

Christie Xenolite high-performance lamp solutions

Digital cinema
Post production



Optimize your digital cinema system –
choose the right Christie Solaria Series
projector and Xenolite lamp combination

CHRISTIE®

Reliability starts here

Christie Xenolite lamps (CDXL)

Christie® Xenolite® lamps light up screens around the world and help you give your patrons the best cinema experience. To get a true representation of color in any environment requires a remarkable light source and the suite of Christie Xenolite lamps delivers. They offer stable color temperature, a wide range of power levels, excellent color rendition, and long-lasting performance consistency. Longer lamp life and lower operating costs are among the key features that exhibitors and installers look for when selecting lamps.

Christie understands the cinema industry. We know our customers personally. With no margin for error, the show must always go on. Christie brings more than 80 years of experience, knowledge and value to your cinema business. From concept to completion, Christie is the undisputed leader in creating solutions for your cinema.



“Christie lamps have proven themselves in four critical areas: reliability, longer lamp life, energy savings and bottom line, giving us the lowest operating costs. Our technical teams find the combination of Christie lamps and Christie digital projectors to be a forceful duo that delivers exceptional, high performance in our theaters.”

Gary Watson, Planning and Logistics
Hoyts Cinema Technology Group, Sydney, Australia



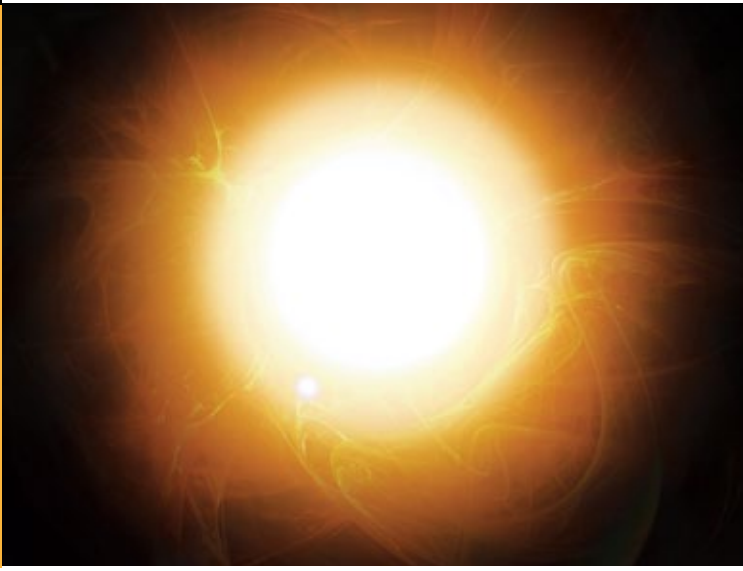
- ▲ Hoyts plans on converting over 400 cinema locations to digital over the next three years. In the largest deal of its kind in Australia and New Zealand, Christie will be supplying 2K- and 4K-ready Christie Solaria Series projectors for Hoyts' conversion.

- ▲ After an intense selection process, Molinare – widely considered the best post-production studio in Spain – opts for Christie Solaria Series projectors.

Designed to deliver

Christie Xenolite lamps are designed specifically for the Solaria Series of digital cinema projectors. They set new levels of performance for digital cinema technology. Choices in brightness and power levels offer flexibility for a variety of screen sizes in existing theater infrastructures.

With a range of lamp sizes that provide greater light output and longevity, Christie continues to meet the rigorous lamp requirements of exhibitors around the world.



“To me, it is more about how long the customer can use the lamp and obtain good results, while at the same time, reduce operating costs.”

Frank Schmitz, Head of Sales
Film Ton Technik (FTT), Germany

Optimize your digital cinema system with the right Christie combination

Select from a suite of Christie Xenolite lamps to lower operating costs, increase light output and efficiency and save maintenance costs. Christie Xenolite lamps provide 99.999% reliability. And Christie lamps and projectors are backed by excellent warranties for even more security.

