

F80



Safety manual

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1 Safety

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About this document

Read this document attentively. It contains important information to prevent personal injury while installing and using the F80 projector. Furthermore, it includes several cautions to prevent damage to the F80 projector. Ensure that you understand and follow all safety guidelines, safety instructions and warnings mentioned in this chapter before installing the F80 projector.

Clarification of the term “F80” used in this document

When referring in this document to the term “F80” means that the content is applicable for following Barco products:

- F80-Q7, F80-Q9, F80-Q12, F80-4K7, F80-4K9, F80-4K12

Model certification name

- GPC

1.1 General considerations

General safety instructions

- Before operating this equipment please read this manual thoroughly and retain it for future reference.
- Installation and preliminary adjustments should be performed by qualified Barco personnel or by authorized Barco service dealers.
- All warnings on the projector and in the documentation manuals should 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.

Notice on optical radiation

This projector embeds extremely high brightness (radiance) lasers; this laser light is processed through the projectors optical path. Native laser light is not accessible by the end user in any use case. The light exiting the projection lens has been diffused within the optical path, representing a larger source and lower radiance value than native laser light. Nevertheless the projected light represents a significant risk for the human eye when exposed directly within the beam. This risk is not specific related to the characteristics of laser light but solely to the high thermal induced energy of the light source; which is equivalent with lamp based systems.

Thermal retinal eye injury is possible when exposed within the Hazard Distance (HD). The HD is defined from the projection lens surface towards the position of the projected beam where the irradiance equals the maximum permissible exposure as described in the chapter “Hazard Distance”.

Notice on optical radiation (addendum)

- F80-Q12, F80-4K12:
 - The projector is Class 1 laser product that conforms with IEC EN 60825-1:2014. 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 2017-V-4837 effective September 13, 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 2.2 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. Safety considerations for RG3 projectors are discussed in section “Risk Group 3 Safety”, page 8.
 - This projector has one or several built-in Class 4 laser clusters. Disassembly or modification is very dangerous and should never be attempted.
- F80-Q9, F80-4K9:
 - The projector is Class 1 laser product that conforms with IEC EN 60825-1:2014. 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 2017-V-4837 effective September 13, 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 2.8 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. Safety considerations for RG3 projectors are discussed in section [“Risk Group 3 Safety”, page 8](#).

- This projector has one or several built-in Class 4 laser clusters. Disassembly or modification is very dangerous and should never be attempted.
- F80-Q7, F80-4K7:
 - The projector is Class 1 laser product that conforms with IEC EN 60825-1:2014. 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 2017-V-4837 effective September 13, 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 3.5 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. Safety considerations for RG3 projectors are discussed in section [“Risk Group 3 Safety”, page 8](#).
 - This projector has one or several built-in Class 4 laser clusters. Disassembly or modification is very dangerous and should never be attempted.

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 RG3, refer to chapter [“Risk Group 3 Safety”, page 8](#). Such combination of projector and lens are intended for professional use only, and are not intended for consumer use.

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.

1.2 Important safety instructions

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. 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 qualified service personnel.
- 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 qualified service personnel 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 powering the projector or adjusting the projector.
- To prevent injury, take note of the weight of the projector. Minimum 2 persons are needed to carry the projector. The projector weights about ±26 kg (±57 lbs) without lens and rigging frame.
- 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 projector:** This projector embeds extremely high brightness (radiance) lasers; this laser light is processed through the projectors optical path. Native laser light is not accessible by the end user in any use case. The light exiting the projection lens has been diffused within the optical path, representing a larger source and lower radiance value than native laser light. Nevertheless the projected light represents a significant risk for the human eye when exposed directly within the beam. This risk is not specific related to the characteristics of laser light but solely to the high thermal induced energy of the light source; which is comparable with lamp based systems.

Thermal retinal eye injury is possible when exposed within the Hazard Distance. The Hazard Distance (HD) is defined from the projection lens surface towards the position of the projected beam where the irradiance equals the maximum permissible exposure as described in the chapter [“High Brightness precautions: Hazard Distance \(HD\)”](#), page 8.

