



Illuminating
ENGINEERING SOCIETY

RECOMMENDED PRACTICE:
LIGHTING HOSPITAL AND
HEALTHCARE FACILITIES
AN AMERICAN NATIONAL STANDARD

Currently in preview, click buy full version



Currently in preview, click buy full version

ANSI/IES RP-29-22

**RECOMMENDED PRACTICE:
LIGHTING HOSPITAL AND HEALTHCARE FACILITIES
AN AMERICAN NATIONAL STANDARD**

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

**Prepared by the
IES Healthcare Facilities Lighting Committee**



Copyright 2022 by the Illuminating Engineering Society.

Approved by the IES Standards Committee, August 10, 2022, as a Transaction of the Illuminating Engineering Society.

Approved November 3, 2022, as an American National Standard.

All rights reserved. No part of this publication may be reproduced in any form, in any electronic or mechanical system or otherwise, without prior written permission of the IES.

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

IES Standards 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 the Director of Standards, at standards@ies.org or the above address, for verification and correction. The IES welcomes and urges feedback and comments.

Printed in the United States of America.

ISBN 978-0-87995-440-6

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.

AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether that person has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation to any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Healthcare Facilities Lighting Committee

Karen P. Murphy, *Chair*

Richard M. Kassouf, *Vice Chair*

Members

M. Alcaraz

B. Arguirova

J. K. Brownell

J. M. Donovan

E. Godson

J. L. Johnson

G. P. Manatad

M. J. Moran

L. M. North

P. Rizzo

L. A. Schwade

J. Wang

R. D. White

Advisory Members

P. Dee

C. Hall

L. Healey

D. Jesurun

R. B. Kurzawa

J. Kuypers

K. Lee

R. Munagala

S. L. Olson

D. G. Rubin

A. Sarkar

T. L. Shaw

S. Spaziani

Currently in preview, click buy full version

CONTENTS

Preface	1
Part I: General Information	1
1.0 Introduction and Scope	1
1.1 Introduction	1
1.1.1 Types of Facilities	2
1.1.2 Trends in Healthcare Design.....	2
1.1.3 Financial Implications	4
1.1.4 Regional Differences	5
1.2 Scope	5
2.0 Principles of Quality Lighting, Task Visibility, Glare, and Color	6
2.1 Principles of Quality Lighting	6
2.2 Task Visibility	6
2.3 Color	6
2.3.1 Correlated Color Temperature	7
2.3.2 Color Rendition	7
2.3.3 The Role of Light Color in Diagnostics.....	8
3.0 Sustainability, Economics, and Lighting Control Systems	8
3.1 Sustainability	8
3.1.1 Energy Efficiency.....	9
3.1.2 Daylighting	10
3.1.3 Environmental Impact	10
3.2 Economics	11
3.2.1 First Costs and Operational Costs.....	11
3.2.2 “Hard” Costs and “Soft” Costs.....	11
3.3 Lighting Control Systems	11
3.3.1 Automated Controls.....	12
3.3.2 Integration and Interoperability	13
3.3.3 Patient Controls.....	18
3.3.4 Staff Controls	18
3.3.5 Interference.....	18

Part II: Design Considerations for Healthcare Facilities.....	20
4.0 Comfort	20
4.1 Overall Experience.....	20
4.1.1 Patient.....	20
4.1.2 Staff	20
4.1.3 Caregivers and Visitors	21
4.1.4 Respite	21
4.2 Lighting Considerations for Comfort.....	21
4.2.1 Prioritizing Lighting Needs	22
4.2.2 Daylight	22
4.2.3 Glare Mitigation.....	22
4.3 Design Aesthetic	22
4.3.1 Creating Visual Interest.....	23
4.3.2 Consideration of Demographic.....	23
4.3.3 Surfaces and Finishes	23
5.0 Function.....	24
5.1 Illuminance Recommendations.....	24
5.2 Flexibility	25
5.3 Wayfinding.....	25
5.3.1 Exterior Areas.....	25
5.3.2 Interior Areas	26
5.4 Special Populations.....	26
5.4.1 Lighting for the Aged	26
5.4.2 Lighting for Pediatrics.....	27
5.4.3 Lighting for Autistic Patients.....	27
5.4.4 Lighting for Behavioral Health.....	28
5.4.5 Lighting for Senior Care Facilities.....	30
6.0 Safety.....	30
6.1 Medication Accuracy.....	31
6.2 Fall Prevention	31
6.3 Infection Management.....	31
6.3.1 Handwashing	31
6.3.2 Antimicrobial Finishes.....	32
6.3.3 Room Decontamination Methods	32
6.3.4 Pressurized Isolation Patient Rooms	33
6.3.5 Biohazard Spaces	33
6.3.6 Luminaire Characteristics.....	34
6.4 Medical Equipment Compatibility	34
6.5 Emergency Systems	35
6.6 Security.....	36

