

Egress Lighting

Category: Commercial Construction

Effective: June 1, 1996 *[Margaret M. Mahoney]*

Responsible Bureau Section: Plan Review
PO Box 8120
Portland, OR 97207-8120
503-823-7301

Rescinded

BACKGROUND

Egress Lighting is required by the Structural Code for most buildings. The standards provided in Section 1012 of the 1996 Edition of the Structural Code require a specific amount of lighting to be provided along the exit pathways. This Guide provides applicants a variety of methods acceptable to the Bureau to show compliance with requirements of the code provisions on egress (exit) lighting for new buildings and alterations to existing buildings.

Egress lighting may be specifically engineered for each project, or the applicant may choose to use one of the prescriptive designs included in this Program Guide. The Guide outlines the design options, minimum illumination levels required in various buildings and portions of buildings and the information needed by the Bureau to review and approve egress lighting.

In many instances, normal premises lighting will provide sufficient illumination to satisfy egress lighting requirements. Exceptions to this rule are:

- < Warehouse and similar uses with either very low light levels or high storage racks; and
- < Buildings which are either required by code to have auxiliary power for egress lighting (see page 8) or for which auxiliary power for the egress lighting is being provided for other than code reasons.

Designers and contractors of buildings fitting into the above exceptions should

Designers and contractors of buildings fitting into the above exceptions should pay close attention to the requirements of this Program Guide. For all buildings, whether falling into the exception categories, or in other categories, the egress path must be clearly shown on the plans (see page 9).

A. Basic Design Standards

The Bureau will accept lighting designs in conformance with either of the following standards:

Option 1 - Egress lighting according to Section 1012 of the 1996 Edition of the Oregon Structural Specialty Code; or

Option 2 - Egress lighting according to NFPA 101, Section 5-9.

B. How to Show Compliance

Compliance with the **Basic Design Standards** can be shown by one of two paths:

Path 1 - Prescriptive Design: A design prepared in conformance with the prescriptive standards contained in this Guide; or

Path 2 - Engineered Design: An engineered design prepared by an electrical engineer or supervising electrician, or by the architect or engineer of record for the project.

Exception: Applicants with projects classified as an A occupancy with an occupant load over 100 must use Path 2.

C. Application of this Guide:

1. General

The provisions and standards outlined in this Guide may be used for permit applications covering any occupancy. The choice of compliance path is limited as described above. The egress lighting design provided under either path shall comply with the Minimum Illumination Area, Minimum Lighting Levels and System Requirements sections of this Guide.

(Note: Individual dwelling units, guest rooms and sleeping rooms are exempt from having egress/exit lighting.)

2. New Construction

The provisions of this code guide will apply to any permit for new construction where egress lighting is required.

3. Alterations and Additions

When getting a permit for alterations to an existing building, a non-compliant egress lighting system will need to be improved and upgraded depending on the overall size of the remodelling project as well as changes to the egress system based on the following thresholds:

- a. The egress lighting must be improved within the space being altered.

Exceptions: 1. Tenant improvements of 1000 square feet or less where there is not increase in occupancy load classification.

2. Improvements such as seismic upgrades and repair, modification or additions to electrical and mechanical systems or other systems that do not increase occupancy load classifications and do not alter corridor fire rating or method of exiting.

- b. If the alteration results in an increase in the occupant load of the area or in a change to the exit path; if the altered area exceeds 10,000 square feet; or if the altered area is more than 50% of the area of any given floor; egress lighting must be improved for all egress pathways serving that area until those pathways reach the exit doors leading from the floor.
- c. If the altered area exceeds 50% of the area of the building, egress lighting must be improved throughout the building, including the stairways.

(Note: Any modifications to the location of the illuminated egress (exit) path are to be shown on the posted "Egress Path Diagram". [See page 9.]

D. Egress Lighting Implementation Plan

In lieu of improving the egress lighting concurrently with the alteration of an area, a building owner (or management company) may submit an "Egress Lighting Improvement Plan". The plan shall provide for the improvement of the egress lighting system in the building over a multi-year schedule. When the building owner or management company has provided a letter of intent to develop a plan that is acceptable by the Bureau, permits to alter tenant areas or subareas of the building will be approved without requiring improvements to the egress lighting outside of the immediate area of the improvements.

