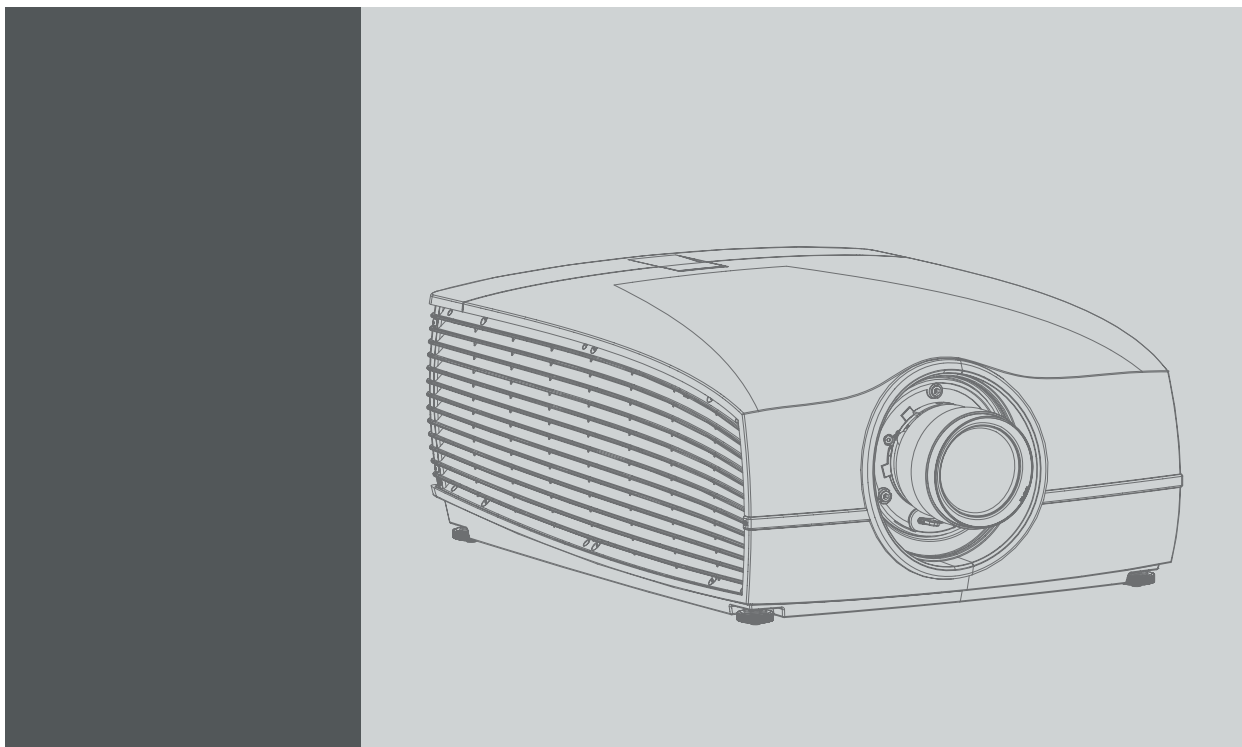


Loki



## Safety and environmental information

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# 1. SAFETY

## About this chapter

Read this chapter thoroughly before attempting to install or operate the projector.

To prevent personal injury to users or physical damage to the projector while installing and using your projector, ensure that you understand and follow all safety guidelines, instructions and warnings included in this chapter and this manual.

## Clarification of the term 'Loki' used in this document

When referring in this manual to the the term, 'Loki', means that the content is applicable for the following products:

- Loki

## Model certification name

The Loki products in general, are all products within the Barco GP6 Platform

## Overview

- General considerations
- Important safety instructions
- Projector Hazard Distances
- Safety symbols
- RoHS compliance
- Contact addresses
- Product Info
- Statement

## 1.1 General considerations



**WARNING: Be aware of suspended Loads.**



**WARNING: Wear a hard hat to reduce the risk of personal injury.**



**WARNING: Be careful while working with heavy loads**



**WARNING: Mind your fingers while working with heavy loads.**

## Notice on optical radiation from Loki Projector



**When installing an interchangeable lens with a throw ratio that make the projector become an RG3 unit, (See the chapter "Approved Lenses" in the installation manual), refer to chapter "Risk Group 3 Safety", page 11 regarding precautions.**

## 1. Safety

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- The projector is Class 1 laser product that conforms with IEC EN 60825-1:2014. For Northern America, the projector is class 3R laser product up to throw ratio 2.33. The projector conforms with IEC 60825-1:2007, and with performance standards for laser products under 21 CFR 1040, except with respect to those characteristics authorized by Variance Number 2016-V-0144 effective March 6, 2017  
Do not stare into Beam.
- This projector is Risk Group 2 (RG2) according to IEC EN 62471-5.  
This projector may become Risk Group 3 (RG3) when an interchangeable lens with throw ratio greater than 3.15 is installed. For Northern America, installation requirements according to Risk group 3 (RG3) must be followed when interchangeable lens with throw ratio greater than 2.33 is installed.  
Refer to the manual for the lens list and throw ratio before operation.  
Such combination of projector and lens are intended for **professional use only**, and are not intended for consumer use.
- For RG3, no direct exposure to the beam shall be permitted.  
For RG3, operators shall control access to the beam within the hazard distance or install the product at a height that will prevent eye exposure within the hazard distance.
- This projector has two (2) built-in Class 4 laser clusters. Disassembly or modification is very dangerous and should never be attempted.
- Any operation or adjustment not specifically instructed by the user's guide creates the risk of hazardous laser radiation exposure.
- Do not open or disassemble the projector as this may cause damage by the exposure of laser radiation.