6.7	Photobiological Safety	36
6.7.1	Eye Fatigue	37
6.7.2	Headaches.....	37
6.7.3	Photosensitivity.....	37
6.7.4	Photosensitive Epilepsy	37
7.0	Health and Wellness	38
7.1	Psychological Impact	38
7.2	Circadian Systems and Human Physiology	38
7.2.1	Reinforcing Circadian Entrainment.....	41
7.2.2	Factors Associated with Circadian Disruption	42
7.3	Evidence-Based Research	43
7.3.1	Cycled Light in Pediatric Units	43
7.3.2	Daylight Exposure and Healing Rates	43
7.3.3	Daylight and Job Satisfaction.....	44
7.3.4	Circadian Adaptation for Nightshift Workers	44
7.3.5	Medication Error Reduction	44
7.3.6	Alzheimer's Disease	45
Part III:	Specific Room Types	45
8.0	Hospitals and Outpatient Facilities	45
8.1	Site	45
8.1.1	Parking	45
8.1.2	Site Control Strategies.....	45
8.1.3	Exterior Entrances.....	45
8.1.4	Safety and Security	46
8.1.5	Landscape and Gardens.....	46
8.2	Circulation Areas	47
8.2.1	Lobbies, Vestibules, and Entrances.....	47
8.2.2	General Corridors	48
8.2.3	Reception and Check-In Areas	48
8.2.4	Waiting Areas	49
8.2.5	Elevator Lobbies and Elevators	49
8.3	Nursing Units and Patient Care Areas	50
8.3.1	Patient Rooms	50
8.3.2	Nursing Units and Support Areas.....	62

8.4	Diagnostic and Treatment Areas	65
8.4.1	Examination Treatment Rooms	65
8.4.2	Emergency Department Examination Rooms	66
8.4.3	Emergency Department Trauma Rooms	66
8.4.4	Seclusion Rooms	67
8.4.5	Surgical Suites	67
8.4.6	Diagnostic Radiology and Imaging	75
8.4.7	Cardiac Function Laboratory	77
8.4.8	Chemotherapy and Infusion Therapy	77
8.4.9	Radiation Oncology	78
8.4.10	Dialysis Treatment	78
8.4.11	Endoscopy Suites	80
8.4.12	Hyperbaric Therapy	80
8.4.13	Prosthetic and Orthotic Work Areas	80
8.4.14	Rehabilitation and Physical Therapy	81
8.4.15	Occupational Therapy	82
8.4.16	Speech Pathology	82
8.4.17	Audiometry	82
8.4.18	Telemedical Diagnostics	82
8.4.19	Dental Suites	83
8.4.20	Ophthalmology	84
8.5	Patient Support Facilities	85
8.5.1	Clinical Laboratories	85
8.5.2	Pharmacy	86
8.5.3	General Support Facilities	87
8.5.4	Autopsy Suite	89
8.5.5	Morgue	89
9.0	Residential Health, Care, and Support Facilities	90
9.1	Site	90
9.1.1	Parking	91
9.1.2	Entrances	91
9.1.3	Landscapes and Gardens	91
9.2	Facility Support Spaces	91
9.2.1	Reception	91
9.2.2	Corridors	92
9.2.3	Toilet Rooms	92
9.2.4	Group Dining Areas	93
9.2.5	Therapy Pools	93
9.2.6	Central Pharmacy	94
9.2.7	Medical Exam Rooms	94
9.2.8	Telemedicine in Residential Care	95
9.2.9	Dental Exam Rooms	95
9.2.10	Hair Salon	96
9.2.11	Laundry	96
9.2.12	Visitation Rooms	96

