

**SECTION 05 55 17**

**PHOTOLUMINESCENT ALUMINUM STAIR NOSINGS**

**\*\*\*\*\* Balco, Inc. manufacturers 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 Exit Path Marking System for safe emergency egress after a power failure. These products recharge in daylight or interior lighting and glow safely for over 24 hours.**

**This guide can be used to specify IllumiTread™ Stair Nosing, Balco's extruded aluminum stair nosing with an integral photoluminescent strip.**

**These products can be used in combination with IllumiTread™ Handrail Illumination Strips, IllumiTread™ Demarcation Way Finding Strips, IllumiTread™ Obstacle Markers, IllumiTread™ Directional and Door Signs to provide a visible Exit Path Marking System for safe egress after the loss of electrical power. 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.**

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**Balco, Inc. IllumiTread™**

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**PHOTOLUMINESCENT ALUMINUM STAIR NOSINGS**

**PART 1 — GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 WORK INCLUDED**

- A. Furnish and install complete Balco, Inc. IllumiTread™ Photoluminescent Stair Nosing.
  - 1. Retrofit Stair Nosing
  - 2. Single Component Stair Nosing
  - 3. Two-Component stair Nosing

**1.03 RELATED WORK**

- A. Related work which is specified elsewhere.
  - 1. Concrete work: Section 03 30 00.
  - 2. Metal Stair construction: Section 05 51 00
  - 3. Signage other than Photoluminescent: Section 10 14 00

**1.04 REFERENCES**

- A. Publications listed herein are part of this specification to the extent referenced. The criteria established in the specifications shall take precedence over the standards referenced herein. (Examples of reference standards are given below.)
  - 1. American Society for Testing and Materials (ASTM):
    - a. ASTM E 2072, except the charging source shall be 1 fc (10 lux) of fluorescent illumination for 60 minutes
    - b. ASTM B 221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
    - c. ASTM G 155, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.
    - d. ASTM B 117, Standard Practice for Operating Salt Spray (Fog) Apparatus.
    - e. ASTM D 4828, Standard Test Methods for Practical Washability of Organic Coatings.

- f. ASTM D 635, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
- g. ASTM D 3648, Standard Practices for the Measurement of Radioactivity.
2. Bombardier:
  - a. Bombardier SMP800-C Toxic Gas Generation Test.
3. 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
4. American National Standards Institute (ANSI):
  - a. ANSI Z535.1-2002, American National Standard for Safety Color Code
5. 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.
6. UL 1994

#### **1.05 SYSTEM DESCRIPTION**

- A. Photoluminescent strips shall be 1" wide and form an integral part of the stair treads and leading edge of all landings. Stair nosing assemblies shall be **[anchored to substrate] [cast-in-place]**.
  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.
- B. Photoluminescent Strips shall consist of a phosphorescent pigment, Strontium Aluminate Oxide, combined with a carrier/fixer that is cross-linked to an aluminum substrate at high temperature. PVC based systems shall not be acceptable.

- C. Photoluminescent Exit Path Marking System shall have a minimum brightness (luminance) 5 millicandlelas per square meter after 90 minutes when tested to ASTM E 2072 as modified by IBC Section 1027, or pass UL 1994 Test Standard.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer: Obtain stair nosing assemblies 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 1024.
  - 2. Manufacturer shall be ISO 9001 Certified.
  - 3. Manufacturer shall have a minimum of ten (10) years of experience in the 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.

**1.07 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 nosings, including required anchorage to surrounding construction.
- D. Submit three (3) 3" samples of the specified system.

**1.08 DELIVERY, STORAGE AND HANDLING**

- A. The manufacturer shall fill stair nosing sub-channels with a protective material to provide protection during construction.
- B. Prior to shipment, the manufacturer shall cover the stair nosing photoluminescent strip and abrasive ribs with protective tape to eliminate concrete infiltration and staining.
- C. Deliver the stair nosing assemblies 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.