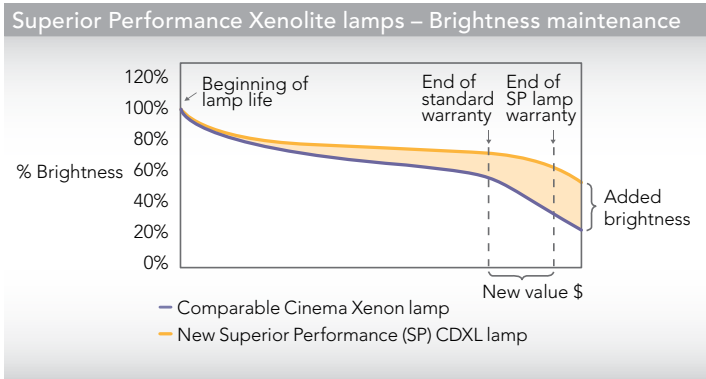
Brighter, longer-lasting Xenon lamps

Christie’s Superior Performance Xenolite lamp series uses the latest in Xenon lamp technology to provide increased brightness, improved stability and a longer life span. This increased brightness offers more captivating 2D and 3D experiences, without a cost to overall lamp performance. In fact, our Superior Performance Xenolite lamps are not only brighter, they last 30% longer than comparable Xenon lamps while still offering the same extraordinary 99.999% in-theater uptime. This means the show will not only go on, but it will go on brighter and with a lower total cost of ownership, increasing your theater’s overall profitability.

- ▶ Christie’s Superior Performance Xenolite lamp series provides increased brightness and 30% longer life than comparable Xenon lamps.

The benefits of Christie Superior Performance Xenolite lamps

- More usable hours per dollar**
 - Longer warranties allow you to safely get more use out of each lamp
 - Fewer lamp replacements equals lower cost of operation
 - Less maintenance required thanks to fewer lamp replacements
- More lumens per dollar**
 - Less brightness drop-off for more available brightness
 - Less power required thanks to less brightness drop-off
 - Less power required equals lower energy costs and lower cost of operation
- More stable brightness and reliability**
 - New lamp technology provides better arc stability and ignition performance
 - Improved performance with the same 99.999% in-theater uptime reliability



Christie Solaria Series

Christie Solaria One and Christie Solaria One+



▲ Christie Solaria One and Christie Solaria One+

Designed for seamless use with Christie Solaria® Series projectors, Christie Xenolite lamps provide high output and brightness in a cost-efficient, high-performance package.



▲ CDXL-14M ▲ CDXL-16M ▲ CDXL-21S1

Christie CP2210



▲ Christie CP2210

High-performance Christie Xenolite lamps are the best option for illuminating your Christie CP2210 digital cinema projector and are designed to deliver mission-critical reliability.



▲ CDXL-14M ▲ CDXL-16M ▲ CDXL-18SD ▲ CDXL-20SD

Christie CP2220 and Christie CP4220

- ▶ Christie CP2220
- ▼ Christie CP4220



Consistent quality, 99.999% proven uptime, longer lamp life and lower operating costs make Christie Xenolite lamps and Solaria Series projectors a winning combination.



▲ CDXL-20/CDXL-20SP ▲ CDXL-30/CDXL-30SP ▲ CDXL-30SD

Christie CP2230 and Christie CP4230

- ▶ Christie CP2230
- ▼ Christie CP4230



Christie Xenolite lamps can produce remarkable brightness and color consistency with excellent resistance to flicker, ignition difficulty and explosion. With this superior performance comes great economy.



