CHRISTIE®

RealLaser™

Cinema Projectors

Usage best practices

CHRISTIE®

Optimize your Christie RGB pure laser cinema system

Christie RGB pure laser projectors with RealLaser illumination technology are built to reproduce images which outperform the extremely rigid DCI requirements of cinema. Christie RealLaser illumination technology is capable of very high brightness coupled with expanded color gamut and ultra-high contrast.

This technology not only improves image quality but can also provide very economical operation making it ideal for any cinema. The guidelines in this document can be used to optimize both image quality and economy. If you need assistance with following the guidelines, please do not hesitate to contact Christie technical support.

How to calculate the amount of light you need

Use the Christie Cinema Projector Lumen and Lens Selector tool to help with these calculations. This tool is available on the Christie website.

The basic formula to calculate this theoretical light requirement is:

❶ Center Lumens (CL) = Screen brightness desired (center fL) X Screen area (sq. ft)
  • Generally accepted practice for the target center brightness is: 14fL for 2D and as high as 14fL for 3D (light measurement taken through 3D glasses).

❷ After you have the "CL" number you would divide it by all significant system efficiencies. Some examples would be:
  • Screen gain: 1.0 to 2.4. Silver screens are typically 2.4. This is a very important part of this equation and care should be taken to make sure this number is accurate. If the screen in question is not new then the overall gain should be measured properly. Any degradation or debris on the screen will reduce the screen gain. Screen replacement might be considered.
  • Port window efficiency: 96% efficiency is typical for good port glass.
  • Loss due to color and uniformity correction: 95% efficiency is typical.
  • 3D system light efficiency: this number can be anywhere from 10% to 30% efficiency depending on the 3D system used. Get this information from the 3D system provider.
  • Other effects like down angle and screen curve do make a difference for light distribution but they only effect these calculations if they are excessive

❸ Calculation: Lumens Required (L) = Center Lumens (CL) / (Screen Gain X Port Window Efficiency X Color Correction Efficiency X 3D Efficiency)

❹ The resulting "L" number you get would be the "MINIMUM lumen requirement" to meet the desired light levels.

How to make sure the system will provide enough light to satisfy screen brightness requirements

There should be enough brightness available even at the end of the RGB laser system useful life to meet your specified center brightness requirement. The laser warranty should be considered when making this decision.

❶ Like xenon, there is a natural brightness drop-off that occurs with any RGB laser system during its life. Unlike xenon, this brightness curve is very slow and steady requiring no maintenance to the light source for many years. Leaving the RGB laser system at 100% power throughout its life would give this typical brightness curve:

Brightness Maintenance over Time
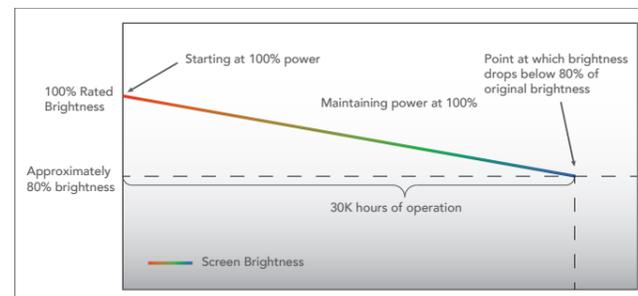
❷ This initial drop-off in brightness is mainly due to the aging of the lasers. There is no need to adjust the laser alignment over time, the alignment will not change.

❸ 100% Rated brightness would indicate the use of a new RGB laser system running at 100% power.

❹ It is NOT recommended to run a RGB laser system in this way. If this is done then the brightness level may not be maintained as long and the brightness over this service period will be reduced.

