

RISK GROUP INFORMATION FOR LASER BASED PROJECTOR

1. INTRODUCTION

Laser based projectors offer many advantages over lamp projectors. These include the long life of the light source, maintenance-free operation, constant brightness with high colour reproduction. As result, in the above 10,000 lumens market segment they now account for 70% of the European projector market.^[1]

^[1] CY2018 Futuresources

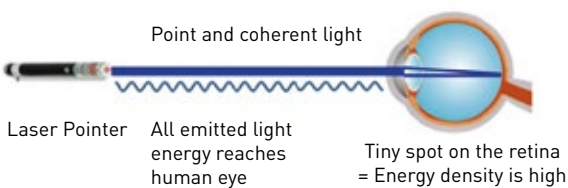


2. THE POTENTIAL HAZARD FROM PROJECTED LIGHT

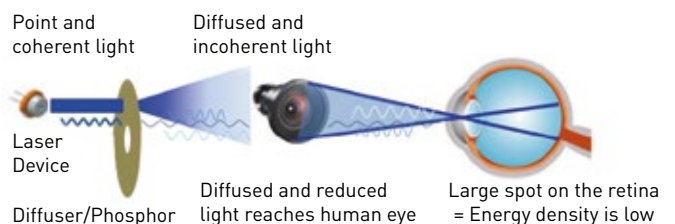
The laser from the projector is diffused through phosphor so that it travels from the lens to the projection surface as diffused light.

This means only diffused light reaches the eye's retina, just like a conventional lamp. As a result, the potential hazard from projected laser light is considered to be equal with a conventional light source.

General laser-emitted light



Projected light from laser projector



3. INTERNATIONAL SAFETY STANDARDS FOR LASER PRODUCTS

In recent years, international standards for laser products have been revised taking into consideration the similarities between diffused laser light and conventional lamp light. The safety risks for products using a laser light source, and the manufacturer requirements, are regulated in Edition 3 of IEC 60825-1, released in May 2014.

This standard (IEC 60825-1) allows the same conditions to be followed as the general lamp standard (IEC 62471 series). However, because laser projectors were relatively new it was felt insufficient research and measurement methods existed. Therefore, a new standard was created especially for projectors: IEC 62471-5: 2015. Under the new IEC 62471-5: 2015 standard, the potential risks of the product are categorised by Risk Group.

4. RISK GROUP

By applying IEC 62471-5: 2015, potential risks of projection light are assessed and classified into four Risk Groups ranging from safe exempt (RG0) to highest Risk Group (RG3) as follows;

When using Panasonic RG2 classified projectors there is no additional measures required for protection in regards of seeing the unit as a Laser light source device except the general safety regulations for installing electrical devices.

For Risk Group 3 (RG3) Laser Projectors, the users must understand the potential risks of projected light and should follow the installation conditions described in the next page.

Please note: Although RG3 Group users must follow these guidelines, the amount of exposure to light from the current high brightness projector is lower than viewing direct sunlight.^[2]

^[2]Radiance value of the sun is approximately 10MWm⁻²sr⁻¹ and categorized to RG3.
20,000 lumen projector is 2.5MWm⁻²sr⁻¹.

Risk Group classification of projectors

Risk Group	Explanation of the risk	Example
Exempt Group (RG0)	Continuous use does not cause any optical hazard.	
Risk Group 1 (RG1)	Safe for almost all applications except staring directly at the light source for a very long time. (100 seconds or more)	Pico-projectors Toy-projectors
Risk Group 2 (RG2)	Safe to use under almost all conditions except staring into the light source for any length of time.	Professional and consumer use projectors
Risk Group 3 (RG3)	Exposure to the light source at close proximity causes optical hazard. Safety measures are essential.	Professional use projectors

Note : Explanations of risks are based on IEC 62471-5, 4.1

The risk determination for interchangeable optics is executed at a projection ratio of 2.0: 1. There may be a change to a higher risk group when using a lens with a larger projection ratio. Before putting the device into operation, read the operating instructions with regard to the optics used and the resulting possible hazard distance.

