

# LIGHTING DESIGN/GUIDELINES

## INDOOR LIGHTING DESIGN

### LAMP LIFE

There are applications where the cost of lamp replacement is very high due to lack of access to the fixture; making lamp life a primary consideration. Careful comparison of various lamps can be made using the lamp data in the Technical section.

Other considerations such as lamp lumen depreciation, design factor and budget may enter into selecting the lamp. Since lamp data tends to change rapidly, always request the latest information from the lamp manufacturer when working with a critical application.

### Fixture Selection

#### ILLUMINANCE LEVEL

To select an illuminance level, you must first determine what task is being performed and select the closest task on the list below. Whatever value you select for your general area illumination, remember that the value should represent the minimum maintained footcandles from the luminaires involved. Furthermore, the values are given as horizontal footcandles — the component of all illumination falling on a horizontal surface at the point of measurement.

In some cases, vertical components may be equally important (shelf faces, control panels, brake presses, etc.) and design allowance should be made accordingly. Point-by-point analysis may be required. If you are not familiar with this method, simply ask for the assistance of your Exceline representative.

The following tables show I.E.S. recommended levels of illuminance covering a broad range of activities and should aid in determining most needs.

The first table provides generic illuminance categories and values according to general type of activity. The remaining tables recommend specific illuminance categories for more exact activities and locations. With a few exceptions that provide foot-candle values, the letter shown should be used to select a foot-candle range from the first table. Each foot-candle range consists of three values. The specific value to be used should be selected by scoring four factors with a -1, 0 or +1. They are:

1. Precision of the task being performed.
2. Occupant ages.
3. Importance of speed.
4. Importance of accuracy.

After adding the four values together, use the lowest foot-candle value given in the illuminance category if the total score is -3 or -4. Use the middle foot-candle level if the score is -1, 0 or +1. The highest foot-candle value will be used with scores of +3 and +4.

For additional information regarding methods of selection and more detailed listings, please refer to the latest Applications Volume of the I.E.S. Handbook.

### ILLUMINANCE CATEGORIES FOR INTERIOR ACTIVITIES

Type of Activity	Illuminance Category	Footcandles	Reference Work-Plane
Public spaces with dark surroundings	A	3	General lighting throughout spaces
Simple orientation for short temporary visits	B	5	
Working spaces where visual tasks are only occasionally performed	C	10	
Performance of visual tasks of high contrast or large size	D	30	Illuminance on task
Performance of visual tasks of medium contrast or small size	E	50	
Performance of visual tasks of low contrast or very small size	F	100	
Performance of visual tasks of low contrast and very small size over a prolonged period	G	300-1000	

# Iesna Lighting Design Guide

**Jianjun Gao**



## **Iesna Lighting Design Guide:**

Roadway Lighting Design Guide American Association of State Highway and Transportation Officials, 2005 This guide replaces the 1984 publication entitled An Informational Guide for Roadway Lighting It has been revised and brought up to date to reflect current practices in roadway lighting The guide provides a general overview of lighting systems from the point of view of the transportation departments and recommends minimum levels of quality The guide incorporates the illuminance and luminance design methods but does not include the small target visibility STV method

**The IESNA Lighting Handbook** Mark Stanley Rea, Illuminating Engineering Society of North America, 2000 **An Introduction to Lighting**

**Upgrades for Buildings** J. Paul Guyer, P.E. R.A., 2018-01-21 Introductory technical guidance for electrical engineers interested in lighting upgrades for buildings to improve energy efficiency and lighting quality Here is what is discussed 1 INTRODUCTION 2 THE IMPORTANCE OF LIGHT 3 A WHOLE SYSTEM APPROACH 4 LIGHTING DESIGN 5 USE EFFICIENT LIGHT SOURCES 6 USE EFFICIENT LUMINAIRES 7 AUTOMATICALLY CONTROL LIGHTING 8 DIMMING CONTROLS 9 COMMISSIONING ENSURES THE BENEFITS OF LIGHTING CONTROLS 10 BUILD IN AN OPERATIONS AND MAINTENANCE PLAN 11 SUMMARY 12 BIBLIOGRAPHY **Application of Luminaire Symbols on Lighting Design**