- 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: Hazard Distance \(HD\)”](#), page 8.
- Don't put your hand in front of the beam.
- This product contains no user serviceable parts. Attempts to modify/replace mechanics or electronics inside the housing or compartments will violate any warranties and may be hazardous.
- A special device (“rigged frame”) based on an external frame must be used when the projector is deployed in a hanging configuration, or when several projector must be stacked. See installation manuals for the correct use of these devices.
- 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.
- It is hazardous to operate without lens or shield. Lenses, shields or ultra violet screens shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired. For example by cracks or deep scratches.
- **Cooling liquid circuit.** The projector contains a cooling circuit filled with Green Ethylene glycol diluted (53% Glycol – 47% Demi water). When the cooling circuit leaks, switch off the device and contact qualified service personnel. The liquid is not for household use. Keep out of reach of children. Harmful by oral intake. Avoid exposure to pregnant women. Avoid contact with eyes, skin and clothing. Avoid inhale of the noxious fumes.
- Never point or allow light to be directed on people or reflective objects within the HD zone.
- All operators shall have received adequate training and be aware of the potential hazards.
- In case of using an external cooling system position the hoses of the cooling system so that they will not be tripped over, pulled, or contact hot surfaces.

To prevent fire hazard

- Do not place flammable or combustible materials near the projector!
- 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. The exclusion zone in the exhaust area must be not less than 100 cm (40”). The exclusion zone on the intake area must be not less than 50 cm (20”).
- Do not place any object in the projection light path at close distance to the projection lens output. The concentrated light at the projection lens output may result in damage, fire or burn injuries.
- 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. 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.
- Ensure no misalignment can occur. Prolonged exposure of wooden walls at close distance (< 20 cm) can represent a fire risk. After alignment the projector shall be securely mounted to the pedestal.
- 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. 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.
- Projection rooms must be well ventilated or cooled in order to avoid build up of heat. It is necessary to vent hot exhaust air from projector and cooling system to the outside of the building.
- Let the projector cool completely before storing. Remove cord from the projector when storing.

To prevent projector damage

- 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.
- The air inlets of the projector must be cleaned on a regular basis. Cleaning the booth area would be monthly-minimum. Neglecting this could result in disrupting the air flow inside the projector, causing overheating. Overheating may lead to the projector shutting down during operation.
- The projector must always be installed in a manner which ensures free flow of air into its air inlets.
- If more than one projector is installed in a common projection booth, the exhaust air flow requirements are valid for EACH individual projector system. Note that inadequate air extraction or cooling will result in decreased life expectancy of the projector as a whole as well as causing premature failure of the lasers.
- In order to ensure that correct airflow is maintained, and that the projector complies with Electromagnetic Compatibility (EMC) and safety requirements, it should always be operated with all of it's covers in place.
- 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 remove all power from the projector. Do not operate the projector again until it has been checked by qualified service personnel.
- Do not block the projector cooling fans or free air movement around the projector.
- Do not use this equipment near water.
- **Special care for Laser Beams:** Special care should be used when DLP projectors are used in the same room as high power laser equipment. Direct or indirect hitting of a laser beam on to the lens can severely damage the Digital Mirror Devices™ in which case there is a loss of warranty.
- Never place the projector in direct sunlight. Sunlight 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. For lens cleaning follow the instructions precisely as stipulated in the projector manual.
- 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.
- Allowed ambient temperature range: $t_a = 10^{\circ}\text{C}$ (50°F) to 40°C (104°F)
- Rated humidity = 20% RH to 80% RH Non-condensed.
- Do not operate the projector outside its temperature and humidity specifications as this may result in overheating and malfunction.

On servicing


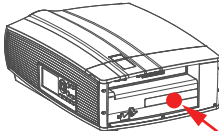

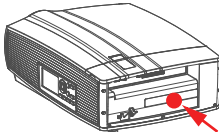

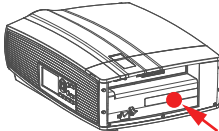

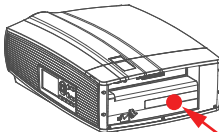
- Do not attempt to service this product yourself. This product contains no user serviceable parts except parts describe in the User manual. Attempts to modify/replace mechanics or electronics inside the housing or compartments will violate any warranties and may expose you to dangerous voltage potentials, risk of electric shock and retinal eye injury.
- 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.
- Remove all power from the projector and refer servicing to Barco authorized repair center under the following conditions:
 - When the power cord or plug is damaged or frayed.
 - 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.
- Replacement parts: When replacement parts are required, be sure the service technician has used original Barco replacement parts or authorized replacement parts which have the same characteristics as the Barco original part. 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.

