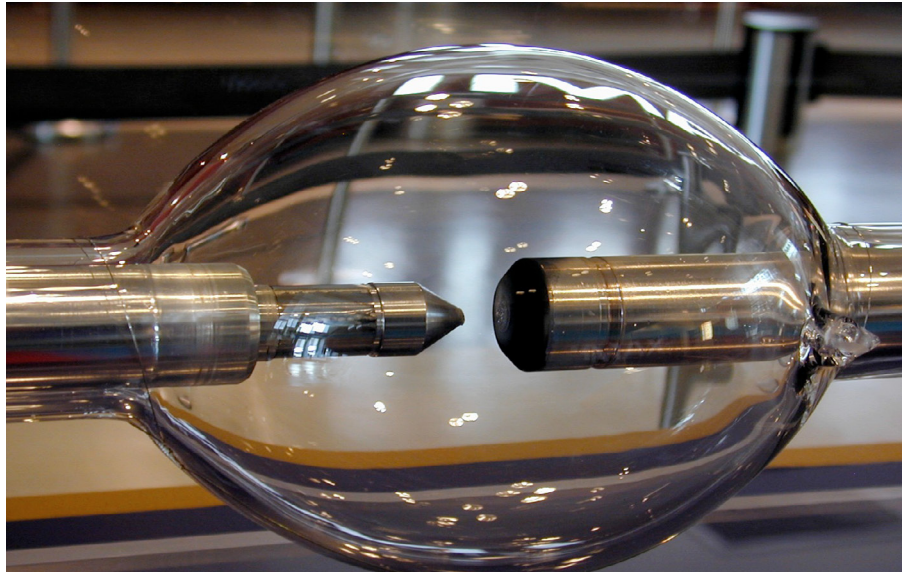


Understanding Xenon Bulbs for Cinema Operators



Understanding Xenon Bulbs

One of the most important parts of any cinema projector is the lamp system that it uses. Without the right lamp system, the image cannot properly be projected on the screen. At the very core of the projector lamp is the bulb. Over the last century or so of cinema there have been numerous enhancements to the lamp system within a projector, with the current 'gold standard' being the Xenon bulb.

The Xenon bulbs used in cinema projection is a highly specialized piece of equipment. Whilst they may look somewhat similar to the bulbs that you can find down at the corner store, they work on a fundamentally different principle. Your normal domestic incandescent bulb works by passing electricity through a wire filament, causing it to heat a glow. A Xenon bulb by contrast works by arcing electricity between two points, with the Xenon gas glowing as it conducts the electricity. Xenon lamps require special care and attention to ensure they remain at their best. To better understand the movie theatre projection process, you need to understand more about Xenon bulbs.

The Gas

Let's start with Xenon gas itself. Remembering from your high school chemistry class, Xenon is on the periodic table of elements as a gas. More accurately it is a noble or inert gas, occurring naturally in very small quantities. It was first discovered in 1898 and has been used in a variety of lamps and lasers since the 1930s. The shortage of naturally occurring Xenon is one of the reasons that the projection bulbs can be a little pricey. It is obtained commercially as a by-product of nitrogen production.

(continued overleaf)

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Why then is Xenon used in movie theatre projector lighting? The gas is especially suited for this type of lighting for a few different reasons.

Xenon is a very dense gas. Naturally occurring it consists of 9 stable isotopes and it conducts electricity very well. Xenon gas provides a very bright and very even glow when electricity arcs through it. This is especially useful in a cinema setting. Without a bright enough light, you will not be able to project the image well onto the screen. Without an even light, the image could appear to flicker or go dim. This is why Xenon works so well for lighting a cinema projector.

The Arc

There are two main parts of the lamp within a glass bulb housing. These two parts are both made of metal and they are separated by a short distance. That distance can vary, but there are two main categories of Xenon bulbs: short arc and long arc. Generally short arc is used for movie theatre lighting because it provides continuous illumination. Long arcs are used where a flickering light is more appropriate, such as in lasers. As mentioned, the space between the two pieces of metal is where the electrical arc will take place. The glass housing around the two pieces is filled with Xenon gas. When an electrical current is sent through the metal, it will jump across to the other piece of metal, creating an arc of electricity. As this happens, the electricity will be conducted through the Xenon, which will then illuminate very brightly and very clearly. This brightly glowing gas provides the basis for cinema projection.

In the Projector

Just how does the Xenon bulb work with a movie theatre projector? To start with, you need to keep in mind that this can be one of the most expensive upkeep costs that you can expect in a cinema setting. As mentioned, Xenon is a rare gas. The cost of a Xenon bulb for one movie theatre screen projector could be around \$700-\$1000. This is why the bulbs should be handled with care. The last thing you would want to do is damage the bulb and have to replace it before it had lived its life. Now, let's discuss how the Xenon bulb works with the projector. For cinema projectors, the bulb will need to be mounted in something called a lamp house. This lamp house has two further components, being mirrors and a condenser. The mirrors ensure that all the available light is used and in fact amplified many times over. The condenser takes this available light and then condenses it down to one beam of very bright, very focused light.

Have you ever been in a theatre when the projector malfunctioned and stopped? If you have, then you may have witnessed on the screen as the film melted away in front of the light. This is because the heat of the focused beam of light from that Xenon bulb is incredibly intense. This requires a great deal of safety precaution whenever working with a cinema projector.

Next on the projector is the shutter. This is used in conjunction with stops on the film of the movie. The shutter closes at breaks and opens on the film. While this sounds like the image would be disjointed, it is not. This all happens so quickly that all viewers will see is one smooth projection of the movie that they are watching.

Why the Xenon?

Of course, there are many different types of light sources. One may be wondering why you could not use a different, more low cost option for providing the projector lighting. The truth is, you will not get the same viewing experience if you do this. The Xenon works so well at conducting electricity and producing light that it is nearly impossible to recreate it in any other way. Other light sources will look dim from the get go or they will be very unreliable, providing dim spots or other problems from time to time. There is nothing as bright or as dependable as Xenon. Remember that providing a cinema is all about customer experience. If you do not have customers, you will not be able to run a business. This means that a movie theatre must stand out above the competition to offer the best viewing experience. Trying to use anything but Xenon could result in losing customers.

One final note would involve disposal of Xenon bulbs. Xenon can be dangerous if left out in the environment. For that reason, it is not a good idea to just throw away old bulbs. They will end up in the landfill and they could pose a danger to humans, nature and animals. Instead, you should look for a recycling centre that specializes in lighting elements of all types. They should have no problem properly disposing of the Xenon bulbs that you need to discard.

For further information please contact Specialty Cinema or an authorised Specialty Cinema dealer.

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