**Drawings** Illuminating Engineering Society of North America, 1994-02 *Lighting Design Basics* Mark Karlen, Christina Spangler, James R. Benya, 2017-09-25 A visual real world guide to professional lighting design Lighting Design Basics is the essential guide to this basic but difficult to master aspect of interior design Offering fundamental concepts and prescriptive techniques in a highly visual format this book provides clear practical guidance on utilizing the latest in lighting techniques and technology to showcase a space without sacrificing utility Covering more than 25 different design scenarios with in depth rationale for proposed solutions this book provides insightful distribution diagrams floor plans and details for lighting installation and construction Real world case studies illustrate lighting design in residential commercial healthcare education and hospitality settings and skill building exercises offer practice for real world projects as well as NCIDQ and NCARB exam preparation This new third edition includes new instructor support materials coverage of computer calculation software and in depth discussion on the latest in LED lighting Lighting is changing both in the technology itself and in the way a designer must approach it This book provides immersive instruction through real world settings and practical guidance suited for immediate application in everyday projects Get up to date on the latest methods and technology for lighting design Examine more than 25 design scenarios for different types of spaces Complete exercises to hone your skills or prepare for the NCIDQ or NCARB Create simple lighting designs and collaborate with architects on complex projects Lighting can make or break a space Improper lighting lends a space an uncomfortable feel can induce headaches or eyestrain and can even be hazardous but thoughtfully designed and executed lighting adds that extra element so often missing from typical spaces Lighting Design Basics shows you how to elevate any space through the fundamental tools and concepts of professional lighting design An

*Introduction to Energy Efficiency Lighting Upgrades for Buildings* J. Paul Guyer, P.E., R.A., 2018-02-21 Introductory technical guidance for electrical engineers interested in lighting upgrades to improve energy efficiency in buildings Here is what is discussed 1 INTRODUCTION 2 THE IMPORTANCE OF LIGHT 3 A WHOLE SYSTEM APPROACH 4 LIGHTING DESIGN 5 USE EFFICIENT LIGHT SOURCES 6 USE EFFICIENT LUMINAIRES 7 AUTOMATICALLY CONTROL LIGHTING 8 DIMMING CONTROLS 9 COMMISSIONING ENSURES THE BENEFITS OF LIGHTING CONTROLS 10 BUILD IN AN OPERATIONS AND MAINTENANCE PLAN 11 SUMMARY 12 BIBLIOGRAPHY *Fundamentals of Integrated Design for Sustainable Building*

Marian Keeler, Prasad Vaidya, 2016-04-08 The Fully Updated Indispensable Study of Sustainable Design Principles *Fundamentals of Integrated Design for Sustainable Building* is the first textbook to merge principles theory and practice into an integrated workflow This book introduces the technologies and processes of sustainable design and shows how to incorporate sustainable concepts at every design stage This comprehensive primer takes an active learning approach that keeps students engaged This book dispenses essential information from practicing industry specialists to provide a comprehensive introduction to the future of design This new second edition includes Expansive knowledge from history and philosophy to technology and practice Fully updated international codes like the CAL code and current legislations Up to date global practices such as the tools used for Life Cycle Assessment Thorough coverage of critical issues such as climate change resiliency health and net zero energy building Extensive design problems research exercise study questions team projects and discussion questions that get students truly involved with the material Sustainable design is a responsible forward thinking method for building the best structure possible in the most efficient way Conventional resources are depleting and building professionals are thinking farther ahead This means that sustainable design will eventually be the new standard and everyone in the field must be familiar with the concepts to stay relevant *Fundamentals of Integrated Design for Sustainable Building* is the ideal primer with complete coverage of the most up to date information **Graphic Standards**

**Field Guide to Commercial Interiors** Corky Binggeli, 2009-05-05 Quick reliable answers to your most common on site questions When you re in the field you never know what you ll come across The Wiley Graphic Standards Field Guide to Commercial Interiors gives you fast access to the information you need when you re on site and under pressure Presented in a highly visual and easily portable format the Field Guide is organized to follow CSI s MasterFormat It covers everything from acoustics to window treatments conveying the most common answers about commercial interiors that interior architects and designers need in the real world when visiting a construction site evaluating existing buildings meeting with clients or browsing at a showroom The Field Guide to Commercial Interiors extends the familiar Interior Graphic Standards beyond the studio with Quick access to essential information wherever you are Graphic Standards quality details accompanied by real world photographs of construction sites Illustrations that help you troubleshoot problems along with on the spot solutions Compact format that s easy to reference and carry along The Graphic Standards Field Guide to

Commercial Interiors is the ideal companion for the on the go interior designer and architect