Safety Data Sheets for Hazardous Chemicals

For safe handling information on chemical products, consult the Safety Data Sheet (SDS). SDSs are available upon request via safetymaterials@barco.com.

1.3 Product safety labels

Light beam related safety labels

Label image	Label description	Label location
	Refer to user manual for further information!	
	Caution! Do not stare into beam, RG2 product.	
	Hazard RG3: not for household use symbol.	
	Hazard RG3: optical radiation warning symbol.	

Label image

Label description

Label location

For F80-Q7, F80-4K7:

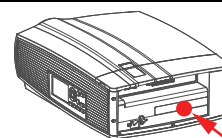
For North America:
THIS PRODUCT IS IN CONFORMITY WITH PERFORMANCE STANDARDS FOR LASER PRODUCTS UNDER 21 CFR 1040, EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2017-V-4837 EFFECTIVE SEPTEMBER 13, 2017.



This projector may become RG3 when an interchangeable lens with throw ratio greater than 3.5 is installed. Refer to the manual for the lens list and hazard distance before operation. Such combinations of projector and lens are intended for professional use only, and are not intended for consumer use.

Ce projecteur peut devenir un projecteur RG3 en cas d'installation d'un objectif interchangeable dont le rapport de projection est supérieur à 3.5. Veuillez vous reporter au manuel pour en savoir plus sur la liste des objectifs et la distance de sécurité avant toute utilisation. De telles combinaisons entre projecteur et objectif sont conçues pour des applications professionnelles uniquement et pas pour des applications grand public.

本投影机安装投射比大于3.5的可换镜头后，可成为RG3，操作前，请参考手册中镜头清单和危险距离。本投影机与镜头组合仅供专业使用，非普通消费者使用。



For North America: THIS PRODUCT IS IN CONFORMITY WITH PERFORMANCE STANDARDS FOR LASER PRODUCTS UNDER 21 CFR 1040, EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2017-V-4837 EFFECTIVE September 13, 2017.

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本投影机安装投射比大于3.5的可换镜头后，可成为RG3，操作前，请参考手册中镜头清单和危险距离。本投影机与镜头组合仅供专业使用，非普通消费者使用。

For F80-Q9, F80-4K9 :

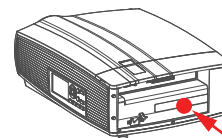
For North America:
THIS PRODUCT IS IN CONFORMITY WITH PERFORMANCE STANDARDS FOR LASER PRODUCTS UNDER 21 CFR 1040, EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2017-V-4837 EFFECTIVE SEPTEMBER 13, 2017.



This projector may become RG3 when an interchangeable lens with throw ratio greater than 2.8 is installed. Refer to the manual for the lens list and hazard distance before operation. Such combinations of projector and lens are intended for professional use only, and are not intended for consumer use.

Ce projecteur peut devenir un projecteur RG3 en cas d'installation d'un objectif interchangeable dont le rapport de projection est supérieur à 2.8. Veuillez vous reporter au manuel pour en savoir plus sur la liste des objectifs et la distance de sécurité avant toute utilisation. De telles combinaisons entre projecteur et objectif sont conçues pour des applications professionnelles uniquement et pas pour des applications grand public.

本投影机安装投射比大于2.8的可换镜头后，可成为RG3，操作前，请参考手册中镜头清单和危险距离。本投影机与镜头组合仅供专业使用，非普通消费者使用。



For North America: THIS PRODUCT IS IN CONFORMITY WITH PERFORMANCE STANDARDS FOR LASER PRODUCTS UNDER 21 CFR 1040, EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2017-V-4837 EFFECTIVE September 13, 2017.

