Illuminating
ENGINEERING SOCIETY

IES RP-20-14
REVISED

Lighting for Parking Facilities

IES RP-20-14
Revised

Lighting for Parking Facilities

Publication of this Recommended Practice has been approved by IES. Suggestions for revisions should be directed to IES.

Approved by the IES Board of Directors, September 12, 2014, as a Transaction of the Illuminating Engineering Society of North America.

Revision approved by the IES Board of Directors, November 21, 2016, as a Transaction of the Illuminating Engineering Society of North America.

Published by the Illuminating Engineering Society of North America, 120 Wall Street, New York, New York 10005.

IES Standards and Guides are developed through committee consensus and produced by the IES Office in New York. Careful attention is given to style and accuracy. If any errors are noted in this document, please forward them to Brian Liebel, Technical Director of Standards, at the above address for verification and correction. The IES welcomes and urges feedback and comments.

Printed in the United States of America.

ISBN # 978-0-87995-300-3

DISCLAIMER

IES publications are developed through the consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on lighting recommendations. While the IES administers the process and establishes policies and procedures to promote fairness in the development of consensus, it makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

The IES disclaims liability for any injury to persons or property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document.

In issuing and making this document available, the IES is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the IES undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The IES has no power, nor does it undertake, to police or enforce compliance with the contents of this document. Nor does the IES list, certify, test or inspect products, designs, or installations for compliance with this document. Any certification or statement of compliance with the requirements of this document shall not be attributable to the IES and is solely the responsibility of the certifier or maker of the statement.

Prepared by:
The Subcommittee on Off-Roadway Facilities
of the IES Roadway Lighting Committee

G. Lister, *Chair*

C. Andersen *
R. Bradford
N. Clanton
M. Dudas
J. Edmonds
K. Fitzmaurice *
J. Hart
J. Jiao
R. Jones
C. Kerschner*
E. Kramer
R. Larivee *
L. Leetzow
R. McCall *
D. Monahan
M. Naylor *
R. Patel*
D. Paulin
P. Phillips
C. Poirier *
R. Rainer
B. Scanlon
L. Smith *
S. Spitulski
J. Weaver*
S. Wegner *
G. Westergren *
R. LeVere **

*Advisory
** Honorary

Roadway Lighting Committee

J. Bloomfield, *Chair*
J. Frazer, Vice *Chair*
M. Aitkenhead, *Secretary*
E. Morel, *Treasurer*

C. Andersen
J. Armstrong
L. Asselin*
M. Baginski*
J. Bastianpillai
D. Baum
C. Bloomfield*
R. Benekohai*
R. Bhagavathula*
J. Brown
G. Brunet*
M. Bucci
K. Burkett
D. Cavalcanti*
G. Chelvanayagam
J. Cheung
N. Clanton*
R. Clear
S. Coyle
Charles Craig*
D. Crawford**
M. Cunningham
J. DaCosta*
D. DeGrazio
C. Dibley
N. Dittman
M. Dudas
A. Duma*
R. Ebbert*
G. Engstrom*
J. Farsaitis
T. Fenimore*
K. Fitzmaurice
R. Gibbons
R. Gupta
R. Harvey
J. Havard*
R. Hunsaker*
D. Husby**
J. Jiao
R. Johnson*
M. Janoff**
J. Jewell**
R. Jones
K. Kang*
H. Kashani
R. Kauffman
D. Keith*
M. Kelly*
E. Kramer
C. Kwong
E. Ladouceur
S. Langford
R. Larivee
G. Lauziere*
L. Leetzow
C. Leone*
O. Letamendi
R. LeVere**
G. Lister
T. Lohman*
X. Lou*
P. Lutkevich*
L. Lutley*
E. MacGill
M. Maltezos
J. Marsh
M. Mayer
J. McCormick**
S. M. Knight**
D. McLean
J. Meyers**
K. Molloy
D. Monahan*
J. O'Connor*
H. Odle**
D. Okon**
C. Ockunzzi*
D. Paulin
M. Pearse*
C. Pekar*
J. Petty*
C. Poirier
L. Radetsky
R. Rainer
M. Riebling*
O. Rivera*
J. Robinson
P. Sabau
M. Seppelt
B. Shelby**
A. Silbiger
J. Simmers
W. Smelser
L. Smith
M. Smolyansky
J. Snowden*
M. Stevens*
R. Stemprok
M. Stern*
F. Stohl
M. Tedesco
G. Thiesse
U. Thurairajah
J. Weaver
S. Wegner
Y-J. Wen
S. Wentworth
E. Yao*
R. Yeager

*Advisory
** Honorary

RP-20 is dedicated to Paul C. Box.

