

SECTION 10 14 43

PHOTOLUMINESCENT EXIT PATH MARKING SYSTEM

******* Balco, Inc. manufactures numerous metal fabrications for the construction industry including gratings, trench covers, stair nosing, expansion joint assemblies, Fire Barriers in 2, 3 and 4 hour ratings, and floor grids and mats. In 2005 Balco, Inc. introduced a new line of photoluminescent exit path marking products consisting of stair nosing, handrail illumination strips, demarcation way finding strips, obstacle markers, and directional signs which meet the requirements for the International Building Code 403.16 Section 1024, NFPA 101 Life Safety Code and New York City Reference standard RS 6-1 and 6-1A. Photoluminescent products have the advantage of providing highly visible emergency signage and lighting that is non-electric, non-radioactive, durable, maintenance-free, weather-resistant, and UV stable. Balco's photoluminescent products can be used in combination to provide a visible routing system for safe emergency egress after a power failure. These products recharge in daylight or interior lighting and glow safely for over 10 hours.**

This guide can be used to specify these photoluminescent egress products:

- IllumiTread™ Handrail Illumination Strips**
- IllumiTread™ Demarcation Way Finding Strips**
- IllumiTread™ Obstacle Markers**
- IllumiTread™ Directional and Door Signs**

These products can be used in combination with IllumiTread™ Stair Nosing to provide a visible routing system for safe egress after the loss of electrical power. This section can also be edited to specify a single photoluminescent product. IllumiTread™ Stair Nosing can be specified using Balco Product Specification SECTION 05 55 17 - PHOTOLUMINESCENT ALUMINUM STAIR NOSINGS. In addition, Balco, Inc. manufactures photoluminescent aisle markers for theaters and other performance facilities. These products can be specified using Balco Product Specification SECTION 10 14 44 - PHOTOLUMINESCENT AISLE MARKERS.

The specifier will need to edit this product specification to reflect the options and applications being used. Most editing can be accomplished by deleting unnecessary requirements.

Section 10 14 43

Photoluminescent Exit Path Marking System

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. Work included: Furnish and install complete Photoluminescent Exit Path Marking System.
 - 1. Stair and Leading Edge Nosing Strips
 - 2. Handrail Illumination Strips
 - 3. Demarcation Way Finding Strips
 - 4. Obstacle Markers
 - 5. Door Signage and Directional Signage

1.3 DESIGN AND PERFORMANCE

- A. Photoluminescent Exit Path Marking System shall be a complete system of low level way finding materials consisting of door signs, stair nosing strips, leading edge nosing strips, handrail illumination strips, demarcation way finding strips, obstacle markers and directional signs.
- B. Photoluminescent strips shall be 1" wide and form an integral part of the stair treads and leading edge of all landings.
 - 1. Mechanical fasteners shall be used to anchor stair nosing to the substrate.
 - 2. Adhesives may be used in conjunction with mechanical fasteners to affix stair nosing to the substrate.
 - 3. Adhesives may not be used as the sole means for affixing stair nosing to the substrate.
 - 4. Stair nosing treads shall be abrasive filled or shall have serrated surfaces to improve slip resistance.
 - 5. Stair nosing tread surfaces shall be slip resistant as defined in ADA recommendations.
 - 6. Stair nosing treads shall meet OSHA Barrier-Free Code requirements for stair design in public buildings.

- D. Photoluminescent handrail Illumination Strip shall be 1 inch wide; adhered to the handrail with a factory applied pressure sensitive adhesive.
- E. Photoluminescent Demarcation Way Finding Strip shall be 1 inch wide; adhered to the floor with a factory applied pressure sensitive adhesive.
- F. Photoluminescent Obstacle Markers 1 inch wide; with a pattern of 2 inch photoluminescent strips alternating with 2 inch black bands angled at 45 degrees adhered to all obstacles as defined by the established code.
- G. Directional and Door Signs shall be in compliance with the New York City Building Code RS 6-1 and RS 6-1A.
- H. Photoluminescent Exit Path Marking System shall have a minimum brightness (luminance) 30 milicandelas per square meter after 10 minutes and 5 milicandelas per square meter after 90 minutes when tested to ASTM E 2072 as modified by IBC Section 1024, or pass UL 1994 Test Standard.

1.4 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM E 2072, except the charging source shall be 1 fc (10 lux) of fluorescent illumination for 60 minutes
 - 2. ASTM B 221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
 - 3. ASTM G 155, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.
 - 4. ASTM B 117, Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - 5. ASTM D 4828, Standard Test Methods for Practical Washability of Organic Coatings.
 - 6. ASTM D 635, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
 - 7. ASTM D 3648, Standard Practices for the Measurement of Radioactivity.
- B. Bombardier:
 - 1. Bombardier SMP800-C Toxic Gas Generation Test.
- C. International Organization for Standardization (ISO):
 - a. ISO 17398, Safety Colors and Safety Signs – Classification, Performance and Durability of Safety Signs.
 - b. ISO 7010 (2003-10-01), Section E001, E002, E005, E006: Graphical Symbols – Safety Colors and Safety Signs – Safety Signs Used in Workplaces and Public Areas