### General safety instructions

- This product contains no user serviceable parts except the Color Wheel. Attempts to modify/replace mechanics or electronics inside the housing or compartments will violate any warranties and may be hazardous.  
Do not remove/replace any other parts than the Color Wheel. Other parts, service personnel only – Warranty void if Removed.  
Follow the instructions in the User Guide to replace the Color Wheel.
- Do not stare into beam when the projector is on. The bright light may result in permanent eye damage.
- Not following the prescribed control, adjustment or operation procedure may cause damage by the exposure of laser radiation.
- Before operating this equipment please read this manual thoroughly and retain it for future reference.
- Installation and preliminary adjustments should be performed by properly trained and qualified personnel.
- All warnings on the projector and in the documentation manuals must be adhered to.
- All instructions for operating and use of this equipment must be followed precisely.
- All local installation codes should be adhered to.

### Notice on safety

This equipment is built in accordance with the requirements of the international safety standards IEC60950-1, as basis for National safety regulation world wide. The safety standard covers information technology equipment including electrical business equipment intended to operate in "normal" environments (offices and homes). This safety standard imposes important requirements on the use of safety critical components, materials and insulation, in order to protect the user or operator against risk of electric shock and energy hazard and having access to live parts. Safety standards also impose limits to the internal and external temperature rises, radiation levels, mechanical stability and strength, enclosure construction and protection against the risk of fire. Simulated single fault condition testing reduce the risk of hazards and contribute to ensure the safety of the equipment to the user even when the equipment's normal operation fails.

### Users definition

Throughout this manual, the term SERVICE PERSONNEL refers to Barco authorized persons having appropriate technical training and experience necessary to be knowledgeable of potential hazards to which they are exposed (including, but not limited to HIGH VOLTAGE ELECTRIC and ELECTRONIC CIRCUITRY and HIGH BRIGHTNESS PROJECTORS) in performing a task, and of measures to minimize the potential risk to themselves or other persons. Only Barco authorized SERVICE PERSONNEL, knowledgeable of such risks, are allowed to perform service functions inside the product enclosure. The term USER and OPERATOR refers to any person other than SERVICE PERSONNEL. When installing an interchangeable lens with a throw ratio that make the projector become an RG3 unit, (see chapter "Approved Lenses" in the installation manual), refer to chapter "Risk Group 3 Safety", page 11 for information regarding precautions.

Refer to the Installation manual for the lens list and hazard distance before operation. Such combination of projector and lens are intended for professional use only, and are not intended for consumer use.

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## 1.2 Important safety instructions

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### To prevent the risk of electrical shock

- This product should be operated from a mono phase AC power source.
- This apparatus must be grounded (earthed) via the supplied 3 conductor AC power cable. If none of the supplied power cables are the correct one, consult your dealer.  
If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.  
Never use 2-prong power cords, as this is dangerous and could lead to electrical shock.
- Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- Use only the power cord supplied with your device or original replacement cords. While appearing to be similar, other power cords have not been safety tested at the factory and may not be used to power the device. For a replacement power cord, contact your dealer.
- Do not operate the projector with a damaged cord. Replace the cord.  
Do not operate the projector if the projector has been dropped or damaged - until it has been examined and approved for operation by a qualified service technician.
- Position the cord so that it will not be tripped over, pulled, or contact hot surfaces.
- If an extension cord is necessary, a cord with a current rating at least equal to that of the projector should be used. A cord rated for less amperage than the projector may overheat.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock.
- Make sure that no objects enter into the vents and openings of the set.
- Do not expose this projector to rain or moisture.
- The projector is designed for indoor use only. Never operate the unit outdoors.
- Do not immerse or expose this projector in water or other liquids.
- Do not spill liquid of any kind on this projector.
- Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Do not disassemble this projector, always take it to an authorized trained service person when service or repair work is required.
- Do not use an accessory attachment which is not recommended by the manufacturer.
- Lightning - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the device due to lightning and AC power-line surges.

### To prevent personal injury

- To prevent injury and physical damage, always read this manual and all labels on the system before connecting to the wall outlet or adjusting the projector.
- To prevent injury, take note of the weight of the projector.
- To prevent injury, ensure that the lens and all covers are correctly installed. See installation procedures.
- Warning: high intensity light beam. NEVER look into the lens! High luminance could result in damage to the eye.
- Warning: extremely high brightness laser: This projector uses extremely high brightness laser. Never attempt to look directly into the lens or at the laser.
- Always switch off the projector and disconnect from the mains power supply before attempting to remove any of the projector covers or access parts inside the projector.
- This product contains no user serviceable parts except the Color Wheel. Attempts to modify/replace mechanics or electronics inside the housing or compartments will violate any warranties and may be hazardous.
- Do not remove/replace any other parts than the Color Wheel. Other parts, service personnel only Warranty void if removed
- Do not place this equipment on an unstable cart, stand, or table. The product may fall, causing serious damage to it and possible injury to the user.
- Only place the projector on a stable surface, or mount it securely using an approved ceiling-mount.
- It is hazardous to operate without lens or lens cap. Lenses or shields shall be changed if they have become visibly damaged, for example with cracks or deep scratches, to such an extent that their effectiveness is impaired.

