

# Hubbell Controls Application Guide to ASHRAE 90.1

A SUPPLEMENTAL GUIDE TO CODE REVISIONS IMPACTING LIGHTING CONTROL



**HUBBELL**<sup>®</sup>  
Control Solutions

 **HUBBELL**<sup>®</sup>  
Lighting

# Hubbell Lighting's Commitment to the ASHRAE 90.1 Challenge

**Hubbell Lighting** understands the challenge of code compliance and is here to lessen this burden on end-users. On October 2016 **ASHRAE 90.1 2016** Energy Standard for Buildings Except Low-Rise Residential Buildings was published. This revised standard improves energy efficiency in non-residential buildings beyond the previous ASHRAE 90.1 publication however, navigating the updated lighting code can be time consuming and confusing.

By breaking down the latest changes to ASHRAE 90.1 by application space, Hubbell Lighting is able to simplify the complexities of code compliance. On the following pages you will find product solutions for each controls type based on application space and code requirements. These controls solutions range from the most basic solutions to the most advanced. The guidelines are focused on recent code revisions and are not intended to replace the complete ASHRAE 90.1 publication.

## The Hubbell Advantage

For over 125 years Hubbell Lighting has continued to make the ordinary extraordinary as one of the largest lighting fixture manufacturers in North America. Serving a multitude of markets Hubbell Lighting aims to provide innovative solutions that provide performance, quality, and ease of use regardless of the application. Supported by the most prestigious portfolio of brand names Hubbell Lighting has a full range of indoor and outdoor lighting products that supply solutions to commercial, industrial, institutional, and residential markets.

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### ONE COMPANY | DISTINCT BRANDS

Alera Lighting  
Architectural Area Lighting  
Beacon Products  
Columbia Lighting  
Compass  
Dual-Lite  
Hubbell Control Solutions  
Healthcare Solutions  
Hubbell Industrial Lighting  
Hubbell Outdoor Lighting  
Kim Lighting  
Kurt Versen  
Litecontrol  
Prescolite  
Whiteway

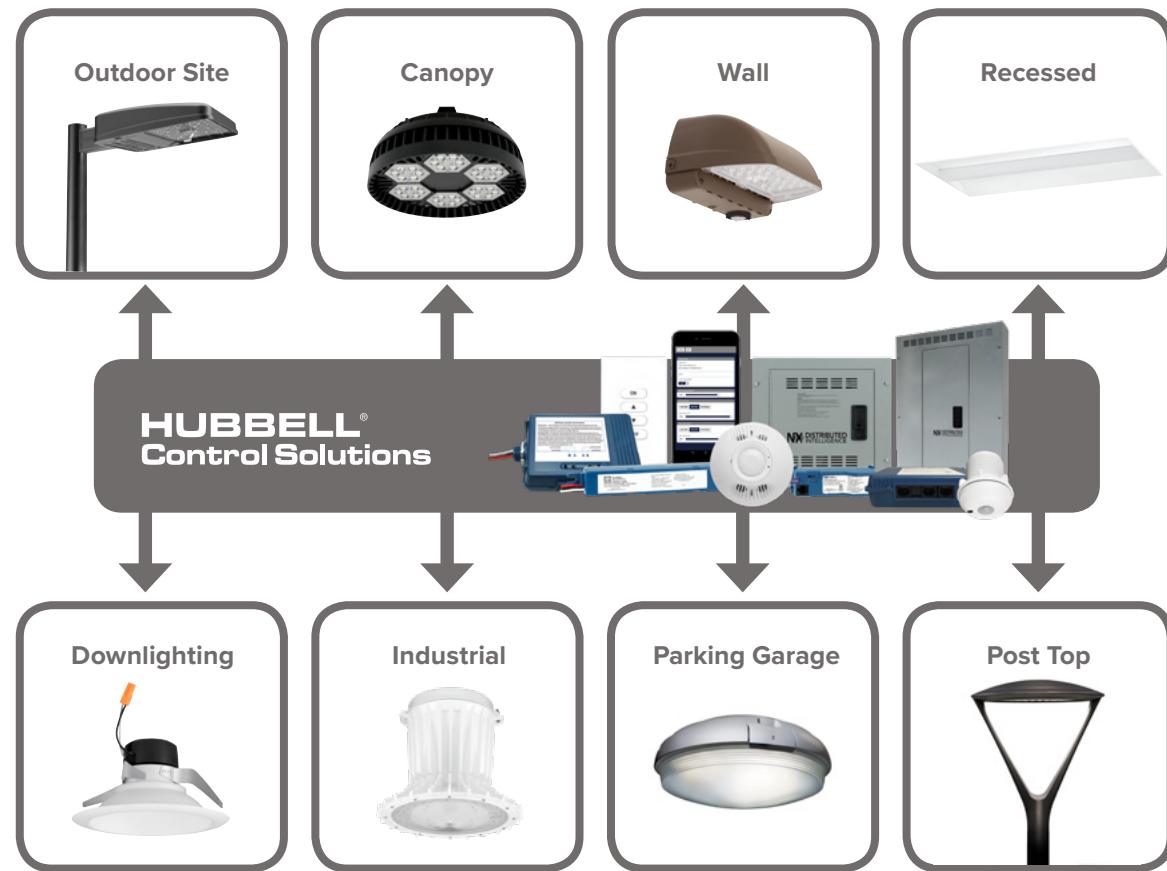


## Hubbell Lighting Core Capabilities - Complete Solutions

Stay on the leading edge of technology by selecting from Hubbell Lighting's portfolio of solid-state lighting products.