▲ CDXL-20/CDXL-20SP ▲ CDXL-30/CDXL-30SP ▲ CDXL-45/CDXL-45SP ▲ CDXL-60/CDXL-60SP

Designed to deliver the highest performing solutions



▲ Christie Solaria One, Christie Solaria One+



▲ Christie CP2210



Xenolite lamps		CDXL-14M ¹	CDXL-16M ¹	CDXL-18SD	CDXL-20SD	CDXL-21S1 ²
Operational details³	estimated average expected life (hrs)	• 3500 hrs	• 3500 hrs	• 2100 ⁴ hrs	• 1500 ⁵ hrs	• 1500 hrs
	warranty	• 100% warranty to 3000 hrs	• 100% warranty to 3000 hrs	• 100% warranty to 1750 hrs	• 100% warranty to 1000 hrs	• 100% warranty to 1000 hrs
	maximum lumen output ⁶	• 4500/3800 lumens (CP2210/Solaria One, Solaria One+)	• 7500/6200 lumens (CP2210/Solaria One, Solaria One+)	• 10,000 lumens (CP2210)	• 12,000 lumens (CP2210)	• 8000/9000 lumens (Solaria One/Solaria One+)
	projector air extraction requirement	• 450 CFM ⁷	• 450 CFM ⁷	• 450 CFM ⁷	• 450 CFM ⁷	• 450 CFM ⁷
Compatibility	• CP2210 • Solaria One • Solaria One+		• CP2210 • Solaria One • Solaria One+	• CP2210	• CP2210	• Solaria One • Solaria One+
Technical data	rated input power	• 1430W	• 1600W	• 1800W	• 2000W	• 2100W
	rated current	• 73.5A	• 72A	• 75A	• 75A	• 80A
	operating wattage range	• 1000-1430W	• 1000-1600W	• 1260-1800W	• 1400-2000W	• 1610-2300W
	rated voltage	• 19.5V	• 22.2V	• 26.5V	• 26.5V	• 26.5V
	horizontal	• ±5°	• ±5°	• ±5°	• ±5°	• ±5°
	base surface temperature	• 200°C max	• 200°C max	• 200°C max	• 200°C max	• 200°C max

¹ Cost efficient ² For use only in Solaria One and Solaria One+ projectors ³ By following Christie's Best Practices for Lamp Usage on pages 7-8 of this brochure, you can find out how to select the ideal lamp size to meet your projector and screen requirements ⁴ 2100 hours when operated in a CP2210 or CP2000-M model number ending in -02 or greater ⁵ 1500 hours when operated in a CP2210 or CP2000-M model number ending in -02 or greater. Not recommended for use in CP2000-M model number ending in -01 ⁶ Color corrected/center lumens ⁷ Exhaust extraction is optional. Extraction with the optional extraction duct requires 450 CFM



▲ Christie CP2220



▲ Christie CP2230



▲ Christie CP4220, Christie CP4230



Xenolite lamps		CDXL-20 ¹	CDXL-20SP	CDXL-30 ¹	CDXL-30SP	CDXL-30SD	CDXL-45	CDXL-45SP	CDXL-60	CDXL-60SP
Operational details²	estimated average expected life (hrs)	• 3500 hrs	• 4000 hrs	• 2500 hrs	• 2800 hrs	• 1500 ³ hrs	• 1200 hrs	• 1500 hrs	• 900 hrs	• 1100 hrs
	warranty	• 100% warranty to 2400 hrs	• 100% warranty to 3200 hrs	• 100% warranty to 1500 hrs	• 100% warranty to 1900 hrs	• 100% warranty to 1000 hrs	• 100% warranty to 1000 hrs	• 100% warranty to 1300 hrs	• 100% warranty to 600 hrs	• 100% warranty to 800 hrs
	maximum lumen output ⁴	• 9000/10,000 lumens (CP2220, CP4220/CP2230, CP4230)		• 16,000/19,000 lumens (CP2220, CP4220/CP2230, CP4230)		• 22,000 lumens (CP2220/CP4220)	• 24,000/26,000 lumens (CP2230/CP4230)		• 32,000/34,000 lumens (CP2230/CP4230)	
	projector air extraction requirement	• 450 CFM		• 450 CFM		• 450 CFM	• 600 CFM		• 600 CFM	
Compatibility	• CP2220 • CP4220 • CP2230 • CP4230			• CP2220 • CP4220 • CP2230 • CP4230		• CP2220 • CP4220	• CP2230 • CP4230		• CP2230 • CP4230	
Technical data	rated input power	• 2000W		• 3000W		• 3000W	• 4500W		• 6000W	
	rated current	• 80A		• 110A		• 100A	• 145A		• 155A	
	operating wattage range	• 1400-2000W		• 2100-3000W		• 2100-3000W	• 3150-4500W		• 4200-6000W	
	rated voltage	• 25V		• 27V		• 30V	• 31.5V		• 39V	
	horizontal	• ±5°		• ±5°		• ±5°	• ±5°		• ±5°	
	base surface temperature	• 200°C max		• 200°C max		• 200°C max	• 200°C max		• 200°C max	