**Lighting Retrofit and Relighting** James R. Benya, Donna J. Leban, 2011-03-08 The ultimate guide to the retrofitting of lighting for greater efficiency and performance Retrofitting outdated energy guzzling lighting components with green energy saving alternatives is a process that promotes sustainability and offers significant benefits for businesses contractors and the community at large Not only can retrofitting improve the overall quality and functionality of light it also can make spaces safer easier and less costly to maintain and more comfortable to inhabit From lighting technology to retrofit financial analysis Lighting Retrofit and Relighting evaluates the latest lighting system types then demonstrates how to apply them for the greatest functional and cost saving benefit This book Discusses the recent advances in lighting equipment and retrofittable controls for both interior and outdoor use Explains how to do a lighting audit to identify and evaluate logical retrofit choices Includes case studies of retrofits illustrating improvements in the quality and efficacy of new lighting Demonstrates how cost savings realized over time can not only pay for new equipment but produce a return on the investment Lighting Retrofit and Relighting serves as an ideal reference for students or professionals whether they are energy auditors designers installers facilities managers or manufacturers by taking a close look at the most current lighting technology illuminating pathways toward a brighter future

*Advanced Lighting Guidelines* New Buildings Institute, 2001

Interior Lighting for Designers Gary Gordon, 2015-01-28 This revised edition of the successful primer thoroughly covers fundamentals of lighting design and also serves as a handy reference for professional designers The Fifth Edition is more comprehensive than ever with new information on LED energy efficiency and other current issues In addition it includes more information for drawing ceiling floor plans and the application of designs to specific types of interiors projects Considered a key reference for the Lighting Certified exam no other text combines both technical and creative aspects of lighting design for beginners and novice designers

An Introduction to Energy Efficiency for Buildings J. Paul Guyer, P.E., R.A., Introductory technical guidance for professional engineers and others interested in energy efficient design of buildings Here is what is discussed 1 HVAC SYSTEM UPGRADES 2 HVAC CONTROLS 3 LIGHTING UPGRADES 4 AIR DISTRIBUTION UPGRADES 5 ENERGY EFFICIENCY FOR DATA CENTERS 6 SOLAR COLLECTORS 7 PASSIVE SOLAR HEATING 8 SOLAR WATER HEATING FUNDAMENTALS 9 SOLAR COOLING SYSTEMS

**An Introduction to Building Lighting Upgrades for Professional Engineers** J. Paul Guyer, 2023-09-15 Introductory technical guidance for electrical engineers and other professional engineers and construction managers interested in lighting upgrades for buildings Here is what is discussed 1 INTRODUCTION 2 THE IMPORTANCE OF LIGHT 3 A WHOLE SYSTEM APPROACH 4 LIGHTING DESIGN 5 USE EFFICIENT LIGHT SOURCES 6 USE EFFICIENT LUMINAIRES 7 AUTOMATICALLY CONTROL LIGHTING 8 DIMMING CONTROLS 9 COMMISSIONING ENSURES THE BENEFITS OF LIGHTING CONTROLS 10 BUILD IN AN OPERATIONS AND MAINTENANCE PLAN 11 SUMMARY 12 BIBLIOGRAPHY

**Recommended Practice for Lighting Industrial Facilities**

American National Standards Institute, 2001      *Lit Interior* Frederick H Jones, William J Fielder, 2007-08-22 Presents an organised comprehensive and easy to understand overview of the lighting design process It covers every topic from the nature of light itself through selecting the correct equipment to preparing project plans and the finished design documents Using a dummy example the student is taken through an entire project step by step where the full range of alternatives and design processes are illustrated The easy to read conversational tone makes the novice feel at home with complex technical concepts and provides an excellent introduction to all newcomers to the subject The book is ideal for those working in architecture electrical engineering and interior design who will one day design lighting systems for others to build A companion website runs alongside the book at <http://litinterior.com> supporting distance learning projects providing manufacturers data calculation engines and downloadable courses for carrying out design exercises The content of the courses will be linked directly to the book Includes US codes and standards      **Architectural Lighting** Hervé Descottes, Cecilia E. Ramos, 2013-07-02 Architectural Lighting the latest addition to the Architecture Briefs series provides both a critical approach to and a conceptual framework for understanding the application of lighting in the built environment The key considerations of lighting design are illuminated through accessible texts and instructional diagrams Six built projects provide readers with concrete examples of the ways in which these principles are applied Short essays by architect Steven Holl artist Sylvain Dubuisson and landscape architect James Corner explore the role of lighting in defining spatial compositions      **Mechanical and Electrical Equipment for Buildings** Walter T. Grondzik, Alison G. Kwok, 2014-09-22 The definitive guide to environmental control systems updated with emerging technology and trends The Interactive Resource Center is an online learning environment where instructors and students can access the tools they need to make efficient use of their time while reinforcing and assessing their understanding of key concepts for successful understanding of the course An access card with redemption code for the online Interactive Resource Center is included with all new print copies or can be purchased separately If you rent or purchase a used book with an access code the access code may have been redeemed previously and you may have to purchase a new access code ISBN 978111899616 4 The online Interactive Resource Center contains resources tied to the book such as Interactive Animations Interactive Self tests Interactive Flashcards Case Studies Respondus Testbank instructors only Instructor's Manual over 200 pages including additional resources Instructors only Roadmap to the 12th Edition Instructors only Student Guide to the Textbook Mechanical and Electrical Equipment for Buildings Twelfth Edition is the industry standard reference that comprehensively covers all aspects of building systems With over 2 200 drawings and photographs the book discusses basic theory preliminary building design guidelines and detailed design procedure for buildings of all sizes The updated twelfth edition includes over 300 new illustrations plus information on the latest design trends codes and technologies while the companion website offers new interactive features including animations additional case studies quizzes and more Environmental control systems are the components of a building that