5. INSTALLATION GUIDELINES

When installing Risk Group 3 classified projectors, users must fully understand the potential risks of projected light and should comply with the following:

Hazard Distance (HD)

Hazard Distance (HD) is the distance until the exposure level decays to the RG2 level. HD depends on the brightness of the projector and the throw ratio of projection lens. When staring into the light within the hazard distance, there is a risk to the eyes from direct radiation. (RG3 area)

Staring from a position beyond the hazard distance is considered safe. (RG2 area)

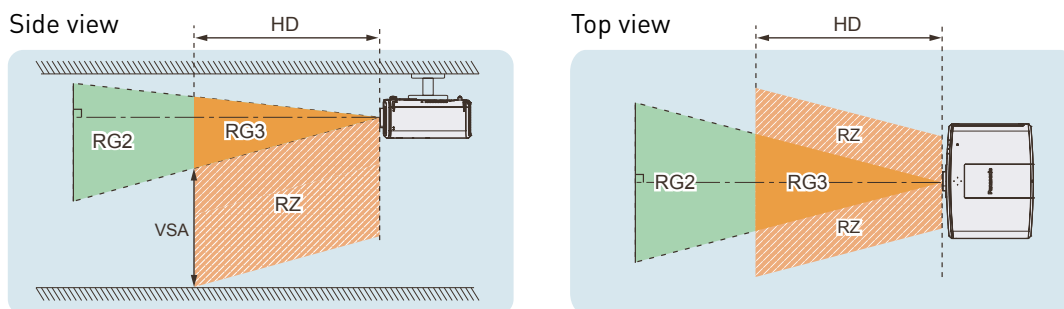
Restriction Zone (RZ) based on the HD

Within the hazard distance, users should install the projector at a height that will prevent observers' eyes from being within the projection light.

Although the Restriction Zone (RZ) is a safeguard area without projection light, it is still necessary to take care by preventing people entering the RG3 area. The recommended distance to beam is:

- 1) a VSA of 2m for a cinema environment
- 2) a VSA of 3m for a non-Cinema environment

And regarding vertical direction (VSA), it is necessary to secure additional clearance when considering the installation environment.



HD : Hazard Distance **VSA** : Vertical Separation Area

RZ : Restriction Zone

Soft start feature

In accordance with the IEC 62471-5:2015, Panasonic laser projectors are equipped with a soft start feature. The projector is starting up at a lower brightness which is then gradually increasing. This feature is protecting people working close to a projector before it is switched on.



6. RISK GROUP CLASSIFICATION OF PRODUCTS

Risk group classification of Panasonic laser projector is as follows.

Series	Brightness (ANSI lumen)	Risk Group
PT-RZ370	3,500 lm	RG2
PT-RZ470	3,500 lm	RG2
PT-RZ575	5,000 lm	RG2
PT-MZ570	5,500 lm	RG2
PT-RZ570	5,200 lm	RG2
PT-MZ670	6,500 lm	RG2
PT-RZ660	6,000 lm	RG2
PT-RZ770	7,000 lm	RG2
PT-MZ770	8,000 lm	RG2
PT-RZ870*	8,500 lm	RG2
PT-RZ970*	9,400-10,000 lm	RG2
PT-RQ10*****	8,000-10,000 lm	RG2
PT-MZ10****	10,000 lm	RG2
PT-RZ120*	12,000 lm	RG2
PT-RZ12K**	12,000 lm	RG2
PT-RQ13K**	10,000 lm	RG2
PT-MZ16*** / PT-MZ13***	16,000 lm / 13,000 lm	RG2
PT-RZ21K	20,000 lm	RG3
PT-RZ31K	30,000 lm	RG3
PT-RQ22	20,000 lm	RG3
PT-RQ32K	26,000 lm	RG3
PT-RQ50K	50,000 lm	RG3

*RG3 with long throw lens (ET-DLE250, ET-DLE350, ET-DLE450)

**RG3 with long throw lens (ET-D75LE30, ET-D75LE40, ET-D75LE8)

***RG3 with ET-EMT700, ET-EMT800

**** RG3 with ET-EMT800

***** RG3 with ET-DLE250, ET-DLE350, ET-DLE450

7. CONCLUSION

The potential hazard of using laser-based projectors with diffused light is equivalent to that of a conventional projector using a lamp light source.

However, international safety standards specifically suitable for laser projectors have now been developed. Regarding the risk group, it is necessary for the user to understand the potential hazards of light exposure - but by setting installation conditions as described in the previous page, it is possible to avoid the risk of light exposure.



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