**1.09 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 strips.

**PART 2 — PRODUCTS****2.01 MANUFACTURERS**

- A. Basis of Design: IllumiTread™ Photoluminescent Stair Nosing 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.

- B. Stair nosing system, **[Manufacturer's model number]:**

**No. 4199:** 3 inches (76 mm) wide, surface mounted nosing with 1 inch (25 mm) wide photoluminescent insert, fluted surface, and 13/16 inch (21 mm) front lip.

**No. 2140:** 3 inches (76 mm) wide, surface mounted nosing with 1/2 inch (13 mm) wide photoluminescent insert, fluted surface, and 13/16 inch (21 mm) front lip.

**No. P-3310-PL-100:** 3 inches (76 mm) wide, concrete embedded nosing with 1 inch (25 mm) wide photoluminescent insert, 3 abrasive treads, with continuous anchor.

**No. R-315L-PL:** 3 inches (76 mm) wide, concrete embedded nosing with 1/2 inch (13 mm) wide photoluminescent insert, 4 abrasive treads, and strap anchors at approximately 12 inches (305 mm).

**No. RS-315L-PL-100:** 3 inches (76 mm) wide, concrete embedded nosing with 1 inch (25 mm) wide photoluminescent insert, 3 abrasive treads, and strap anchors at approximately 12 inches (305 mm).

**No. DXH 330-PL:** 3-1/4 inches (82 mm) wide, two component, concrete embedded nosing with 1/2 inch (13 mm) wide photoluminescent insert, abrasive fill, sub-channel, and anchor bolts.

**No. DXH 330-PL-100:** 3-1/4 inches (82 mm) wide, two component, concrete embedded nosing with 1 inch (25 mm) wide photoluminescent insert, abrasive fill, sub-channel, and anchor bolts.

**No. RS-405L-PL:** 4 inches (102 mm) wide, surface mounted nosing with 1/2 inch (13 mm) wide photoluminescent insert, 4 abrasive treads, and 1-3/8 inch (35 mm) front lip.

**No. RS-405L-PL-100:** 4 inches (102 mm) wide, surface mounted nosing with 1 inch (25 mm) wide photoluminescent insert, 3 abrasive treads, and 1-3/8 inch (35 mm) front lip.

**No. RS-609L-PL: 6 inches (152 mm) wide, surface mounted nosing with 1/2 inch (13 mm) wide photoluminescent insert, 8 abrasive treads, and 1-3/8 inch (35 mm) front lip.**

**No. RS-609L-PL-100: 6 inches (152 mm) wide, surface mounted nosing with 1 inch (25 mm) wide photoluminescent insert, 7 abrasive treads, and 1-3/8 inch (35 mm) front lip.**

## 2.02 MATERIALS

- A. Aluminum: ASTM B 221, alloy 6063-T5
- 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 systems shall not be acceptable.
  - 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 and model number, and MEA number and Brightness Number for New York City.
- E. Fasteners required for complete installation to manufacturer's instructions.
  - 1. Retrofit Stair Nosing: **[Concrete Anchors, plugs and screws] [Wood Screws] [Sheet Metal Screws] [Other].**
  - 2. Single Component Stair Nosing: **[Standard, Strap] [Standard, Continuous] [Other].**
  - 3. Two Component Stair Nosing: **[Standard, Cap Screws and Hex Jamb Nuts] [Other]** and tread plate securing screws.

## 2.03 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.

**2.04 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****3.01 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.
- C. Verify that when installed the photoluminescent surfaces of the stair nosing will be exposed to sufficient activating illumination (a minimum of 2 foot-candles) to ensure the photoluminescent strip will be effectively charged and will meet the required brightness rating.

**3.02 INSTALLATION**

- A. Install stair nosing 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 and rigidly anchored to the substrate.
- D. Stair and Leading Edge Nosing shall be rigidly anchored to the substrate and cover the full length of each step and landing edge.

**3.03 CLEANING**

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

**3.04 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