

ASHRAE 90.1-2019 Lighting Standards

A Guide for Compliance

The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) provides engineering guidelines for minimum energy efficiency standards for all new and retrofitted buildings, except low-rise residential.

The guidelines are updated regularly, with the most recent changes made in 2019. A growing number of jurisdictions use these standards to guide energy efficiency decisions for new and retrofitted construction. As of March 2020, all but eight states had adopted some version of ASHRAE 90.1 guidelines.

Section 9, which covers lighting, includes guidelines for indoor lighting power density (measured in watts/square foot), as well as controls for lighting inside and outside buildings, and in parking garages.

Enlighted provides immediate compliance with the lighting requirements in the 2019 standards, and goes above and beyond requirements, to future proof for additional updates.

For example:

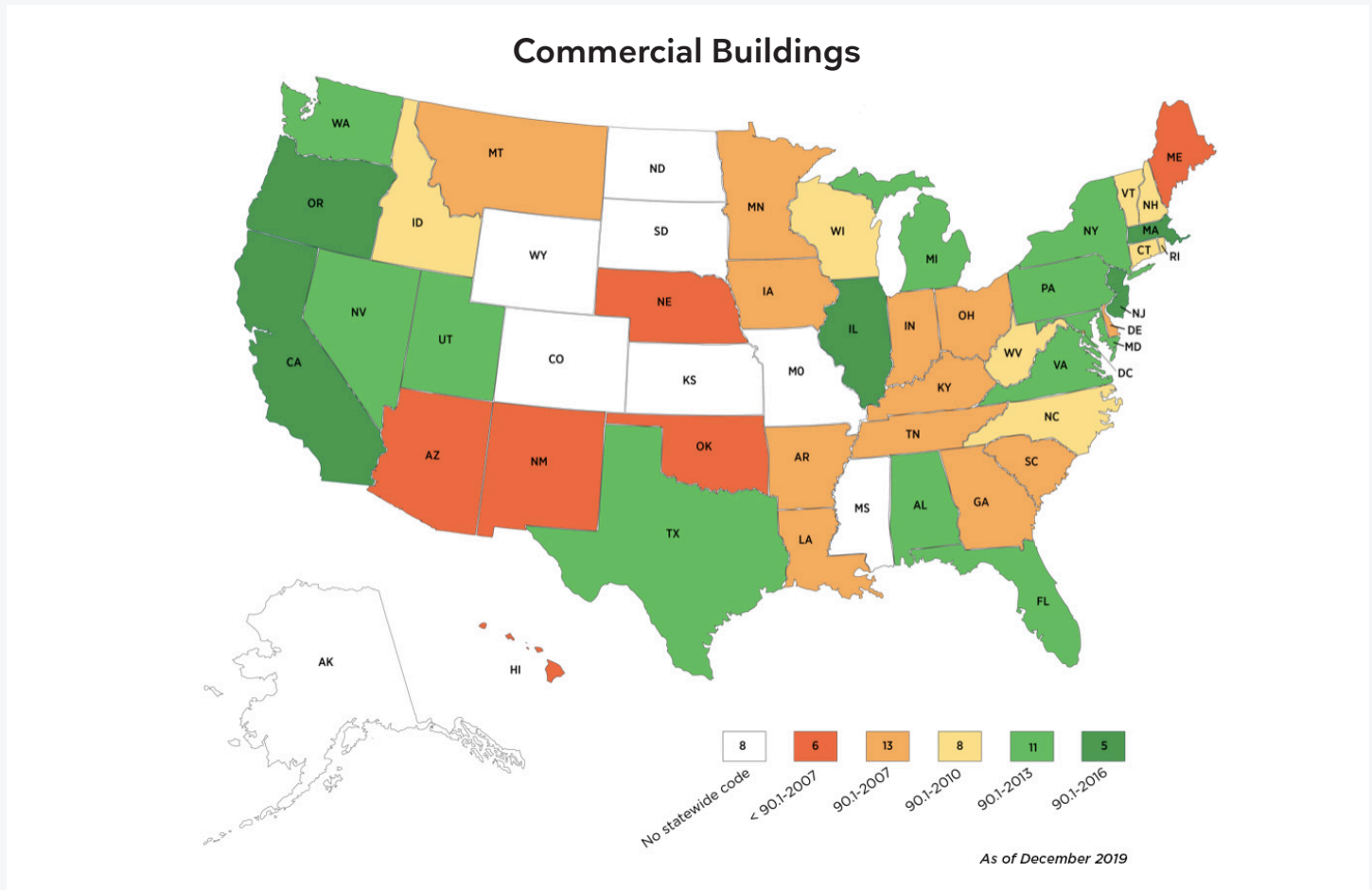
- Each update of ASHRAE creates new requirements for building projects. Implementing Enlighted now enables immediate compliance, and helps to avoid future costs along with unexpected project delays.
- Utility incentives are changing rapidly – new utility incentives are being created for systems that go beyond ASHRAE compliance. Installing Enlighted simplifies the utility rebate process on building projects.
- Installing Enlighted prepares building owners to immediately qualify for future utility rebates as they emerge, and simplifies the LEED certification process.