### To prevent fire hazard

- Barco projection products are designed and manufactured to meet the most stringent safety regulations. This projector radiates heat on its external surfaces and from ventilation ducts during normal operation, which is both normal and safe. Exposing flammable or combustible materials into close proximity of this projector could result in the spontaneous ignition of that material, resulting in a fire. For this reason, it is absolutely necessary to leave an "exclusion zone" around all external surfaces of the projector whereby no flammable or combustible materials are present.
- Do not place flammable or combustible materials near the projector!
- For the Loki projector, the exclusion zone on the lens side within the light beam must be at least 1,5m.
- Caution! Hot air is exhausted from the rear vent. Do not place objects that are sensitive to heat nearer than 100 cm (40") to the exhaust vent.
- Slots and openings in this equipment are provided for ventilation. To ensure reliable operation of the projector and to protect it from overheating, these openings must not be blocked or covered.
- The openings should never be blocked by placing the projector too close to walls, or other similar surface. Allow for sufficient distance to walls and ceilings to avoid overheating. Minimum safety distance to the exhaust area of the unit must not be less than 100 cm (40") and to the intake area, not less than 50 cm (20").
- This projector should never be placed near or over a radiator or heat register.
- This projector should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- Do not cover the projector or the lens with any material while the projector is in operation. Keep flammable and combustible materials away from the projector at all times.
- Mount the projector in a well-ventilated area away from sources of ignition and out of direct sun light. Always allow ample airflow through the projector.
- Never expose the projector to rain or moisture. In the event of fire, use sand, CO2 or dry powder fire extinguishers.
- Never use water on an electrical fire.
- Always have service performed on this projector by authorized Barco service personnel. Always insist on genuine Barco replacement parts. Never use non-Barco replacement parts as they may degrade the safety of this projector.
- Projection rooms must be well ventilated or cooled in order to avoid heat buildup.
- Let the projector cool down completely before storing. Remove cord from the projector when storing.

### To prevent projector damage

- To ensure correct airflow is maintained the projector should only be operated when all of its covers in place.
- Always remove lens cap before switching on the projector. If the lens cap is not removed, it may melt due to the high energy light emitted through the lens. Melting the lens cap may permanently damage the surface of the projection lens
- Only connect the projector to signal sources and voltages as described in the technical specification. Connecting to unspecified signal sources or voltages may lead to malfunction and permanent damage of the unit.
- To ensure correct airflow is maintained, it should only be operated when all of its covers are in place.
- The projector must always be installed in a manner which ensures free flow of air into its air inlets and unimpeded evacuation of the hot air from its cooling system.
- Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. The device should not be placed in a built-in installation or enclosure unless proper ventilation is provided. Ensure that nothing can be spilled on, or dropped inside the projector. If this does happen, switch off and unplug the mains supply immediately. Do not operate the projector again until it has been checked by Barco authorized service personnel.
- Do not block the projector cooling fans or free air movement around the projector. Minimum safety distance to the exhaust area of the unit must not be less than 100 cm (40") and to the intake area, not less than 50 cm (20").
- Do not use this equipment near water.
- Do not operate the projector outside its temperature and humidity specifications as this may result in overheating and malfunction.
- Never place the projector in direct sun light. Sun light on the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Save the original shipping carton and packing material. They will come in handy if you ever have to ship your equipment. For maximum protection, repack your set as it was originally packed at the factory.
- Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning. Never use strong solvents, such as thinner or benzine, or abrasive cleaners, since these will damage the cabinet. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution.
- To ensure the highest optical performance and resolution, the projection lenses are specially treated with an anti-reflective coating, therefore, avoid touching the lens. To remove dust on the lens, use a soft dry cloth. Do not use a damp cloth, detergent solution, or thinner.

## On servicing

- Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage potentials and risk of electric shock.
- Refer all servicing to Barco authorized repair centers.
- Attempts to alter the factory-set internal controls or to change other control settings not specially discussed in this manual can lead to permanent damage to the projector and cancellation of the warranty.
- Unplug this product from the wall outlet and refer servicing to Barco authorized service personnel or technicians under the following conditions:
  - If liquid has been spilled into the equipment.
  - If the product has been exposed to rain or water.
  - If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of the other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
  - If the product has been dropped or the cabinet has been damaged.
  - If the product exhibits a distinct change in performance, indicating a need for service.
  - When the power cord or plug is damaged or frayed.
- Replacement parts: When replacement parts are required, be sure the service technician has used original Barco replacement parts. Unauthorized substitutions may result in degraded performance and reliability, fire, electric shock or other hazards. Unauthorized substitutions may void warranty.
- Safety check: Upon completion of any service or repairs to this projector, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

## 1.3 Projector Hazard Distances

### **WARNING. This may be a RG3 laser Product, dependent on which lens used.**

This projector may become Risk Group 3 (RG3) when an interchangeable lens with throw ratio greater than 3.15 is installed. For Northern America, installation requirements according to Risk group 3 (RG3) must be followed when interchangeable lens with throw ratio greater than 2.33 is installed

Refer to the installation manual Chapter 3 for the lens list and throw ratio before operation.

Do not look directly in to the beam from the projector lens.

No direct eye exposure to the beam is permitted.

Operators shall control access to the beam within the hazard distance or install the product at a height that will prevent eye exposure within the hazard distance.

