

The Basics of Lighting For

K Kurtzon Lighting
Morris Kurtzon, Inc.

Biosafety Environments



The Basics of Lighting For Biosafety Environments

Introduction. Welcome! This is our latest installment in Kurtzon's series of "the basics of lighting....." These brochures are directed to an audience of Kurtzon specifiers, sales representatives, and other industry colleagues who may find themselves dealing with new ideas and terms. Following below you will find a set of brief definitions and an accompanying chart to assist those who may encounter the general area of biosafety lighting in building interiors during the course of their work. Since we plan to be modifying the material herein as new data comes in, we appreciate any suggestions for improvement from readers. Any comments should be directed via email to Dan Koch dkoch@kurtzon.com

Definitions of Some Basic Terms in Common Use:

Biosafety: The practice of defining building areas for safe use of specific types of biologically active materials. The building interiors are usually for specialized laboratory or manufacturing use only.

Biosafety Levels 1-4: (often abbreviated as BL-1, BL-2, BL-3, BL-4) the practice of specifically defining certain areas of a building into zones, by the biological materials which are expected to be present in those areas. See chart.

There are 3 general factors considered in the establishment of biosafety areas in a building;

- 1) Lab or manufacturing practices, procedures, and training.
- 2) Building design practices or procedures.
- 3) Equipment selection, including luminaires.

Biosafety cabinets: A specific type of lab equipment classified by the type of containment method used in the cabinet design. Available from equipment manufacturers and used within a specified lab space by one person for a specific task.

Biohazard: A general term used to warn users of the presence of biological agents that require special handling and/or special equipment. A

special symbol is used to mark areas or objects contaminated by those agents.

Bioterrorism: The deliberate use of biological materials to attack a civilian population in a public or semi-public setting. The materials can be in the form of either microscopic airborne substances, gases, powders/dusts, or some combination thereof.

Luminaires For Use In Biosafety Areas: The selection and use of certain lighting fixtures, designed and engineered specifically to meet the demands of various biosafety zones, as defined, in a building. See Chart below.

Negative Pressure Environment: A containment method used in BL-3 & 4 spaces where the closed room is maintained below atmospheric pressure by air handlers in order to limit transition of contaminated air into adjoining spaces.

Vivarium: A laboratory where living organisms are quarantined and studied in an isolated environment over long periods of time, usually to evaluate the effectiveness of a treatment program.

LINKS: For further information, we are referring interested readers to several government and university websites


Centers of Disease Control
<http://www.cdc.gov/od/ohs/biosfty/bmbl4/b4ae.htm>
Health Canada
<http://www.hc-sc.gc.ca/pphb-dgspsp/publicat/lbg-lmbl-96/index.html>

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Selecting Luminaires For Use in Biosafety Areas

Biosafety Level	Agents found in space	Features of Space	Features of Secondary Barrier Lighting Fixtures	Kurtzon Product
1	Not likely to cause disease in healthy human adults, but capable of causing infections in vulnerable humans.	Typical Laboratory	Sealed static troffer	<u>EL Series</u>
2	Causes non-life-threatening human disease through contact, ingestion, inhalation or inoculation.	A limited access space using BSC(a) Class 1 & 2 where equipment and waste are decontaminated.	Sealed static troffer with stainless steel exposed surfaces and triple gasketing	<u>EL & KL Series</u>
3	Causes human disease through contact or aerosol transmission where serious or lethal effects are possible.	Access to space is through a airlock or similar passage. Lab maintains a negative pressure. Air is not recirculated. Work is performed in a Class 3 BSC(a) Clothing equipment and waste are decontaminated.	Sealed static troffer with stainless crevice free surfaces and triple gasketing	<u>KL Series w/ IP-65 option</u>
4	High risk-agents causing life-threatening disease with easy or unknown risk of transmission.	A separate facility or structure is often required. Access to space is only within a pressurized personal suit. Lab maintains a negative pressure. Air is not recirculated. Work is performed in a Class II b2 or III BSC(a) Clothing equipment and waste are decontaminated following use.	Top Access sealed plenum housing and stainless steel crevice free exposure. Fully tested and certified IP-65 from above and below. Suitable for installation into a membrane ceiling system. Capable of maintaining a 2.0 in. wc pressure differential (lab/plenum) without seal failure.	KL F/TR series  See Class 1 certification on page 5

(a) There are three types of biological safety cabinets used in microbiological laboratories (Class 1, Class 2, and Class 3). Open fronted Class 1 and Class 2 biological safety cabinets are primary barriers, which offer significant levels of protection to laboratory workers and to the environment when used with good microbiological techniques. The Class 2 biological safety cabinet also provides protection from contamination of the materials (e.g., cell cultures, stocks) being manipulated inside the cabinet. Class 3 BSC's contain a sealed front with gloved panels for manipulation of the pathogens.

Biosafety
Level

Characteristics of Biological Agents

- | | |
|---|--|
| 1 | Not likely to cause disease in healthy human adults, but capable of causing infections in vulnerable humans. |
| 2 | Associated with moderate human disease. Risk hazards associated with cuts, ingestion, or mucus membrane exposure. |
| 3 | Indigenous or exotic agents with potential for respiratory transmission. Disease may have serious health effects. |
| 4 | Dangerous or exotic agents that pose a high risk of life threatening disease. Aerosol transmission, or related agents with unknown risk of transmission. |



Kurtzon Lighting's KL and EL series troffers for cleanroom use (left to right).

KL Series

- ◆ The HD1700 design withstands 1700PSI from a .04" nozzle positioned five feet from the fixture.
- ◆ Certified IP-65 by an independent testing laboratory.
- ◆ One-Piece Stainless Steel Door Frame with 90° Bevelled Edge.
- ◆ Suitable for up to Class 10 Cleanspaces.
- ◆ National Sanitation Foundation Listing.
- ◆ Triple Gasketed.

EL Series

- ◆ The HD85 Design withstands 85PSI from a .1" nozzle positioned two feet from the fixture.
- ◆ 20-Gauge Channel Door Frame.
- ◆ Closed Cell Neoprene Gasketing.
- ◆ Class 10,000 performance.
- ◆ Triple Gasketed.
- ◆ Suitable for up to Class 10 Cleanspaces.