WHITE PAPER

Achieving Compliance with California Building Energy Efficiency Standards – Title 24 Lighting and Lighting Controls

OVERVIEW

The California Building Energy Efficiency Standards for Residential and Nonresidential Buildings, otherwise known as Title 24, Parts 6 and 11, is the State of California's Construction Energy Code. It is updated every three years. As of the publication of this paper, the current effective version of the code was published in 2019. The 2022 version of the code will take effect in January 2023.

The code governs the design and construction of indoor and outdoor occupancies including residential, non-residential, and hospitality occupancies. Since its inception in 1978, its purpose is to provide a standard for energy efficiency of the constructed environment in the State of California. The code covers building techniques and materials, HVAC systems, plumbing systems, power distribution, and lighting systems. The purpose of this article is to provide guidance for achieving compliance with the lighting and lighting controls sections of the code applied to non-residential occupancies.

ABOUT RSP

RSP Architects has emerged as one of the country's most trusted, diverse and agile architecture and design firms.

RSP's Mission Critical Group was established in 2018 to serve a growing roster of clients who required a higher level of technology infrastructure. The group focuses exclusively on creating flexible, sophisticated environments that support and enhance data management, computing operations and the systems that underpin and backup those functions.

LIGHTING CONTROLS REQUIREMENTS:

When designing a Title 24 compliant lighting system, the code must be consulted when selecting both luminaires and their respective controls systems. First, it is helpful to ensure the lighting controls specified comply with "SECTION 110.9 – MANDATORY REQUIREMENTS FOR LIGHTING CONTROLS" to ensure that the selected basis of design can be implemented. Once this has been confirmed, Subchapter 4 (NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, AND HOTEL/MOTEL OCCUPANCIES—MANDATORY REQUIREMENTS FOR LIGHTING SYSTEMS AND EQUIPMENT, AND ELECTRICAL POWER DISTRIBUTION SYSTEM) will be the primary reference for ensuring controls compliance.

Information on manual controls, multi-level controls, shut-off controls, automatic daylighting, demand responsive controls and their interactions can be found in the aforementioned subchapter. Focus should be paid to Table 130.1-A, which outlines controls uniformity requirements based on luminaire technology and wattage. Designs that include outdoor lighting are governed by Section 130.2. Luminaire cut-off requirements in subsection "b" (backlight, uplight, and glare (BUG) ratings) are unique to this code and should be taken into consideration when selecting outdoor lighting fixtures that this code applies to.

LUMINAIRE ENERGY EFFICIENCY REQUIREMENTS

Luminaire and lighting system energy efficiency requirements are detailed in Subchapter 5 (NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, AND HOTEL/MOTEL OCCUPANCIES—PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES FOR ACHIEVING ENERGY EFFICIENCY), Section 140.6 (PRESCRIPTIVE REQUIREMENTS FOR INDOOR LIGHTING). Rules for calculating the actual and allowed indoor and outdoor lighting power are also included in this section. The code allows for the use of lighting Power Adjustment Factors (PAF) which are outlined in Table 140.6-A. Tables C through E outline allowed lighting power density values (LPD) in Watts/Ft2 determined by the calculation method and space classification type.

Outdoor lighting requirements are detailed in Section 140.7 (PRESCRIPTIVE REQUIREMENTS FOR OUTDOOR LIGHTING). Note: this section has many exceptions which are listed in 140.7.a. LPD values are listed at the end of this section in tables 140.7.A and B.

REQUIRED COMPLIANCE FORMS

In Section 130.4 (LIGHTING CONTROL ACCEPTANCE AND INSTALLATION CERTIFICATE REQUIREMENTS), the code outlines that certain forms are required to be submitted for compliance. These codes can be found on the California Energy Commission's website, energy.ca.gov. The two forms required for lighting systems installations are the "Lighting Control Certificate of Compliance", "Lighting Control Certificate of Acceptance" and the "Lighting Control Certificate of Installation". The certificate of compliance must be completed and signed by the engineer of record. It is helpful to fill out this form during design to ensure compliance before submission to the authority having jurisdiction. The certificate of acceptance must be filled out by a certified acceptance test technician certified by the CEC. The certificate of installation must be filled out by the CLSB licensed contractor who installed the system per the contract documents.

SUMMARY

Title 24, Parts 6 and 11, contains both detailed and rigorous requirements for the design and implementation of lighting and lighting controls systems. Navigation of and compliance with the code requires an in depth understanding of lighting and controls technologies, as well as an intimate knowledge of the requirements outlined in the code. Particular focus must be paid to the areas outlined in this publication as they are examples of requirements that may not be present in other locally applied energy codes.

In addition to direct consultation with the code, communication with controls and luminaire manufacturers' representatives familiar with this jurisdiction is an indispensable part of providing a timely and compliant lighting design to our clients. We hope that this publication provides valuable guidance in navigating this code.

ABOUT THE AUTHORS

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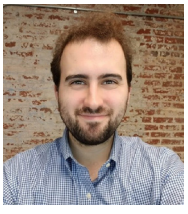

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