¹ Cost efficient ² By following Christie's Best Practices for Lamp Usage on pages 7-8 of this brochure, you can find out how to select the ideal lamp size to meet your projector and screen requirements ³ 1500 hours when operated in a CP2220, CP4220 or CP2000-ZX ⁴ Color corrected/center lumens

Optimize your Christie digital cinema system

Christie Xenolite lamps can produce remarkable brightness and color consistency with excellent resistance to flicker, ignition difficulty and explosion. With this superior performance comes great economy. Here are some usage guidelines that can be applied to get optimum performance from the Christie Xenolite lamp and Christie Solaria Series projector combination. If you need technical support to help you with this, please do not hesitate to contact Christie technical support.



How to calculate the amount of light required

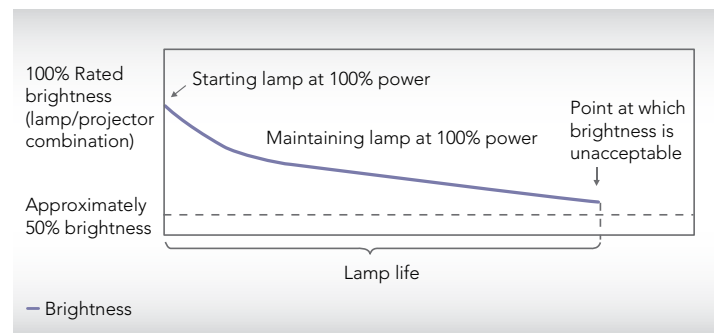
The basic formula to calculate this theoretical light requirement is:

- 1 **Lumens (L) = Average Screen Brightness desired (average fL) X Screen Area (sq ft)**
 - Given a good light distribution, the "Average Screen Brightness" can be estimated by multiplying the center brightness desired by 0.95. Generally accepted practice for the target center brightness is: 14fL for 2D and 4.5fL for 3D (light measurement taken through 3D glasses).
- 2 After you have the "Lumens" number you would divide it by all significant system efficiencies. Some examples would be:
 - Screen gain: 1.0 to 2.4. Silver screens are 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.
 - Port window efficiency: 96% efficiency is typical for good port glass.
 - Loss due to color correction required for meeting DCI color specifications: 97% efficiency is typical.
 - 3D system light efficiency: this number can be anywhere from 10% to 30% efficiency depending on the 3D system used.
 - Other effects like down angle and screen curve do make a difference for light distribution but they only affect these calculations if they are excessive.
- 3 **Calculation: Lumens Required (L) = Lumens (L) / (Screen Gain X Port Window Efficiency X Color Correction Efficiency X 3D Efficiency)**
- 4 The resulting "Lumens Required" number you get would be the "MINIMUM lumen requirement" to meet the desired light levels.

