

*Radiation Protection Act 2005 – Section 17*

**CERTIFICATE OF COMPLIANCE:  
STANDARD FOR RADIATION APPARATUS -  
LASER INDUSTRY  
(CLASS 3B OR CLASS 4 LASER)**

SECTION 1: REQUIREMENTS FOR CERTIFICATES OF COMPLIANCE FOR CLASSES OF RADIATION APPARATUS

SECTION 2: PARTS OF STANDARDS AND CODES OF PRACTICE ADOPTED BY THIS STANDARD

**This information can also be accessed at**  
[http://www.dhhs.tas.gov.au/peh/radiation\\_protection](http://www.dhhs.tas.gov.au/peh/radiation_protection)

## **Section 1 – REQUIREMENTS FOR CERTIFICATES OF COMPLIANCE FOR CLASSES OF RADIATION APPARATUS**

### **PART – A**

**Section 2 of this Standard is to be used by an accredited person when assessing Radiation Apparatus, classified by Radiation Protection Act 2005 “Laser Class 3B” or “Laser Class 4” used for industrial purposes, for the purpose of issuing a certificate of compliance in accordance with 17 (1) (b) of the Radiation Protection Act 2005.**

**The Radiation Apparatus must be shown to fully comply with the requirements in Section 2 of this Standard.**

**† Where an item was demonstrated to comply at the time of manufacture or supply, ongoing compliance for that item may be stated only if it is reasonable to assume there has been no change, modification, damage or unacceptable wear and tear to that item since the time of manufacture.**

**The requirements in Section 2 are taken from the following:**

AS/NZS 2211.1-2004  
(equiv. to IEC 60825-1:2001,MOD)

*Safety of laser products Part 1:Equipment classification, requirements and users guide.*

## PART – B

The Standards listed in this part are to be used by a person or company licensed to manufacture or sell Radiation Apparatus, classified by Radiation Protection Act 2005 licences as “Laser Class 3B” or “Laser Class 4” used for industrial purposes, for the purpose of issuing a certificate of compliance in accordance with 17 (1) (b) of the Radiation Protection Act 2005.

The holder of a licence to manufacture or sell such Radiation Apparatus must be able to show that the Radiation Apparatus fully complies with the following Standards\*.

AS/NZS 2211.1-2004  
(equiv. to IEC 60825-1:2001,MOD)

*Safety of laser products Part 1:Equipment classification, requirements and users guide.*

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\* In many cases radiation apparatus will bear the “CE” mark. As part of the process of obtaining a CE mark the manufacturer makes an application to a “Certifying Body” to have the equipment assessed. During this assessment the manufacturer would, in their application, state the "Standards" that they wished to be tested against.

In order for licensed manufacturers or sellers to issue a certificate of compliance under the Radiation Protection Act 2005, they need only demonstrate that they hold, or have access to, the **Declaration of Conformity** documents which show that the “make and model” of apparatus they are supplying complies with the Standards listed in Part B above.