This projector may become RG3 when an interchangeable lens with throw ratio greater than 2.8 is installed. Refer to the manual for the lens list and hazard distance before operation. Such combinations of projector and lens are intended for professional use only, and are not intended for consumer use.

Ce projecteur peut devenir un projecteur RG3 en cas d'installation d'un objectif interchangeable dont le rapport de projection est supérieur à 2.8. Veuillez vous reporter au manuel pour en savoir plus sur la liste des objectifs et la distance de sécurité avant toute utilisation. De telles combinaisons entre projecteur et objectif sont conçues pour des applications professionnelles uniquement et pas pour des applications grand public.

本投影机安装投射比大于2.8的可换镜头后，可成为RG3，操作前，请参考手册中镜头清单和危险距离。本投影机与镜头组合仅供专业使用，非普通消费者使用。

For F80-Q12, F80-4K12 :

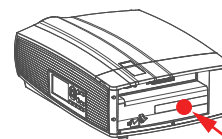
For North America:
THIS PRODUCT IS IN CONFORMITY WITH PERFORMANCE STANDARDS FOR LASER PRODUCTS UNDER 21 CFR 1040, EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2017-V-4837 EFFECTIVE ON SEPTEMBER 13, 2017.



This projector may become RG3 when an interchangeable lens with throw ratio greater than 2.2 is installed. Refer to the manual for the lens list and hazard distance before operation. Such combinations of projector and lens are intended for professional use only, and are not intended for consumer use.

Ce projecteur peut devenir un projecteur RG3 en cas d'installation d'un objectif interchangeable dont le rapport de projection est supérieur à 2.2. Veuillez vous reporter au manuel pour en savoir plus sur la liste des objectifs et la distance de sécurité avant toute utilisation. De telles combinaisons entre projecteur et objectif sont conçues pour des applications professionnelles uniquement et pas pour des applications grand public.

本投影机安装投射比大于2.2的可换镜头后，可成为RG3，操作前，请参考手册中镜头清单和危险距离。本投影机与镜头组合仅供专业使用，非普通消费者使用。



For North America: THIS PRODUCT IS IN CONFORMITY WITH PERFORMANCE STANDARDS FOR LASER PRODUCTS UNDER 21 CFR 1040, EXCEPT WITH RESPECT TO THOSE CHARACTERISTICS AUTHORIZED BY VARIANCE NUMBER 2017-V-4837 EFFECTIVE September 13, 2017.

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Ce projecteur peut devenir un projecteur RG3 en cas d'installation d'un objectif interchangeable dont le rapport de projection est supérieur à 2.2. Veuillez vous reporter au manuel pour en savoir plus sur la liste des objectifs et la distance de sécurité avant toute utilisation. De telles combinaisons entre projecteur et objectif sont conçues pour des applications professionnelles uniquement et pas pour des applications grand public.

Label image	Label description	Label location
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本投影机安装透射比大于2.2的可换镜头后，可成为RG3，操作前，请参考手册中镜头清单和危险距离。本投影机与镜头组合仅供专业使用，非普通消费者使用。

1.4 Risk Group 3 Safety

1.4.1 General considerations

Notice on optical radiation from F80 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 one or several 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.



WARNING: No direct exposure to the beam within the hazard distance shall be permitted, RG3 (Risk Group 3) IEC EN 62471-5:2015



CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

PPE (Personal Protective Equipment) description.

A skilled person or service person shall be worn protective clothes and goggles when access to restricted area.

Possible skin or eye damage.

Disconnect power before servicing.

1.4.2 High Brightness precautions: Hazard Distance (HD)



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 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 10.

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.

