AS 2713—1984
UDC 628.976:621.385.832

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Australian Standard 2713—1984

LIGHTING AND THE VISUAL ENVIRONMENT FOR SCREEN-BASED TASKS

STANDARDS ASSOCIATION OF AUSTRALIA
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This Australian Standard was prepared by Committee LG/1, Interior Lighting. It was approved on behalf of the Council of the Standards Association of Australia on 3 April 1984 and published on 11 May 1984.

The following interests are represented on Committee LG/1:

Association of Consulting Engineers Australia

Australian Chamber of Commerce

Australian Electrical and Electronic Manufacturers Association

Australian Optometrical Association

Confederation of Australian Industry

Department of Employment and Industrial Relations

Department of Housing and Construction

Department of Industrial Relations, New South Wales

Department of Public Works, New South Wales

Electricity Supply Association of Australia

Illuminating Engineering Societies of Australia

Public Works Department, Victoria

Royal Australian Institute of Architects

University of Sydney

This standard was issued in draft form for comment as DR 82133.

AUSTRALIAN STANDARD

LIGHTING AND THE VISUAL ENVIRONMENT FOR SCREEN-BASED TASKS

AS 2713—1984

First published 1984

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.

ISBN 0 7262 3397 8

PREFACE

This standard was prepared by the Association's Committee on Interior Lighting, in response to a request from the Australian Journalists Association for guidance on the lighting and environmental conditions necessary for the satisfactory performance of screen-based visual tasks, especially those involving visual display units and other terminals which utilize a cathode ray tube display. The standard makes extensive referance to AS 1680 which sets out recommendations which are applicable generally for all types of visual task.

The last few years have seen a dramatic increase in the use of screen-based equipment such as visual display units and microform readers. Work with screen-based equipment differs in a number of important ways from traditional reading and writing tasks, often referred to as 'hard copy' tasks. For example, individual workers have much less freedom in choosing—and in periodically changing—their working position and/or line of sight. Also, the worker's line of sight is nearer to the horizontal. Correct ergonomic design of the workstation is therefore of particular importance, especially when screen-based equipment is in continuous use by an operator seated in a fixed position. Appendix B provides information on ergonomic and other factors associated with the design and use of screen-based equipment which interact with lighting and visual conditions.

It should be noted that provision of good lighting and environmental conditions cannot compensate for defects in message visibility which are caused by the design or construction of the screen-based equipment. On the other hand, an unsatisfactory lighting installation or environment can greatly reduce the visibility of an otherwise satisfactory screen display.

The recommendations in this standard are based on the equipment and practices existing at the time of its preparation. Attention is drawn to the fact that the design and use of screen-based equipment is still at an early stage of development, and further changes are likely to take place, both in equipment design and in the associated lighting and environmental design techniques.

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Australian Standard
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LIGHTING AND THE VISUAL ENVIRONMENT FOR SCREEN-BASED TASKS

1 SCOPE. This standard sets out recommendations for the creation of a suitable visual environment for the use of screen-based equipment (SBE). The general recommendations in AS 1680 will also apply to areas where SBE is used, unless otherwise indicated in this standard.

The recommendations apply primarily to installations where operators use SBE for prolonged periods (see Clause 4.1 and Clause B2 of Appendix B).

NOTES:

1. Whilst the recommendations of this standard are concerned primarily with lighting and visual conditions, attention is drawn to the importance of ergonomic and other factors in creating a satisfactory environment for the use of SBE. Some of these factors are described in Appendix B and further information may be obtained from documents referenced in the Annex.
2. Appendix C provides a checklist of the information which should be provided to facilitate the design of interiors suited to screen-based tasks.

2 REFERENCED DOCUMENTS. A list with titles of the documents referred to in this standard is given in the Annex. The Annex also lists several additional documents which are considered useful sources of information on the subject of this standard.

3 DEFINITIONS. For the purpose of this standard, the following definitions apply.

3.1 Brightness (luminosity)—the attribute of visual sensation according to which a surface appears to emit or reflect more or less light.

NOTE: This is a subjective effect which cannot be measured in absolute units, and the term should only be used to describe the appearance of a source or surface.

3.2 General lighting—lighting designed to illuminate an area without special provision for local requirements within that area.

NOTE: Normally this is provided by an arrangement of luminaires which produce approximately uniform illuminance throughout an interior.

3.3 Glare—a visual condition which results in discomfort, annoyance, interference with visual efficiency, or eye fatigue due to the brightness of a portion of the field of view (e.g. lamps, luminaires, or other surfaces) being markedly greater than the rest.

NOTE: 'Glare' comprises two distinct effects. These are 'discomfort glare' which causes discomfort without necessarily impairing the visibility of objects, and 'disability glare' which impairs the visibility of objects without necessarily causing discomfort. Both effects are usually present but in artificially lit interiors the controlling of discomfort glare will normally control disability glare effects as well.

3.4 Illuminance—the luminous flux incident on a surface per unit area. The unit is the lux (lx). Symbol E.

3.5 Illumination—the process of lighting an object.

3.6 Local lighting—the illumination of a specific task area by a luminaire or luminaires specially provided for the purpose.

NOTE: This method of lighting frequently contributes little, if any, general illumination and in such cases should be used only in conjunction with general lighting.

3.7 Luminaire—apparatus (fixed or portable) which distributes, filters or transforms the light given by a lamp or lamps and which includes all the items necessary for fixing and protecting these lamps and for connecting them to the supply circuit.

It does not include permanent parts of a building such as a ceiling or other structural element.

3.8 Luminance (at a point of a surface and in a given direction)—the luminous intensity per unit projected area of a surface; e.g. if a very small portion of a surface has a luminous intensity of 1 cd in a particular direction, and if the orthogonal projection (on a plane perpendicular to the given direction) of that portion has an area A, the average luminance in that direction is 1/A candelas per unit area. The unit is the candela per square metre (cd/m^2).

3.9 Microform reader—an optical projection device, with either a front projection or back projection screen, for viewing an enlarged micro-image with the unaided eye. The term includes microfiche and microfilm readers.

NOTE: Requirements for the design and construction of microfiche readers are provided in AS 2653, AS 2654 and AS 2655.

3.10 Partition screen—an opaque screening device, either floor mounted or suspended which, when suitably placed, will eliminate the direct or reflected view of bright windows or luminaires.

3.11 Reflectance (reflection factor)—the ratio of the luminous flux reflected from a surface to the incident luminous flux.

3.12 Room index—a factor dependent on the shape of a room or space which is used to indicate the relative efficiency with which light energy is utilized.

NOTE: The room index is given by the following formula:

$$\text{Room index} = \frac{L \times W}{H_m (L + W)}$$

where

L = length of the room

W = width of the room

H_m = mounting height of the luminaires above the working plane

3.13 SBE workstation—a particular location within an office, business or industrial environment at which any form of SBE is installed and used.

NOTE: Guidelines for the design of microform workstations are provided in AS 2466.

3.14 Screen-based equipment (SBE)—equipment which displays information on a screen. The term includes visual display units and microform readers.

3.15 Service illuminance—the mean illuminance throughout the life of a lighting installation averaged over a particular area. This area may be large or small,