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SAA Public Lighting Code

Part 2: Computer procedures for the calculation of light technical parameters for Category A lighting

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Australian Automobile Association

Australian Council of Local Government Engineers Associations

Australian Electrical and Electronic Manufacturers Association

Australian National Committee on Illumination

Australian Road Research Board

Confederation of Australian Industry

Department of Housing and Construction

Department of Transport

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Part 2: Computer procedures for the calculation of light technical parameters for Category A lighting

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PREFACE

This standard was prepared by the Association's Committee on Street Lighting. It is one of what is essentially a new series of standards which, although retaining the generic designation AS 1158, supersedes the previous series, i.e. AS 1158 Part 1—1973, Part 2—1971 and Part 5—1974. Of this previous series it should be noted that Part 3 and Part 4, although foreshadowed, were never prepared.

This standard (designated AS 1158.2) forms Part 2 of the new series which comprises the following standards:

AS 1158.1 SAA Public Lighting Code

Part 1—Performance and Installation Design Requirements

The standard applies to the whole of the urban road hierarchy from major arterial roads, including freeways, to residential streets and certain public thoroughfares, other than roads, which provide for the movement of pedestrians and/or cyclists. A number of lighting categories are described for application to particular types of road or area and appropriate performance and installation design requirements are specified for each category. It also specifies the luminaire and installation design data that must be provided to facilitate lighting design and assessment of compliance with the specified requirements.

AS 1158.2 SAA Public Lighting Code

Part 2—Computer Procedures for the Calculation of Light Technical Parameters for Category A Lighting

The standard specifies the computer–based procedures applicable to Category A lighting for use in the derivation of installation design data or for the direct calculation of light technical parameters to determine compliance with the requirements of AS 1158.1. It describes the use of a computer program, designated SAA STAN, for the calculation of light technical parameters on straight sections of road. The source code for the SAA STAN program (on a 13 cm IBM–formatted flexible disc) is provided with the standard.

AS 1158.3 SAA Public Lighting Code

Part 3—Guide to Design, Installation and Maintenance†

The standard sets out guidelines for the design, installation and maintenance of lighting for roads and public thoroughfares, other than roads, which provide for the movement of pedestrians and/or cyclists. The purpose of the standard is to provide background information and advice to assist in the application of the requirements of AS 1158.1.

AS 1158.4 SAA Public Lighting Code

Part 4–Supplementary Lighting at Pedestrian Crossings

The standard specifies requirements for a system of floodlighting comprising one or more floodlights mounted above each stream of traffic with the beam(s) pointed in the direction of the traffic flow and downwards towards the pedestrian crossing. It assumes the existence of and is supplementary to road lighting complying with the requirements of AS 1158.1.

AS 1158.1, AS 1158.2 and, when published, AS 1158 .3 together supersede AS 1158, Part 1—1973 and Part 2—1971. The three standards collectively represent a major change in the approach previously adopted in the specification of road lighting. Information on the most significant changes is contained in the Foreword to AS 1158.1.

AS 1158.4, when published, will supersede AS 1158, Part 5—1974.

Grateful acknowledgement is made of the assistance provided by staff of the University of New South Wales in the preparation of this standard.

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* AS 1158 SAA Public Lighting Code
Part 1–1973 Lighting of Urban Traffic Routes
Part 2–1971 Lighting of Minor Streets
Part 5–1974 Supplementary Lighting at Pedestrian Crossings

† In course of preparation

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STANDARDS ASSOCIATION OF AUSTRALIA

AUSTRALIAN STANDARD
for
THE LIGHTING OF URBAN ROADS AND OTHER PUBLIC THOROUGHFARES

PART 2—COMPUTER PROCEDURES FOR THE CALCULATION OF LIGHT TECHNICAL PARAMETERS FOR CATEGORY A LIGHTING

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies the computer-based design procedures applicable to Category A lighting (see Note 1) for use in —

(a) the derivation of the installation design aids described in AS 1158.1, i.e. luminaire spacing tables, luminaire performance tables and isolux diagrams; and

(b) the direct calculation of light technical parameters, where required, for the design or evaluation of road lighting in accordance with the requirements of AS 1158.1.

This standard describes the use of a computer program, designated SAA STAN, for the calculation of light technical parameters for straight sections of road. The source code for the program is available on a 13 cm IBM-formatted flexible disc as AS 1158.2S. A copy of the disc is provided in a pocket inside the back cover of this standard.

NOTES:

1. See AS 1158.1 for information on the classes of road for which Category A lighting is appropriate.
2. It is expected that persons using this standard will have some expertise in lighting design and be familiar with the nature of computer generated data.
3. The use of the program SAA STAN is described in Section 4 and other relevant information is given in Appendix B.

1.2 REFERENCED DOCUMENTS. The following standards and other documents are referred to in this standard:

AS 1158.1 SAA Public Lighting Code
Part 1 — Performance and Installation Design Requirements

ANSI X3.9 American National Standard Programming Language FORTRAN (designated as FORTRAN 77)

CIE Publication No 30.2 Calculation and Measurement of Luminance and Illuminance in Road Lighting*

CIE Publication No 31 Glare and Uniformity in Road Lighting Installations*

ARRB Publication ARR 106 The Design and Implementation of Fixed Lighting for Arterial Roads and Freeways. Ed. R R Hall (1980).
Australian Road Research Board Research Report.

1.3 DEFINITIONS. For the purpose of this standard, the definitions given in AS 1158.1 apply.

1.4 SYMBOLS AND ABBREVIATIONS. For the purpose of this standard the symbols and abbreviations given in AS 1158.1 apply.

1.5 COMPUTER PROGRAMS AND THEIR APPLICATION.

1.5.1 General. The computer programs and the road elements for which their use is applicable for the purpose of AS 1158.1 are shown in Fig. 1.1. Fig. 1.1 also shows the computer programs which are applicable for the generation of the installation design aids described in AS 1158.1. The dashed flow lines in Fig. 1.1 indicate that the path is possible but requires greater user control and data tabulation.

In order to ensure that data derived from the computer programs by different users are compatible, the designated specifications of computation referred to in Clauses 1.5.2, 1.5.3 and 1.5.4 should be observed, as applicable.

1.5.2 SAA STAN. The program SAA STAN is used to generate data on which the three design methods prescribed for Category A lighting in AS 1158.1 are based. The use of the program is described in Section 4 herein and other relevant information is given in Appendix B. The designated specifications of computation for SAA STAN are prescribed in Clause 3.1.

1.5.3 LUCIE. It will be noted from Fig. 1.1 that LUCIE can be used for the design of lighting on all nominated road elements — it is a very flexible and comprehensive program. Consequently it requires more complex input data to correctly specify the situation and greater user awareness for inadvertent errors in the input data as these may not always be obviously reflected in the output.

For straight road elements there is no real benefit to be gained in using LUCIE and, for these applications, it is very much simpler to use SAA STAN.

For the calculation of illuminance values for intersections, junctions and roundabouts, etc, the use of LUCIE requires the reflection characteristics of a hypothetical road surface to be entered. This 'hypothetical road surface is a uniform diffuser. The resultant 'luminance' values calculated by LUCIE are in fact illuminance values, expressed in lux. The use of LUCIE to calculate large numbers of illuminance values in this manner is not very efficient and the use

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