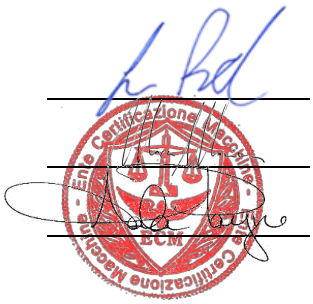
TEST REPORT

IEC 60825-1:2014

Safety or laser Products-Part 1: Equipment classification, requirements and user's guide

Report Reference No.	:	**0I221209.SNTET46**
Tested by (+signature)	:	**Luca Bedonni**
Reviewed by (+signature)	:	**Marco Morina**
Approved by (+signature)	:	**Amanda Payne**
Date of issue	:	**9th December 2022**
Contents	:	19 pages



Entrusted Testing Laboratory

Name : **ENTE CERTIFICAZIONE MACCHINE SRL**

Address : **Via Cà Bella, 243 - 40053 Valsamoggia Loc. Castello di Serravalle (Bo) Italy**

Test location : **Same as above**

Client

Name : **Shandong Nuoxin Tiancheng Electronic Technology Co., Ltd**

Address : **No. 1613, Fengshan Road, Changqing District, Jinan, Shandong, P.R.China**

Test specification

Standard : **IEC60825-1:2014**

Test procedure : **IEC Test Report**

Test item Description: Pan tilt scanning laser gas detector

Trade mark : **NXTC**

Mode and/or type reference : **NX-LD300/400**

Tested Laser Type&Class **Detection Laser: Class 1**

Indicating Laser: Class 2

Manufacture..... **: Shandong Nuoxin Tiancheng Electronic Technology Co., Ltd**

Address..... **: No. 1613, Fengshan Road, Changqing District, Jinan, Shandong, P.R.China**

Rated..... **Input: AC 100-240V, 50Hz/60Hz 0.5A**

Test case verdicts

Test case does not apply to the test object.. **:N(N/A)**

Test item does meet the requirement..... **:P(Pass)**

Test item does not meet the requirement... **:F(Fail)**

Testing

Date of receipt of test item **1th December 2022**

Date(s) of performance of test **9th December 2022**

General remarks

This test report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the object tested and information given from applicant or manufacturer.

"(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report

Throughout this report a comma is used as the decimal separator

Modified Information

Version	Report No.	Revision Data	Summary
1.0	0I221109.SNTET46	/	Original Version

General product information-

1. The report includes Attachment 1: product photos.

2. All tests were conducted on model NX-LD300.

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Address	**: Via Cà Bella, 243 - 40053 Valsamoggia Loc. Castello di Serravalle (Bo) Italy**
Test location	**: Same as above**

Client

Name	**: Shandong Nuoxin Tiancheng Electronic Technology Co., Ltd**
Address	**: No. 1613, Fengshan Road, Changqing District, Jinan, Shandong, P.R.China**

Test specification

Standard	**: IEC60825-1:2014**
Test procedure	**: IEC Test Report**

Test item Description: Portable Laser Methane Remote Detector

Trade mark	**: NXTC**
Mode and/or type reference	**: NXLD50/100/150/200/001**
Tested Laser Type&Class	**Detection Laser: Class 1**

Indicating Laser: Class 2

Manufacture..... **: Shandong Nuoxin Tiancheng Electronic Technology Co., Ltd**

Address..... **: No. 1613, Fengshan Road, Changqing District, Jinan, Shandong, P.R.China**