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❺ This chart describes the recommended operation of any RGB laser system:

Brightness Maintenance vs. Operation Power
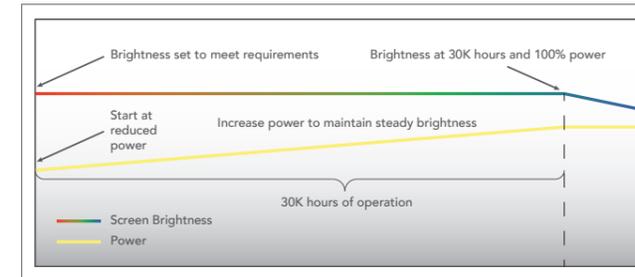
❻ Understanding this brightness curve will help when deciding how much brightness will be needed from the start. It is important that the RGB laser system can produce the required brightness at the end of its determined life or service period. Here is how this is estimated:
  • Select a RealLaser RGB projector and reduce its maximum lumen value by about 20% as a starting point. This would be an estimate of the brightness that the projector can achieve at or near the END of its service period at the stated warranty. If you intend on running the RGB laser illumination system longer than the stated warranty then you would increase this percentage. Call this resulting lumen value the "maximum aged brightness".
  • Take the "minimum lumens required" number and select the RealLaser RGB projector that can cover this with its "maximum aged brightness" value.
  • When performing the initial setup installation, the brightness should be set at the same brightness used in these calculations. This will determine the initial power that the system will be set at.

How to preserve brightness with the proper projector operating environment

Proper operating environment conditions will preserve brightness life. Unlike xenon, RGB laser systems are very sensitive to temperature, humidity and air quality.

❶ **Room temperature:** Between 59°F and 77°F (15°C and 25°C)

❷ **Room humidity (non-condensing):** 20% to 80%

❸ **Room air quality:** MERV A14 Filtration / AQI of 85 or less Excessive ingress of dust, oils and other pollutants may affect the performance. Minimizing these pollutants is very important in preserving brightness and longevity.
  ! The room air circulation system shall include a MERV (Minimum Efficiency Reporting Value) A14 or better filtration system to ensure that the sub 5 micron particles are removed
  ! If outdoor air is being used to ventilate the ambient area around the projector during operation, the AQI (Air Quality Index) of the outdoor air should be 85 or lower
  ! The intake filters on the projector will filter out particulates larger than 5 microns. This would be dust you would commonly see on surfaces and would show if you wiped your fingers across it. It can also be seen floating in the light cone of the projector as the light exits the lens. Larger partials will be caught in the filters but excessive amounts can clog the filters prematurely.

  ! Particles smaller than 5 microns, like popcorn oil, will pass through filters and cannot be seen but can cause internal degradation of the light path resulting in reduced brightness and longevity

  ! Operating a RealLaser RGB system outside of these optimal conditions will:
    1. reduce the projector's brightness capability
    2. create an out of warranty condition
    3. reduce system efficiencies

  ✓ **External exhaust extraction:** It is recommended to use the optional exhaust extraction adapter and provide a minimum of 450 CFM exhaust air flow if the ambient temperature could approach or exceed the maximum room temperature specified above.
  ✓ Routine service should include checks for temperature, humidity, air quality and air flow as well as inspections of the air handling system to insure optimal environmental conditions are maintained.
  ✓ Make sure that the air duct system has a damper feature which closes off to the outside air when the system is powered down. This will prevent dirty moist air from being pulled back down into the projector when the system is off.

How to determine a RealLaser projector's average expected service period

In a Christie RGB RealLaser projector data sheet, you will find the maximum brightness output in lumens and the brightness drop-off that can be expected over a specified service period.

❶ If the operating situation is not optimal then a faster brightness drop-off or reduced life can be expected.

❷ Non-optimal conditions would include:
  • Poor operating environment (temp, humidity & air quality)
  • Starting the RealLaser RGB system out near or above 100% power and running it this way throughout its life
  • Not providing adequate air extraction

Christie RGB RealLaser warranty

Christie RGB RealLaser projectors are built to very high quality standards making any failure unlikely. If a Christie RealLaser system has failed for any reason then a service technician should check the system, environment conditions and operating practices to make sure that the projector is being used properly and in accordance to these guidelines. All Christie RealLaser RGB systems are covered under warranty against any manufacturer defects. Details can be found in the projector warranty documentation.

❶ At installation, fill out and follow instructions on the Installation Checklist found in the projector documentation.

❷ If a warranty claim is required, prompt action must be taken. Contact Christie Tech Support in your region for assistance.

If the request is unusual and it is suspected that the operating practices or environmental conditions may have caused the failure, Christie may start an investigation to verify the claim. This is to help prevent repeating failures caused by improper practices or poor operating environment conditions.

Certified System
ISO 9001
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DLP
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For the most current specification information, please visit www.christiedigital.com

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