Radium

XERADEX

Handling instruction

Radium

Content

Note

This XERADEX® lamp must only be used with the appropriate DBD electrical control gear (ECG). No other DBD should be connected to this lamp. The lamp has to be installed and tested by qualified personnel only. Please read this manual carefully prior to lamp installation. In addition, please review carefully “User instructions DBD”.

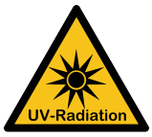
Introduction

The unique operating principle leads to outstanding efficiency – with no or low cooling required (s. chapter cooling). The XERADEX® lamp has an outstanding 40 percent conversion efficiency (electrical to UV) compared to 10 percent in conventional sinusoidal driven lamps. This tremendous advantage is due to our patented pulsed operation mode and to the innovative lamp design of XERADEX®. When operated using the corresponding electronic control gear (ECG), the result is a compact system of remarkable performance. Up to 200W per meter irradiation length, no cooling is required. For higher input power, only gas cooling is necessary (s. page 8).

This Handling instruction addresses primarily general characteristics of the lamp. As the lamps are used for specific equipment of various manufacturers, we do not give a detailed description of different fixtures or of the electronic control gear (ECG) required for the operation. The ECG units will be described in detail in the respective operating instructions (see our various DBD units e.g. DBD 20, DBD 300). For information regarding installation and operation of the lamp in the fixture please refer to the particular user manuals.

Safety instruction

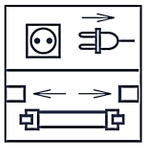
XERADEX® lamps may only be handled and used by qualified personnel. Read these handling instructions and the instructions for the power supply (ECG) and fixture prior to lamp installation.



XERADEX® lamps are producing ultraviolet (invisible) light that can severely harm eyesight and skin of anyone nearby. Frequent exposure or exposure over a long period of time potentially leads to diseases and can cause cancer. Do not look directly at the XERADEX® lamps during operation. Stay clear of the XERADEX® lamps during operation. Come close only when wearing protecting UV filtering glasses and skin protection.

The emitted UV light will lead to the creation of ozone if oxygen is ambient around the XERADEX® lamp. Ensure sufficient supply of fresh air and exhaust the ozone around the system. Wear a filtering mask if necessary.

The XERADEX® lamp uses high voltage to generate a discharge. Touching electrical parts during operation can cause severe injury or death. Make sure the lamp socket is securely connected to a protective earth (PE) grounding at all times. Do not touch any part of the XERADEX® lamp during operation.



Switch off and disconnect the ECG from its main supply source before mounting or changing the lamp. Never touch a broken lamp before disconnecting the ECG (power supply) from mains power supply.

Mechanical installation

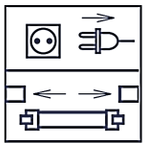
XERADEX® lamps are sturdily constructed; however, they are made of quartz, and thus require proper handling to protect against impact, shock, and undesirable external forces. For this reason, XERADEX® lamp handling should be subject to certain precautions. For details, see p.4, „Safety Instruction“. On no occasion should the lamp be subjected to force during the installation. As a common practice, lamps should only be touched at the metal socket bases. The lamp socket and/or connection cables should be free from dirt and corrosion. The exposure equipment‘s electrical connection/sockets must also be free from dirt and corrosion. If they are not, they will need to be cleaned or replaced in order to ensure safe operation of the lamp.
XERADEX® lamp should not be touched directly at the quartz tube. Fingerprints can carefully be removed with a soft lintfree alcohol soaked cloth before switching on the lamp. It is recommended that the user wears gloves while handling the lamps.
Due to solarisation the lamp becomes fragile during operation. Do not remove or transport lamps that have been operated.

Double-ended lamps
In order to allow for expansion of the housing and torsion, the lamp should be fitted tightly only at one end.
Double-ended lamps must always be supported on both sides while handled. Holding them at on side, will cause breaks or misplace the sockets.

Single-ended lamps
Single ended lamps can be installed in any position at the lamps base.
Never try to fix lamp and socket simultaneously. Never fix the lamp this way that you try to press or bend lamp and socket in different directions. This will cause breakage of the lamp tube.

Electrical connection

Before replacing the lamp, disconnect the DBD-ECG (power supply) from the main line source. The lamps may only be operated with the specially designed electronic control gear (power supply). The attached connect or cable should never be replaced or extended with other cables. This will destroy the ECG because of its special short pulse driving mode.
The high voltage plug is not compatible to the BNC standard. Never try to connect the connector cable to standard BNC-cable; this will destroy the plug irreversibly.
XERADEX® is a high voltage driven lamp. Never use the lamp with broken cable or plug. The cable can only be exchanged against an original spare part cable of the same type at Radium. Switch off and disconnect the ECG from power before mounting or changing the lamp. Never touch a broken lamp before disconnecting the ECG from main line source.