Rated..... **Input: AC 100-240V, 50Hz/60Hz 0.5A**

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Modified Information

Version	Report No.	Revision Data	Summary
1.0	0I221109.SNTET45	/	Original Version

General product information-

1. The report includes Attachment 1: product photos.

2. All tests were conducted on model NXLD50.

IEC60825-1			
Clause	Requirement + Test	Result + Remark	Verdict

4.	ENGINEERING SPECIFICATIONS		
4.1	General remarks		P
	Laser products require certain built-in safety features, depending on the class to which they have been assigned by the manufacturer. The requirements for these are given in 4.2 to 4.10. The manufacturer shall ensure that the personnel responsible for the classification of laser products and systems have received training to an appropriate level which allows them to understand the full implications of the classification scheme.		P
4.1.1	modification		P
	If the modification of a previously classified laser product affects any aspects of the product's performance or intended functions within the scope of this standard. the person or organization performing any such modification is responsible for ensuring the reclassification and label of the laser product.	The manufacturer will reclassify and label the laser product if modification is performed.	P
4.2	protective housing		P
4.2.1	General		P
	Each laser product shall 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 or the function(s) of the product (See annex E for guidance on this requirement for high power lasers).		P
4.2.2	Service		N
	Any parts of the housing or enclosure of a lase, 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 {see 4.3) shall be secured in such a way that removal or displacement of the parts requires the use of	Not applicable, the housing or enclosure leads to the laser radiation is all interlocked	N

	tools.		
4.2.3	Removable laser system		P
	If an embedded laser product or a laser system can be removed from its protective housing or enclosure and operated without modification. the laser shall comply with the manufacturing requirements of clause 4 and 5 that are appropriate to its class, except for laser products which are sold to other manufacturers for use as components of any system for subsequent sale which are not subject to this standard, since the final product will itself be subject to this standard.		P
4.3	Access panels and safety interlocks		N
4.3.1	A safely interlock shall be provided for access panels of protective housing when both of the following conditions are met: a) the access panel is intended to be removed or displaced during maintenance or operation, and b) the removal of the panel gives access to laser radiation levels designated by "X" in the table below	No such part	N
	Removal of the panel shall not result in emission through the opening in excess of Class 1M or Class 2M as applicable according to the wavelength		N
	The safety interlock shall 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 limit specified in 4.3.1b). Inadvertent resetting of the interlock shall not in itself restore emission values above the AEL of the Class assigned nor above the limits specified in 4.3.1b).		N
4.3.2	If a deliberate override mechanism is provided. the manufacturer shall also provide adequate instructions about safe methods of working. It shall not be possible to leave the override in operation when the access panel Is returned to its normal position. The interlock shall be clearly associated with a	No this situation	N

	label conforming to 5.9.2 Use of the override shall give rise to a distinct visible or audible warning whenever the laser is energized or displaced. Visible warnings shall be clearly visible through protective eyewear specifically designed or specified for the wavelength(s) of the accessible laser radiation.		
4.4	Remote interlock connector		N
	Each Class 3B and Class 4 laser system shall have a remote interlock connector. When the terminals of the connector are open-circuited、the accessible radiation shall not exceed Class 1M or Class 2M as applicable.		N
4.5	Key control		N
	Each Class 3B and Class 4 laser system shall incorporate a key-operated master control The key shall be removable and the laser radiation shall not be accessible when the key is removed. In this part 1 the term "key" includes any other control devices, such as magnetic cards, cipher combinations. Etc.		N
4.6	Laser radiation emission warning		N
4.6.1	Each Class 3R laser system in the wavelength range below 400 nm and above 700 nm and each Class 38 and Class 4 laser system shall 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 positively discharged The warning device shall be fail-safe or redundant Any visible warning device shall be clearly visible through protective eyewear specifically designed for the wavelength(s) of tile emitted laser radiation. The visible warning device(s) shall be located so that viewing does not require exposure to laser radiation in excess of the AEL for Class 1M and 2M	Class 1 laser system	N
4.6.2	Each operational control and laser aperture \hat can be separated by 2 metres or more from a radiation warning device shall itself be provided with a radiation warning device. The warning device shall be clearly visible or	The machine size is less than 2m. so it's not applicable for this requirement	N