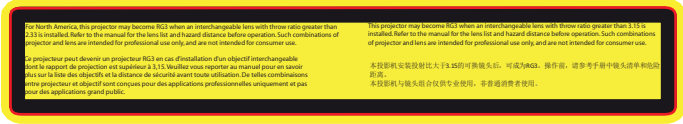
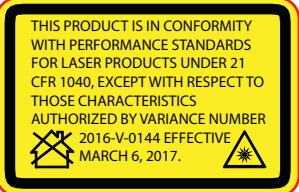
See table below for a definition of hazardous distances versus the throw ratio of the lens.

## 1.4 Safety symbols

### Description of safety symbols used in product documentation or on product.

| Image | Description                                      |
|-------|--|
|       | Refer to user manual for further information!    |
|       | Caution! Do not stare into beam, RG2 product.    |
|       | No telephone! Do not connect to telephone lines. |

# 1. Safety

| Image   | Description  |
|---|--|
| <p>Loki Warning Label</p>  | <p>Caution! For North America: With interchangeable lens with throw ratio greater than 2.33, consider hazard distance and installation requirements for RG3 product. Refer User Manual.</p> <p>Caution! With Interchangeable lens with throw ratio greater then 3.15, consider hazard distance and installation requirements for RG3 product. Refer User manual.</p> |
| <p>Loki FDA Label</p>      |  |

## Location of Safety Label

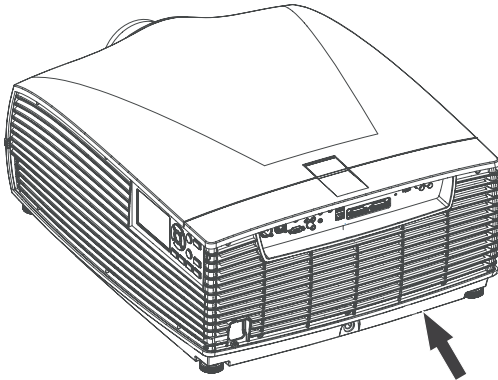


Image 1-1  
Loki Projector

## Disposal Information

### Waste Electrical and Electronic Equipment



This symbol on the product indicates that, under the European Directive 2012/19/EU governing waste from electrical and electronic equipment, this product must not be disposed of with other municipal waste. Please dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

For more information about recycling of this product, please contact your local city office or your municipal waste disposal service.

For details, please visit the Barco website at: <http://www.barco.com/en/AboutBarco/weee>

### WEEE Information

This product conforms to all requirements of the EU Directive on waste electrical and electronic equipment (WEEE). This product shall be recycled properly. It can be disassembled to facilitate proper recycling of its individual parts.

Consult your dealer or relevant public authority regarding drop-off points for collection of WEEE. For details, please visit the Barco website at: <http://www.barco.com/en/AboutBarco/weee>.



**CAUTION:** This product contains chemicals, including lead, known to the State of California to cause birth defects or other reproductive harm. Recycle properly, do not dispose of in ordinary waste!



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### Turkey RoHS compliance



■ Türkiye Cumhuriyeti: AEEE Yönetmeliğine Uygundur.

[Republic of Turkey: In conformity with the WEEE Regulation]

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## 1.5 RoHS compliance

### 中国大陆 RoHS (Chinese Mainland RoHS)

根据中国大陆《电器电子产品有害物质限制使用管理办法》(也称为中国大陆RoHS), 以下部分列出了Barco产品中可能包含的有毒和/或有害物质的名称和含量。中国大陆RoHS指令包含在中国信息产业部MCV标准:“电子信息产品中有毒物质的限量要求”中。

According to the “Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products” (Also called RoHS of Chinese Mainland), the table below lists the names and contents of toxic and/or hazardous substances that Barco’s product may contain. The RoHS of Chinese Mainland is included in the MCV standard of the Ministry of Information Industry of China, in the section “Limit Requirements of toxic substances in Electronic Information Products”.

## 1. Safety

| 零件項目 (名稱)<br>Component Name  | 有毒有害物質或元素<br>Hazardous Substances or Elements |           |           |               |               |                 |
|--|---|-----------|-----------|---------------|---------------|-----------------|
|  | 鉛<br>(Pb)                                     | 汞<br>(Hg) | 鎘<br>(Cd) | 六價鉻<br>(Cr6+) | 多溴聯苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
| 印製電路配件<br>Printed Circuit Assemblies                                 | X   | O         | X         | O             | O             | O               |
| 外接電 (線) 纜<br>External Cables   | X   | O         | O         | O             | O             | O               |
| 內部線路<br>Internal wiring  | X   | O         | O         | O             | O             | O               |
| 鏡頭支架<br>Lensholder   | X   | O         | O         | O             | O             | O               |
| 激光發生器<br>Laser   | X   | O         | O         | O             | O             | O               |
| 底架<br>Chassis  | O   | O         | O         | O             | O             | O               |
| 外殼<br>Enclosure  | O   | O         | O         | O             | O             | O               |
| 螺帽, 螺釘 (栓), 螺旋 (釘), 墊圈緊固件<br>Nuts, bolts, screws, washers. Fasteners | X   | O         | O         | O             | O             | O               |
| 電源供應商<br>Power Supply Unit   | X   | O         | O         | O             | O             | O               |
| 散熱片 (器)<br>Heatsinks   | O   | O         | O         | O             | O             | O               |
| 風扇<br>Fan  | X   | O         | O         | O             | O             | O               |
| 塑膠外殼<br>Plastic Enclosure  | O   | O         | O         | O             | O             | O               |
| 外殼<br>Enclosure  | O   | O         | O         | O             | O             | O               |
| 電池 (組)<br>Batteries  | O   | O         | O         | O             | O             | O               |
| 文件說明書<br>Paper Manuals   | O   | O         | O         | O             | O             | O               |
| 裝置配件<br>Installation kit   | O   | O         | O         | O             | O             | O               |
| 附電池遙控器<br>Remote control   | X   | O         | O         | O             | O             | O               |

本表格依據 SJ/T 11364 的規定編制。

This table is prepared in accordance with the provisions of SJ/T 11364.

