ANSI/ASHRAE/IESNA Addendum *q* to
ANSI/ASHRAE/IESNA Standard 90.1-2001

ASHRAE® STANDARD

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on June 26, 2004; by the ASHRAE Board of Directors on July 1, 2004; and by the American National Standards Institute on July 1, 2004.

This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines are given at the back of this document and may be obtained in electronic form from ASHRAE's Internet Home Page, *http://www.ashrae.org*, or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard and printed copies of a public review draft may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: *orders@ashrae.org*. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in U.S. and Canada).

ISSN 1041-2336

Approved American National Standard
ANSI

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SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Consensus is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this standard as an ANS, as "substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution." Compliance with this standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Manager of Standards of ASHRAE should be contacted for:

a. interpretation of the contents of this Standard,
b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard,
d. permission to reprint portions of the Standard.

[This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process.]

FOREWORD

This addendum is an extensive revision of the 90.1-2001 Exterior Lighting Requirements. It was prompted by comments and continuous maintenance proposals the committee has received about the deficiencies of the exterior lighting requirements in the currently published standard. The committee's review involved the following activities:

- *Reviewing existing exterior lighting documents, including outdoor lighting research proposal for California outdoor lighting standards, IESNA RP-33, RP-2, RP-20, RP-10 (draft), DG-5, and the 9th edition Handbook.*
- *Establishing a set of categories of exterior lighting applications for new lighting requirement tables.*
- *Developing a set of exterior lighting models and cases to determine appropriate LPD values. These models included current efficient, commonly available equipment. Multiple lighting solution models were created and analyzed for parking areas, walkways, plazas, building entries, canopies, façade lighting, and outdoor sales.*
- *Revising the current supporting requirements text for clarity. This included a revision and update of exemptions and all basic requirements.*

This addendum increases the stringency of the section. Where LPD values existed in the 2001 standard, these values were reduced or maintained based on current design criteria and current lighting equipment efficiency. All of the other exterior lighting in the existing 2001 lighting section was only regulated as a light source efficacy. This addendum enhances this requirement with specific LPD values that provide definite limits for exterior lighting use.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and strikethrough (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum *q* to 90.1-2001 (I-P and SI editions)

Modify Sections 9.2.1.3 and 9.3.2 as follows:

9.2.1.3 Exterior Lighting Control. ~~Lighting for all exterior applications not exempted in 9.1 and 9.3.2 shall be controlled by a photosensor or astronomical time switch that is capable of automatically turning off the exterior lighting when sufficient daylight is available or the lighting is not required.~~ Lighting for all exterior applications not exempted in 9.1 shall have automatic controls capable of turning off exterior lighting when sufficient daylight is available or when the lighting is not required during nighttime hours. Lighting not designated for dusk-to-dawn operation shall be controlled by an astronomical time switch. Lighting designated for dusk-to-dawn operation shall be controlled by an astronomical time switch or photosensor. Astronomical time switches shall be capable of retaining programming and the time setting during loss of power for a period of at least 10 h.

Exception to 9.2.1.3: Lighting for covered vehicle entrances or exits from buildings or parking structures where required for safety, security, or eye adaptation.

9.2.6 Exterior Building Grounds Lighting. All exterior building grounds luminaires that operate at greater than 100 watts shall contain lamps having a minimum efficacy of 60 lm/W unless the luminaire is controlled by a motion sensor or qualifies for one of the exceptions under 9.1 or 9.3.2.

9.3.2 Exterior Building Lighting Power. ~~The exterior building façade lighting power shall not exceed 0.25 W/ft^2 of the illuminated area.~~ The total *exterior lighting power allowance* for all ~~other~~ exterior building applications is the sum of the individual lighting power ~~limits~~ densities permitted ~~and specified~~ in Table 9.3.2 for these applications plus an additional unrestricted allowance of 5% of that sum. Trade-offs are allowed only among exterior lighting applications listed in the Table 9.3.2 "Tradable Surfaces" section. Exterior lighting for all applications (except those included in the exceptions to 9.1 and 9.3.2) shall comply with the requirements of 9.2.6.

