE .....	3
2 REFERENCED DOCUMENTS .....	3
3 DEFINITIONS .....	3
4 SAFETY REQUIREMENTS .....	4
5 CIRCUIT POWER FACTOR .....	4
6 MAXIMUM CURRENT IN ANY LEAD TO A CATHODE .....	4
7 STARTING CONDITIONS .....	4
8 STARTING AID AND DISTANCES .....	5
9 OPERATING CONDITIONS .....	5
10 LAMP OPERATING CURRENT WAVEFORM .....	6
11 MAGNETIC SCREENING .....	6
12 IMPEDANCE AT AUDIO-FREQUENCIES .....	6
13 MAINS TRANSIENT OVER-VOLTAGES .....	6
14 PERFORMANCE AND TESTING .....	6
15 OPERATIONAL TESTS FOR ABNORMAL CONDITIONS .....	6
16 ENDURANCE .....	6
17 MARKING .....	7
APPENDICES	
A REFERENCE BALLASTS .....	8
B REFERENCE LAMPS .....	10
C GENERAL CONDITIONS OF TESTING .....	10
D TEST CONDITIONS .....	11
E EXPLANATION OF STARTING CONDITIONS .....	16

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

## STANDARDS AUSTRALIA

## Australian Standard

**a.c. supplied electronic ballasts for tubular fluorescent lamps—  
Performance requirements**

**1 SCOPE** This Standard specifies performance requirements for electronic ballasts for use on a.c. supplies up to 1000 V at 50 Hz with operating frequencies deviating from the supply frequency associated with or incorporated in tubular fluorescent lamps as specified in either AS 1201, IEC 901 or by the ballast manufacturer and operated with or without a starter switch.

**2 REFERENCED DOCUMENTS** The following documents are referred to in this Standard:

AS

1201 Tubular fluorescent lamps for general lighting service

3134 (Int) Approval and test specification — a.c. supplied electronic ballasts for tubular fluorescent lamps

IEC

901 Single-capped fluorescent lamps — Safety and performance requirements

**3 DEFINITIONS** For the purpose of this Standard, the definitions below apply.

**3.1 Ballast** — unit inserted between the supply and one or more fluorescent lamps which serves mainly to limit the lamp current to the required value. The unit may consist of one or more separate components.

It may also include means for transforming the supply voltage and arrangements which help to provide starting voltage and preheat current, prevent cold starting, reduce stroboscopic effects, correct the power factor or suppress radio interference.

**3.2 Electronic ballast** — mains-supplied a.c. to a.c. inverter, which includes stabilizing elements for starting and operating one or more tubular fluorescent lamps, generally at high frequency.

**3.3 Independent ballast** — ballast which can be mounted separately outside a luminaire, without any additional enclosure.

**3.4 Built-in ballast** — a ballast exclusively designed to be built into a luminaire, box, enclosure or similar container.

**3.5 Integral ballast** — ballast which forms a non-replaceable part of a luminaire or lamp and which cannot be tested separately.

**3.6 Supply voltage** — voltage applied to the complete circuit of one or more lamps and ballast.

**3.7 Working voltage** — highest r.m.s. voltage which may occur across any insulation, transients being neglected, in open-circuit conditions or during lamp operation, when the ballast is operated at its rated voltage.

**3.8 Rectifying effect** — effect which may occur at the end of lamp life when one cathode is broken or has insufficient electron emission resulting in the arc current in consecutive half cycles being unequal.

**3.9 Rated maximum operating temperature of a ballast case: ( $t_c$ )** — highest permissible temperature which may occur on the outer surface (at the indicated place if marked) of the ballast under normal operating conditions and at the rated voltage or the maximum of the rated voltage range.

**3.10 Starting aid** — any physical means which assists the lamp during starting in starterless circuits.

**3.11 Ballast lumen factor** — ratio of the light output of a reference lamp when the ballast under test is operated at its rated voltage compared with the light output of the same lamp operated with the appropriate reference ballast supplied at its rated voltage and frequency.

**3.12 Reference ballast** — special ballast for providing comparison standards for testing ballasts and for selecting reference lamps. It is essentially characterized by the fact that at its rated frequency it has a stable voltage/current ratio which is relatively uninfluenced by variations in current, temperature and the magnetic surroundings, as outlined in Appendix A.

**3.13 Reference lamp** — lamp for testing ballasts which, when associated with a reference ballast under the conditions specified in Appendices A and B, has electrical characteristics which are close to the nominal values as stated in the relevant lamp Standard for that particular type of lamp.

**3.14 Calibration current of a reference ballast** — value of current on which the calibration and control of the ballast are based.