### Complete Solutions

From beautiful commercial environments to complex industrial applications, Hubbell Lighting provides high performance solutions across virtually every industry application.

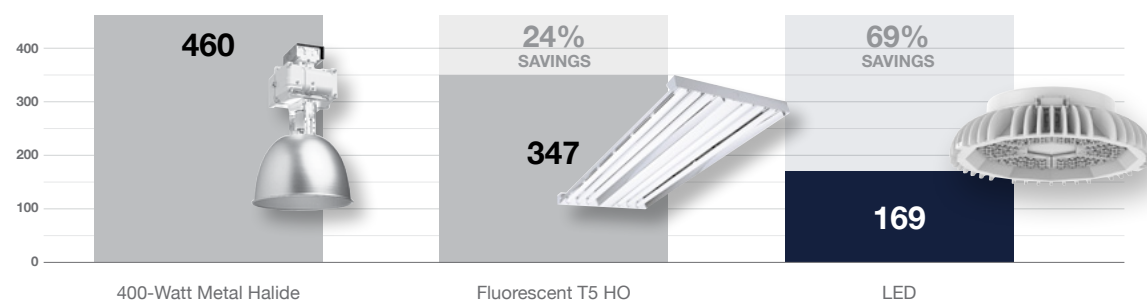


### Hubbell Lighting Controls

Having lights on only when needed, helps in reducing utility costs for energy savings and sustainability objectives. Easy installation, intuitive interfaces and web-based commissioning and monitoring make Hubbell Control Solutions (HCS) the logical choice for lighting control.

### Energy Savings

Hubbell Lighting has broken the technology barriers to create cost effective, high performance LED luminaires that can save up to 70% in applications, replacing less efficient technologies such as HID or fluorescent.



### Reducing Maintenance

Energy savings is only part of the story. Solid-state LED solutions from Hubbell Lighting last up to 3 times longer than Metal Halide or Fluorescent sources and up to 60 times longer than incandescent sources, dramatically reducing maintenance costs.

	LAMP TYPE	LIFE IN HOURS	REQUIRED RELAMPS vs. LED
	Incandescent	1,000	60
	Compact Fluorescent	10,000	6
	Metal Halide	20,000	3
	Linear Fluorescent	20,000	3
	LED	60,000	0

### Control In Application

Hubbell LED solutions provide instant restrike performance, that when combined with factory integrated controls, reduce energy usage by as much as 80% in application. It's another innovative way we help meet fast evolving codes.



### Easy Install, Easy Maintenance

Hubbell LED luminaires are designed with installation and ease of maintenance in mind. Our products offer simple access to electrical components that will reduce installation time and costs while making maintenance quick and efficient.



### Electronic Tracking

In the fast evolving LED space, component performance upgrades are ongoing. To provide best-in-class field support, we're integrating electronic tagging technology across our product lines, giving us a record of all the spec details of your luminaire. Years after installation a quick scan will reveal all of the critical specification details our teams will need to provide superior service and support.



### Environmentally Friendly

With no mercury, unlike HID or fluorescent technologies, Hubbell Lighting LED luminaires require no lamp recycling and dramatically reduce CO2 emissions when replacing legacy technologies.

### Rebate Program Approved

Utility rebate programs, where available, usually require products to be Design Lights Consortium® (DLC) or ENERGY STAR® qualified. Hubbell Lighting maintains an extensive collections of DLC and ENERGY STAR® qualified products available to reduce project costs and quicken payback. For a complete listing, visit <https://www.hubbell.com/columbialighting/en/createchange>



# Classroom / Lecture Hall / Training Room

	Code Provision	Minimum Control Type	Requirements		Basic (Choice of)	Intermediate (Choice of)	Advanced
<b>ON/OFF CONTROLS</b>	9.4.1.1(a)	Local switch	Readily accessible device(s) to control lighting within an enclosed space.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> <li>• LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
	9.4.1.1(b, c) and 9.4.1.1(h)	Occupancy sensor Manual On - Auto Off or Automatic Partial On - Auto-Off	Partial On no more the 50% of full light output. Automatically shuts off lighting power after vacancy of 20 minutes or less		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> <li>• LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
<b>LIGHT LEVEL CONTROL</b>	9.4.1.1.(d)	Bi-level lighting control minimum	At least one intermediate step shall be between 30% and 70% (inclusive) of full lighting power.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> <li>• LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
	9.4.1.1(e, f)	Multi-level daylight control	Sensor to reduce lighting in response to available daylight when daylight area is 150W or greater. Daylight areas defined in definitions. Control points between 20 -40% and 50-70% In addition to off. Primary daylight zones must be controlled separately from secondary zones.			<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
<b>ADDITIONAL CONTROL</b>	9.4.3	Functional testing	Testing shall ensure that occupant sensors, time switches, programmable schedule controls, and photo sensors are calibrated, programmed, and functioning properly.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
	8.4.2	Receptacle control	Automatically turn OFF at least 50% of the receptacles in the space. This can either be achieved by switching every alternate receptacle or 50% of the outlets in each receptacle			<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>



NOTE: Alterations of more than 20% and not a one-to-one replacement or only replacement of lamp and ballast/driver must meet the above control requirements in this space type.