	audible to the person in the vicinity of the operational control or laser aperture		
4.6.3	Where the laser emission may be distributed through more than one output aperture. then a visible warning device shall clearly indicate the output aperture or apertures through which laser emission can occur. in accordance with 4.6.1.	Warning signs have been labelled near to the aperture.	N
4.7	Beam stop or attenuator		N
	Each Class 3B and Class 4 laser system 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 shall be capable of preventing human access to laser radiation in excess of Class 1M or Class 2M as applicable		N
4.8	Controls		N
	Each laser product shall have controls located so that adjustment and operation do not require exposure to laser radiation or Class 3R, 3B or Class 4.		N
4.9	Viewing optics		N
	Any view optics, viewport or display screen incorporated in a laser product shall provide sufficient attenuation to prevent human access to laser radiation in excess of the AEL for Class 1M, and tor any shutter or variable attenuator incorporated in the viewing optics, viewport or display screen, a means shall be provided to:		N
	a) prevent human access lo laser radiation in excess of the AEL for Class 1M when the shutter ls opened or the attenuation varied;		N
	b) prevent opening of the shutter or variation of the attenuator when exposure to taser radiation in excess of the AEL for Class 1M is possible.		N
4.10	Scanning safeguard		N
	Laser products intended to emit scanned radiation, and classified on this basis, shall not, as a result of scan failure or of variation	Not this use.	N

	in either scan velocity oe amplitude, permit human access to laser radiation in excess of the AEL for the assigned class.		
4.11	Alignment aids		N
	Where routine maintenance requires the alignment of beam path components. then a safe means of achieving this shalt be provided.	No need to align the beam.	N
4.12	"Walk-in' access		N
	If a protective housing is equipped with an access panel which provides “walk-in” access then.	Not applicable	N
	a) means shall be provided so that any person inside the housing can prevent activation of a Class 38 or Class 4 laser hazard	Not applicable	N
	b) a warning device shall tie situated so as to provide adequate warning of emission of Class JR laser radiation in the wavelength range below 400 nm and above 700 nm, or of Class 3B or Class 4 laser radiation to any person who might be within the housing.	Not applicable	N.
4.13	Environmental conditions		P
	The laser product shall meet the safety requirements defined in this standard under all expected operating conditions appropriate to the intended use of the product Factors to be considered shall include.		P
	- climatic conditions (e.g. temperature, relative humidity);	The working environment has been indicated in the Instruction Manual	P
	- vibration and shock.	Has been defined.	P
	If no provisions are made in the product safety standard, the relevant sub clauses of IEC 61010-1 shall apply	The sub clauses of IEC 61010-1 have been considered	P
4.14	Protection against other hazards		P
4.14.1	Non -optical hazards		P
	The requirements of the relevant product safety standard shall be fulfilled during operation and in the event of a single fault for the following.	Proper standards have been taken into consideration during designing	P
	-electrical hazards;	No hazards	P

	-excessive temperature;	No such situation	N
	-spread of fire from the equipment;	No such situation.	N
	-sound and ultrasonics;	No such situation.	N
	-harmful substances;	No such situation	N
	-explosion	No such situation.	N
	If no provisions are included in the product safety standard the relevant sub-clauses of IEC61010-1 shall apply.	The sub-clauses of IEC 61010-1 have been considered.	P
4.14.2	Collateral radiation		P
	The protective housing or laser products will normally protect against the hazards of collateral radiation (e.g. UV. visible, IR) However, if a concern exists that accessible collateral radiation might be hazardous, the laser MPE values may be applied to conservatively evaluate this risk.	The protective housing of laser products can protect against the hazards of collateral radiation as well.	P
5	LABELING		
5.1	General		P
	Each laser product shall carry label(s) in accordance with the requirements of the following clauses. The labels shall be permanently fixed, legible. and clearly visible during operation. maintenance or service. according to their purpose. They shall be so positioned that they can be read without the necessity for human exposure to laser radiation in excess of the AEL for Class 1. Text borders and symbols shall be black on a yellow background except for Class 1 where this color combination need not be used.	The necessary labels have been affixed on the correct position of Laser Pointer Mouse	P
	If the size or design of the product makes labeling impractical the label should be included with the user information or on the package	Not this case.	N
5.2	Class 1 and Class 1M		
	Except as permitted in 1.1, each Class 1 laser product shall have affixed an explanatory label (figure 15l bearing the words·		P
	CLASS 1 LASER PRODUCT	For ranging and indicating laser	P
	Each Class 1M laser product shall have affixed an explanatory label (figure. 15) bearing the	See the page 3	N