O: 表示該有毒有害物質在該部件所有均質材料中的含量均在 GB/T 26572 標準規定的限量要求以下。

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572

X: 表示該有毒有害物質至少在該部件的某一均質材料中的含量超出 GB/T 26572 標準規定的限量要求。

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used forth is part is above the limit requirement in GB/T 26572.

Image 1-2

| 零件项目(名称)<br>Component Name                                       | 有毒有害物质或元素<br>Hazardous Substances or Elements |           |           |               |               |                 |
|--|---|-----------|-----------|---------------|---------------|-----------------|
|  | 铅<br>(Pb)                                     | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(Cr6+) | 多溴联苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
| 印制电路配件<br>Printed Circuit Assemblies                             | X   | O         | X         | O             | O             | O               |
| 外接电(线)缆<br>External Cables                                       | X   | O         | O         | O             | O             | O               |
| 内部线路<br>Internal wiring  | X   | O         | O         | O             | O             | O               |
| 镜头支架<br>Lensholder   | X   | O         | O         | O             | O             | O               |
| 激光发生器<br>Laser   | X   | O         | O         | O             | O             | O               |
| 底架<br>Chassis  | O   | O         | O         | O             | O             | O               |
| 外壳<br>Enclosure  | O   | O         | O         | O             | O             | O               |
| 螺帽,螺钉(栓),螺旋(钉),垫圈,紧固件<br>Nuts, bolts, screws, washers, Fasteners | X   | O         | O         | O             | O             | O               |
| 电源供应器<br>Power Supply Unit                                       | X   | O         | O         | O             | O             | O               |
| 散热片(器)<br>Heatsinks  | O   | O         | O         | O             | O             | O               |
| 风扇<br>Fan  | X   | O         | O         | O             | O             | O               |
| 塑胶外壳<br>Plastic Enclosure  | O   | O         | O         | O             | O             | O               |
| 外壳<br>Enclosure  | O   | O         | O         | O             | O             | O               |
| 电池(组)<br>Batteries   | O   | O         | O         | O             | O             | O               |
| 文件说明书<br>Paper Manuals   | O   | O         | O         | O             | O             | O               |
| 装置配件<br>Installation kit   | O   | O         | O         | O             | O             | O               |
| 附電池遙控器<br>Remote control   | X   | O         | O         | O             | O             | O               |

本表格依据SJ/T 11364的规定编制  
This table is prepared in accordance with the provisions of SJ/T 11364.

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。  
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。  
X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

在中国大陆销售的相应电子信息产品(EIP)都必须遵照中国大陆《电子电气产品有害物质限制使用标识要求》标准贴上环保使用期限(EFUP)标签。Barco产品所采用的EFUP标签(请参阅实例,徽标内部的编号用于指定产品)基于中国大陆的《电子信息产品环保使用期限通则》标准。

## 1. Safety

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All Electronic Information Products (EIP) that are sold within Chinese Mainland must comply with the “Marking for the restriction of the use of hazardous substances in electrical and electronic product” of Chinese Mainland, marked with the Environmental Friendly Use Period (EFUP) logo. The number inside the EFUP logo that Barco uses (please refer to the photo) is based on the “General guidelines of environment-friendly use period of electronic information products” of Chinese Mainland.



## 1.6 Contact addresses

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### For Taiwan:

Barco Ltd., 33F., No. 16. Xinzhan Rd., Banqiao Dist., New Taipei City 220, Taiwan

Tel: +886-2-7715-0099, Fax: +886-2-7715-0097

E-mail: service.taiwan@barco.com

## 1.7 Product Info

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### Product info

# BARCO

Image 1-3

product name 產品名稱:

projector 投影機

model 型號: GP6

## 1.8 Statement

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### EN55032/CISPR32 Class A MME (MultiMedia Equipment)

Warning : This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

### Class A ITE (Information Technology Equipment)

Warning : This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## 2. RISK GROUP 3 SAFETY

### 2.1 General considerations

#### Notice on optical radiation from Loki Projector when it becomes Risk Group 3.

- For RG3, no direct exposure to the beam shall be permitted.  
For RG3, operators shall control access to the beam within the hazard distance or install the product at a height that will prevent eye exposure within the hazard distance.
- This projector has two (2) built-in Class 4 laser clusters. Disassembly or modification is very dangerous and should never be attempted.
- Any operation or adjustment not specifically instructed by the user's guide creates the risk of hazardous laser radiation exposure.
- Do not open or disassemble the projector as this may cause damage by the exposure of laser radiation.

FOR PROFESSIONAL USE ONLY means installation can only be carried out by Barco AUTHORIZED PERSONNEL familiar with potential hazards associated with high intensity light beams.

### 2.2 Safety Training provided by the installer



Refer to document 601-0462 "Declaration of user safety training" for training tick off and signing.



**WARNING: The installer is responsible that the user is instructed. The user will sign a document to confirm that the instructions have been received and understood.**

#### Users definition

The Loki projector is intended for persons who have been instructed and trained by Barco authorized personnel to identify energy sources that may cause injury and to take precautions to avoid unintentional contact with or exposure to those energy sources.