# Conference / Meeting / Multi-Purpose Room

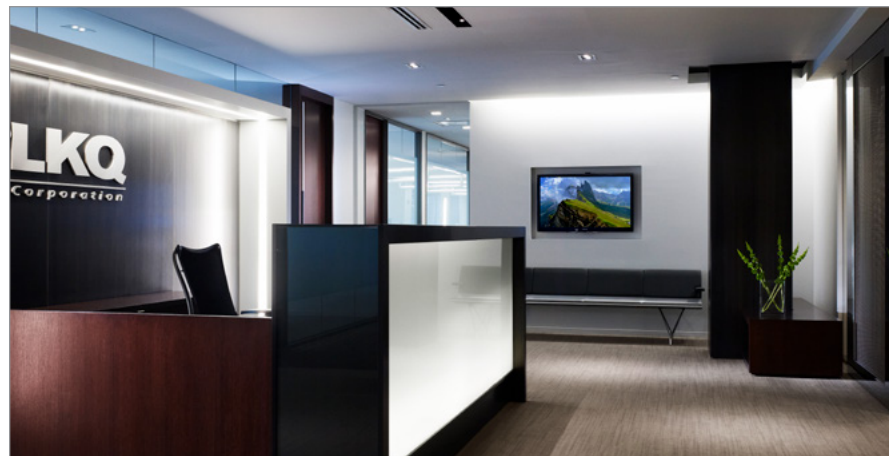
	Code Provision	Minimum Control Type	Requirements		Basic (Choice of)	Intermediate (Choice of)	Advanced
<b>ON/OFF CONTROLS</b>	9.4.1.1(a)	Local switch	Readily accessible device(s) to control lighting within an enclosed space.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> <li>• LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
	9.4.1.1(b, c) and 9.4.1.1(h)	Occupancy sensor Manual On - Auto Off or Automatic Partial On - Auto-Off	Partial On no more the 50% of full light output. Automatically shuts off lighting power after vacancy of 20 minutes or less.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> <li>• LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
<b>LIGHT LEVEL CONTROL</b>	9.4.1.1(d)	Bi-level lighting control minimum	At least one intermediate step shall be between 30% and 70% (inclusive) of full lighting power.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
	9.4.1.1(e, f)	Multi-level daylight control	Sensor to reduce lighting in response to available daylight when daylight area is 150W or greater. Daylight areas defined in definitions. Control points between 20 -40% and 50-70% In addition to off. Primary daylight zones must be controlled separately from secondary zones.			<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
<b>ADDITIONAL CONTROL</b>	9.4.3	Functional testing	Testing shall ensure that occupant sensors, time switches, programmable schedule controls, and photo sensors are calibrated, programmed, and functioning properly.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> <li>• LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
	8.4.2	Receptacle Control	Automatically turn OFF at least 50% of the receptacles in the space. This can either be achieved by switching every alternate receptacle or 50% of the outlets in each receptacle.			<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>



# Office ≤ 250 Sq. Ft.

	Code Provision	Minimum Control Type	Requirements		Basic (Choice of)	Intermediate (Choice of)	Advanced
<b>ON/OFF CONTROLS</b>	9.4.1.1(a)	Local switch	Readily accessible device(s) to control lighting within an enclosed space.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> <li>• LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
	9.4.1.1(b, c) and 9.4.1.1(h)	Occupancy sensor Manual On - Auto Off or Automatic Partial On - Auto-Off	Partial On no more the 50% of full light output. Automatically shuts off lighting power after vacancy of 20 minutes or less.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> <li>• LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
	9.4.1.1(d)	Bi-level lighting Control	At least one intermediate step shall be between 30% and 70% (inclusive) of full lighting power.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> <li>• LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
<b>LIGHT LEVEL CONTROL</b>	9.4.1.1(e, f)	Multi-level daylight control	Sensor to reduce lighting in response to available daylight when daylight area is 150W or greater. Daylight areas defined in definitions. Control points between 20 -40% and 50-70% In addition to off. Primary daylight zones must be controlled separately from secondary zones.			<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
	9.4.3	Functional testing	Testing shall ensure that occupant sensors, time switches, programmable schedule controls, and photosensors are calibrated, programmed, and functioning properly.		<ul style="list-style-type: none"> <li>• OMNI Ceiling Sensor &amp; Override Switch</li> <li>• LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
<b>ADDITIONAL CONTROL</b>	8.4.2	Receptacle control	Automatically turn OFF at least 50% of the receptacles in the space. This can either be achieved by switching every alternate receptacle or 50% of the outlets in each receptacle			<ul style="list-style-type: none"> <li>• NX Room Control</li> <li>• CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>• NX Distributed Intelligence™</li> <li>• PowerHUBB™ PoE Lighting &amp; Control</li> </ul>

NOTE: Alterations of more than 20% and not a one-to-one replacement or only replacement of lamp and ballast/driver must meet the above control requirements in this space type.



Office > 250 Sq. Ft.