How to select the right projector/lamp combination that will provide enough light to satisfy screen brightness requirements

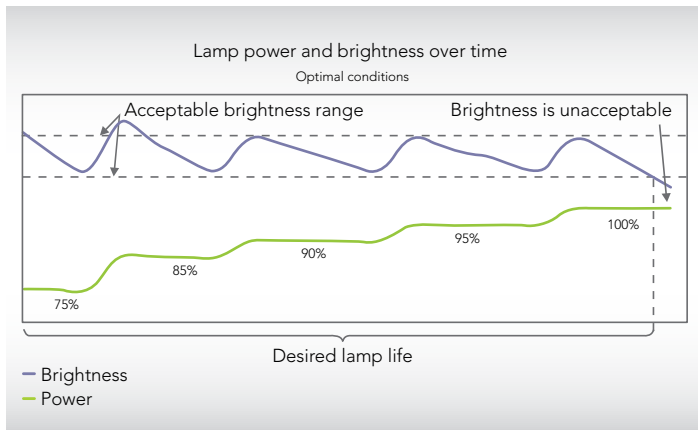
There should be enough brightness available even at the end of the lamp's life to meet your specified center brightness requirement. Your company's lamp changing policy may need to be reviewed to make this decision.

- 1 There is a natural brightness drop-off that occurs with any Xenon lamp during its life. This brightness curve is typically sharp at the beginning of the lamp's life and drops slower after this initial period. Leaving the lamp at 100% power throughout its life would give this typical brightness curve:



- 2 This initial drop-off in brightness is mainly due to the re-shaping of the electrodes inside the lamp. The arc between the electrodes inside the lamp will move slightly during this period. Re-aligning the lamp often can minimize this drop-off. This re-alignment should be done at least every time the equipment is serviced. The more frequently this is done, the more light efficiency can be preserved.
- 3 100% rated brightness would indicate the use of a new lamp running at 100% power.

- 4 It is NOT recommended to run a lamp in this way. If this is done then the brightness level will not be maintained for very long and the lamp life will be reduced.
- 5 This chart describes the recommended operation of any Xenon lamp.



- 6 Understanding this brightness curve will help when deciding which projector and lamp to use. It is important to select a lamp that can produce the required brightness at the end of its life. Here is how this is estimated:
 - Select a lamp for an example from pages 5-6 of this brochure and reduce its maximum lumen value by about 25% as a starting point. This would be an estimate of the brightness that the lamp can achieve at or near the END of its life at the stated warranty. For higher wattage lamps this value would be more like 30% or 35%. If you intend on running the lamp 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 lamp/projector combination that can cover this with its “maximum aged brightness” value. It is best to be conservative with this selection to make sure the required brightness can be reached.

How to preserve lamp life with the proper projector operating environment

Proper operating environment conditions will preserve lamp life.

- 1 Room temperature: Comfortable room temperature is usually acceptable. Between 50°F and 95°F (10-35°C).
- 2 Room humidity (non condensing): 20% to 80%.
- 3 External exhaust extraction: Use pages 5-6 of this brochure to find the proper air flow in CFM that is required:
 - Make sure this air flow is maintained anytime the projector is on. Add this measurement to all routine service visits.
 - 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 ensure proper lamp house electrical connections to the lamp

Xenon lamps operate at very high current or amperage levels. Because of this, any electrical connections are very critical. When installing a lamp make sure these connections are tight and secure.

- 1 A loose or bad connection can cause the connector to burn which in turn will either break the electrical connection or overheat the end of the lamp causing the seal inside the lamp end to fail. This will result in a lamp that will not ignite.
- 2 Do not use any connectors that are discolored or burnt. Replace any discolored connectors before installing a new lamp.
- 3 Inspect both end connectors for discoloration at every routine service visit.
- 4 Lamps exhibiting burnt or discolored ends are not covered under warranty.

How to determine average expected life

On pages 5-6 of this brochure, you will find an “Estimated average expected life” number for each lamp/projector combination.