This personnel must instruct the user about:

- High intensity light beam. The user must respect the exclusion zone, based on the light beam Hazard Distance (HD).
- Dangerous energy sources inside the projector. The user is not allowed to remove any cover from the projector.
- The installation, maintenance or service is for skilled persons only.
- The requirements for a **restricted access location** and an **exclusion zone**.

#### Restricted access location

To protect untrained persons and children, the projector must be installed in a **restricted access location**. The definition of a **restricted access location** is a location for equipment where both of the following paragraphs apply:

- Access can only be gained by Barco authorized personnel or persons who have been instructed and trained by a skilled person. The persons must have been instructed about the reasons for the restriction applied to the location and about the precautions that shall be taken.
- Access is only possible through the use of the tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.

Why a restricted access location: This is a RG3 product. Based on international requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related Hazard Distance (HD). This shall be physically impossible by creating sufficient separation height or by placing optional barriers. Within the restricted area operator training is considered sufficient. The applicable separation heights are discussed in "High Brightness Precautions", page 11

### 2.3 High Brightness Precautions

#### Restriction Zone (RZ) based on the HD (Hazard Distance).

The HD depends on the amount of lumens produced by the projector and the type of lens installed. See next chapter "HD in function of the lens Throw Ratio (TR)", page 8 .

## 2. Risk Group 3 Safety

To protect untrained end users (as cinema visitors) the installation shall comply with the following installation requirements: Operators shall control access to the beam within the hazard distance or install the product at the height that will prevent spectators' eyes from being in the hazard distance. Radiation levels in excess of the limits will not be permitted at any point less than 2.0 meter (SH) above any surface upon which persons other than operators, performers, or employees are permitted to stand or less than 1.0 meter (SH) lateral separation from any place where such persons are permitted to be. In non-cinema environments where unrestrained behavior is reasonably foreseeable, the minimum separation height should be greater than or equal to 3.0 meter to prevent potential exposure, for example by an individual sitting on another individual's shoulders, within the HD.

These values are minimum values and are based on the guidance provided in IEC 62471-5:2015 section 6.6.5.

The end user must understand the risk and apply protective measures based upon the hazard distance as indicated on the label and in the user information. Installation method, barriers, detection system or other applicable control measure shall prevent hazardous eye access to the radiation within the hazard distance.

For example, projectors that have a HD greater than 1 m and emit light into an uncontrolled area where persons may be present should be positioned in accordance with "the fixed projector installation" parameters, resulting in a HD that does not extend into the audience area unless the beam is at least 2.0 meter above the floor level. In non-cinema environments where unrestrained behavior is reasonably foreseeable, the minimum separation height should be greater than or equal to 3.0 meter to prevent potential exposure, for example by an individual sitting on another individual's shoulders, within the HD. For example, a sufficiently large separation height may be achieved by mounting the image projector on the ceiling or through the use of physical barriers.

For applications installed in the USA market the above limits for cinema like environments do not apply. The relevant minimum separation height is 2.5m (8,2 ft) by the FDA CDRH. Non cinema like environments require 2.5 meter (8.2 ft) separation height and 1.0 meter (3.3 ft) separation width for areas where restrained behavior is to be expected. All other areas require 3.0 (9.9 ft) separation height.

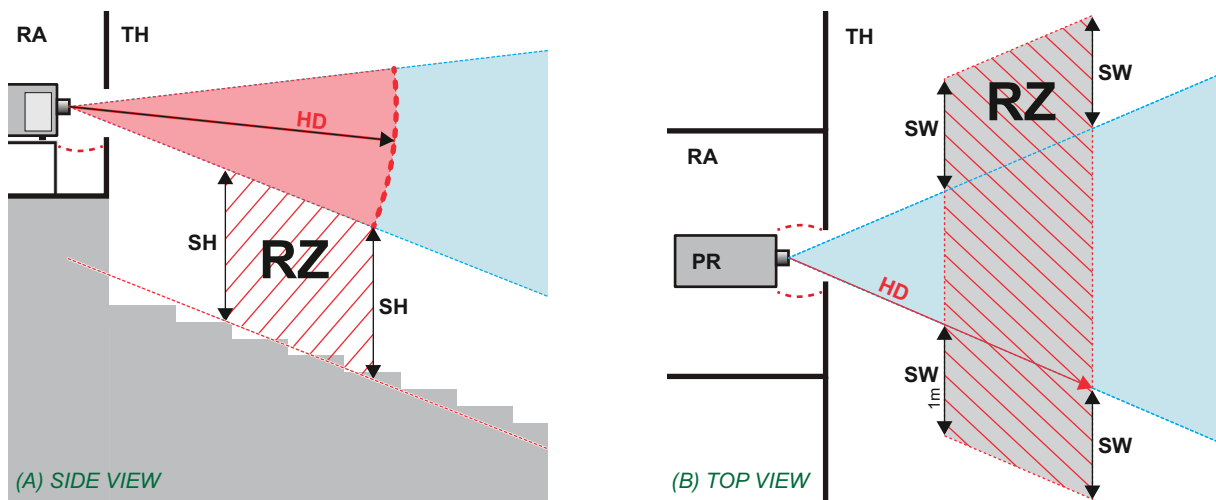


Image 2-1  
 A Side View  
 B Top View  
 RA Restricted Area  
 PR Projector  
 TH Theater  
 RZ Restriction Zone in the theater  
 SH Separation Height  
 SW Separation Width



**Regarding the SH Distance: For Cinema applications, the distance must be >2m. For Concert applications, the distance must be >3m.**

Based on national requirements, no person is allowed to enter the projected beam within the zone between the projection lens and the related hazard distance (HD). This shall be physically impossible by creating sufficient separation height or by placing barriers. The minimum separation height takes into account the surface upon which persons other than operator, performers or employees are permitted to stand.