Cover photo courtesy of Paul Turang, www.paulturang.com

This edition (published November 21, 2016) incorporates editorial Errata found in IES RP-20-14*. The list of corrected items is as follows:*

1. *Foreword, Part I Paragraph 9, parenthetical note added*
2. *Foreword, Part I Paragraph 9, new notes added*
3. *Table 2, Avg: Min values and category deleted*
4. *Table 2, New notes f, g, h, i added.*
5. *Table 4, Avg: Min values and category deleted*
6. *Table 4, new notes f, g, h added*
7. *Annex B Section B1.0, delete "…average or at a point"*
8. *Annex B Section B6.0 Determinations of Average Illuminance for a Parking Lot, deleted entirely, including Figure B2 captions and all text in between.*
9. *Annex B Section B7.2 Isolux Diagram, paragraph 5 deleted.*
10. *Annex B Section B7.2 last paragraph, delete last sentence "This is the value to compare…"*
11. *Annex B Section B8.0 Uniformity Ratios, delete paragraph 9, "If the designer is using average illuminance…"*
12. *Delete Figure B5 and caption*

Contents

FOREWORD

The following is a summary history on the evolution of this document (RP-20). It describes the progress leading to the current RP-20.

A *Recommended Practice of Outdoor Parking Area Lighting* was prepared in 1960 by an IESNA Committee.[1] This document specified as a basic value 11 lux (1 fc)** average maintained horizontal illuminance, with a 4:1 or better average/minimum uniformity ratio [minimum point illuminance ≥ 2.5 lux (0.25 fc)]. A doubling of these values was recommended at parking area entrances and exits.

In 1974, the IESNA Roadway Lighting Committee produced recommendations for lighting safety rest areas along limited access highways.[2] A value of 11 lux (1 fc) was specified for major activity sections, with a 3:1 or better average to minimum uniformity. For lower activity zones (picnic areas, shelters), a 5 lux (0.5 fc) illuminance and a 6:1 uniformity were recommended. These values were carried forward to the *IESNA Lighting Handbook*, Eighth Edition[3] and correspond to minimum illuminance values of 0.8 to 3.3 lux (0.08 to 0.33 fc).

In 1984, a new IESNA Recommended Practice, IES RP-20-84, *Lighting for Parking Facilities* was published.[4] This document contained separate recommendations for lots and garages. Values were based on average illuminance for vehicle-use-only areas of lots and for all areas of garages. For general parking and pedestrian areas of lots, the recommendations were for minimum illuminance values of 2 to 10 lux (0.2 to 1 fc). Maximum average-to-minimum uniformity ratios of 4:1 were specified in most applications, producing average illuminance values of up to 40 lux (4 fc) when designed to this ratio. Differences in assumed levels of activity for various land uses formed the basis for setting the range in recommended minimum illuminance values. This version of RP-20 also added vertical illuminance recommendations, which were as important as the horizontal values, measured at 1.5 meters (5 ft) above the pavement (for facial recognition).

IES RP-20-84 was not based upon surveys or field measurements of existing parking facilities; it was based on state-of-the-art prevailing practice. Subsequent to its publication, reports surfaced of field measurements finding significantly lower levels in typical uses. A sampling survey of cities in 1991 found only one-fifth to be applying the IES RP-20-84 document in checking construction plans for private parking facilities, which constituted the vast majority of lots and garages.

The IESNA document dealing with airport parking areas (IESNA RP-17-87) was prepared as a guide for the application of fixed outdoor lighting in and around the airport environment with respect to the airport's special requirements. These requirements included:

- Height restrictions such as obstructions affecting navigable airspace as defined by the governing civil aviation authorities
- The ability to distinguish color of light for visual cues
- Restriction of light trespass that might interfere with visibility for of Air Traffic Control Tower (ATCT) controllers or pilots

The *Recommended Building Code Provisions for Open Parking Structures*[8], published by the National Parking Association in 1985, specified 65 lux (6.0 fc) average at 75 cm (30 in.) above the floor, with a maximum uniformity ratio of 3:1. An earlier publication, *Parking in the City Center*, commissioned by the Automobile Manufacturers Association, recommended 43 to 54 lux (3.3 to 5.4 fc) in garage parking areas.

The IES RP-20-84 publication was revised in 1998 based on field surveys of actual illumination found in existing parking facilities. *Rather than specify an average illuminance criterion, a minimum illuminance criterion was established.* The minimum basic requirement in parking lots was 2 lux (0.2 fc), with a minimum of 5 lux (0.5 fc) where enhanced security was an issue. The uniformity ratio was then redefined in terms of a maximum to minimum ratio of less than 20:1 rather than an average to minimum ratio, as the eye was thought to adapt to the brightest pavement (i.e., paved surface) in the field of view, not the average light level. The maximum to minimum uniformity ratio was limited in order to allow one to see into the darkest areas from the brightest areas. The uniformity ratio for enhanced security was 15:1.

This Max/Min ratio was chosen for two reasons:

1) The better-quality HID luminaires (generally with horizontal lamps) were able to achieve these results (as are today's LED luminaires). Desiring a "best practice" approach to this document, a consensus was achieved.

** Within the general notes of *The Lighting Handbook*, 10th ed. (IES 2011), for each Illuminance Recommendation Table, note C specifies that "Footcandle conversions of any values cited in this table should be made at 1 fc = 10 lx."