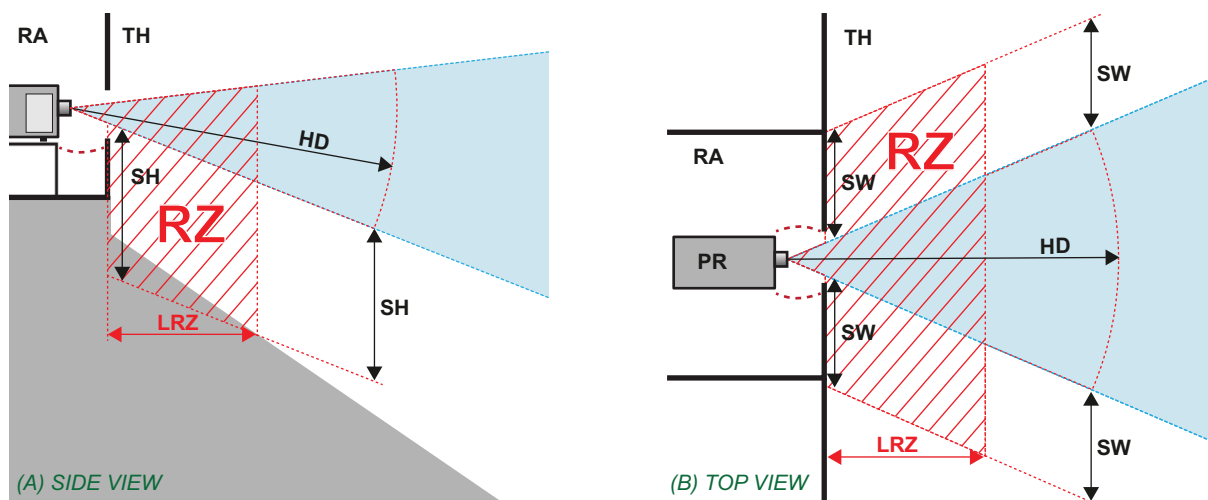


Image 1-1

- A** Side view.
- B** Top view.
- RA** Restricted Access location (boot area of projector).
- PR** Projector.
- TH** Theater.
- RZ** Restriction Zone in the theater.
- SH** Separation Height.
- SW** Separation Width.

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.

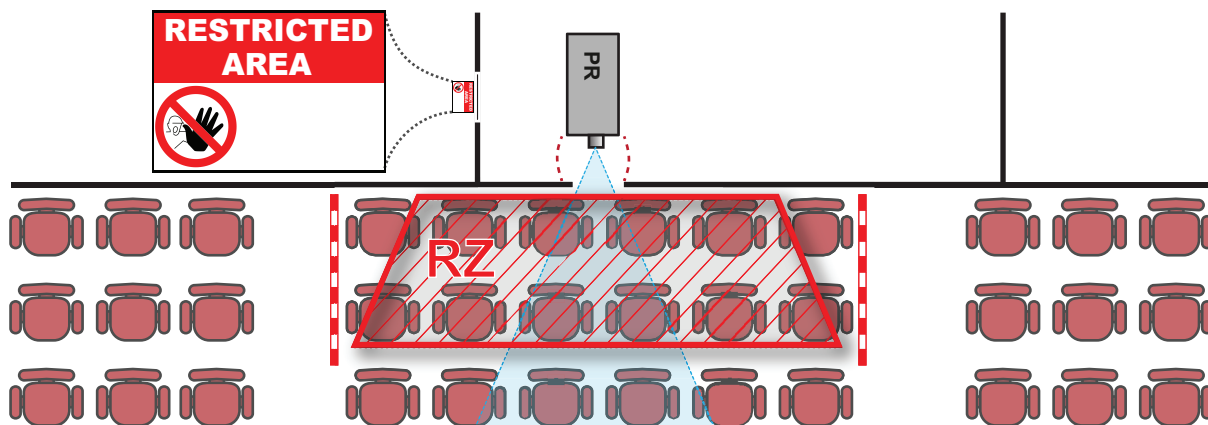


Image 1-2

USA market

For LIPs (Laser Illuminated Projectors) installed in the USA market other restriction zone conditions apply.

LIPs for installation in restrained environment (cinema theaters, business rooms, class rooms, museums ...) shall be installed at height vertically above the floor such that the bottom plane of the hazard distance zone shall be no lower than 2.5 meters above the floor. Horizontal clearance to the hazard distance zone shall be not less than 1 meter. Alternatively, in case the height of the separation barrier for the horizontal clearance is at least 1 meter high then the horizontal clearance (SW) can be reduced to:

- 0 meter if the height of the hazard zone is minimum 2.5 meter.
- 0.1 meter if the height of the hazard zone is minimum 2.4 meter.
- 0.6 meter if the height of the hazard zone is minimum 2.2 meter.

