American National Standard for Roadway Lighting Equipment—Tunnel Lighting Luminaires

Sponsor

Accredited Standards Committee on Roadway Lighting, C136

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Secretariat

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Abstract: Luminaires used for illuminating roadway tunnels are covered. The requirements in this standard are limited to general attributes of tunnel luminaires due to the wide variety of designs possible.

Keywords: lamps, lighting equipment, luminaires, roadway lighting equipment, tunnel lighting, tunnels

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Introduction

(This introduction is not a part of ANSI C136.27-1996, American National Standard for Roadway Lighting Equipment—Tunnel Lighting Luminaires.)

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American National Standard for Roadway Lighting Equipment—Tunnel Lighting Luminaires

1. Scope

This standard covers luminaires used for illuminating roadway tunnels. The requirements in this standard are limited to general attributes of tunnel luminaires due to the wide variety of designs possible.

2. References

This standard shall be used in conjunction with the following publications. When the following standards are superseded by an approved revision, the revision shall apply.

ANSI C81.61-1990, American National Standard for Electrical Lamp Bases.[1]

ANSI C82.1-1985 (Reaff 1992), American National Standard Specifications for Fluorescent Ballasts (includes supplements).

ANSI C82.4-1992, American National Standard Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).

ANSI C136.2-1985, American National Standard for Roadway Lighting—Luminaires—Voltage Classification.[2]

ANSI C136.11-1995, American National Standard for Roadway Lighting Equipment—Multiple Sockets.

ANSI C136.15-1986, American National Standard for Roadway Lighting Equipment—High-Intensity-Discharge and Low-Pressure Sodium Lamps in Luminaires—Field Identification.

ASTM B117-94, Test Method of Salt Spray (Fog) Testing.[3]

IESNA RP-22-87, Tunnel Lighting.[4]

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[1]ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

[2]ANSI C136 publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA.

[3]ASTM publications are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

[4]IESNA publications are available from the Illuminating Engineering Society of North America, 120 Wall Street, 17th Floor, New York, NY 10005, USA.

NEMA 250-1991, Enclosures for Electrical Equipment (1000 Volts Maximum).[5]

3. Definitions

3.1 counter beam system: Tunnel lighting system or luminaires having a light distribution that is greater in the opposite direction of travel.

3.2 pro beam system: Tunnel lighting system or luminaires having a light distribution that is greater in the direction of travel.

3.3 symmetric system: Tunnel lighting system or luminaires having a symmetric light distribution with respect to the direction of travel.

4. Terminal blocks

Unless otherwise specified, a terminal block with a minimum of two line-side pressure-type wire connectors having slotted-head screws shall be securely mounted in the luminaire so that incoming conductors will clear all internal accessories. Each connector shall accept one copper or aluminum conductor, either solid or stranded, from #14 American Wire Gauge (AWG) to #8 AWG.

5. Wiring

All internal components shall be assembled and prewired so that the luminaire can be energized by line connections at the terminal block unless otherwise specified. Multiwattage or multivoltage luminaires will be wired in accordance with customer specifications.

6. Latching and hinging

If the luminaire is equipped with latches to secure the lens door and to permit access to the lamp compartment, then the latches shall be operable by persons wearing protective gloves and using a maximum of one tool. If the luminaire is equipped with a sealed removable lamp compartment, it shall be removable by persons wearing protective gloves and using a maximum of one tool. All screws used either to gain access to the lamp compartment or to remove the sealed lamp compartment shall be captive. Latches or any other objects attached to the luminaire shall be designed to prevent the snagging of flapping tarpaulins, ropes, etc., from vehicles.

7. Voltage classification

The luminaires shall be of the 250 V or 600 V classification, whichever is applicable, as defined in ANSI C136.2-1985.[6]

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[5]NEMA publications are available from the National Electrical Manufacturers Association, 1300 N. 17th St., Ste. 1847, Rosslyn, VA 22209, USA.

[6]Information about references can be found in clause 2.