keep occupants comfortable and help make the building work Mechanical and Electrical Equipment for Buildings covers both active controls like air conditioners and heaters as well as passive controls like daylighting and natural ventilation Because these systems comprise the entire energy use and costs of a building's life the book stresses the importance of sustainability considerations during the design process by both architects and builders Authored by two leading green design educators MEEB provides the most current information on low energy architecture including topics like Context comfort and environmental resources Indoor air quality and thermal control Illumination acoustics and electricity Fire protection signal systems and transportation Occupant comfort and building usability are the most critical factors in the success of a building design and with environmental concerns mounting it's becoming more and more important to approach projects from a sustainable perspective from the very beginning As the definitive guide to environmental control systems for over 75 years Mechanical and Electrical Equipment for Buildings is a complete resource for students and professionals alike

**LEED v4 Practices, Certification, and Accreditation Handbook** Sam Kubba, 2015-11-30 LEED v4 Practices Certification and Accreditation Handbook Second Edition provides users with a practical user friendly roadmap that presents the guidelines for selecting the LEED v4 rating system to better fit a particular project e.g. LEED for Building Design and Construction LEED for Operations and Maintenance LEED for Interior Design and Construction LEED for Building Design and Construction or LEED for Neighborhood Development In addition this comprehensive handbook carefully explains the modifications in the credentialing process including the new 3 Tier system requiring applicants to first take the LEED™ Green Associate exam followed by the LEED™ Professional Accreditation exam Practical strategies and guidelines for applying LEED v4 project certification Annotated tables checklists charts and references to quantum leap LEED v4 Includes case studies with special focus is put on key areas where most errors occur Demystifies LEED v4 requirements for project as well as personal professional LEED Certification Appendixes including sample exam questions acronyms and abbreviations and a glossary

**Stage Lighting Second Edition** Richard E. Dunham, 2018-10-16 Stage Lighting The Fundamentals is written specifically for introductory stage lighting courses The book begins with an examination of the nature of light perception and color then leads into a conversation of stage lighting equipment and technicians Lamps luminaries controls dimming and electricity form the basis of these chapters The book also provides a detailed explanation and overview of the lighting design process for the theatre and several other traditional forms of entertainment Finally the book explores a variety of additional areas where lighting designers can find related future employment such as concert and corporate lighting themed design architectural and landscape lighting and computer animation New for this edition enlarged full color illustrations photographs light plots and examples of lighting design updated information on LED lighting and equipment expanded discussion of the practical use of color as a designer expanded discussion of psychological perceptual effects of color new discussion of color mixing through light sources that make use of additive mixing expanded discussion of industry

professions expanded discussion and illustrations relating to photometrics expanded discussion and examples of control protocols and new equipment and updated designer profiles along with the addition of still more designer profiles     *The Integrative Design Guide to Green Building* 7group, Bill Reed, 2011-10-11 The members of 7group and Bill Reed are examples writ large of the kind of leadership that is taking this idea of green building and forming it into reality by helping change minds building practice and design process from the Foreword by S Rick Fedrizzi President CEO and Founding Chair U S Green Building Council A whole building approach to sustainability The integrative design process offers a new path to making better green building decisions and addressing complex issues that threaten living systems In *The Integrative Design Guide to Green Building Redefining the Practice of Sustainability* 7group's principals and integrative design pioneer Bill Reed introduce design and construction professionals to the concepts of whole building design and whole systems With integrative thinking that reframes what sustainability means they provide a how to guide for architects designers engineers developers builders and other professionals on incorporating integrative design into every phase of a project This practical manual Explains the philosophy and underpinnings of effective integrative design addressing systems thinking and building and community design from a whole living system perspective Details how to implement integrative design from the discovery phase to occupancy supported by process outlines itemized tasks practice examples case studies and real world stories illustrating the nature of this work Explores the deeper understanding of integration that is required to transform architectural practice and our role on the planet This book both practical and thoughtful will help you deliver your vision of a sustainable environment



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