LIPs for installations in unrestrained environment (concerts, ...) shall be installed at a height vertically above the floor such that the bottom plane of the Hazard distance Zone shall be no lower than 3 meters above the floor. Horizontal clearance to the hazard distance zone shall be not less than 2.5 meters. Any human access horizontally to the Hazard Zone, if applicable, shall be restricted by barriers. If human access is possible in an unsupervised environment, the horizontal or vertical clearances shall be increased to prevent exposure to the hazard distance zone.

The LIP shall be installed by Barco or by a trained and Barco-authorized installer or shall only be transferred to laser light show variance holders. This is applicable for dealers and distributors since they may need to install the LIP (demo install) and/or they transfer (sell, rent, lease) the LIP. Dealers and distributors shall preserve sales and installation records for a period of 5 years. Variance holders may currently hold a variance for production of Class IIIB and IV laser light shows and/or for incorporating RG3 LIPs. Laser light show variance for RG3 LIPs can be requested by mailing the application to RadHealthCustomerService@fda.hhs.gov.

The installation checklist for laser illuminated RG3 projectors must be fully completed after the installation. The installation checklist can be downloaded from the Barco website. The installer shall preserve the checklist for a period of 5 years.

Install one or more readily accessible controls to immediately terminate LIP projection light. The power input at the projector side is considered as a reliable disconnect device. When required to switch off the projector, disconnect the power cord at the projector side. In case the power input at the projector side is not accessible (e.g. truss mount), the socket outlet supplying the projector shall be installed nearby the projector and be easily accessible, or a readily accessible general disconnect device shall be incorporated in the fixed wiring.

1.4.3 HD for fully enclosed projection systems



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 defuse 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).

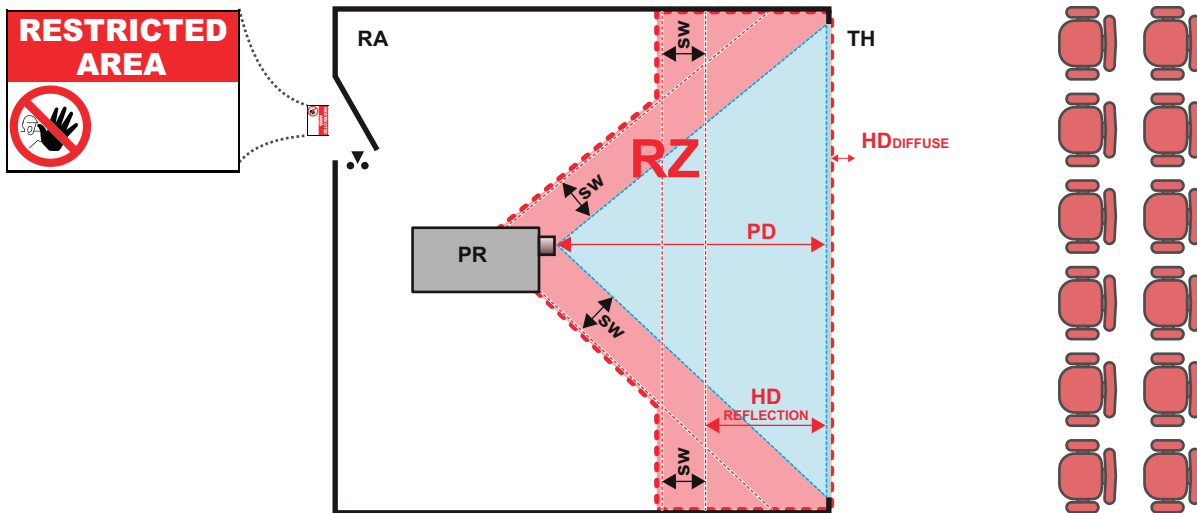


Image 1–3

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

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

- HD as discussed in “High Brightness precautions: Hazard Distance (HD)”, page 8, relevant for intrabeam exposure.
- $HD_{\text{reflection}}$: the distance that has to be kept restrictive related to the reflected light from the rear projection screen.
- HD_{diffuse} : the relevant distance to be considered while observing the diffuse surface of the rear projection screen.