On image 1-2 a typical setup is displayed. It must be verified if these minimum requirements are met. If required a restricted zone (RZ) in the theater must be established. This can be done by using physical barrier, like a red rope as illustrated in image 1-2.

The restricted area sticker can be replaced by a sticker with only the symbol.

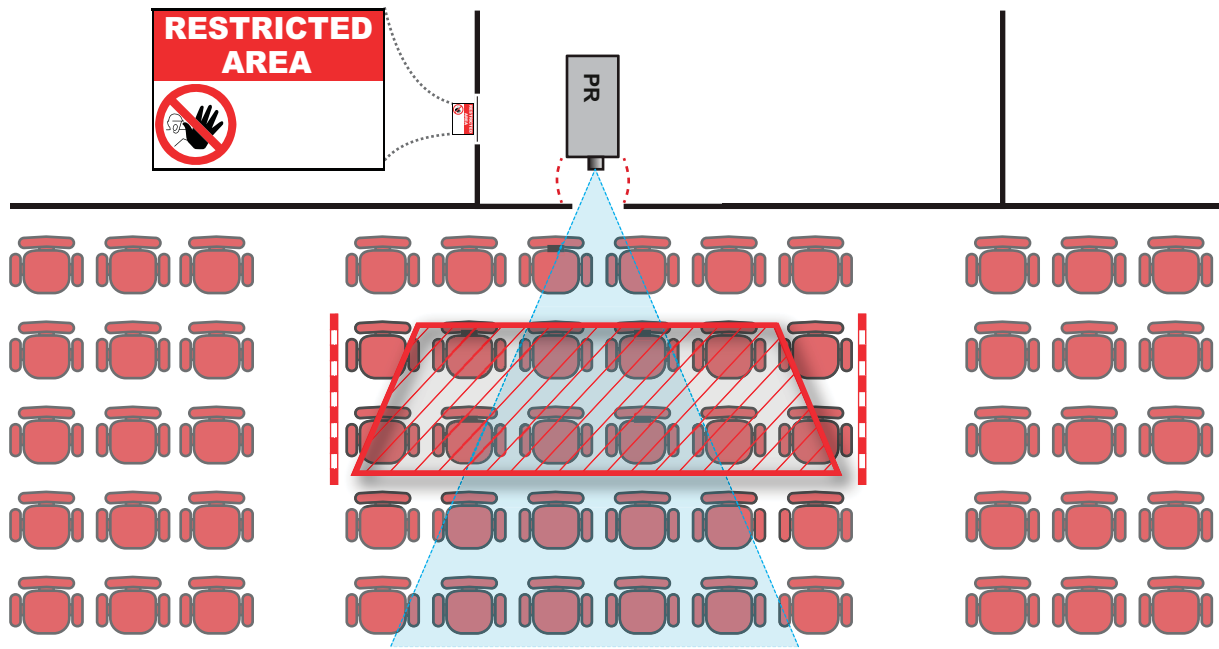


Image 2-2

## 2.4 Hazard Distance for fully closed projection system



### HD

Hazard Distance (HD) is the distance measured from the projection lens at which the intensity or the energy per surface unit becomes lower than the applicable exposure limit on the cornea or on the skin. The light beam is considered (to be) unsafe for exposure if the distance from a person to the light source is less than the HD.

### Restriction Zone RZ Based on the HD

The projector is also suitable for rear projection applications; projecting a beam onto a diffuse coated projection screen. As displayed in image 1-3 two areas should be considered: the restricted enclosed projection area (RA) and the observation area (TH).