- 1 This number is a guideline to help you determine how long a particular lamp can be operated under optimal conditions as described here.
- 2 If the operating situation is not optimal then a shorter lamp life can be expected.
- 3 Non-optimal conditions would include:
 - Starting the lamp out near or above 100% power and running it this way throughout its life.
 - Not providing adequate air extraction.
 - Poor operating environment.
 - Changing the power level drastically up and then back to accommodate two different light level requirements such as 2D then 3D.


Christie Xenolite Lamp Champion Warranty


Christie Xenolite lamps are of very high quality and any failure is unlikely. If a lamp has failed for some reason then a service technician should check the system and operating practices to make sure that the lamp is being used properly. All Christie Xenolite lamps are covered under the Christie Xenolite Lamp Champion Warranty against any manufacturer defects. The period of time is based on the warranty hours of operation given on pages 5-6 of this brochure and a period of two years from invoice date whichever comes first.

- 1 If a warranty claim is required then prompt action must be taken. A “Xenolite Lamp Warranty Claim Form” must be filled out completely and submitted, following the instructions on the form. These forms are in the lamp box or they can be obtained by contacting the Christie office located in your region. Please see contact information on the back of this brochure.
- 2 If the request is unusual and it is suspected that the lamp did not cause the failure then Christie will contact the person making the claim to verify the operating conditions. This is to help prevent repeat failures caused by something other than the lamp.

Warning


-  Do not operate the lamp in close proximity to paper, cloth or other combustible material, or cover it with such materials, immediately after it is turned off. Doing so could cause a fire.
-  The lamp is filled with high-pressure Xenon gas. Do not hit the lamp against anything, apply excessive stress or scratch the lamp because it could cause an injury if the lamp bursts.
-  The lamp must be operated in a splinter – and scatter-proof lamp house. Do not open the lamp house while the lamp is operating or immediately after it is turned off because it could cause an injury if the lamp bursts.
-  Do not touch the lamp while it is operating or immediately after it is turned off because it is extremely hot. To do otherwise could cause a burn.
-  Do not operate the lamp in an atmosphere containing a flammable substance such as gasoline, sprays containing volatiles, thinner, lacquer or dust. To do otherwise could cause a fire or an explosion.
-  The lamp is filled with high-pressure Xenon gas. It must be kept in the provided protective case when transporting, storing or disposing. The lamp could cause an injury if it bursts.


 A lamp that has been used for the rated service life is more likely to break and burst because of the deteriorated glass condition. Therefore, follow the instructions for replacement and disposal of the used lamp. To do so could cause injury if it bursts.


 Wear a protective mask, protective gloves and a thick, long-sleeved shirt when the lamp is handled or installed and removed to/from the lamp house.


The protective mask that covers the carotid must be made with thicker than 2mm polycarbonate or another material with same strength or more.


Gloves and a thick, long-sleeved shirt must be made with rip-proof and pierce-proof material such as aramid fiber. The lamp could cause an injury if it bursts.

 Operate the lamp in the proper position. To do otherwise could cause overheating of the lamp house, lamp breakage or short lamp life.

 Thoroughly ventilate the area or the room when operating the lamp in an oxygen atmosphere (in air), except in the case of ozone-free lamps. If ozone is inhaled, it could cause headaches, nausea or dizziness.

 Turn off the electrical power before installing, removing or cleaning the lamp house. To do otherwise could cause electrical shock.

 During operation, the lamp emits intense UV radiation, which is harmful to the eyes and skin. Do not look directly or indirectly at the operating lamp. To do otherwise could cause eye aches or eyesight problems.

 Do not directly or indirectly expose your skin to the lamp light. To do otherwise could cause inflammation of the skin.

Important operation notes¹:

The lamp must be operated under the specified use conditions such as lamp current, lamp voltage and cooling condition.

Keep the lamp base temperature below 200°C or maximum temperature, if specified, by following cooling conditions designated.