	Code Provision	Minimum Control Type	Requirements		Basic (Choice of)	Intermediate (Choice of)	Advanced
<b>ON/OFF CONTROLS</b>	9.4.1.1(a)	Local switch	Readily accessible device(s) to control lighting within an enclosed space.		• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
	9.4.1.1(b) and 9.4.1.1(i)	Manual On - Programmable Timeclock Off	Scheduled time-of-day operated control that turns lighting off at specified times when typically unoccupied. Other building system signals that turn OFF lights during vacancy also comply.			• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
	OR						
	9.4.1.1(b,c) and 9.4.1.1(h)	Occupancy sensor Manual On - Auto Off or Automatic Partial On - Auto-Off	Partial On no more the 50% of full light output. Automatically shuts off lighting power after vacancy of 20 minutes or less.		• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
<b>LIGHT LEVEL CONTROL</b>	9.4.1.1(d)	Bi-level lighting control	At least one intermediate step shall be between 30% and 70% (inclusive) of full lighting power,		• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
	9.4.1.1(e, f)	Multi-level daylight control	Sensor to reduce lighting in response to available daylight when daylight area is 150W or greater. Daylight areas defined in definitions. Control points between 20 -40% and 50-70% In addition to off. Primary daylight zones must be controlled separately from secondary zones.			• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
<b>ADDITIONAL CONTROL</b>	9.4.3	Functional testing	Testing shall ensure that occupant sensors, time switches, programmable schedule controls, and photosensors are calibrated, programmed, and functioning properly.		• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
	8.4.2	Receptacle control	Automatically turn OFF at least 50% of the receptacles in the space. This can either be achieved by switching every alternate receptacle or 50% of the outlets in each receptacle			• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control



NOTE: Alterations of more than 20% and not a one-to-one replacement or only replacement of lamp and ballast/driver must meet the above control requirements in this space type.

	Code Provision	Minimum Control Type	Requirement		Basic <i>(Choice of)</i>	Intermediate <i>(Choice of)</i>	Advanced
<b>ON/OFF CONTROLS</b>	9.4.1.1(a)	Local switch	Readily accessible device(s) to control lighting within an enclosed space.		• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
	9.4.1.1(h)	Vacancy sensor Automatic Off	Automatically shuts off lighting power after vacancy of 20 minutes or less		• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
	OR						
	9.4.1.1(i)	Programmable Timeclock Off	Scheduled time-of-day operated control that turns lighting off at specified times when typically unoccupied. Other building system signals that turn OFF lights during vacancy also comply.			• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
	9.4.1.1(g)	Occupancy sensor Automatic Partial-Off	Automatically reduces lighting power by at least 50% after vacancy of 20 minutes or less.		• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
<b>LIGHT LEVEL CONTROL</b>	9.4.1.1(e, f)	Multi-level daylight control	Sensor to reduce lighting in response to available daylight when daylight area is 150W or greater. Daylight areas defined in definitions. Control points between 20-40% and 50-70% in addition to off. Primary daylight zones must be controlled separately from secondary zones.			• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
<b>ADDITIONAL CONTROL</b>	9.4.3	Functional testing	Testing shall ensure that occupant sensors, time switches, programmable schedule controls, and photo sensors are calibrated, programmed, and functioning properly.			• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control

NOTE: Alterations of more than 20% and not a one-to-one replacement or only replacement of lamp and ballast/driver must meet the above control requirements in this space type.





# Restroom

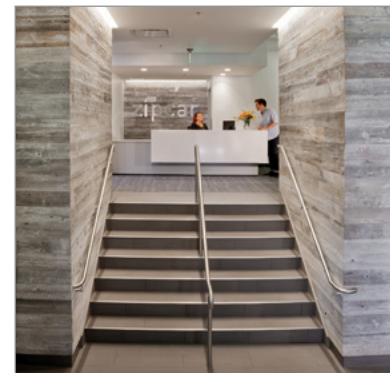
	Code Provision	Minimum Control Type	Requirement	Basic (Choice of)	Intermediate (Choice of)	Advanced
<b>ON/OFF CONTROLS</b>	9.4.1.1(h)	Vacancy sensor Automatic Off	Automatically shuts off lighting power after vacancy of 20 minutes or less	• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
<b>LIGHT LEVEL CONTROL</b>	9.4.1.1(e, f)	Multi-level daylight control	Sensor to reduce lighting in response to available daylight when daylight area is 150W or greater. Daylight areas defined in definitions. Control points between 20 -40% and 50-70% In addition to off. Primary daylight zones must be controlled separately from secondary zones		• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
<b>ADDITIONAL CONTROL</b>	9.4.3	Acceptance testing Functional testing	Testing shall ensure that occupant sensors, time switches, programmable schedule controls, and photosensors are calibrated, programmed, and functioning properly.	• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control

NOTE: Alterations of more than 20% and not a one-to-one replacement or only replacement of lamp and ballast/driver must meet the above control requirements in this space type.



