TEST REPORT
IEC 60825-1 / EN 60825-1
Safety of laser products -
Part 1: Equipment classification and requirements

Report Reference No. ..... :	J55-RSJ-22139
Date of issue ..... :	July 30, 2024
Testing Laboratory ..... :	Rudong Feiju Laser Technology Co.,Ltd
Address ..... :	Caobu Industrial Park Zone, Rudong County, Nantong City, Jiangsu, China
Applicant's name ..... :	Nantong Sanjing Chemglass Co., Ltd
Address ..... :	Caobu Industrial Park Zone, Rudong County, Nantong City, Jiangsu, China
Manufacturer's name..... :	Rudong Feiju Laser Technology Co.,Ltd
Address ..... :	Caobu Industrial Park Zone, Rudong County, Nantong City, Jiangsu, China
Factory's name..... :	Same as applicant
Address ..... :	
Test specification:	
Standard..... :	☒ EN 60825-1:2014 + A11:2021 + A11:2021
Test procedure..... :	Commission test
Non-standard test method……..:	N/A
Test Report Form No. ..... :	EN 60825-1
TRF Originator ..... :	ZCT
Master TRF ..... :	Dated 2020-05
Test item description ..... :	CO_2 Laser Tube
Trade Mark..... :	/
Model/Type reference ..... :	C70, C80, C100, C130, C150
Ratings..... :	220-240V 50Hz Max 150W

Copy of marking plate:	
CO_2 Laser Tube Model: xxx 220-240V 50Hz Max 150W Rudong Feiju Laser Technology Co.,Ltd Caobu Industrial Park Zone, Rudong County, Nantong City, Jiangsu, China Made in China	xxx=C70, C80, C100, C130, C150
Summary of testing: This test report complies with EN 60825-1	
Test Report Content This test report consists of: Main report Annex I: Photo Documentation	

Test case verdicts:	
Test case does not apply to the test object ...:	N/A
Test object does meet the requirement .....:	Pass (P)
Test object does not meet the requirement ..:	Fail (F)
Testing:	
Date of receipt of test item .....:	July 16, 2024
Date(s) of performance of test .....:	July 16, 2024 to July 30, 2024

General remarks:

The test results presented in this report relate only to the item(s) tested.

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

"(see Annex #)" refers to an annex appended to the report.

"(see appended table)" refers to a table in the Test Report.

Throughout this report a comma (point) is used as the decimal separator.

IEC 60825-1 / EN 60825-1			
Clause	Requirement – Test	Result	Verdict
4	**CLASSIFICATION PRINCIPLES**		-
4.3	Classificationrules		-
4.3a	Radiationoasf inglewavelength		N/A
4.3b	Radiationomf ultiplewavelengths		P
	L1 Laser product emit at two or more wavelengths shown as additive inTable1		P
	L2 Laser product emit at two or more wavelengths not sthown as additive inTable1		N/A
4.3c	Ra diationfromext endedsources(see5.4.3)		N/A
4.3d	Non uniform, non-circula or multiple apparent source		N/A
4.3e	Timmebases		-
	1) 25s		N/A
	2) 100s		P
	3) 0000s		N/A
4.3f	Repetitively pulsed modulated lasers		N/A
	1) Any single pulse		N/A
	2) Averagepowefropr ulsetrains		N/A
	3) Pulseduration$t \leq T1$. Number of Pulses N and C_5		N/A
4.4	Lase pr roducts designed to function as conventional lamps.		N/A
	measured at 200mm dist ance from closets point of humanaccess (α>5mrad).		N/A
	Un-weighted radiance L measured a t 200mm distance(comparisonwith LT=1MWm-2sr-1/) under reasonably foreseeable single fault conditions.		N/A
	Evaluation of emission accordingto IEC62471 series (optional): Standard applied (IEC62471 series)……...:.. Risk Group……..……...:.. Labelling……:.. Classification of product based on accessible laser radiation (infolaser radiation accessible C: lass1).		N/A
5	**Determination Of The Accessible Emission Level and Product Classification**		-
5.1	Tests		P
	Compliance under reasonably foreseeable single fault conditions.		P
5.3	Determination of the class of the laser product ... :		-
	For Class 1C: vertical safety standard applied with requirements for Class 1C.		P