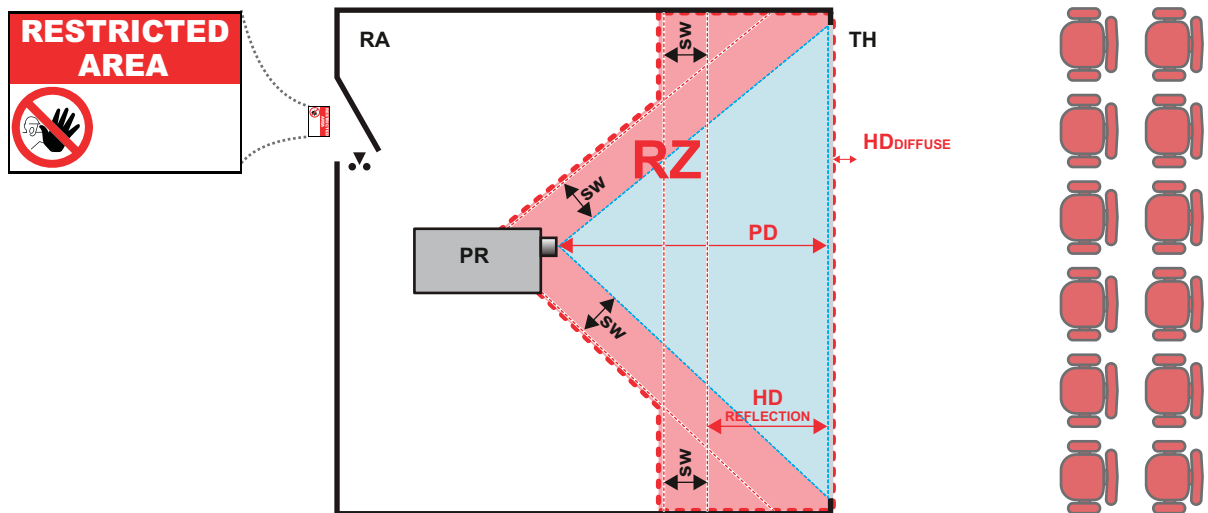


Image 2-3

- RA Restricted Access location (Enclosed projection area)
- PR Projector.
- TH Theater (observation area).
- RZ Restriction Zone
- PD Projection Distan
- SW Separation Width. Must be minimum 1 meter.

### Restriction zone (RZ) based on the HD continued.

For this type of setup 3 different HD shall be considered:

## 2. Risk Group 3 Safety

- HD as discussed in "High Brightness precautions: Hazard Distance (HD)", page 6 , relevant for intrabeam exposure.
- HDreflection : the distance that has to be kept restrictive related to the reflected light from the rear projection screen.
- HDdiffuse : the relevant distance to be considered while observing the defuse surface of the rear projection screen.

As described in "High Brightness precautions: Hazard Distance (HD)", page 6 , it is mandatory to create a restricted zone within the beam areas closer than any NOHD. In the enclosed projection area the combination of two restricted zones are relevant: The restricted zone of the projected beam toward the screen; taking into account 1 meter Separation Width (SW) from the beam onward. Combined with the restricted zone related to the rear reflection from the screen (HDreflection); also taking into account a 1 meter lateral separation.

The HDreflection distance equals 25% of the difference between the determined HD distance and the projection distance to the rear projection screen. To determine the HD distance for the used lens and projector model see graphs in chapter "HD in function of the lens Throw Ratio (TR)", page 8 .

$$\text{HDreflection} = 25\% (\text{HD} - \text{PD})$$

The light emitted from the screen within the observation shall never exceed the RG2 exposure limit, determined at 10 cm. The HDdiffuse can be neglected if the measured light at the screen surface is below 5000 cd/m<sup>2</sup> or 15000 LUX.

## 2.5 HD in function of the lens Throw Ratio (TR)



### TR (Throw Ratio)

The ratio of the distance to the screen (throw) to the screen width.

### HD versus Throw Ratio

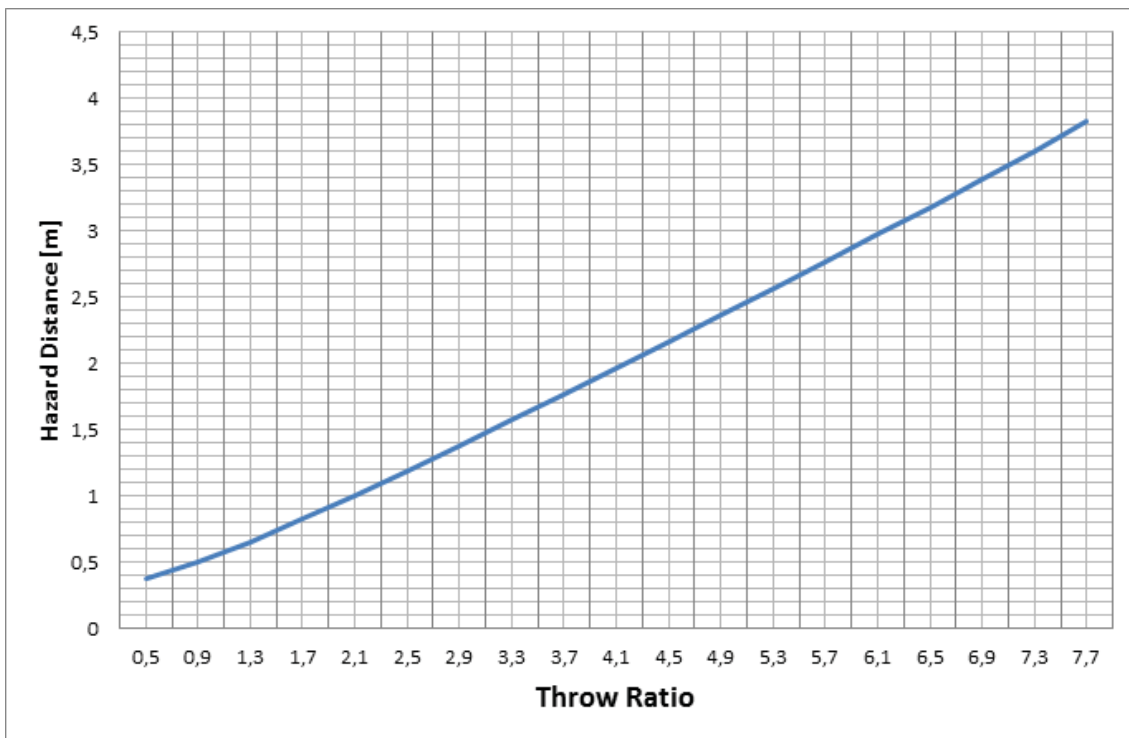


Image 2-4  
Hazard Distance in meters versus Throw ratio of the lens for the Loki Projector

Graphs shows Hazard Distance in meters versus Throw ratio of the lens