# Stairwell

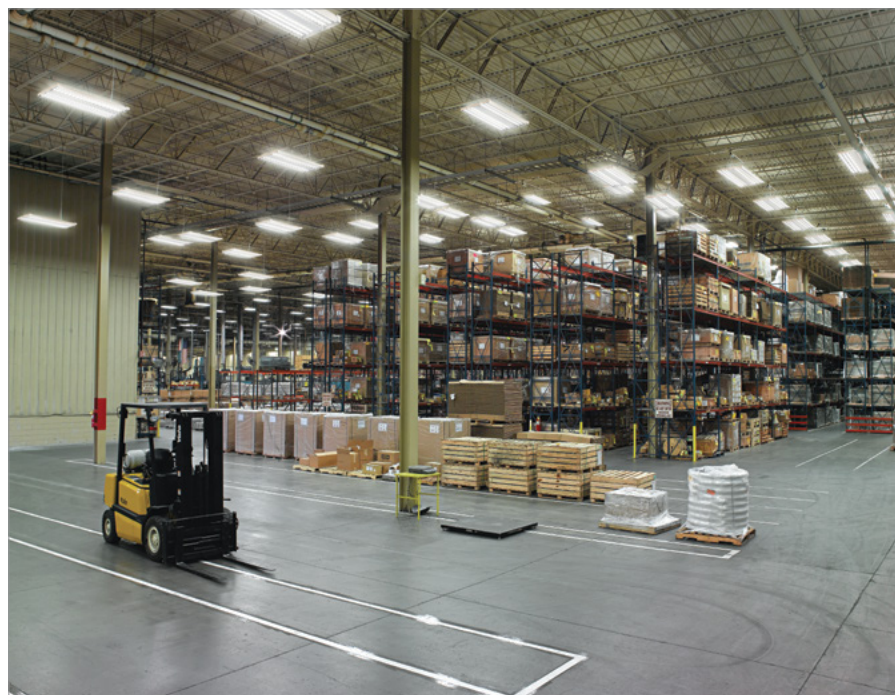
	Code Provision	Minimum Control Type	Requirements		Basic (Choice of)	Intermediate (Choice of)	Advanced
<b>ON/OFF CONTROLS</b>	9.4.1.1(h)	Vacancy sensor Automatic Off	Automatically shuts off lighting power after vacancy of 20 minutes or less		• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
	OR						
	9.4.1.1(i)	Programmable Timeclock Off	Scheduled time-of-day operated control that turns lighting off at specified times when typically unoccupied. Other building system signals that turn OFF lights during vacancy also comply.			• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
	9.4.1.1(g)	Occupancy sensor Automatic Partial-Off	Automatically reduces lighting power by at least 50% after vacancy of 20 minutes or less.		• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
<b>LIGHT LEVEL CONTROL</b>	9.4.1.1.(d)	Bi-level lighting control	At least one intermediate step shall be between 30% and 70% (inclusive) of full lighting power			• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control
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<b>ADDITIONAL CONTROL</b>	8.4.2	Functional testing	Testing shall ensure that occupant sensors, time switches, programmable schedule controls, and photosensors are calibrated, programmed, and functioning properly.		• OMNI Ceiling Sensor & Override Switch	• NX Room Control • CX Panel Controls	• NX Distributed Intelligence™ • PowerHUBB™ PoE Lighting & Control



# Storage Room < 1000 Sq. Ft.

	Code Provision	Minimum Control Type	Requirements	Basic (Choice of)	Intermediate (Choice of)	Advanced	
<b>ON/OFF CONTROLS</b>	9.4.1.1(a)	Local switch	Readily accessible device(s) to control lighting within an enclosed space.		<ul style="list-style-type: none"> <li>LightHAWK2 Wall Switch Sensor</li> </ul>	<ul style="list-style-type: none"> <li>NX Room Control</li> <li>CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>NX Distributed Intelligence™</li> <li>PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
	9.4.1.1(b, c) and 9.4.1.1(h)	Occupancy sensor Manual On - Auto Off or Automatic Partial On - Auto-Off	Partial On no more the 50% of full light output. Automatically shuts off lighting power after vacancy of 20 minutes or less.			<ul style="list-style-type: none"> <li>NX Room Control</li> <li>CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>NX Distributed Intelligence™</li> <li>PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
<b>LIGHT LEVEL CONTROL</b>	9.4.1.1(e, f)	Multi-level daylight control	Sensor to reduce lighting in response to available daylight when daylight area is 150W or greater. Daylight areas defined in definitions. Control points between 20 -40% and 50-70% In addition to off. Primary daylight zones must be controlled separately from secondary zones.			<ul style="list-style-type: none"> <li>NX Room Control</li> <li>CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>NX Distributed Intelligence™</li> <li>PowerHUBB™ PoE Lighting &amp; Control</li> </ul>
<b>ADDITIONAL CONTROL</b>	9.4.3	Functional testing	Testing shall ensure that occupant sensors, time switches, programmable schedule controls, and photosensors are calibrated, programmed, and functioning properly.			<ul style="list-style-type: none"> <li>NX Room Control</li> <li>CX Panel Controls</li> </ul>	<ul style="list-style-type: none"> <li>NX Distributed Intelligence™</li> <li>PowerHUBB™ PoE Lighting &amp; Control</li> </ul>

NOTE: Alterations of more than 20% and not a one-to-one replacement or only replacement of lamp and ballast/driver must meet the above control requirements in this space type.



NX platform is capable of scaling from standalone fixture and room control applications to networked enterprise deployments. NX operates using wired, wireless and hybrid connectivity with native BACnet™ support.

## In-Fixture Controls



### In-Fixture Control Modules

- On / Off control and/or two channel dimming
- Suitable for indoor and outdoor applications
- Wireless programming



### In-Fixture Sensor Modules

- Luminaire-integrated design reduces complexity and design time
- Out-of-the-box operation to meet code and simplify installation
- Bluetooth® enabled sensors available in five versions to address occupancy and daylight dimming



### NX Radio Modules

- Provide HubbNET™ wireless network communication
- Robust and reliable IEEE 802.15.4 2.4GHz radio
- Remote, in-fixture and on-fixture mounting options



### Accessories

- Provide dual RJ45 ports for CAT5 daisy-chain connections
- Offer dual, mini SmartPORT™ connections for In-Fixture modules
- Simple attachment to luminaires

## Room Controls



### Room Controllers

- Intelligent auto-configuration with devices
- Automatic code compliance
- Cat5 plug and play connectivity