## Section 2 – PARTS OF STANDARDS AND CODES OF PRACTICE ADOPTED BY THIS STANDARD

ITEM	Requirements
laser product -general engineering specifications	
protective housing <sup>†</sup>	<p><b>AS/NZS 2211.1 4.2.1</b> each laser product must have a protective housing which, when in place, prevents human access to laser radiation (including errant laser radiation) in excess of class I, except when human access is necessary for the performance of the function (s) of the product.</p>
removal of parts for service <sup>†</sup>	<p><b>AS/NZS 2211.1 4.2.2</b> any parts of the housing or enclosure of a laser product (including embedded laser products) that can be removed or displaced for service and which would allow access to laser radiation in excess of the AEL assigned and are not interlocked must be secured in such a way that removal or displacement of the parts requires the use of tools</p>
safety interlocks <sup>†</sup>	<p><b>AS/NZS 2211.1 4.3.1 a), b)</b> a safety interlock must be provided for access panels of protective housings when both of the following conditions are met:</p> <ul style="list-style-type: none"> <li>a) the access panel is intended to be removed or displaced during maintenance or operation.</li> <li>b) the removal of the panel gives access to laser radiation levels designated by X in the table.</li> </ul> <p>Removal of the panel must not result in emissions through the opening in excess of Class I M or Class 2 M as applicable according to the wavelength.</p> <p>The safety interlock must be of a design which prevents the removal of the panel until the accessible emission levels are below the AEL of the Class assigned and, in any case, below the limits specified in 4.3.1 b). Inadvertent resetting of the interlock must not in itself restore the emission values above the AEL of the class assigned nor above the limits specified in 4.3.1 b).</p>
override mechanism and a label on the interlock <sup>†</sup>	<p><b>AS/NZS 2211.1 4.3.2</b> if a deliberate override mechanism is provided, the manufacturer must also provide adequate instruction about safe methods of working. It must not be possible to leave the override in operation when the access panel is returned to its normal position. The interlock must be clearly associated with a label conforming to 5.9.2 “caution - laser radiation when opened and interlocks defeated”. Use of the override must give rise to a distinct visible or audible warning whenever the laser is energised or capacitor banks are not fully discharged, whether or not the access panel is removed or displaced. A visible warning must be clearly visible through protective eyewear appropriate for use with the particular laser.</p>

remote interlock connector	<p><b>AS/NZS 2211.1 4.4</b> Each class 3B and 4 laser system must have a remote interlock connector. When the terminals of the connector are open – circuited, the accessible radiation must not exceed class 1 M or Class 2 M as applicable.</p>
key control	<p><b>AS/NZS 2211.1 4.5</b> Each class 3B and Class 4 laser system must incorporate a key operated master control. The key must be removable and the laser radiation must not be accessible when the key is removed. In this part the term “key” includes any control devices, such as magnetic cards, cipher combinations, etc.</p>
laser radiation emission warning	<p><b>AS/NZS 2211.1 4.6.1</b> Each class 3R laser system in the wavelength range below 400 nm and above 700 nm and each Class 3B and Class 4 laser system must give an audible or visible warning when it is switched on or if capacitor banks of a pulsed laser are being charged or have not been positively discharged.</p> <p>The warning device must be fail - safe or redundant. Any visible warning must be clearly visible through protective eyewear appropriate for use with the particular laser. The visible warning must be located so that viewing does not require exposure to laser radiation in excess of the AEL for Class 1 M and Class 2 M</p>
warning device distances	<p><b>AS/NZS 2211.1 4.6.2</b> each operational control and laser aperture that can be separated by 2 metres or more from a radiation warning device must itself be provided with a radiation warning device. The warning device must be clearly visible or audible to the person in the vicinity of the operational control or laser aperture.</p>
aperture indication	<p><b>AS/NZS 2211.1 4.6.3</b> where the laser emission may be distributed through more than one aperture, then a visible warning device must clearly indicate the output aperture or apertures through which laser emission can occur.</p>
beam stop or attenuator	<p><b>AS/NZS 2211.1 4.7</b> each Class 3B and Class 4 laser system must incorporate one or more permanently attached means of attenuation (beam stop or attenuator, other than a laser energy source switch, mains connector or key control). The beam stop or attenuator must be capable of preventing human access to laser radiation in excess of Class 1M or Class 2 M as appropriate,</p>
scanning safeguard <sup>†</sup>	<p><b>AS/NZS 2211.1 4.10</b> laser products intended to emit scanned radiation, and classified on this basis, must not, as a result of scan failure or of variation in either scan velocity or amplitude, permit human access to laser radiation in excess of the AEL for the assigned class.</p>