E. Egress Path Categories – Minimum Illumination Areas

Lighting shall be provided for the egress pathway(s) appropriate for the use of the building or space. The following categories and minimum standards will be used by the Bureau when reviewing egress path lighting designs. Regardless of whether a permit application includes a prescriptive or engineered design approach to compliance with the egress lighting standards, the design shall comply with the following minimum illumination area standards.

1. General - All Buildings:

All exits (corridors, exit balconies, stairs, ramps, landings) shall be provided with egress lighting until the egress path arrives at grade. Lighting shall be provided on the exterior side of all exterior egress doors regardless of height above grade. Exterior, at grade, egress pathways from the building to the right of way need not be provided with egress lighting.

2. Corridors:

Lighting shall cover the minimum, code required, egress width for all egress corridors and exit balconies.

- a. Corridors and exit balconies having minimum required width: The egress lighting must cover the full width of the corridor or balcony.
- b. Corridors and exit balconies wider than the required exit width: Where the full width of the corridor or balcony is not illuminated, the illumination provided for egress lighting shall provide light to an egress path which is at least as wide as the minimum required width of the egress path.

3. Stairways:

Lighting shall cover the minimum egress width for all egress stairways.

- a. Stairways having minimum required width: The egress lighting must cover the entire width of the stair including the handrails.
- b. Stairways wider than the required width: Where the full width of the stairway is not illuminated, the illumination provided for egress lighting shall provide lighting to an egress path which is as least as wide as the minimum required width of the egress path and provide illumination of the handrails.
- c. Not less than one fixture shall be provided at each landing.

(Note: Placing additional fixtures, beyond those required by code, which increase the contrast at tread nosings is recommended and will provide better illumination and reduce the potential for trips and falls.)

4. Foyers, vestibules, and lobbies:

The illumination shall light an area not less than the calculated exit path width required for the space or building being exited, and illumination shall be provided in all areas that can reasonably be assumed to contain the egress path. The egress path diagram, submitted as part of the permit application, shall clearly indicate the location of the egress path for these areas.

5. Assembly areas:

- a. In assembly areas, including classrooms, having an occupant load of less than 50 and without fixed seats, egress lighting may be provided by the normal premises lighting providing it complies with the minimum illumination levels.
- b. In assembly areas, including classrooms, having an occupant load of 50 or more and without fixed seats, egress lighting shall cover the entire space of the assembly area.

- c. In auditoriums, theaters, or concert halls and similar assembly spaces with fixed seats, egress lighting shall be provided for the exit pathways. The system can be designed to allow the lighting levels of the exit pathway to be reduced during performances provided that the required illumination be automatically restored upon activation of the premises fire alarm system, or by a loss of power to either the building or the circuit wiring.

6. Retail stores, department stores, offices and similar occupancies:

- a. Where circulation aisles are between rows of shelving, racks or partitions more than 6 feet high:

Where the aisles exceed 60 feet in length, they shall be considered part of the egress path and provided with lighting. In addition, the primary aisles leading to required exits shall be provided with egress path lighting.

- b. Where shelving, racks or partitions are 6 feet in height or less:

Egress lighting shall be provided along primary circulation space or aisles along pathways connecting the circulation path to each exit. Secondary areas within departments of department stores where displays, shelving and racks are 6 feet in height, or less; or in secondary circulation open office areas where partitions are 6 feet in height, or less; are not considered part of the egress path requiring lighting.

7. Manufacturing Plants:

The primary circulation aisles and all paths/aisles extending to exits shall be provided with egress lighting. Where secondary aisles exceed 40 feet in length, they shall be provided with egress lighting.

8. Warehouses:

In warehouses and storage areas where only employees have access, egress lighting shall be provided along the primary aisle that leads to required exits and along secondary aisles which exceed 75 feet in length.

9. Parking garages, repair garages and similar buildings:

See standards for Manufacturing.

F. Minimum Lighting Levels

1. System design and installation must comply with either subsection 1.1 or 1.2, as follows:
 - a. Systems shall comply with the NFPA 101, Section 5-9 standards as follows:
 - An average of 1.0 footcandles over the entire exit path. (This level may diminish to not less than 0.6 footcandles over 1.5 hours of operation.)
 - A minimum of 0.1 footcandles at any point of the exit path (This level may diminish to not less than 0.06 footcandles over 1.5 hours of operation.)
 - A 40 to 1 maximum to minimum ratio of illumination levels.
 - b. Systems shall comply with U.B.C. Section 1012.1 by providing light having an intensity of not less than 1 footcandle at floor level at all points of the exit pathway.