	words·		
	Laser radiation do not view directly with optic alk instruments class 1m laser product		N
	The type of optical instrument which could result in an increased hazard may be added in parenthesis after the word instruments•. The added wording could in particular be "(BINOCULARS OR TELESCOPES)' for a laser product with collimated. large-diameter beam. which is classified 1M because if fails condition 1 or table 10, or '(MAGNIFIERS)" for a laser product which is classified 1M because it fails condition 2 of table 10 (highly diverging beam).		N
	Instead of the above labels. at the discretion of the manufacturer. the same statements may be included in tl1e in formation for the user.		N
5.3	Class 2 and Class 2M		N
	Each Class 2 laser product shall have affixed a warning label (figure 14) and an explanatory label (figure15) bearing the words.		N
	Laser radiation do not stare into the beam or view directly with optical instruments class 2m laser product		N
	Each Class 2M laser product shall have affixed a warning label (figure14) and an explanatory label (figure 15) bearing the words:		N
	laser radiation do not stare into the beam or view directly with optical instruments class 2m laser product		N
	The type of optical instrument which could result in an increased hazard mat be added in parenthesis after the word "instruments·. The added wording could in particular be ¯ξ (SINO- CULARS OR TELESCOPED)" for a laser product with a collimated, large-diameter beam which is classified 2M because il fails condition 1 of table 10, or "(MAGNIFIERS)" for a laser product" which is classified 2M because if fails condition 2 of table 10 Chia h l v diverging beam).		N
5.4	Class 3R		N

	Each Class 3R laser product in the wavelength range from 400 nm to 1400 nm shall have affixed a warning label (figure 14) and an explanatory label (figure 15) bearing 111e words :	Not class 3R laser product.	N
	Laser radiation avoid direct eye exposure class 3r laser product	Not class 3R laser product	N
	For other wavelengths, each Class 3R laser product shall have affixed a warning label (figure 14) and an explanatory label (figure 15) bearing the words.	Not class 3R laser product.	N
	Laser radiation Avoid direct eye exposure class 3r laser product	Not class 3R laser product.	N
5.5	Class 38		N
	Each Class 3B laser product shall have affixed a warning label (figure 14) and an explanatory label (figure 15) bearing the words:	Not class 3B laser product.	N
	Laser radiation avoid exposure to beam class 3b laser product	Not class 3B laser product	N
5.6	Class 4		N
	Each Class 4 laser product shall have affixed a warning label (Figure 14) and an explanatory label (figure 15) bearing the words:		N
	Laser radiation avoid eye or skin exposure to direct or scattered radiation class 4 laser product		N
5.7	Aperture label		N
	Each Class 3R, Class 3B and Class 4 laser product shall have affixed a label close to each aperture through which laser radiation in excess of the AEL for Class 1 or Class 2 is emitted. The label(s) shall bear the words		N
	Laser aperture or avoid exposure-laser radiation is emitted from this aperture		N
5.8	Radiation output and standards·1nformation		N
	Each laser product, except those or Class 1, shall be described on the explanatory label (figure 15) by a statement of the maximum output of laser radiation, the pulse duration (if appropriate) and the emitted wavelength(s). The name and publication		N

	date of the standard to which the product was classified shall be included on the explanatory label or elsewhere in close proximity on the product. For Class 1 and Class 1M. instead of the labels on the product, the information may be contained in the information for the user		
5.9	Labels for access panels		P
5.9.1	labels for panels		P
	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 shall have affixed labels bearing the words (for the case of an embedded Class 1M laser, the statement instead may be included in the information for the use) CAUTION-LASER RADI ATION WHEN OPEN	Not applicable	N
	In addition, this label shall bear the words:		N
	a) caution-class 1m laser radiation when open do not view directly with optical instruments		N
	If the accessible radiation does not exceed the AEL for Class 1M where the level of radiation is measured according to 9.2g) and 9.3;		N
	b) Caution-class 2 laser radiation when open do not stare in to the beam	This clause is met.	P
	If the accessible radiation does not exceed the AEL for Class 2 where the level of radiation is measured according to 9.2g) and 9.3;		P
	c) caution-class 2m laser radiation when open do not stare into the beam or view directly with optical instruments		N
	If the accessible radiation does not exceed the AEL for Class 2M where the level of radiation is measured according to 9.2h) and 93:	Not applicable	N
	d) caution-class Jr laser radiation when open avoid direct eye exposure		N
	If the accessible radiation is in the wavelength range from 400nm to 1400 nm and does not	Not applicable	N

