Australian Standard®

Safe use of lasers in the building and construction industry

This Australian Standard was prepared by Committee SF/19, Personal Protection Against Laser Radiation. It was approved on behalf of the Council of Standards Australia on 25 March 1992 and published on 14 June 1993.

The following interests are represented on Committee SF/19:

Australian Chamber of Commerce and Industry

Australian Dental Association

Australian Laser Institute

Dept of Employment, Vocational Education Training and Industrial Relations, Queensland

Department of Defence (Commonwealth)

Department of Health, New South Wales

Department of Health, Queensland

Health Department, Victoria

Melbourne Water

Occupational Health and Safety Authority, Victoria

Queensland University of Technology

Royal Australian College of Ophthalmologists

Safety Institute of Australia

Telecom Australia

University of Melbourne

Water Board—Sydney—Illawarra—Blue Mountains

WorkCover Authority, New South Wales

Additional interests participating in preparation of Standard:

Australian Radiation Laboratory

Building Workers Industrial Union

Laser manufacturers

Master Builders Federation of Australia

Victorian Building Industry Training Council

Victorian Trades Hall Council

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PREFACE

This Standard was prepared by the Standards Australia Committee on Lasers Used In the Construction Industry, to supersede AS 2397—1980 and as a supplementary Standard to AS 2211, *Laser safety*. It was originally prepared following requests from interests involved in the building and construction industry, who felt that management, employees, and authorities concerned with certain tasks in that industry needed a ready reference to safety procedures appropriate for lasers in their industry without necessarily having to refer to the more complex Standard AS 2211. This Standard reflects experience gained in the application of the 1980 edition and the industry developments since that time.

The Standard refers exclusively to safety matters associated with lasers used for alignment, levelling, control, and survey tasks in the building and construction industry. While the general requirements of AS 2211 apply to the design, manufacture and use of such lasers, this Standard—

(a) contains only those requirements pertinent to lasers used for alignment, levelling, control, and survey tasks;

(b) presents such requirements in terminology familiar to or understandable by tradespeople and non-professional persons who may operate lasers in the course of their employment; and

(c) standardizes guidelines and syllabus for the training and certification of laser safety officers (LSOs). Laser safety officers are persons trained in the elementary theory and practical application of lasers and with authority and responsibility for ensuring that other persons do not receive harmful exposure to laser radiation.

The equipment warning labels and area warning signs to be used on the types of lasers permitted by this Standard have been reproduced in Appendix A of this Standard for information.

Significant changes incorporated in this edition include the following:

(i) The industry definition and associated tasks for which this Standard is applicable have been clarified.

(ii) The definition of a Class 3B (Restricted) laser as one which has the same 5 mW power (radiant power) limit as Class 3A lasers but has an irradiance limit of 50 Wm^{-2}.

(iii) The provision for the use of 'Class 3B (Restricted)' lasers where the level of illumination is appropriate, i.e. not dimly lit.

(iv) Clarification that eye examinations are not specified for users of the classes of laser permitted by this Standard.

(v) Amendment to the suggested syllabus for training programs for LSOs and their responsibilities.

(vi) Identification of matters with which operators of lasers should be familiar.

Regarding (iii) and (iv), experience has shown the 5 mW visible light helium neon lasers, often used for levelling and alignment work, have irradiance levels between 35 Wm^{-2} and 45 Wm^{-2}. Reduction of this irradiance level to the Class 3A limit of 25 Wm^{-2} renders the laser less useful in normal daylight conditions. However, while anxious to provide for the economical and practicable use of lasers, the Committee preparing this Standard was concerned to continue to maintain the philosophy that not more than 1 mW should be able to enter the eye and has therefore restricted the use of such lasers to areas that are not dimly lit, where it is most unlikely that the diameter of the eye pupil will ever exceed 5 mm. (Note that even with an irradiance of 50 Wm^{-2} and a pupil diameter of 5 mm, the power entering the eye is still less than 1 mW).

While this Standard is directed towards building and construction applications, much of the material in the Standard could be used for guidance in other laser applications such as mining, outdoor land survey, marine survey, metrology, and machine alignment.

Requirements in this Standard in no way negate or degrade the requirements specified in AS 2211.

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S E C T I O N 1 S C O P E A N D A P P L I C A T I O N

1.1 SCOPE This Standard sets out safety requirements for the use of lasers for alignment, levelling, control and survey tasks in the building and construction industry.

It reproduces and supplements those requirements of AS 2211 relevant to such work, but does not cover the design and manufacture of lasers (see AS 2211), nor the use of lasers in other applications.

1.2 APPLICATION This Standard is intended as a reference by persons concerned with the use of lasers for alignment, levelling, control and survey tasks in the building and construction industry.

NOTES:

1 Although this Standard is directed towards those building and construction applications outlined above, much of the material in the Standard could be used for guidance in other laser applications such as mining, outdoor land survey, marine survey, metrology and machine alignment.

2 Requirements in this Standard in no way negate or degrade the requirements specified in AS 2211.

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

AS

1680	Interior lighting
1680.2.0	Recommendations for specific tasks and interiors
1885	Measurement of occupational health and safety performance
2211	Laser safety

1.4 DEFINITIONS For the purpose of this Standard, the definitions below apply:

1.4.1 Building and construction tasks—alignment, levelling, control and survey tasks in the building and construction industry—any (see Note) operations for or in relation to and directly associated with, alignment, levelling, control or survey tasks involved in the construction, reconstruction, renovation, alteration, demolition or maintenance of, or repairs to, any of the following:

(a) Buildings.

(b) Roads, railways or other works for the passage of persons, animals or vehicles.

(c) Breakwaters, docks, jetties, piers, wharves or works for the improvement or alteration of any harbour, river or watercourse for the purposes of navigation.

AS 2397-1993 Safe use of lasers in the building and construction industry