Key Highlights from the 2019 Update

- Lighting power density requirements have been set for a range of interior and exterior space types, ranging from the lowest, 0.18 W/sf for parking garages, to the highest, 0.96 W/sf for hospitals. See chart on page 6 for full details.
- Lighting power allowances for the Space-by-Space Method and the Building Area Method were modified to be more representative of real-world conditions with the inclusion of updated IES recommendations, room cavity ratios, additional surface reflectance categories, light loss factors, and a 100% LED technology baseline with updated efficacy values.
- A new simplified method for lighting (new Section 9.2) was added to provide a simple approach for contractors and designers who design or renovate office buildings and retail buildings up to 25,000 sf. This method is reflected in the table below.
- Lighting control requirements for parking garages were updated to account for the use of LED in this application by increasing the stringency of the setback requirement to 50% and reducing the control timeout from 20 minutes to 10 minutes.
- Daylight responsive requirements were updated from continuous dimming or stepped control to continuous dimming required for all spaces, and a definition was added for continuous dimming based on NEMA LSD-64-2014.
- As in previous versions of the standard, measurement devices must be installed in new buildings to monitor the electrical energy use for each of the following separately: a. Total electrical energy b. HVAC systems c. Interior lighting d. Exterior lighting e. Receptacle circuits. For buildings with tenants, these systems shall be separately monitored for the total building and (excluding shared systems) for each individual tenant.
- The Enlighted IoT platform is one of the only connected lighting platforms that can meet the rigorous energy measurement and metering requirements in the standard immediately upon installation, and across our entire portfolio of IoT-powered smart building solutions.

Status of State Energy Code Adoption

This guide contains an overview of major aspects of Section 9 of the ASHRAE 90.1-2019 Standards. To ensure your building project is fully compliant with these standards, please email us at enlightedinc.com/contact-sales.



Overview of 2019 Requirements

Note that ASHRAE 90.1-2019 offers two methods of compliance. This document outlines the Simplified Building Method that applies to buildings and renovations under 25,000 sf. For further guidance about the Space-by-Space Method for buildings greater than 25,000 sf, please contact us at enlightedinc.com/contact-sales.

Space Type	ASHRAE 90.1-2019 Requirement	How Enlighted Meets and Exceeds Requirements
Office buildings: All interior spaces except parking garages, corridors and stairwells.	Lighting power allowance of 0.70 W/sf. Automatic controls to turn off lighting when building is unoccupied or scheduled to be unoccupied. Each space shall have a manual control device that allows power to be manually reduced by a minimum of 50%, and manually shut off.	Every light fixture is equipped with an Enlighted sensor that detects occupancy, and allows full and partial lighting reduction based on occupancy or manual control. Enlighted Energy Manager is fully programmable to schedule lights to turn off when required.
Office spaces less than or equal to 250 sf. Classrooms, conference rooms, meeting rooms, training rooms, storage rooms and break rooms.	Lighting power allowance of 0.70 W/sf. In addition to automatic off and dimmable controls, lighting shall also be controlled by occupant sensors.	Enlighted sensors are centrally programmable, and can also be controlled by manual-on switches installed in office spaces. Enlighted is the only advanced lighting system that can be quickly and easily reprogrammed when the floor plan changes.

