Department of Health and Human Services
Population Health

Radiation Protection Act 2005 – Section 17

CERTIFICATE OF COMPLIANCE:

STANDARD FOR RADIATION APPARATUS -

LASER ENTERTAINMENT

(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

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

PART – A

This Standard is to be used by an accredited person when assessing Radiation Apparatus, classified by Radiation Protection Act 2005 licences as "Laser Class 3B" or "Laser Class 4" and used for laser entertainment, for the purpose of issuing a certificate of compliance, for the purpose of issuing a certificate of compliance in accordance with 17 (1) (b) of the Radiation Protection Act 2005.

† **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.*
National Health and Medical Research Council	*Code of Practice for the Safe use of Lasers in the Entertainment Industry (1994)*

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" and used for laser entertainment, 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.*
National Health and Medical Research Council	*Code of Practice for the Safe use of Lasers in the Entertainment Industry (1994)*

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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†	**AS/NZS 2211.1 4.2.1** 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 1, except when human access is necessary for the performance of the function (s) of the product.
removal of parts for service†	**AS/NZS 2211.1 4.2.2.** 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
safety interlocks†	**AS/NZS 2211.1 4.3.1 a), b)** a safety interlock must be provided for access panels of protective housings when both of the following conditions are met: a) the access panel is intended to be removed or displaced during maintenance or operation. b) the removal of the panel gives access to laser radiation levels designated by X in the table. Removal of the panel must not result in emissions through the opening in excess of Class 1 M or Class 2 M as applicable according to the wavelength. 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).

override mechanism and a label on the interlock	**AS/NZS 2211.1 4.3.2** 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.
remote interlock connector	**AS/NZS 2211.1 4.4** 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.
key control	**AS/NZS 2211.1 4.5** 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.
laser radiation emission warning	**AS/NZS 2211.1 4.6.1** 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. 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
warning device distances	**AS/NZS 2211.1 4.6.2** 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.

aperture indication	**AS/NZS 2211.1 4.6.3** 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.
beam stop or attenuator	**AS/NZS 2211.1 4.7** 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,
scanning safeguard†	**AS/NZS 2211.1 4.10** 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.
labelling	**AS/NZS 2211.1 5.2,5.3,5.4,5.5, 5.6 and 5.7** each laser product must carry labels in accordance with of
labels for access panels†	**AS/NZS 2211.1 5.9.1, 5.9.2.** 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 1 must have labelling as per

laser product -information provided by the manufacturer to the user	**AS/NZS 2211.1 6.1 a), b), c), d), e), f)** The appropriate documentation containing the following information must be available (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. AS/NZS 2211.1 6.1
equipment requirements - for particular uses	
laser demonstrations, displays and exhibitions	**AS/NZS 2211.1 12.4** Check the class of laser being used. Only Class 1 or Class 2 laser products should be used for demonstration, display or entertainment in unsupervised areas. Higher power lasers for display or entertainment refer to NH&MRC Code.

apertures	**NH&MRC 5.2** laser projection apertures must be masked using a material sufficiently robust to withstand direct impact of the laser beam for extended periods of time. The mask must be positioned to confine the projections to the intended directions and to prevent the escape of errant beams.
targets and mirrors	**NH&MRC 5.3** targets must be appropriately masked to prevent the continued passage of a laser beam in the event that the incident beam becomes misaligned with the target. reflective components must also be appropriately masked to prevent the escape of errant beams due to component misalignment.
component mounting	**NH&MRC 5.4** laser projectors, mirrors and targets must be mounted rigidly to prevent movement due to vibration, jarring or atmospheric conditions. Such equipment must be protected from detrimental weathering effects.
scanners†	**NH&MRC 5.5** scanners and their control systems must be designed to prevent the potential exposure of spectators to levels of radiation in excess of the SZL. ancillary personnel to levels of radiation in excess of the emission of a Class 3A laser product under any reasonably foreseeable fault condition; and
	performers or operators to levels of laser radiation in excess of the MPE for eye or skin as appropriate
beam stops and baffles†	**NH&MRC 5.6** beam stops and baffles must be made of material that can withstand the laser beam without adverse effects, is fire resistant and has low reflectance at the relevant laser wavelength(s)
emergency shut off	**NH&MRC 5.7** each laser installation must be provided with at least one clearly identifiable emergency shutoff control which immediately terminates the laser radiation when required. Such controls must be readily accessible and easily actuated by the operator.