

Australian/New Zealand Standard™

Safety of laser products

Part 1: Equipment classification and requirements



AS/NZS IEC 60825.1:2014

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee SF-019, Personal Protection Against Laser Radiation. It was approved on behalf of the Council of Standards Australia on 2 October 2014 and on behalf of the Council of Standards New Zealand on 3 October 2014.
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Australian/New Zealand Standard™

Safety of laser products

Part 1: Equipment classification and requirements

Originated in Australia as AS 2211—1978.
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-019, Personal Protection Against Laser Radiation, to supersede AS/NZS IEC 60825.1:2011.

It is important to note that the designation of this Standard has changed; prior to 2011, this Standard was designated AS/NZS 2211.1:2004, *Safety of laser products, Part 1: Equipment classification, requirements and user's guide* (IEC 60825-1:2001, MOD).

Standards in the IEC 60825 series may have been adopted as either AS/NZS IEC 60825 series standards (e.g. IEC/TR 60825-14 has been adopted as AS/NZS IEC 60825.14), or AS/NZS 2211 series standards (e.g. IEC 60825-4 has been adopted as AS/NZS 2211.4).

The objectives of this Standard are as follows:

- (a) To protect people from laser radiation in the wavelength range 180 nm to 1 mm by introducing a system of classification of lasers and laser products according to their degree of optical radiation hazard.
- (b) To specify requirements for the manufacturer to supply information so that proper precautions can be adopted.
- (c) To ensure adequate warnings are provided to individuals of hazards associated with accessible radiation from laser products through the use of labels and instructions.
- (d) To reduce the possibility of injury by minimizing unnecessary accessible radiation and to give improved control of the laser radiation hazards through protective features.

This Standard is identical with, and has been reproduced from, IEC 60825-1, Ed. 3.0 (2014), *Safety of laser products, Part 1: Equipment classification and requirements*.

This Standard adopts the 2013 maximum permissible exposure (MPE) limits published by the International Commission on Non-Ionizing Radiation Protection. The MPE limits in Annex A of this Standard are more recent than the MPE limits in other earlier standards in this series, and may be used in preference.

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

- (i) In the source text 'this part of IEC 60825' should read 'this Australian/New Zealand Standard.'
- (ii) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian/New Zealand Standards, as follows:

| <i>Reference to International Standard</i> | <i>Australian/New Zealand Standard</i> |
|--------------------------------------------------------------------|-----------------------------------------------------------------|
| IEC | AS/NZS IEC |
| 62471 Photobiological safety of lamps and lamp systems (all parts) | 62471 Photobiological safety of lamps and lamp systems (series) |

Only normative references that have been adopted as Australian or Australian/New Zealand Standard have been listed.

The term 'informative' has been used in this Standard to define the application of the annex to which it applies. An 'informative' annex is only for information and guidance.

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FOREWORD

This edition includes the following significant technical changes with respect to the previous edition:

- a new class, Class 1C, was introduced;
- the measurement condition 2 (“eye loupe” condition) was removed;
- classification of the emission of laser products below a certain radiance level that are intended to be used as replacement for conventional light sources can, as an option, be based on the IEC 62471 series;
- the accessible emission limits (AELs) for Class 1, 1M, 2, 2M and 3R of pulsed sources, particularly of pulsed extended sources, were updated to reflect the latest revision of the ICNIRP guidelines on exposure limits (accepted for publication in Health Physics 105 (3): 271 – 295; 2013, see also www.icnirp.org).

AUSTRALIAN/NEW ZEALAND STANDARD

Safety of laser products**Part 1:
Equipment classification and requirements****1 Scope and object**

IEC 60825-1 is applicable to safety of laser products emitting laser radiation in the wavelength range 180 nm to 1 mm.

Although lasers exist which emit at wavelengths less than 180 nm (within the vacuum ultraviolet), these are not included in the scope of the standard since the laser beam normally has to be enclosed in an evacuated enclosure, and, therefore, the potential optical radiation hazards are inherently minimal.

A laser product may consist of a single laser with or without a separate power supply or may incorporate one or more lasers in a complex optical, electrical, or mechanical system. Typically, laser products are used for demonstration of physical and optical phenomena, materials processing, data reading and storage, transmission and display of information, etc. Such systems have found use in industry, business, entertainment, research, education, medicine and consumer products.

Laser products that are sold to other manufacturers for use as components of any system for subsequent sale are not subject to IEC 60825-1, since the final product will itself be subject to this standard. Laser products that are sold by or for manufacturers of end products for use as repair parts for the end products are also not subject to IEC 60825-1. However, if the laser system within the laser product is operable when removed from the end product, the requirements of this Part 1 apply to the removable laser system.

NOTE 1 Operable equipment does not require a tool to prepare for operation.

Any laser product is exempt from all further requirements of this Part 1 if classification by the manufacturer of that product according to Clauses 4 and 5 shows that the emission level does not exceed the AEL (accessible emission limit) of Class 1 under all conditions of operation, maintenance, service and failure. Such a laser product may be referred to as an exempt laser product.

NOTE 2 The above exemption is to ensure that inherently safe laser products are exempt from Clauses 6,7,8 and 9.

In addition to the adverse effects potentially resulting from exposure to laser radiation, some laser equipment may also have other associated hazards, such as electricity, chemicals and high or low temperatures. Laser radiation may cause temporary visual impairment, such as dazzle and glare. Such effects depend on the task and ambient lighting level and are beyond the scope of this Part 1. The classification and other requirements of this standard are intended to address only the laser radiation hazards to the eyes and skin. Other hazards are not included within its scope.

This Part 1 describes the minimum requirements. Compliance with this Part 1 may not be sufficient to achieve the required level of product safety. Laser products may also be required to conform to the applicable performance and testing requirements of other applicable product safety standards.

NOTE 3 Other standards may contain additional requirements. For example, a Class 3B or Class 4 laser product may not be suitable for use as a consumer product.