- D. American National Standards Institute (ANSI):
 - a. ANSI Z535.1-2002, American National Standard for Safety Color Code
- E. New York City Reference Building Code:
 - a. Standard RS 6-1, Photoluminescent Exit Path Markings
 - b. Standard RS 6-1A, Additional Standards as Required by Reference Standard RS 6-1 for Photoluminescent Exit Path Markings.
- F. UL 1994

1.5 QUALITY ASSURANCE

- A. Manufacturer: Obtain Photoluminescent Exit Path Marking System components through one source from a single manufacturer.
 - 1. Manufacturer shall be listed with an independently recognized testing laboratory for compliance and on-going certification that photoluminescent performance complies with UL 1994 and/or ASTM E2072 as modified by IBC Section 1027.
 - 2. Manufacturer shall be ISO 9001 Certified.
 - 3. Manufacturer shall have a minimum of ten (10) years of experience in fabrication of stair nosing systems.
 - 4. Manufacturer shall be listed with the City of New York, Department of Buildings and all products will have approved M.E.A. numbers.
- B. Installer: Firm with not less than three (3) years of successful experience in the installation of systems similar to those required by this project and acceptable to the manufacturer of the system.

1.6 SUBMITTALS

- A. Submit manufacturer's specifications and technical data, including Material Safety Data Sheets, installation instructions, as required, and catalog cuts and templates where required to explain construction and to provide for incorporation into the project.
- B. Submit certificates and/or copies of independent test reports or research reports showing compliance with specified performance requirements.
- C. Submit shop drawings showing complete fabrication details for all stair nosing, handrail illumination strip, door signage and demarcation way finding strip including required anchorage to surrounding construction.
- D. Submit three (3) 3" samples of each specified system.

1.7 DELIVERY, STORAGE AND HANDLING

- A. The manufacturer shall fill two component stair nosing sub-channels with a protective material to provide protection during construction.

- B. Prior to shipment, the manufacturer shall cover the stair nosing's photoluminescent strip and abrasive ribs with protective tape to eliminate concrete infiltration and staining.
- C. Deliver the photoluminescent egress system components to jobsite in new, clean, unopened crates of sufficient size and strength to protect materials during transit.
- D. Store components in original containers in a clean, dry location.

1.8 WARRANTY

- A. Submit manufacturer's warranty that materials furnished will perform as specified for period of not less than five (5) years when installed in accordance with manufacturer's recommendations and that the photoluminescent pigment and glow properties will continue to charge and emit glow with less than a 5% loss of light output over a 25 year period.
- B. Submit manufacturer's letter of certification that they have used only legal pigments purchased through licensed distributors of Nemoto & Co., LTD of Tokyo, Japan or Honeywell International (Nemoto's licensee) in manufacturing photoluminescent exit path markings.

PART 2 — PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: IllumiTread™ Photoluminescent Exit Path Marking System as manufactured by Balco, Inc., 2626 S. Sheridan, Wichita, KS 67217; phone: 800-767-0082 or (316) 945-9328; fax: (316) 945-0789, and serves as the standard of quality upon which other products will be judged.
 - 1. Stair and Leading Edge Nosing shall be IllumiTread™ Photoluminescent Egress System stair nosing **[model no.]**.
 - 2. Handrail Illumination Strips shall be model # 4010c.
 - 3. Demarcation Way Finding Strips shall be model # 4211c.
 - 4. Obstacle Markers shall be model # 4211.
 - 5. Directional Signs and Door Signs shall be as indicated on Door Schedule and Signage Schedule Drawings.

2.2 MATERIALS

- A. Aluminum: ASTM B 221, alloy 6063-T5 for extrusions
- B. Photoluminescent: Phosphorescent pigment, Strontium Aluminate Oxide, combined with a carrier/fixer that is cross-linked to an aluminum substrate at high temperature. PVC based pigment systems shall not be acceptable. Conforms to the following requirements:

BALCO PRODUCT SPECIFICATIONS

May 2009

Balco, Inc., 2626 South Sheridan, P.O. Box 17249, Wichita, Kansas 67217-0249

PHONE: 800-767-0082; FAX: 316-945-0789; WEBSITE: www.balcousa.com

1. Brightness Rating shall exceed New York City Reference Standard RS 6-1 and 6-1A of BR: 30-7-5 when tested in accordance with ISO 17398.
 2. UL 1994: Pass
 3. ASTM E 2072, as modified by IBC Section 1024
 4. UV Degradation: 2000 hours when tested in accordance with ASTM G155.
 5. Salt Spray resistance: ASTM B117.
 6. Cleaning Test: ASTM D4820, pass.
 7. Rate of Burning: ASTM D635, comply.
 8. Surface Flammability: ASTM E162
 9. Toxicity Testing: Bombardier SMP800-C "Toxic Gas Generation Test".
 10. Radioactivity Test: ASTM D3648.
- C. Abrasive: Two (2) part Epoxy combined with aluminum oxide grit.
- D. Labeling: Products shall exhibit Manufacturers name & model number, and MEA number and Brightness Number for New York City.
- E. Fasteners required for complete installation to manufacturer's instructions.
1. Handrail strip and demarcation way finding strip will have a factory applied pressure sensitive adhesive backing.
 2. Door and Directional signs shall be fastened with materials supplied by the manufacturer.