### Occupancy Sensors

- Embedded IntelliDAPT™ self-adaptive technology
- Passive Infrared, Ultrasonic and Dual Technology versions
- Occupancy or vacancy mode with up to 2000 sq. ft. coverage area



### Daylight Sensors

- Open-loop daylighting controls
- Supports up to 6 lighting zones per room
- Simple setup using the NX mobile App



### Interfaces

- Allow third party interfaces
- Support A/V, Dry Contacts and HVAC options
- Mounts to standard junction box or DIN rail

## Enterprise / Building Controls



### Area Controllers

- Central component for enterprise solutions
- Real-time programming and monitoring
- Native BACnet™ support



### Network Bridge

- Connect Room Controllers to HubbNET network
- Provide communication link for Area Controllers
- CAT5 plug and play connectivity



### Network Accessories

- Enable connection of additional NX devices
- Provide network connections and power to NX accessories
- Mount to standard DIN rail



### Lighting Control Panels

- Provides programmable switching and dimming of lighting circuits
- Can be used exclusively or as part of a network solution
- Available in 8, 16, 24, 32 and 48 relay versions

These are the key components. For a full list of NX products please visit [www.hubbellcontrolsolutions.com](http://www.hubbellcontrolsolutions.com).



## Device Setup App

The NX Device Setup App provides Bluetooth® wireless setup and configuration of NX Room Control devices and luminaires equipped with an NX In-Fixture module with smart sensor. The mobile App is available in Android™ and iOS® versions for free download from Google Play™ or Apple® stores.



## IntelliScope™

IntelliScope provides a unique and powerful tool for calibrating and testing NX In-Fixture smart sensors. Motion captured by the sensor is displayed in real time relative to the current sensitivity setting making precise calibration possible without the need for repetitive “test mode” trial and error calibration.



## Wall Switch Stations

Single and multi-button wall switch stations are available in specialty pre-configured and programmable smart versions. Both offer a self-configuration feature that automatically configures the wall switch stations to perform the logical control and code compliant sequence of operation. All NX wall switch stations can be used with Room Controllers, Panels, or In-Fixture Modules in either standalone or networked applications.



## Area Controller

The NX Area Controller is the central component in an enterprise or building networked system. The interface is web browser based and does not require the installation of any software. A native BACnet™ interface facilitates a standard TCP/IP connection providing monitoring and control of lighting by the Building Automation System.



These are the key components. For a full list of NX products please visit [www.hubbellcontrolsolutions.com](http://www.hubbellcontrolsolutions.com).

Hubbell's PowerHUBB™ is an enterprise-level, Power over Ethernet (PoE), lighting and control platform that seamlessly integrates luminaires, sensors, user interfaces and software for a scalable, intelligent building control solution.



### PowerHUBB Nodes

- Provide power distribution and data connectivity for luminaires and control devices
- RJ45 ports provided for PoE power and bidirectional Input/Output (I/O) connections
- 1% to 100% dimming range in 1% increments
- 60W peak operating power
- External sensor/relay and wall switch connections

PowerHUBB's scalable software suite provides configurable options for delivering advanced customized energy saving strategies, building automation integration, and enablement of IoT solutions.

From simple lighting control to advanced cloud based energy management analytics, PowerHUBB empowers your lighting to deliver value beyond illumination with a data driven, open platform.



Standard Lighting Control Software



Service Package



Advanced Energy Package\*



Enterprise Management Package\*

### LIGHTING CONTROL SOFTWARE SUITE

#### Standard Lighting Control Software Package

- Supports lights, wall controls On/Off/Dim, motion sensors, and daylight sensors
- Lighting system commissioning, rapid-commissioning, and diagnostic tools
- Occupancy control (software-defined)
- High and low end trimming (software-defined)
- Daylight harvesting (software-defined)
- Lighting scheduling

### ADVANCED SOFTWARE SERVICE PACKAGES

#### Connectivity

- API access and test suite
- Multi-IP network binding management

#### Automation Access

- Accepts BACnet™ commands and inquiries
- Supports temperature sensors

#### Service (via cloud portal)

- Near real-time system monitoring
- System status, analytics, statistics, and dashboards
- Advanced multi-recipient email alerts for critical system status
- Daily backups of configuration

#### Advanced Energy\* (via cloud portal)

- Energy analytics, statistics, dashboards, and interactive reports
- Energy data repository

#### Enterprise Management\* (via cloud portal)

- Multi-site enterprise performance and service dashboards
- Advanced log dashboard and analyzer
- Multi-user multi-role cloud portal logins

\*Service Package Required



### Low Voltage Sensors

#### OMNI®

Occupancy/Vacancy Wall Mount Sensor

- Passive Infrared (PIR), Ultrasonic (US) and Dual Technology (DT) versions
- Proprietary IntelliDAPT™ Technology eliminates false triggers
- Optional relay and photocell control



#### LightOWL®

Occupancy/Vacancy Wall Mount Sensor

- PIR and DT versions
- Smart IntelliDAPT™ Technology eliminates false triggers
- Optional relay and photocell control
- DT offered in both US with PIR and US with Acoustic Sensor



#### LightHAWK®2

Occupancy/Vacancy Wall Switch Sensor

- PIR, US and DT versions
- Manual-ON (Vacancy Sensor) or Automatic-ON (Occupancy Sensor)
- Smart IntelliDAPT™ Technology eliminates false triggers
- Built-in photo sensor for automatic daylight harvesting
- Single or Dual relay



### Low Voltage Wall Stations

- Supported by I/O connections on PowerHUBB nodes
- Offered in 1, 2, 3 and 4 button configurations
- Momentary button action
- Optional LED indicators available
- 24 VDC low voltage device



## CX COMMERCIAL LIGHTING SYSTEM

Feature rich, cost effective lighting control system for switching and 0-10V dimming.