(Note: Additional lighting may be appropriate in special needs occupancies or in occupancies frequently used by the elderly or visually impaired. Additional lighting beyond the minimums of the code and this Program Guide are a design choice of the builder and are not addressed in this Guide. It should also be noted that other standards and/or regulations beyond the Structural Specialty Code may require additional lighting in certain occupancies.)

G. System Requirements

1. Egress lighting must be illuminated whenever the building is occupied, except as permitted in theaters, auditoriums and similar assembly areas with fixed seats.

2. Egress lighting must be provided with auxiliary power:
- In all Group I, Division 1.1 and 1.2 occupancies.
 - In all other occupancies, auxiliary power is required for the portions of egress (exiting) system which serve an occupant load (based on Table 10-A) exceeding 100. For example, within an individual tenant space with an occupant load of less than 100, auxiliary power is not needed. However if the total occupant load of two or more tenant spaces on a floor exceeds 100, then the common corridors (outside of the tenant spaces) shall be provided with auxiliary power, as well as stairways and lobbies downstream from the floor. In another building where the occupant load on any floor does not exceed 100, auxiliary power may only be required in the common stairways and lobbies used for exiting.
- a. Where auxiliary power is required, emergency exit illumination is to be designed to activate either upon loss of utility power to the building or upon loss of the ordinary lighting circuits within the building.
 - b. As provided in the Electrical Code, only authorized persons shall have access to the switch or switches which control emergency exit illumination. This may be accomplished by locating switches in restricted areas, or providing keyed switches.

H. Prescriptive Design Paths

Attached to this guide are prescriptive lighting design standards which have been analyzed and approved by the Bureau providing compliance with the Structural Code requirements for lighting of the egress paths. Applications for permit which include use of one of the attached, approved prescriptive designs will be presumed to meet the requirements of Section 1.1 of Minimum Lighting Levels, above.

(Note: These designs have been pre-engineered to comply with NFPA 101, Section 5-9. At this point in time there is not an approved prescriptive design using emergency unit [bug eye] equipment.)

I. Additional Prescriptive Designs

Additional prescriptive egress lighting designs may be submitted for review and approval to the Bureau of Buildings. The proposed prescriptive standards shall be prepared by an electrical engineer and submitted with sufficient data and calculations to show that the minimum levels of egress lighting will be provided. Approved prescriptive designs will be included in subsequent editions of this Guide.

J. Engineered Design Path

Applicants may submit an engineered design for egress lighting specific to the building for which a permit is sought. The engineered design shall account for lumen loss over time (1.5 hours), maintenance of footcandles and reflectance values.

K. Submittal Requirements

For either the Prescriptive Path or Engineered Design Path the following shall be submitted to the Bureau of Buildings at the times indicated for each. Four (4) sets of the required information shall be submitted.

1. Egress path diagram/plan - Submit with the building permit application with approved copies to be attached to electrical permit drawings. This may be an architectural floor plan, reflected ceiling plan or electrical lighting plan. The minimum scale is 1/16 inch to 1 foot. The egress path is to be shown as a heavy dashed line or other similar means. Where the full width of a corridor, stair, lobby or other area used for egress is not illuminated, a diagram/plan shall clearly indicate the minimum exit widths.
2. Egress Lighting Compliance Form - May be submitted with the building permit or subsequently with a contractor design permit for the electrical power/lighting design.
3. Plan of fixture layout - May be submitted with the building permit or subsequently with a contractor design permit for the electrical power/lighting design.

Where either the Egress Lighting Compliance Form or the Plan of Fixture Layout are

not submitted with the building permit application, the applicant shall provide the name and telephone number of the egress lighting designer using the contractor design procedures established by the Bureau.

L. Posting of Egress Path Diagram

Prior to issuance of the final approval by the building inspector, a diagram of the egress paths showing minimum exit widths, shall be posted by the main electrical panel for that floor or in another location approved by the building inspector. The diagram shall also note that the illumination and the posted diagram must be corrected when floor layout is changed.