2.3 FABRICATION

- A. Fabricate stair nosing assemblies as detailed. Provide anchors and accessories indicated in the installation instructions and necessary for complete installation.
1. Provide abrasive treads of the specified color.
 2. Provide specified anchors and where required, tread plate securing screws.
 3. Surfaces to be embedded in concrete shall be coated with a clear acrylic lacquer.
- B. Fabricate handrail illumination strips, demarcation way finding strips, obstacle markers and door and directional signs using phosphorescent pigment, Strontium Aluminate Oxide, combined with a carrier/fixer that is cross-linked to an aluminum substrate at high temperature.

2.4 FINISHES

- A. Aluminum sub-channels and tread plates shall be:
1. Mill finish.
 2. Clear acrylic lacquer coated for components to be embedding in concrete.
- B. Slip resistant surfaces shall be:
1. Serrated Aluminum OR
 2. Abrasive ribs shall be: [Black] {Approved Color selected from manufacturer's standard colors} [Other, as selected and approved by the architect].

PART 3 — EXECUTION

3.1 EXAMINATION

- A. Installer shall examine conditions under which work is to be performed and shall notify the contractor in writing of unsatisfactory conditions. Installer shall not proceed until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- B. Verify that when installed the photoluminescent surface(s) of the stair nosings, the handrail illumination strips and the demarcation way finding strips will be exposed to sufficient activating illumination (a minimum of 1 foot-candles) to ensure the photoluminescent strip will be effectively charged and will meet the required brightness rating.

3.2 INSTALLATION

- A. Install Photoluminescent Exit Path Marking System in accordance with the governing regulations, the industry standards applicable to the work, and the manufacturer's written installation instructions.
 - 1. Sub-channels of two component stair nosing shall be installed with the concrete pour.
 - 2. Tread plates of two component stair nosing shall be installed in the final stages of construction
- B. Work shall be aligned plumb, level and, where required, flush with adjacent surfaces.
- C. Stair and Leading Edge Nosing shall be rigidly anchored to the substrate.
 - 1. Install the full length of each step and landing edge in accordance with the established code requirements.
- D. Handrail Illumination Strips shall be adhered to the handrails in accordance with the established code requirements with the factory applied pressure sensitive adhesive.
 - 1. Placed strips on the top surface of the handrail for the entire length of the handrail, including handrail extensions and newel post caps.
 - 2. At bends or corners, the stripe shall be as continuous as practicable with no more than a 4 inch gap in the photoluminescent strip.
- E. Demarcation Way Finding Strips shall be adhered in accordance with the established code requirements with the factory applied pressure sensitive adhesive. Strips shall be as continuous as practicable with no more than a 4 inches gap in the photoluminescent strip.
 - 1. Floor mounted option: shall be positioned as close to the wall as practicable but no more than 4 inches away from the wall. Extend to within 2 inches of the leading edge nosing. Extend across the floor in front of obstacles. Continue across all doors except door frames marked as intermediate and final exit doors.

2. Wall mounted option: Place bottom edge is no more than 4 inches above the finished floor. At the top and bottom of the stairs, demarcation lines shall drop vertically to the floor within 2 inches of the leading edge nosing. Transition demarcation vertically to the floor and then extend across the floor where a line on the floor is the only practical method of outlining the path. Continue demarcation across all doors, or transition to the floor and extend across the floor in front of the door, except doors marked as intermediate exit doors and doors marked as final exit doors.
- F. Obstacle Markings shall be adhered to the obstruction in accordance with the established code requirements.
1. Mark all obstacles at or below for 6'-6" in height and projecting more than 4" into the egress path.
- G. Door and Directional Signage shall be located and adhered in accordance with the established code requirements and at a maximum height from the floor of 18".
1. Intermediate exit doors and final exit doors
 - a. Intermediate exit doors are doors that lead from a vertical exit, horizontal extension in a vertical exit, horizontal exit, supplemental vertical exit, or exit passageway, but do not lead directly to the exterior or to a street level lobby.
 - b. Final exit doors are doors that lead directly to the exterior or a street level lobby.
 - c. Mount signs on the center of the door.
 - d. Door hardware shall be marked with no less than 16 square inches of photoluminescent material and the photoluminescent material shall be located behind, immediately adjacent to, or on the door handle and/or escutcheon. Panic bars shall have a 1" photoluminescent strip along their entire length.
 - e. The top and sides of the door frames shall be marked with a solid and continuous 1" wide photoluminescent strip with a factory applied pressure sensitive adhesive. Stripe is permitted to be installed on the wall surrounding the door frame.

3.3 CLEANING

- A. Clean exposed surfaces as recommended by the manufacturer.

3.4 PROTECTION

- A. Advise the contractor of procedures required to protect the finished work from damage by work of other Sections during the remainder of the construction period.
- B. Finished units shall be without damage. Units damaged during shipping or construction shall be repaired by the contractor at the expense of the party damaging the material, in accordance with the contract requirements.

End of Section