### CX 8 RELAY MASTER PANEL WITH DIMMING CARD

- 8 dimming channels
- 8 - 20AMP relays with 4 relay options - 20A/1P, N/O, 20A/2P, N/O, N/C (14K SSCR) and 30A/1P latching (18K SSCR)
- Color LCD user interface with keypad
- 365 day programming with 64 schedules
- Astronomical and real time clock
- Programmable inputs accept low voltage switches, photocells, or motion sensors



### OMNI CEILING MOUNT OCCUPANCY SENSOR

- Low voltage Form C contacts available
- Digital dual-technology (ultrasonic [US] and passive infrared [PIR]) sensor
- IntelliDAPT® self-adaptive technology
- Up to 2,000 square-foot coverage area
- Non-volatile memory for sensor settings—no manual adjustment required



### CX Daylight Sensor

- Indoor and outdoor versions
- Open or Close loop operation (dependant on Daylight Sensor used)
- Foot-candle range: 3-75,000 (Dependant on Daylight Sensor used)
- Mounts vertically or horizontally



### CX Switch Stations

- Discreet or connectorized switch
- Cat5e/6 compatible utilizing RJ45 ports
- Raise/lower dimming capabilities
- Toggle on/off capabilities
- Buttons are assignable



## WASP2™ AND DIMMING WASP™

Indoor and outdoor occupancy and photocell sensors for on/off or preset dimmed



### WASP2 Occupancy and Photocell Sensor

- Digital Passive Infrared (PIR) sensor
- Multiple (single and dual) output versions
- Unique Smart Cycling™ for improved fluorescent lamp life
- Interchangeable high/low mount detection lens options
- Low voltage and line voltage models available
- Factory Installed & Field Installed Options Available



### Dimming WASP Outdoor Motion and Photocell Sensor

- Mounting heights: high mount lens: 30 ft outdoors; 45 ft indoors; low mount lens: 16 ft indoors/outdoors
- Controls 0-10V, 2-wire dimmable ballasts
- User controlled dimming with high/low area detection options
- Low temperature /water-tight/indoor-outdoor
- Factory Installed & Field Installed Options Available

## LOW VOLTAGE SENSORS

Wall switch vacancy & occupancy sensors



### LightHAWK®2 Wall Switch Sensor

- IntelliDAPT® self-adaptive technology - no manual adjustment required
- Available in Passive Infrared, Ultrasonic and Dual Technology versions
- Nightlight and Dimming versions available
- 1 or 2 relay models for single-level, bi-level or dual-circuit control
- Up to 1,000 square-foot, 180° coverage
- Built-in photocell
- Available in 24 VDC, Dual 120/277 VAC and 347 VAC versions



### LightOWL®

- IntelliDAPT® self-adaptive technology – no manual adjustments required
- Available in Passive Infrared and Dual Technology versions
- 1,600 square-foot coverage area
- Optional relay and photocell control



### OMNI®

- IntelliDAPT® self-adaptive technology – no manual adjustments required
- Available in Passive Infrared, Ultrasonic and Dual Technology versions
- 500 – 2,000 square-foot coverage area per sensor (depending on model)
- Optional relay and photocell control

# ASHRAE 90.1 2016 Definitions, Abbreviations, and Acronyms (Select Terms)

These are helpful terms pulled from ASHRAE 90.1. The full glossary can be found in Section 3; Definitions, Abbreviations, and Acronyms of the published standard

**ADDITION** is any change to a building that increases conditioned floor area and conditioned volume. Addition is also any change that increases the floor area and volume of an unconditioned building of an occupancy group or type regulated by Part 6. Addition is also any change that increases the illuminated area of an outdoor lighting application regulated by Part 6.

**ALTERATION** is any change to a building's water-heating system, space-conditioning system, lighting system, or envelope that is not an addition. Alteration is also any change that is regulated by Part 6 to an outdoor lighting system that is not an addition. Alteration is also any change that is regulated by Part 6 to signs located either indoors or outdoors.

**ANSI** is the American National Standards Institute.

**AUTOMATIC** is capable of operating without human intervention.

**AUTOMATIC CONTROL DEVICE** is a device capable of automatically turning loads off and on without manual intervention.

**BALLAST** device used in conjunction with an electric-discharge lamp to cause the lamp to start and operate under the proper circuit conditions of voltage, current, wave form, electrode heat, etc.

**CONTINUOUS DAYLIGHT DIMMING** method of automatic lighting control using daylight photosensors, where the lights are dimmed continuously, or using at least four preset levels with at least a five-second fade between levels, where the control turns the lights off when sufficient daylight is available.

**CONTROL DEVICE** a specialized device used to regulate the operation of equipment

**DAYLIGHTED AREA** the floor area substantially illuminated by daylight.

**DIMMER** a lighting control device that is capable of varying the light output and energy usage of light sources

**DOMINANT OCCUPANCY** is the occupancy type in mixed occupancy buildings with the greatest percentage of total conditioned floor area.