	exceed the AEL for Class 3R:		
	e) caution-class 3r laser radiation when open avoid exposure to the beam		N
	If the accessible radiation is outside the wavelength range from 400 nm to 1400 nm and does not exceed the AEL for Class 3R,	Not applicable	N
	f) caution-class 3b laser radiation when open avoid exposure to the beam		N
	If the accessible radiation does not exceed the AEL for Class 3B:	Not applicable	N
	g) caution-class 4 laser radiation when open avoid eye or skin exposure to direct or scattered radiation		N
	If the accessible radiation exceeds the limits for Class 3B.	Not applicable	N.
	This information may be provided in more than one adjacent label on the product	Not applicable	N
5.9.2	Labels for safety interlocked panels		N
	Appropriate labels shall be clearly associated with each safety interlock which may be readily overridden and which would then permit human access to laser radiation in excess of the AEL of Class 1. Such labels shall be visible prior to and during interlock override and be in close proximity 10 the opening created by the removal of the protective housing. This label shall bear the words specified In items a) to g) of 5.9.1, with the introduction of an additional line, positioned after the first line. with the following words:		N
	And interlocks defeated		N
5.10	Warning for invisible laser radiation		N
	In many cases, the wording prescribed for labels in clause 5 includes the phrase“laser radiation”.If the output of the laser is outside the wavelength range from 400nm to 700nm, this shall be modified to read "Invisible laser radiation", or if the output is at wavelengths both inside and outside this wavelength range. to read "Visible and invisible laser radiation·.	Not applicable	N

	If a product is classified on the basis of the level of visible laser radiation and also emits in excess or the AEL of Class 1 at invisible wavelengths, the label shall include the words “Visible and invisible laser radiation” in lieu of “Laser radiation”.	Not applicable	N
5.11	Warning for visible laser radiation		N
	The wording "laser radiation” for labels in clause 5 may be modified to read “laser light” if the output of the laser is in the (visible)wavelength range from 400 nm to 700 nm.		N
5.12	Warning for LED radiation		N
	For LED radiation the word "Laser" on the labels in clause 5 shall be replaced by "LED"	Not applicable	N
6	OTHER INFORMATIONAL REQUIREMENTS		
6.1	Information for the user		P
	Manufactures of laser products shall provide (or see to the provision of) as an integral part of any user instruction or operation manual which is regularly supplied with the laser product:		P
	a) Adequate instructions for proper assembly, maintenance. and safe including clear warnings concerning precautions to avoid possible exposure to hazardous laser radiation	The content has been included in the Instruction Manual.	p
	b) For Class 1M and 2M laser products an additional warning 1s required for diverging beams, this warning shall state that viewing the laser output with certain optical instruments (for example. eye loupes, magnifiers and microscopes) within a distance of 100 mm may pose an eye hazard For collimated beams, this warning shall state that viewing the laser output with certain optical instruments designed for use at a distance (for example, telescopes and binoculars) may pose an eve hazard		N
	c)A statement in appropriate units of beam divergence for collimated beams, pulse duration and maximum output, with the magnitudes of the cumulative measurement	Not applicable	N