Rescinded

M. Field Testing

When field testing is required by the Bureau inspector, engineered egress lighting designs must be tested by, or in the presence of, the Bureau's structural/mechanical inspector. Egress lighting not complying with the proposed and approved design shall be modified to comply. Where lighting is installed according to one of the approved prescriptive paths, The Bureau may take field measurements of the resulting light levels for information gathering. Such information will be used in future revisions to this Guide, but will not affect an individual project approved to follow a prescriptive path.

N. Duties and Responsibilities

Design Professional:

The primary design professional (architect, engineer, etc) is responsible for designing system to meet required lighting levels on all paths of egress. The design shall clearly indicate the proposed egress pathway(s) on the permit application plans and indicate the lighting method(s) selected.

Buildings and Fire Bureau Plans Examiners:

The Plans Examiners for the Building and Fire Bureau shall be responsible for approving the egress pathways. The Buildings Plans Examiner is responsible for distribution of the approved egress pathway plan to the Building Inspector, the Electrical Section, the building permit applicant and to microfilm.

Rescinded

Building Inspector:

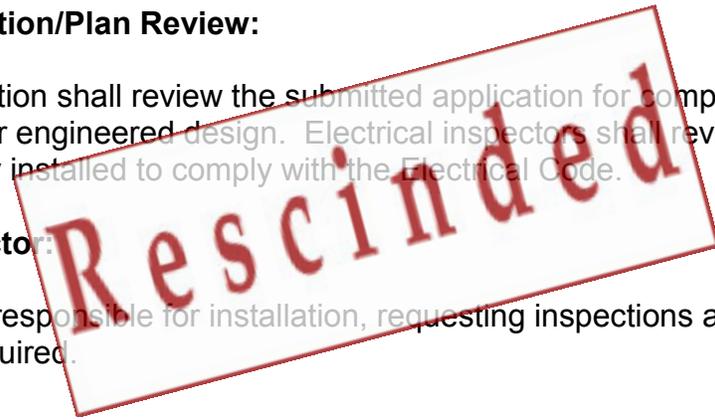
The building inspector shall inspect the installed system. During the inspection, the inspector may meter the light levels provided by the installed system.

Electrical Inspection/Plan Review:

The Electrical section shall review the submitted application for compliance with the prescriptive and/or engineered design. Electrical inspectors shall review that the egress lighting is properly installed to comply with the Electrical Code.

Building Contractor:

The contractor is responsible for installation, requesting inspections and making corrections as required.

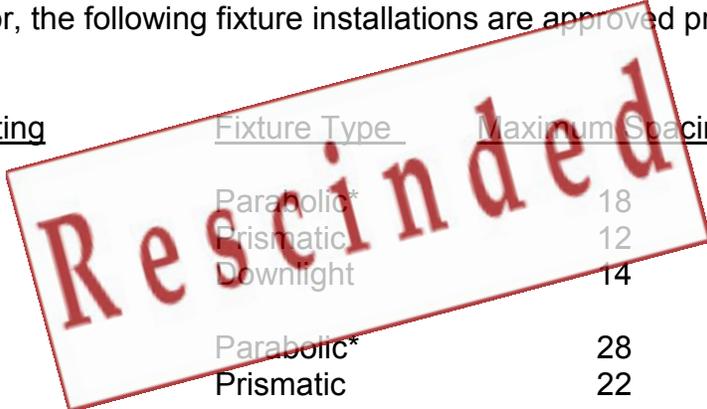


Prescriptive Design Standard - 1-A

Corridors

In corridors up to 8 feet in width, with fixtures mounted at a height of 9 feet or less, above finished floor, the following fixture installations are approved prescriptive designs for egress lighting.

<u>Battery Pack Rating</u>	<u>Fixture Type</u>	<u>Maximum Spacing (feet)</u>
500 lumen	Parabolic*	18
	Prismatic	12
	Downlight	14
750 lumen	Parabolic*	28
	Prismatic	22
	Downlight	20
1000 lumen	Parabolic*	40
	Prismatic	28



* This is based on a 3 inch deep parabolic fixture. Parabolic fixtures of greater or lesser depth must be engineered.

- Notes:**
1. Auxiliary power is not required in all buildings. See pages 7 and 8, System Requirements, to determine when required.
 2. At this point in time there is not an approved prescriptive design using emergency unit (bug eye) equipment.