**DWELLING UNIT** A single unit providing complete, independent living facilities for one or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

**EFFICACY** the ratio of the total luminous output of a lamp to the total power input to the lamp, typically expressed in lm/W.

**EFFICIENCY** performance at specified rating conditions.

**ENCLOSED SPACE** a volume substantially surrounded by solid surfaces, such as walls, floors, roofs, and operable devices, such as doors and operable windows.

**FIXTURE** the component of a luminaire that houses the lamp or lamps or positions the lamp, shields it from view, and distributes the light. The fixture also provides for connection to the power supply, which may require the use of a ballast/driver.

**ENERGY EFFICIENCY RATIO (EER)** the ratio of net cooling capacity (Btu/h) to total rate of electric input in watts under designated operating conditions.

**HIGH-INTENSITY DISCHARGE (HID) LAMP** an electric discharge lamp in which light is produced when an electric arc is discharged through a vaporized metal such as mercury or sodium. Some HID lamps may also have a phosphor coating that contributes to the light produced or enhances the light color.

**INSTALLED EXTERIOR LIGHTING POWER** the power in watts of all site, landscape, and building lighting systems for exterior luminaires.

**IES** Illuminating Engineering Society of North America

**INSTALLED INTERIOR LIGHTING POWER** the power in watts of all general, task, and furniture lighting systems for interior luminaires..

**LAMP** a generic term for a man-made light source, often called a "bulb" or "tube."

**LIGHTING, DECORATIVE** lighting that is ornamental or installed for aesthetic effect. Decorative lighting shall not include general lighting..

**LIGHTING, GENERAL** lighting that provides a substantially uniform level of illumination throughout an area. General lighting shall not include decorative lighting or lighting that provides a dissimilar level of illumination to serve a specialized application or feature within such area.

**LIGHTING POWER ALLOWANCE, EXTERIOR** the maximum lighting power in watts allowed for the exterior of a building.

**LIGHTING POWER ALLOWANCE, INTERIOR** the maximum lighting power in watts allowed for the interior of a building.

**LIGHTING POWER DENSITY (LPD)** the lighting power per unit area of a building, space, or outdoor area expressed in W/ft<sup>2</sup>.

**LUMINAIRE** a complete lighting unit consisting of a lamp or lamps together with the housing designed to distribute the light, position and protect the lamps, and connect the lamps to the power supply.

**MANUAL** requiring personal intervention for control. Nonautomatic does not necessarily imply a manual controller, only that personal intervention is necessary.

**OCCUPANT SENSOR** a device that detects the presence or absence of people within an area and causes lighting, equipment, or appliances to be regulated accordingly.

**PHOTOSENSOR** a device that detects the presence of visible light, infrared (IR) transmission, and/or ultraviolet (UV) energy.

**PLENUM** a compartment or chamber to which one or more ducts are connected, that forms a part of the air distribution system, and that is not used for occupancy or storage. A plenum often is formed in part or in total by portions of the building..

**PRIMARY SIDELIGHTED AREA** the total primary sidelighted area is the combined primary sidelighted area within each space. Each primary sidelighted area is directly adjacent to vertical fenestration below the ceiling

**REGULATED ENERGY USE** energy used by building systems and components with requirements prescribed in Sections 5 through 10. This includes energy used for HVAC, lighting, service water heating, motors, transformers, vertical transportation, refrigeration equipment, computer-room cooling equipment, and other building systems, components, and processes with requirements prescribed in Sections 5 through 10.

**RESIDENTIAL** spaces in buildings used primarily for living and sleeping. Residential spaces include, but are not limited to, dwelling units, hotel/motel guest rooms, dormitories, nursing homes, patient rooms in hospitals, lodging houses, fraternity/sorority houses, hostels, prisons, and fire stations.

**ROOM CAVITY RATIO (RCR)** a factor that characterizes room configuration as a ratio between the walls and ceiling and is based upon room dimensions

**SINGLE-LINE DIAGRAM** a simplified schematic drawing that shows the connection between two or more items. Common multiple connections are shown as one line.

**SKYLIGHT** a fenestration surface having a slope of less than 60 degrees from the horizontal plane. Other fenestration, even if mounted on the roof of a building, is considered vertical fenestration.

**SKYLIGHT WELL** the shaft from the skylight to the ceiling.

**SYSTEM** a combination of equipment and auxiliary devices (e.g., controls, accessories, interconnecting means, and terminal elements) by which energy is transformed so it performs a specific function, such as HVAC, service water heating, or lighting.

**TASK LIGHTING** lighting directed to a specific surface or area that provides illumination for visual tasks..

**TOPLIGHTING** lighting building interiors with daylight admitted through fenestration, such as skylights and roof monitors, located on the roof.

**VISIBLE TRANSMITTANCE (VT)** the ratio of visible radiation entering the space through the fenestration product to the incident visible radiation, determined as the spectral transmittance of the total fenestration system, weighted by the photopic response of the eye and integrated into a single dimensionless value.



ALERA LIGHTING

ARCHITECTURAL AREA LIGHTING

BEACON PRODUCTS

COLUMBIA LIGHTING

COMPASS

DUAL-LITE

HUBBELL CONTROL SOLUTIONS

HUBBELL INDUSTRIAL LIGHTING

HUBBELL OUTDOOR LIGHTING

KIM LIGHTING

KURT VERSEN

LITECONTROL

PRESCOLITE

WHITEWAY

**HUBBELL®**  
**Control Solutions**

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