As described in “High Brightness precautions: Hazard Distance (HD)”, page 8, it is mandatory to create a restricted zone within the beam areas closer than any HD. 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 ($HD_{\text{reflection}}$); also taking into account a 1 meter lateral separation.

The $HD_{\text{reflection}}$ 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 chapter “HD in function of the lens Throw Ratio (TR)”, page 10.

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

The light emitted from the screen within the observation shall never exceed the RG2 exposure limit, determined at 10 cm. The HD_{diffuse} can be neglected if the measured light at the screen surface is below 5000 cd/m² or 15000 LUX.

1.4.4 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

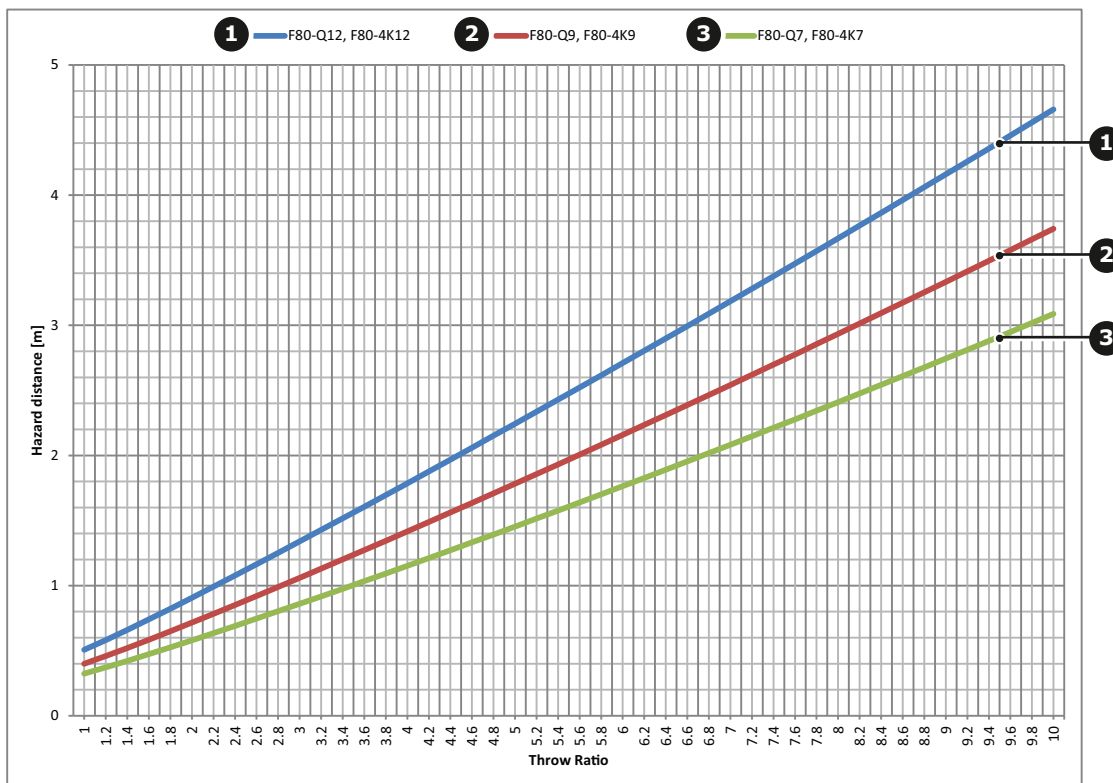


Image 1–4

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

1.5 Compliance

UK Compliance



This product is fit for use in the UK.

Authorised Representative: Barco UK Ltd

Address: Building 329, Doncastle Road
Bracknell RG12 8PE, Berkshire, United Kingdom

1.6 Download Product Manual

Download Product Manual

Product manuals and documentation are available online at www.barco.com/td.

Registration may be required; follow the instructions given on the website.

IMPORTANT! Read Installation Instructions before connecting equipment to the mains power supply.