9.3	Nursing and Residential Care Units	97
9.4	Long-Term Acute Care, Residential Substance Abuse, and Behavioral Health Treatment Facilities	97
9.4.1	Patient Rooms	97
9.4.2	Patient Toilet Rooms	98
9.4.3	Patient Corridors	99
9.4.4	Nurse Stations	99
9.4.5	Medication Dispensing Rooms	99
9.4.6	Activity Rooms	99
9.4.7	Group Therapy Room	99
9.4.8	Quiet Rooms	99
9.4.9	Dining Rooms	100
9.5	Independent Living and Adult Daycare Facilities	100
Annex A – Illuminance Recommendations		101
Annex B – Additional Resources		125
Annex C – Healthcare Terms		125
References		128

Preface

This Preface is not part of ANSI/IES RP-29-22. It is provided for informational purposes only.

This Recommended Practice (RP) does not provide general lighting information that is included in other IES documents. If the reader does not already have this information, it may be obtained as needed from the following IES Standards:

The Lighting Science Series:

- *ANSI/IES LS-1-22, Lighting Science: Nomenclature and Definitions for Illuminating Engineering*
- *ANSI/IES LS-2-20, Lighting Science: Concepts and Language of Lighting*
- *ANSI/IES LS-3-20, Lighting Science: Physics and Optics of Radiant Power*
- *ANSI/IES LS-4-20, Lighting Science: Measurement of Light – The Science of Photometry*
- *ANSI/IES LS-5-21, Lighting Science: Color*
- *ANSI/IES LS-6-20, Lighting Science: Calculation of Light and Its Effects*
- *ANSI/IES LS-7-20, Lighting Science: Vision – Eye and Brain*
- *ANSI/IES LS-8-20, Lighting Science: Vision – Perceptions and Performance*

The Lighting Practice Series:

- *ANSI/IES LP-1-20, Lighting Practice: Designing Quality Lighting for People and Buildings*
- *ANSI/IES LP-2-20, Lighting Practice: Designing Quality Lighting for People in Outdoor Environments*
- *ANSI/IES LP-3-20, Lighting Practice: Designing and Specifying Daylighting for Buildings*
- *ANSI/IES LP-4-20, Lighting Practice: Electric Light Sources – Properties, Selection, and Specification*
- *ANSI/IES LP-6-20, Lighting Control Systems – Properties, Selection, and Specification*
- *ANSI/IES LP-7-20, Lighting Practice: The Lighting Design and Construction Process*
- *ANSI/IES LP-8-20, Lighting Practice: The Commissioning Process Applied to Lighting and Control Systems*
- *ANSI/IES LP-9-20, Lighting Practice: Upgrading Lighting Systems in Commercial and Industrial Facilities*

- *ANSI/IES LP-10-20, Lighting Practice: Sustainable Lighting – An Introduction to the Environmental Impacts of Lighting*
- *ANSI/IES LP-11-20, Lighting Practice: Environmental Considerations for Outdoor Lighting*
- *ANSI/IES LP-12-21, Lighting Practice: IoT Connected Lighting*
- *ANSI/IES LP-13-21, Lighting Practice: Introduction to Resilient Lighting Systems*
- *ANSI/IES LP-16-22, Lighting Practice: Documenting Control Intent Narratives and Sequences of Operations*

Part I: General Information

1.0 Introduction and Scope

1.1 Introduction

More than fifty years ago, the Illuminating Engineering Society recognized that healthcare facilities have unique and specialized illumination needs, resulting in the publication of the first version of this recommended practice. Since then, the only constant in both the healthcare and lighting arenas has been change. Technological advances (both within the lighting industry and within the medical equipment industry), changing regulations and guidelines, clinical breakthroughs, and philosophical shifts in healthcare delivery models have created a theme of “health for life” for ANSI/IES RP-29-22.

The mission of healthcare facilities is to save lives, enhance lives, and facilitate life’s transitions. Whether as a patient, supportive visitor, caregiver or resident, an encounter with a care environment is almost inevitable in one’s lifetime, and experiences within these settings can be intimidating or joyous, despondent, or hopeful. From an operational standpoint, there are also considerations of the life and longevity of the physical infrastructure, fiscally responsible practices for owning long-term real estate, and sustainable practices. Designers working on healthcare projects have a