Safety of Short Arc Xenon Lamps

Ultraviolet Safety

Cinema air-cooled Xenon arc lamps range from 1,000 to 7,000 watts. Short arc Xenon lamps produce a highly-stable arc in the ultraviolet, visible and infrared spectral ranges. Shielding is absolutely mandatory. The ultraviolet radiation will cause serious burns to the eyes and skin if not properly shielded. Even brief exposure to the short arc Xenon lamp’s radiation can cause severe burning of the skin and eyes. Even a minor ultraviolet radiation burn affecting the cornea can cause permanent eye damage. The burn, which feels like sand in the eyes that cannot be washed out, will take days to heal. Extended exposure to the high power ultraviolet radiation may cause blindness. Short-time exposure to the skin will evoke erythema on normal skin. Even though only a small amount of radiation penetrates the Malpighian layer, exposure can cause severe burns to the skin. Direct light from the short arc Xenon lamps should not be visible to the operator nor other personnel. Proper eye, face and skin protection must be used while handling or servicing short arc Xenon lamps.

Short Arc Lamp Handling

Short arc lamps contain high-pressure Xenon gas. Special care must be taken in the handling of these highly pressurized lamps. Whether cold (at idle) or while at high temperature (during operation), the highly pressurized short arc lamps may unexpectedly shatter or explode. The possibility of an injury exists if the fragments of quartz are not contained.

Proper handling of the Xenon lamp is critical, the following points should be observed at all times.

- The quartz body must be protected from contamination, scratches and abrasions. Even the smallest size scratch, that may not be detectable to the naked eye, can lead to the build up of strain leading to an explosive failure.
- The lamp must be used only in the equipment and power supply for which it was designed.
- The lamp must always be mounted in the correct physical and electrical orientation for which it was designed.
- The cooling system and the lamp socket connectors should be checked periodically.
- To avoid injuries such as an electrical shock, a burn or a lamp explosion never replace a lamp if hot.
- Proper eye, face and skin protection must be used while handling or servicing short arc lamps.
- Lamp maintenance and replacement should be accomplished by qualified personnel only.
- Upon receipt of lamp package, the carton should be examined for damage incurred in shipping. Delivering carrier employee should sign off any apparent damages at time of receipt.
- The carton should be opened fully so lamp and its plastic protective wrap can be lifted out of package with no twisting or pulling.
- Due to the high internal pressure of the short arc lamps, unpacking should take place in an area protected from other personnel.
The lamp must be wiped with alcohol before placing to service. Bare skin contact with the quartz envelope must be avoided. Compounds from the skin when heated on the lamp will form permanent etching (devitrification) on the quartz surface allowing overheating in that area. Strain will build eventually causing premature catastrophic failure.

Ozone Safety

Triatomic oxygen or ozone is a by-product of some short arc Xenon lamps. It is formed when oxygen is exposed to wavelengths lower than 210 nanometers of radiation. Ozone formation can be eliminated by using ‘ozone-free quartz’ lamps. Certain dioxides are added to the quartz bodies of these short arc lamps, which absorb the ozone producing wavelengths. If used indoors, the ozone produced by the ozone producing lamps can be effectively eliminated by exhausting the air from the cooling system to outside of the building. Such exhausting has no danger as the hot gas is unstable, breaking down to oxygen rapidly in the ducting.

Power Supplies

All short arc Xenon lamps should be operated on power supplies designed specifically for the particular lamp being used to provide proper performance. DC lamps use specifically designed high-efficiency power supplies with high voltage ignitors. Power supply designs must be capable of supplying a high current, low voltage arc to maintain stable uniform lamp operation. Lamp life, stability, uniformity and lamp ignition are all directly dependent on a properly designed power supply.

Short Arc Lamp Disposal

All short arc Xenon lamps must be disposed of with extreme care. If stress is applied to the bulbs, they will explode with great force. Disposal must be in accordance with local, state and federal regulations. Do not discard these lamps in the trash at the end of their useful life. Contact your local hazardous waste management authority for proper recycling/disposal information.

CAUTION

Short arc lamps operate at high temperature and pressures while emitting radiation which is harmful to eyes and skin. Great care should be taken in both the handling of the lamps and the shielding of the equipment to insure that personnel are not exposed to the direct radiation. Protective facemask and gloves must be worn when handling or installing short arc.

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