Exceptions to 9.3.2: Lighting used for the following exterior applications is exempt when equipped with ~~an~~ a ~~independent~~ *control device* independent of the control of the nonexempt lighting:

(a) specialized signal, directional, and marker lighting associated with transportation;

~~(b) lighting used to highlight features of public monuments and registered *historic* landmark structures or *buildings*; and~~

(b) ~~(c) lighting that is integral to~~ advertising signage or directional signage;

(c) lighting that is integral to *equipment* or instrumentation and is installed by its *manufacturer;*

(d) lighting for theatrical purposes, including performance, stage, film, and video production;

(e) lighting for athletic playing areas;

(f) temporary lighting;

(g) lighting for industrial production, material handling, transportation sites, and associated storage areas;

(h) theme elements in theme/amusement parks; and

(i) lighting used to highlight features of public monuments and registered *historic* landmark structures or *buildings.*

Replace the current IP version of Table 9.3.2 with the revised version (shown below the current version):

Current IP version of Table 9.3.2:

TABLE 9.3.2
Lighting Power Limits for Building Exteriors

Applications	Power Limits
Building entrance with canopy or freestanding canopy	3 W/ft^2 of canopied area
Building entrance without canopy	33 W/lin ft of door width
Building exit	20 W/lin ft of door width

Revised IP version of Table 9.3.2:

TABLE 9.3.2
Lighting Power Densities for Building Exteriors

Applications	Lighting Power Densities
Tradable Surfaces (Lighting Power Densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs, and outdoor sales areas may be traded.)	
Uncovered Parking Areas	
Parking lots and drives	0.15 W/ft^2
Building Grounds	
Walkways less than 10 feet wide	1.0 watts per linear foot
Walkways 10 feet wide or greater, plaza areas, and special feature areas	0.2 W/ft^2
Stairways	1.0 W/ft^2
Building Entrances and Exits	
Main entries	30 watts per linear foot of door width
Other doors	20 watts per linear foot of door width
Canopies and Overhangs	
Canopies (freestanding and attached and overhangs)	1.25 W/ft^2
Outdoor Sales	
Open areas (including vehicle sales lots)	0.5 W/ft^2
Street frontage for vehicle sales lots in addition to "open area" allowance	20 watts per linear foot
Non-Tradable Surfaces (Lighting Power Density calculations for the following applications can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the "Tradable Surfaces" section of this table.)	
Building facades	0.2 W/ft^2 for each illuminated wall or surface or 5.0 watts per linear foot for each illuminated wall or surface length
Automated teller machines and night depositories	270 watts per location plus 90 watts per additional ATM per location
Entrances and gatehouse inspection stations at guarded facilities	1.25 W/ft^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
Loading areas for law enforcement, fire, ambulance, and other emergency service vehicles	0.5 W/ft^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
Drive-up windows at fast food restaurants	400 watts per drive-through
Parking near 24-hour retail entrances	800 watts per main entry

Replace the current SI version of Table 9.3.2 with the revised version (shown below the current version):

Current SI version of Table 9.3.2:

TABLE 9.3.2
Lighting Power Limits for Building Exteriors

Applications	Power Limits
Building entrance with canopy or freestanding canopy	32.4 W/m^2 of canopied area
Building entrance without canopy	108.3 W/lin m of door width
Building exit	65.6 W/lin m of door width

Revised SI version of Table 9.3.2:

TABLE 9.3.2
Lighting Power Densities for Building Exteriors

Applications	Lighting Power Densities
Tradable Surfaces (Lighting Power Densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs, and outdoor sales areas may be traded.)	
Uncovered Parking Areas	
Parking lots and drives	1.6 W/m^2
Building Grounds	
Walkways less than 10 feet wide	10.7 watts per linear meter
Walkways 10 feet wide or greater, plaza areas, and special feature areas	2.2 W/m^2
Stairways	10.8 W/m^2
Building Entrances and Exits	
Main entries	98 watts per linear meter of door width
Other doors	66 watts per linear meter of door width
Canopies and Overhangs	
Canopies (freestanding and attached and overhangs)	13.5 W/m^2
Outdoor Sales	
Open areas (including vehicle sales lots)	5.4 W/m^2
Street frontage for vehicle sales lots in addition to "open area" allowance	66 watts per linear meter
Non-Tradable Surfaces (Lighting Power Density calculations for the following applications can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the "Tradable Surfaces" section of this table.)	
Building facades	2.2 W/m^2 for each illuminated wall or surface or 16.4 watts per linear meter for each illuminated wall or surface length
Automated teller machines and night depositories	270 watts per location plus 90 watts per additional ATM per location
Entrances and gatehouse inspection stations at guarded facilities	13.5 W/m^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
Loading areas for law enforcement, fire, ambulance, and other emergency service vehicles	5.4 W/m^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
Drive-up windows at fast food restaurants	400 watts per drive-through
Parking near 24-hour retail entrances	800 watts per main entry

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the standards and guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive technical committee structure, continue to generate up-to-date standards and guidelines where appropriate and adopt, recommend, and promote those new and revised standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating standards and guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.