labelling  labels for access panels	<b>AS/NZS 2211.1 5.2,5.3,5.4,5.5, 5.6 and 5.7</b> each laser product must carry labels in accordance with <b>AS/NZS 2211.1 5.9.1, 5.9.2.</b> each connection, each panel of a protective housing and each access panel of a protective enclosure which when removed or displaced permits human access to laser radiation in excess of the AEL for Class I must have labelling as per
<b>laser product -information provided by the manufacturer to the user</b>	<b>AS/NZS 2211.1 6.1 a), b), c), d) e), f)</b> manufacturers of laser products must provide (or see to the provision of) the following information.  a) adequate instructions for proper assembly, maintenance and safe use including clear warnings concerning precautions to avoid possible exposure to hazardous laser radiation and other hazards associated with the equipment.  b) A statement in appropriate units of beam divergence for collimated beams, pulse duration and maximum output, with the magnitudes of the cumulative measurement uncertainty and any expected increase in the measured quantities at any time after the manufacture added to the values measured at the time of manufacture (duration of pulses resulting from unintentional mode-locking need not be specified); however those conditions associated with the product known to result in unintentional mode locking must be specified). Additionally for embedded laser products and other incorporated laser products, similar information must be provided to describe the incorporated laser. The information must also include appropriate safety instructions to the user to avoid inadvertent exposure to hazardous laser radiation.  c) legible reproductions of all required labels and hazard warnings to be affixed to the laser product or provided with the laser product. The corresponding positions of each label affixed to the product must be indicated or, if provided with the product, a statement that such labels could not be affixed to the product but were supplied with the product and a statement of the form and manner in which they were supplied must be provided.  d) a clear indication in the manual of all locations of laser apertures.  e) a listing of controls, adjustments and procedures for operation and maintenance, including the warning "Caution-Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure".  f) in the case of laser products that do not incorporate the laser energy source necessary for laser emission a statement of the compatibility requirements for a laser energy source to ensure safety.

surveying and alignment	<p><b>AS/NZS 2211.1 12.6.2 a), b), c), d), e), f), g)</b></p> <ul style="list-style-type: none"> <li>a) Areas in which these lasers are used must be posted with appropriate laser warning sign.</li> <li>b) Wherever practicable, mechanical or electronic means must be used to assist in the alignment of the laser.</li> <li>c) Precautions must be taken to ensure persons do not look directly into the beam (prolonged intrabeam viewing can be hazardous). Direct viewing of the beam through optical instruments (theodolite etc) may also be hazardous.</li> <li>d) The laser beam should be terminated at the end of its useful path and should in all cases be terminated if the hazardous beam ( to NOHD) extends beyond the controlled area.</li> <li>e) The laser beam should be located well above or below eye level wherever practicable.</li> <li>f) Precautions should be taken to ensure the laser beam is not unintentionally directed at mirror-like (specular) surfaces (but more importantly at flat or concave mirror like surfaces)</li> <li>g) When not in use the laser should be stored in a location where unauthorised personnel cannot gain access.</li> </ul>
	<p><b>AS.NZS 2211.1 12.6.4</b></p> <p>In those exceptional cases where Class 3B lasers are necessary, the requirements of 12.6.3 must be followed. In addition human access should not be permitted to laser radiation in the wavelength range from 400 nm to 700 nm with a radiation power that exceed <math>5 \times 10^{-3} \text{ W}</math> for any emission duration exceeding <math>3.8 \times 10^{-4} \text{ s}</math> nor should human access be permitted to laser radiation in excess of the AEL for Class I for any other combination of emission durations and wavelength.</p>
<b>Laboratory and Workshop laser installations</b>	
Class 3B	<p><b>AS.NZS 2211.1 12.5.1 a), b), c), d), e)</b></p> <ul style="list-style-type: none"> <li>a) The laser should be operated in a controlled area.</li> <li>b) Care should be exercised to prevent unintentional specular reflections.</li> <li>c) The laser beam should be terminated where possible at the end of its useful path by a material that is diffuse and of such a colour and reflectivity as to make beam positioning possible while still minimizing the reflection hazards.</li> <li>d) Eye protection is required if there is any possibility of viewing either the direct or specularly reflected beam, or of diffuse reflections not complying with condition c)</li> <li>e) The entrances to areas should be posted with standard laser warning signs.</li> </ul>

Class 4	<b>In addition to 12.5.2 AS.NZS 2211.1 12.5.3 a), b), c), d), e), f), g)</b>  a) The beam paths should be enclosed whenever practicable b) Operated by remote control c) Good room illumination d) Cooled beam stop and consideration of thermally induced aberrations in optical components e) Prevention of unwanted reflections. f) Local screening g) Periodic checking of alignment.
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