Space Type	ASHRAE 90.1-2019 Requirement	How Enlighted Meets and Exceeds Requirements
Office spaces greater than 250 sf, and restrooms.	Lighting power allowance of 0.70 W/sf. In addition to automatic off and dimmable controls, lighting shall also be controlled by occupant sensors.	Enlighted sensors detect movement, temperature, occupancy, and vacancy, allowing lighting to automatically adjust according to a range of factors including occupancy.
Stairwells and corridors in office buildings and parking garages.	Lighting power allowance of 0.70 W/sf. These spaces shall also be controlled by occupant sensors that reduce the lighting power by a minimum of 50% when no activity is detected for up to 20 minutes. Must also be controlled to turn off when the building is either unoccupied, or scheduled to be unoccupied.	Enlighted sensors can be programmed for both time-of-day and occupancy detection shutoffs, to detect vacancy and automatically time out to reduce lighting to a preset level after no more than 20 minutes.
Parking garages in any type of building.	Lighting power allowance: 0.13 W/sf. All lighting shall be automatically controlled to turn off during garage non-operating hours. Lighting shall also be controlled by occupant sensors. Controls shall reduce the power by a minimum of 50% when no activity is detected for no longer than 20 minutes. No device shall control more than 3,600 sf.	Enlighted sensors are present in every light fixture, so coverage is assured. The Enlighted system can be programmed to automatically turn off or adjust lighting levels to preset minimums based on time of day or occupancy.
Retail building interior spaces other than parking garages, stairwells and corridors.	Lighting power allowance: 1.00 W/sf. All lighting shall be automatically controlled to turn off when the building is either unoccupied or scheduled to be unoccupied. Each space shall have a manual control device that allows the occupant to reduce lighting power by a minimum of 50% and to turn lighting off.	Enlighted sensors detect occupancy, and allow full and partial lighting reduction based on occupancy or manual control, in all, or specific parts, of a building space. Enlighted Energy Manager is fully programmable to schedule lights to dim or turn off when required, and includes local manual controls for occupant control of lighting in any area.
Retail sales areas.	Lighting power allowance: 1.00 W/sf.	Enlighted smart sensors provide occupancy control in all required areas, and can be programmed to adapt automatically to changing conditions or use.
Retail stock rooms, dressing/fitting rooms, locker rooms and restrooms.	Lighting power allowance: 1.00 W/sf. Shall be controlled by auto-on or manual-on occupant sensors, and continuous daylight dimming controls in spaces with toplighting.	Enlighted smart sensors provide occupancy control in all required areas, and can be programmed to adapt automatically to changing conditions or use. Daylight harvesting controls also provide continuous automatic response to changing lighting levels. Daylight harvesting can take place at all fixtures.
Office spaces, conference rooms, meeting rooms, training rooms, storage rooms, break rooms and utility spaces.	Lighting power allowance: 1.00 W/sf. Shall be controlled by auto-on or manual-on occupant sensors, and continuous daylight dimming controls in spaces with toplighting.	Enlighted system is fully programmable to provide the required control indoors, and can be easily reconfigured to adapt to changing use or usage patterns. Automatic daylight harvesting controls also provide continuous response to changing lighting levels from toplighting. Daylight harvesting can take place at all fixtures.

Lighting Power Density Allowances Using the Building Area Method

Building Area Type ^a	LPD, W/ft
Automotive facility	0.75
Convention center	0.64
Courthouse	0.79
Dining: Bar lounge/leisure	0.80
Dining: Cafeteria/fast food	0.76
Dining: Family	0.71
Dormitory	0.53
Exercise center	0.72
Fire station	0.56
Gymnasium	0.76
Health-care clinic	0.81
Hospital	0.96
Hotel/motel	0.56
Library	0.83
Manufacturing facility	0.82
Motion picture theater	0.44
Multifamily	0.45
Museum	0.55
Office	0.64
Parking garage	0.18
Penitentiary	0.69
Performing arts theater	0.84
Police station	0.66
Post office	0.65
Religious facility	0.67
Retail	0.84
School/university	0.72
Sports arena	0.76
Town hall	0.69
Transportation	0.50
Warehouse	0.45
Workshop	0.91

^aIn cases where both a general *building area type* and a specific *building area type* are listed, the specific *building area type* shall apply.



Building Robotics, Inc.,
a Siemens Company

Turn Everyday Spaces into Extraordinary Places

Wherever space, people and work meet, Enlighted empowers organizations with the technology to transform real estate spaces into regenerative places that fuel positive impact for people, portfolio, and our planet.

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