	uncertainty and any expected increase in the measured quantities at any time of manufacture added to the values measured at the lime 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 shall be specified).		
	Additionally, for embedded laser products and other incorporated laser products. similar information shall be provided to describe the incorporated laser. The information shall also include appropriate safety instructions to the user to avoid inadvertent exposure to hazardous laser radiation.	Not this case	N
	d) Legible reproductions (color optional) of all required labels and hazard warnings to be affixed to the laser product or provided with the laser product. The corresponding position of each label affixed to the product shall 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 shall be provided.	The content has been included in the instruction Manual.	P
	e) A clear indication in the manual of all locations of laser apertures.	The content has been included in the Instruction Manual.	P
	l) A listing of controls, adjustments and procedures for operation and maintenance. including 1he warning“Caution-Use of controls or adjustments or performance or procedures other than those specified herein may result in hazardous radiation exposure”	The proper use has been stated in the Instruction Manual.	P
	g) In the case of laser products that do not incorporate the laser energy source necessary for laser emission, a statement or the compatibility requirements for a laser energy source to ensure safety.	Not this situation.	N
6.2	Purchasing and servicing Information		P
	Manufacturers of laser products shall provide		P

	or cause to be provided:		
	a) In all catalogues, specification sheets and descriptive brochures the classification of each laser product and any warnings required by 6.1b) shall be stated .	This clause has been considered	P
	b) To servicing dealers and distributors, and lo others upon request, adequate instructions for service adjustments and service procedures for each laser product model, which includes clear warning and precautions to be taken to avoid possible exposure to radiation and other hazards and a schedule of maintenance necessary to keep the product in compliance: and, in all such service instructions, a listing or those controls and procedures which could be utilized by persons other than the manufacturer or his agents to increase accessible emission levels of radiation, and a clear description of the location of displaceable portions of the protective housing which could allow access to laser radiation in excess of the accessible limits in tables 1,2,3 and 4. The instructions shall include protective procedures for service personnel. And legible reproductio11s (color optional) of required labels and hazard warnings.	The content has been included in the Instruction Manual.	P
7	ADDITIONAL REQUIREMENTS FOR SPECIFIC LASER PRODUCTS		
7.1	Medical laser products		N
	Each medical laser product shall comply with all of the applicable requirements for laser products of its class. In addition, any Class 3B or Class 4 medical laser product shall comply with IEC60601-2-22		N
7.2	Other parts of the standard serious IEC 60825		N
	For specific applications, one or other of the following IEC 60825 series may be applicable (see also annex HI.	Not such screws	N
	-IEC 60825-2 is additionally applicable to optical fiber communication systems.	Not applicable	N
	-IEC 60825-4 is additionally applicable to laser guards.		N.
	-Further information on laser shows may be	Not applicable	N

	found in IEC/TR 60825-3		
	-Further information regarding a manufacturer's checklist may be found in IEC·TR 60825-5.	Not applicable	N
	-Further information regarding products exclusively used for visible information transmission may be found in IEC/TS 60825-6.	Not applicable	N
	-Further information regarding products exclusively used for non-visible information transmission may be found in IEC/TS 60825-7.	Not applicable	N
	-Guidelines for the sate use of medical laser equipment may be found in IECITR 60825-8.	Not applicable	N
	-Further information regarding a review of MPEs for incoherent radiation may be found in IEC/TR 60825-9	Not applicable	N
8	CLASSIFICATION	Class 1 laser product.	
8.1	Introduction		P
	Because of the wide ranges possible for the wavelength, energy content and pulse characteristics of a laser beam, the hazards arising in its use vary widely. It is impossible to regard lasers as a single group to which common safety limits can apply.		P
8.2	Description of laser classes		P
	Class 1: Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing.		P
	Class 1 M: Lasers emitting in the wavelength range from 302.5 nm to 4 000 nm which are safe under reasonably foreseeable conditions of operation. but may be hazardous if the user employs optics within the beam. Two conditions apply:		N
	a) for diverging beams if the user places optical components within 100 mm from the source to concentrate (collimate) the beam; or		N
	b) for a collimated beam with a diameter larger than the diameter specified in table 10		N