IEC 60825-1 / EN 60825-1			
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5.4	Measurement geometry		-
5.4.1	General		-
5.4.2	Default (simplified) evaluation P		-
	Conditions applied ..... :	Condition 1 and Condition 3	P
	Aperture diameter ..... :	50 mm (for Condition 1) 7 mm (for Condition 3)	P
	Reference point .		N/A
	Measurement distance (for each condition)	2000 mm (for Condition 1) 100 mm (for Condition 3)	P
5.4.3	Evaluation condition for extended sources N/A		N/A
	Conditions applied ..... :		N/A
	Most restrictive position ..... : (distance from reference point)		N/A
	Angular subtense of the apparent source and C_6 (for each condition)		N/A
5.4.3 a	Aperture diameters (for each condition). ..... :		N/A
5.4.3 b	Angle of acceptance (for each condition)……...:		N/A
6	**Engineering Specifications**		N/A
7	**LABELLING**		N/A
8	**Other Informational Requirements**		N/A
9	**Additional Requirements For Specific Laser Products**		N/A

IEC 60825-1 / EN 60825-1			
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TABLE: Critical components information

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity1)
Pick up Unit	Rudong Feiju Laser Technology Co.,LtdCO_2 Laser Tube	5mW	1,9Vd.c. 7780-00nm	IEC 60825-1	Tested with appliance

Supplementaryinformation:
1) Provided evidenc ensures theagreed level of compliance.
Measured laser radiation, calculations and comparison with AEL limits:

1. TEST CONDITIONS

(1) General
Temperature: 20 – 25°C
Relative humidity: Max. 75 %
Power supply: Powered by USB charger
(2) Normal operation
The Laser is simulating normal operation to emit intentional optical power.
(3) Fault condition: Refer to measurement results for single fault conditions

2. MEASUREMENT METHOD

(1) Measurement of wavelength
The wavelength of Laser is measured under normal operation.
(2) Calculation of measurement distance
For condition 1: r = 2000 mm.
For condition 3: r = 100 mm.
(3) Measurement of radiant power
The radiant power emitted from Laser of the equipment is measured under normal operation.
In case of condition 1, the Laser radiation is collected through a circular aperture stop having a diameter 50 mm and its location is 2000 mm away from the closet point of human access.
In case of condition 3, the Laser radiation is collected through a circular aperture stop having a diameter 7 mm and its location is 100 mm away from the apparent source.
The measurement is performed at a position to detect a maximum radiation emitted from the apparent source.

3. TEST RESULT

(1) Measurement of wavelength
λ = 780 nm
(2) Calculation of measurement distance
For condition 1: r = 2000 mm.
For condition 3: r = 100 mm.
The condition 3 is obviously severer than condition 1. Therefore, measurement for condition 1 is omitted.
(3) Measurement of radiant power
Condition 3
Normal operation: r = 100 mm
Thermal hazard power: P = 2,1 μW
Fault condition: s-c pin c /e of Q2
Thermal hazard power: P = 2,0 μW

4. CLASSIFICATION OF LASER/LED RADIATION

(1) Compare the accessible emission level of radiation emitted from Laser of the equipment with the accessible emission limit of certain class. This comparison is evaluated using the measurement value under each condition. Accessible emission levels are measurement value or calculated from the measurement value if necessary.
(2) Time base
The time base is 100 s for wavelength greater than 400 nm or 0,25 s is applied for comparison with AEL of Class 2, Class 2M and Class 3R for wavelength from 400 nm to 700 nm by requirement of clause 4.3(e).
(3) Correction factor for Laser

IEC 60825-1 / EN 60825-1			
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Correction factor C_4 equals 1,44, C_7 equals 1, for simplified (default) method.
(4) Comparison with AEL
Normal operation:

Typeohf azard limit	Measured distance	Wavelength	Emission Duration	Accessible Emission Level	Accessible Emission Limit	Class
Thermal	100mm	785 nm	100s	P=2,1µW	P=3,9xC4C7x1 0^{-4} W P=564µW	1

Therefore, the Laser product is Class 1 under normal operation.
Fault condition: s-c pin c /e of Q2

Type of hazard limit	Measured distance	Wavelength	Emission Duration	Accessible EmissionLevel	AccessibleEmission Limit	Class
Thermal	100mm	785 nm	100s	P=2,0µW	P=3,9xC4 C7x10^{-4} W P = 564 µW	1

Therefore, the Laser product is Class 1 under fault condition

- End of Test Report -