8. Lamp socket

Metallic parts of sockets shall be constructed of corrosion-resistant material. Sockets shall be constructed to prevent lamps from shaking loose due to vibration.

8.1 Medium or mogul socket

Luminaires that are equipped with either a medium or a mogul socket shall meet the requirements of ANSI C136.11-1995.

8.2 Fluorescent lamps

Luminaires that are intended for use with fluorescent lamps shall have sockets meeting the requirements of ANSI C81.61-1990. Lamp supports may be necessary depending on socket design.

8.3 Low-pressure sodium lamps

Luminaires that are intended for use with low-pressure sodium lamps shall have sockets that meet the requirements of ANSI C81.61-1990. Lamp supports are necessary for low-pressure sodium lamps.

9. Optical assembly

The optical assembly shall be effectively sealed by conforming gaskets to minimize the entrance of atmospheric contaminants. While the luminaire is being opened, the gasket shall remain securely attached to the intended surface. The lens door or sealed removable lamp compartment shall prevent the entrance of water into the optical assembly when the luminaire is subjected to the hosedown test (NEMA 4X), as described in NEMA 250-1991. The luminaire shall be considered to have met the requirements of this test if no water has entered the enclosure. If applicable, venting of the optical assembly shall be through a filtered orifice that will prevent soot, dirt, water, and other contaminants from entering the optical assembly. The optical assembly seal shall not leak due to the expansion and contraction of the luminaire components over a temperature range from –20 °C to 40 °C.

10. Lens

The luminaire shall be equipped with a lens made of material that is resistant to thermal shock, ultraviolet light, exhaust fumes, soot, and other chemicals found in a tunnel atmosphere. Soot and tunnel dirt shall be readily cleaned from the lens using soap and water under pressure. The lens, lens frame, and gasket system shall be constructed to minimize stresses on the lens due to the different coefficient of thermal expansion of the lens and lens frame. The lens assembly shall not warp or crack over an ambient temperature range from –20 °C to 40 °C for operating and nonoperating conditions.

11. Light distribution

The luminaire light distribution shall be appropriate for creating a symmetric, counter beam, or pro beam lighting system as specified by the user.

12. Ballast

The tunnel luminaires shall be equipped with a ballast that will operate the intended lamp, be it high-intensity-discharge, low-pressure sodium, or fluorescent lamp. The ballast shall meet the requirements of ANSI C136.2-1985 and ANSI C82.4-1992 for high-intensity-discharge (HID) ballasts or ANSI C82.1-1985 for fluorescent ballasts. The ballast shall start and operate the specified lamp over an ambient temperature range from –20 °C to 40 °C.

13. Materials and protective coatings

Materials and protective coatings used for the luminaire shall individually and as a system be resistant to atmospheric conditions, including the corrosive and erosive action of conditions of service encountered in roadway tunnels. When dissimilar materials are in contact, the effects of corrosion shall be considered. All latches, hinges, screws, and other external hardware shall be made out of stainless steel or other materials that are resistant to corrosion from exhaust fumes, salt, dirt, and soot as found in tunnels. The luminaire shall be subjected to the ASTM B117-94 salt spray test for 1000 h without altering the performance and serviceability of the luminaire. The luminaire and its associated mounting hardware shall not be corroded by the chemical action from concrete.

14. Labeling

Luminaires shall be provided with one or more permanently affixed, readily legible, visible, and durable nameplate(s) or label(s) that provides the following information:

a) Name of the manufacturer and catalog number
b) Supply voltage
c) Starting and operating currents
d) Ballast type
e) Lamp type, lamp wattage, and lamp voltage, if applicable
f) Descriptive wiring diagram of luminaire
g) The month and year of manufacture

The nameplate(s) or label(s) may be externally or internally affixed to the luminaire as specified by the user.

15. External identification

External identification of the lamp used in the luminaire, if specified, shall be in accordance with ANSI C136.15-1986.

16. Grounding

A means shall be provided for grounding noncurrent-carrying metal parts of the luminaire.