	for the measurements of irradiance and radiant exposure.		
	Class 2: Lasers that emit visible radiation in the wavelength range from 400 nm to 700 nm where eye protection is normally afforded by aversion responses. including the blink reflex This reaction may be expected to provide adequate protection under reasonably foreseeable conditions of operation including the use of optical instruments for intrabeam viewing.		N
	Class 2M: Lasers that emit visible radiation in the wavelength range from 400 nm to 700 nm where eye protection is normally afforded by aversion responses including the blink reflex. However, viewing of the output may be more hazardous ii the user employs optics within the beam. Two conditions apply:		N
	a) for diverging beams, if the user places optical components within 100 mm from the source to concentrate (collimate) the beam, or		N
	b) for a collimated beam with a diameter larger than the diameter specified in table 10 for the measurements of irradiance and radiant exposure		N
	Class 3R· Lasers that emit in the wavelength range from 302,5 nm to 106 nm where direct intrabeam viewing is potentially hazardous but the risk is lower than for Class 3B lasers, and fewer manufacturing requirements and control measures for the user apply than for Class 3B lasers The accessible emission limit is within five times the AEL of Class 2 in the wavelength range from 400 nm to 700 nm and within five limes the AEL of Class 1 for other wavelengths.		N
	Class 3B: Lasers that are normally hazardous when direct intrabeam exposure occurs (i.e. within the NOHD). Viewing diffuse reflections is normally safe (see also note to 12.52c)).		N
	Class 4· Lasers that is also capable of producing hazardous diffuse reflections. They		N

	may cause skin injuries and could also constitute a fire hazard. Their use requires extreme caution.		
8.3	Classification responsibilities		P
	It is the responsibility of the manufacturer or his agent to provide correct classification of a laser product. The product shall be classified on the basis of that combination of output power(s) and wavelength (s) of the accessible laser radiation over the full range of capability during operation at any time after manufacture which results in its allocation to the highest appropriate class The accessible emission limit (AELs) for Class 1 and 1M, Class 2 and 2M, Class 3R and Class 3B (listed in order of increasing hazard) are given in tables 1, 2. 3 and 4 respectively.		P
8.4	Classification rules		P
	a) Radiation of a single wavelength	1419-1668nm	P
	b) Radiation of multiple wavelengths		P
	c) Radiation from extended sources		N
	d) Non-circular and multiple sources		N
	e) Time bases	1000ns	P
	f) Repetitively pulsed or modulated lasers		N
9	MEASUREMENTS FOR CLASSIFICATION		
9.1	Tests		P
	Tests shall take into account all errors and statistical uncertainties in the measurement process (see IEC 61040) and increases in emission and degradation in radiation safety with age Specific user requirements may impose additional tests.		P
	Tests during operation shall be used to determine the classification of the product. Tests during operation. maintenance and service shall also be used as appropriate to determine the requirements for safety interlocks, labels and information for the user The above tests shall be made under each and every reasonably foreseeable single-fault condition; however, faults which result in the emission of radiation in excess of the AEL for		P

	a limited period only, and for which it is not reasonably foreseeable that human access to the radiation will occur before the product is taken out of service, need not be considered.		
	Optical amplifiers shall be classified using the maximum accessible total output power or energy, which may include maximum rated input power or energy.		P
9.2	Measurement of laser radiation		P
	Measurement of laser radiation levels may be necessary to classify a laser product in accordance with 9.1. Measurements are unnecessary when the physical characteristics and limitations or the laser source place the laser product or laser installation clearly in a particular class. Measurements shall be made under the following conditions		P
9.3	Measurement geometry		P
	Two measurement conditions as given in table 10 apply for wavelengths where optically aided viewing may increase the hazard. The most restrictive condition shall be applied. If the applicability of condition 1 or 2 is not obvious, both cases shall be evaluated. Condition 1 applies to collimated beams where telescopes and binoculars may increase the hazard, and condition 2 applies to sources with a highly diverging output where the use of microscopes, hand magnifiers and eye loupes may increase the hazard.		P

Test Result

1.wavelength

Laser Type in Tested Sample	Min	Typ.	Max.
Measuring laser	--	1653nm	--

2.Measure of total power

Laser Type in Tested Sample	Operating condition	Maximum condition
Measuring laser	0.04mW	<5mW