ANSI/IES RP-41-20

Illuminating Engineering Society

RECOMMENDED PRACTICE: LIGHTING THEATERS AND WORSHIP SPACES

AN AMERICAN NATIONAL STANDARD

Approved American National Standard ANSI

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The IES Assembly and Performance Lighting Committee

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Foreword

This Foreword is not part of ANSI/IES RP-41-20. 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:

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

The Lighting Practice Series:

- *LP-1-20, Lighting Practice: Designing Quality Lighting for People and Buildings*
- *LP-2-20, Lighting Practice: Designing Quality Lighting for People in Outdoor Environments*
- *LP-3-20, Lighting Practice: Designing and Specifying Daylighting for Buildings*
- *LP-4-20, Lighting Practice: Electric Light Sources – Properties, Selection, and Specification*
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- *LP-8-20, Lighting Practice: The Commissioning Process Applied to Lighting and Control Systems*
- *LP-9-20, Lighting Practice: Upgrading Lighting Systems in Commercial and Industrial Facilities*
- *LP-10-20, Lighting Practice: Sustainable Lighting – An Introduction to the Environmental Impacts of Lighting*
- *LP-11-20, Lighting Practice: Environmental Considerations for Outdoor Lighting*

1.0 Introduction and Scope

1.1 Introduction

The IES Assembly and Performance Lighting Committee developed this Recommended Practice (RP) to assist design professionals in specifying or understanding the requirements of performance lighting and control systems.

The public assembly spaces in auditoriums, theaters, and worship spaces share many similar lighting requirements and yet remain different. For example, the tasks of reading, circulation, and personal interaction are similar, yet most auditoriums and theaters never utilize daylight (as this interferes with the projected image or the presentation lighting on the stage). Common concerns include, for example, task illuminance, accent illuminance (perhaps with different features), egress lighting, and lighting controls.

Lighting for any kind of live presentation or production space involves the use of specialized "lighting instruments," or "light fixtures." Until very recently, these most often used tungsten-halogen lamps and may be referred to as "conventional instruments," but LED sources are becoming more common. Theatrical lighting instruments are used in conjunction with flexible control equipment to facilitate easy changes in the lighting. The space will need to include many mounting positions for the lights, power, and control wiring infrastructure, and extensive lighting control equipment.

There are several other IES publications that designers should consider. These include the most recent revision of *ANSI/ASHRAE/IES Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings*[1] and *ANSI/IES LM-73-18, Photometric Testing of Entertainment Luminaires Using Incandescent Filament Lamps or High Density Discharge Lamps*.[2]

It is important to note that the theatrical lighting community uses a few unique terms that differ from those typically accepted in the general lighting industry. One of these is *(stage) lighting instrument* or *light fixture* for a lighting device otherwise known as a *luminaire*. Other unique terms are defined in *ANSI/IES LS-1-20, Nomenclature and Definitions for Illuminating Engineering*.[3] This RP attempts to explain theatrical lighting and its practice using the terms of the trade as the theatrical lighting community understands them.

1.2 Scope

This RP considers the factors involved in achieving a successful, functioning space for live performances. It outlines the unique nature of these facilities and general techniques for creative lighting, but leaves the details to architects and the special consultants involved in the design of these spaces.

As a complete review and revision of prior documents on these topics, this RP incorporates the latest design and application information associated with contemporary theatrical and worship architecture, lighting positions in both the house and stage areas, typical lighting instruments and layouts, the effects of lighting on mechanical and acoustical elements, and the lighting controls used for activities and presentations.

This document provides specialized information on assembly spaces, as a component of larger facilities. It primarily addresses specifics that should influence lighting instrument and light source selection, as well as final layouts based on project programming and architectural requirements and limitations. Other room types—those not specific to assembly, performance, or worship—are covered in *ANSI/IES RP-10-20, Recommended Practice: Lighting Common Applications*.[4]

In this RP, the term "theater" means a space to present live performances, including all necessary ancillary facilities. Theaters may be found in facilities such as lecture and concert halls, churches, platforms, motion picture houses, portions of restaurants, and sports arenas.

2.0 General Objectives

The objective of stage lighting is to support the functional and artistic goals of the live performance for both the performers and the audience. Lighting is used to help control visibility, contribute to scene composition, enhance movement of the performance action, and set a mood (or "atmosphere") for the presentation. This requires a well-defined plan, which is commonly communicated through a "light plot," and other production lighting documentation.

To achieve these goals, the theatrical lighting designer needs complete flexibility as to choice of lighting instruments, mounting location, wattage, color, intensity, beam shape, beam direction, and light movement. The team designing the spaces that will be used for productions should include suitable infrastructure to support the creative process at a level commensurate with the proposed programs. The architectural space should be designed to support the function and aesthetic of the facility. This may include circulation, egress, task (generally reading), display, art, and decorative lighting. If the assembly space is a theater, much flexibility can be anticipated. If the space is a house of worship, a significant consideration may be the use of simple controls. The design team has many tools available for use in shaping the facility for owner use.

2.1 Considerations for Design Professionals

The architect involved with facility design should be aware of all of the types of people who will use the facility. The "clients" are not just the owner or producer, but the performers, designers, and technicians. It is to the architect's advantage to seek them out and solicit their design input.

Theater facility design is a unique form of architecture that frequently requires specialized design assistance. The scope and complexity of each project will determine the need for additional design advice. Talented consultants are readily available for stage machinery and rigging, lighting, acoustics, and other theater disciplines. Their participation will help ensure that the building functions properly.