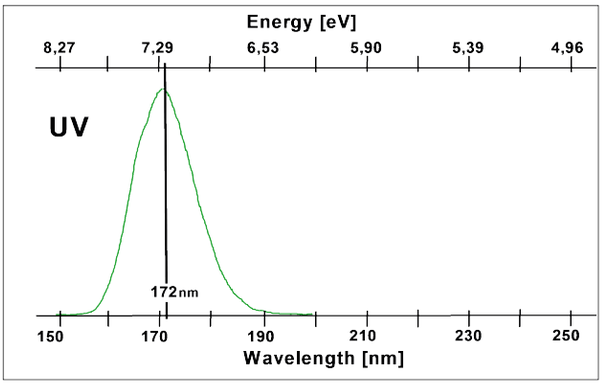


Storage

XERADEX® lamps have a very long shelf life. However, they must be stored in non-aggressive environmental conditions, i.e. no storage temperatures exceeding 50 °C / 122 °F, no condensation (relative humidity 10-80%) and a non-corrosive atmosphere.

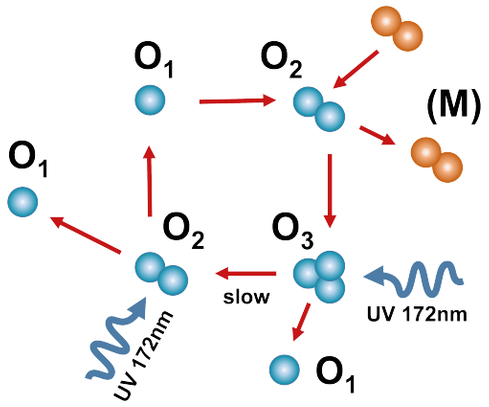
Spectral distribution

Beside small emissions in the visible range and infrared XERADEX® emits mainly at 172 nm in the vacuum ultraviolet. The pulsed discharge inside the lamp produces xenon excimer molecules, which dissociate after a very short time. Caused by this process 172 nm radiation is emitted as molecular radiation. The peak has a width of 14 nm full width half maximum (FWHM).



Ozone generation

XERADEX® emits 172 nm vacuum ultraviolet radiation (VUV). Radiation below 200 nm is absorbed by oxygen and the oxygen then is partly transformed into ozone and activated atomic oxygen. Ozone is a harmful colourless or bluish gas with a strong characteristic odor. Due to the strongly oxidizing properties of ozone, ozone is a primary irritant, affecting especially the eyes and respiratory systems. It can be hazardous at even low concentrations.



Using XERADEX® in air or oxygen is only possible in a closed system or together with an exhaust system which protects the user from ozone contact.

From **“International chemical safety card 0068”**:

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes and the respiratory tract inhalation of the gas may cause lung oedema. Inhalation of the gas may cause asthma like reactions. The substance may cause effects on the central nervous system, resulting in headache and impaired vigilance and performance.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Lungs may be affected by repeated or prolonged exposure to the gas.

Cooling

Due to the high efficiency of XERADEX® lamps, up to 200 W per meter irradiation length no cooling is needed. Up to this power it is even possible to run XERADEX® in a non-ventilated closed system or even inside a vacuum chamber (special XERADEX® with KF50 flange). For higher pow-ers up to 500 W per meter irradiation length the cooling need is indeed low but the lamp has to be cooled by a gas or air flow. The surface temperature of the lamp should not exceed 160°C and has to be homogeneous. Higher temperatures lower the efficiency of the lamp and increase the possibility of an irregular temperature profile which than can lead to located filaments. Such filaments lower the homogeneity of the emission and might lead to destructions if they are located at the same place for a longer time. It is not possible to cool XERADEX® by direct contact. This will always lead to located filaments near the contact zone.
If you need further assistance for the installation of high power XERADEX® lamps, please contact Radium Lampenwerk GmbH.

Service life and end of lifetime

XERADEX® lamps have to be removed after a specified period of time.
Caused by the very intensive VUV radiation the special outer tube of the lamp suffers radiation induced damages (solarisation) which can lead to micro cracks and later to a break of the whole tube. Because of these effects it is important to replace XERADEX® lamps after the specified lifetime.
Like every discharge lamp XERADEX® lamps lose intensity over their lifetime. During the specified lifetime XERADEX® lamps keep more than 70% of the initial intensity.
The lifetimes is depending on the intensity and therefore on the electrical power applied to the lamps. Exact values can be found in the technical datasheets available for every type of lamp.

Lamp disposal

XERADEX® lamps contain no mercury. They can be disposed at domestic waste. However, we request that you return them back to us with feedback on failure mode, lifetime data (hours) and other pertinent information that will help in improving lamp performance in future applications.

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Thank you!

Notes

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