“I consistently experience the extended life of the lamps well beyond their warranty hours and have had virtually no returns due to failures. Christie lamps give me the lowest cost of ownership. I have been using Christie Xenolite lamps for over 14 years, and I love the fact that Christie is always working on R&D to develop better and more efficient lamps.”

Jacques Dornbierer Hogan, President
Dor Internacional, S.A.

¹ Refer to Best Practices for Lamp Usage on pages 7-8 of this brochure for more information

Caution

Handling

When the lamp is soiled with fingerprints by touching the glass envelope with bare hands or dust, clean it with an alcohol-soaked cloth. To do otherwise could burst the lamp or shorten its life.

Do not subject the lamp to vibration or shock. To do otherwise could burst or shorten the lamp life.

Installation

Install the lamp in the correct polarity. To do otherwise could burst the lamp and cause overheating of the lamp house or shorten the lamp life.

Do not apply excessive stress such as twisting or bending when installing the lamp. To do otherwise could cause an injury, if the lamp bursts.

Do not use any tools to tighten connections when fixing the lamp. Only use your hands. To do otherwise could cause breakage.

Affix the lamp and its lead wire firmly to the terminals. Before affixing, make sure that there is no rust, burning or discoloration where electrical connections are made between the lamp and the lamp house which could cause overheating because of a poor electrical connection.

Install the lamp with the protective cover. Be sure to remove the protective cover from the lamp after installation.

Cover the lamp with the protective cover before removing the lamp from the lamp house. To do otherwise could cause an injury, if the lamp bursts.

Operation

Do not open the lamp house for at least ten (10) minutes after the lamp is turned off. To do otherwise could cause an injury, if it bursts.

Remove the lamp from the lamp house after making sure it has been turned off for more than 15 minutes and the lamp and lamp house have cooled down. To do otherwise could cause an injury or burn, if the lamp bursts.

Use a suitable lamp house and power supply (ballast). Operate a lamp in the range of wattage designated.

Storage

Store the lamp under the following conditions: Temperature: -25-65°C, Humidity: 20-95%RH, without condensation.

Disposal

The used lamp must be kept in the provided protective case until disposal by breaking the glass part. To do otherwise could cause injury.

The lamp is filled with high-pressure Xenon gas. Disposal without breaking the glass part may result in the lamp bursting. Follow the instructions below to prevent harm.

WEAR A PROTECTIVE MASK, PROTECTIVE GLOVES AND A LONG-SLEEVED SHIRT WHEN HANDLING THE LAMP.

- 1 The used lamp must be kept in the protective case. The case must be securely locked by the case latch.
- 2 Place the used lamp in the protective case and in the provided box. Firmly attach the tape of the paper case to make certain the case will not open when the lamp is dropped.
- 3 From a height of about one (1) meter, drop the provided box, with the lamp and protective case inside, onto a hard floor.
- 4 Shake the box to determine if the lamp is broken.
- 5 Dispose of the lamp as industrial waste. Dispose separately where metal and glass must be disposed of separately.

Warranty hours¹

- 1 This Xenon high-pressure, short-arc lamp has been manufactured to the highest quality standards, and has been carefully tested and inspected. However, the lamp is under high internal pressure and should be handled with care.
- 2 The protective cover must be left on the lamp during handling and installation. A protective face mask, clothing and gloves with cuff should be worn when the lamp cover is removed or replaced. These items are available from your Christie dealer.
- 3 The warranty is void unless the lamp is operated with adequate cooling and within the voltage and current range specified.
- 4 The possibility of high-pressure lamps exploding increases with age.
- 5 Christie shall not be liable for any consequential damage other than REFLECTOR, UV FILTER & INTEGRATOR, if used in a compatible Christie brand cinema projector.
- 6 Lamps being returned for warranty credit should be insured for the amount of anticipated credit.

¹ Refer to Best Practices for Lamp Usage on pages 7-8 of this brochure for more information

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ISO 9001
ISO 14001

Kitchener, Ontario



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Printed in Canada on recycled paper. 3529 Mar 13

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