Prescriptive Design Standard - 2-A

Open Office

For egress (exit) pathways up to 8 feet in width, the following fixture installations are approved prescriptive designs for egress lighting.

1. Recessed Downlights - Mounted at 9 feet above finished floor level

<u>Battery Pack Rating</u>	<u>Maximum Spacing (feet)</u>
500 lumen	14
750 lumen	20
1000 lumen	28

2. Lens Troffers and Parabolic Luminaires mounted at 9 feet above finished floor (each fixture is a standard 2 feet by 4 feet).

<u>Battery Pack Rating</u>	<u>Maximum Spacing (feet)</u>
500 lumen	16
750 lumen	20

- Notes:**
1. Auxiliary power is not required in all buildings. See pages 7 and 8, System Requirements, to determine when required.
 2. At this point in time there is not an approved prescriptive design using emergency unit (bug eye) equipment.

Prescriptive Design Standard - 3-A

Retail

For egress (exit) pathways in retail spaces, the following installations are approved prescriptive designs:

<u>Battery Pack Rating</u>	<u>Height (feet above finished floor)</u>	<u>Maximum Spacing (feet)</u>
750 lumen	16	14
1000 lumen	16	16
1000 lumen	20	12



This prescriptive design requires installation of a fluorescent industrial luminaire.

- Notes:**
1. Auxiliary power is not required in all buildings. See pages 7 and 8, System Requirements, to determine when required.
 2. At this point in time there is not an approved prescriptive design using emergency unit (bug eye) equipment.

Prescriptive Design Standard - 4-A

Warehouse Retail

For egress (exit) pathways in warehouse retail spaces, the following installations are approved prescriptive designs:

Luminaires must be provided for each row or aisle between shelving. Fixtures shall be typical 2 lamp fluorescent industrial.

<u>Battery Pack Rating</u>	<u>Height (feet above finished floor)</u>	<u>Maximum Spacing (feet)</u>
750 lumen	16	14
1000 lumen	16	20
750 lumen	20	12
1000 lumen	20	16

- Notes:**
1. Auxiliary power is not required in all buildings. See pages 7 and 8, System Requirements, to determine when required.
 2. At this point in time there is not an approved prescriptive design using emergency unit (bug eye) equipment.

EGRESS LIGHTING COMPLIANCE FORM

City of Portland – Office of Planning and Development Review

Project Name: _____

Project Address: _____

Applicant Name: _____ Date: _____

Applicant Address: _____ Phone: _____

Submittal Requirements

For either the Prescriptive Path or Engineered Design Path the following shall be submitted to the Bureau of Buildings at the times indicated for each. Four (4) sets of the required information shall be submitted.

1. Egress path diagram/plan - Submit with the building permit application with approved copies to be attached to electrical permit drawings. This may be an architectural floor plan, reflected ceiling plan or electrical lighting plan. The minimum scale is 1/16 inch to 1 foot. The egress path is to be shown as a heavy dashed line or other similar means. Where the full width of a corridor, stair, lobby or other area used for egress is not illuminated, a diagram/plan shall clearly indicate the minimum exit widths.
2. Egress Lighting Compliance Form - May be submitted with the building permit or subsequently with a contractor design permit for the electrical power/lighting design.
3. Plan of fixture layout - May be submitted with the building permit or subsequently with a contractor design permit for the electrical power/lighting design.

Where either the Egress Lighting Compliance Form or the Plan of Fixture Layout are not submitted with the building permit application, the applicant shall provide the name and telephone number of the egress lighting designer using the contractor design procedures established by the Bureau.

Method of Compliance

(Check box for chosen path and options used under the chosen path.)

Prescriptive Path: The egress lighting system has been designed to comply with the following Prescriptive Path designs per Office of Planning and Development Review Egress Lighting Program Guide

- | | |
|---|----------------------------------|
| <input type="checkbox"/> Corridors | <input type="checkbox"/> Offices |
| <input type="checkbox"/> "Warehouse" Retail | <input type="checkbox"/> Retail |

Engineered Design Path: The egress lighting system has been designed to comply with:

- NFPA 101 Structural Specialty Code - Chapter 10

(Please note: Engineered Designs are subject to field verification; lighting not complying with the approved design must be modified.)

Signature (Engineer, Supervising Electrician, Electrical Engineer or Architect)

Stamp