

Interior Lighting Summary

LTG-INT

2006 Washington State Nonresidential Energy Code Compliance Forms

Revised July 2007

Project Info	Project Address 1 -	Date
	2 -	For Building Department Use
	3 -	
	Applicant Name: 4 -	
	Applicant Address: 5 -	
	Applicant Phone: 6 -	

Project Description	<input type="checkbox"/> New Building <input type="checkbox"/> Addition <input type="checkbox"/> Alteration <input type="checkbox"/> Plans Included Refer to WSEC Section 1513 for controls and commissioning requirements.
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Compliance Option	<input type="radio"/> Prescriptive <input type="radio"/> Lighting Power Allowance <input type="radio"/> Systems Analysis (See Qualification Checklist (over). Indicate Prescriptive & LPA spaces clearly on plans.)
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Alteration Exceptions (check appropriate box - sec. 1132.3)	<input type="checkbox"/> No changes are being made to the lighting <input type="checkbox"/> Less than 60% of the fixtures new, installed wattage not increased, & space use not changed.
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Maximum Allowed Lighting Wattage

Location (floor/room no.)	Occupancy Description	Allowed Watts per ft ² **	Area in ft ²	Allowed x Area
** From Table 15-1 (over) - document all exceptions on form LTG-LPA				Total Allowed Watts

Proposed Lighting Wattage

Location (floor/room no.)	Fixture Description	Number of Fixtures	Watts/Fixture	Watts Proposed
Total Proposed Watts may not exceed Total Allowed Watts for Interior			Total Proposed Watts	

Notes:

- For proposed Fixture Description, indicate fixture type, lamp type (e.g. T-8), number of lamps in the fixture, and ballast type (if included). For track lighting, list the length of the track (in feet) in addition to the fixture, lamp, and ballast information.
- For proposed Watts/Fixture, use manufacturer's listed maximum input wattage of the fixture (not simply the lamp wattage) and other criteria as specified in Section 1530. For hard-wired ballasts only, the default table in the NREC Technical Reference Manual may also be used. For track lighting, list the greater of actual luminaire wattage or length of track multiplied by 50, or as applicable, the wattage of current limiting devices or of the transformer.
- List all fixtures. For exempt lighting, note section and exception number, and leave Watts/Fixture blank.

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Prescriptive Spaces	Occupancy: <input type="radio"/> Warehouses, storage areas or aircraft storage hangers <input type="radio"/> Other
Qualification Checklist Note: If occupancy type is "Other" and fixture answer is checked, the number of fixtures in the space is not limited by Code. Clearly indicate these spaces on plans. If not qualified, do LPA Calculations.	Lighting Fixtures: (Section 1521) <input type="checkbox"/> Check if 95% or more of fixtures comply with 1,2 or 3 and rest are ballasted. <ol style="list-style-type: none"> 1. Fluorescent fixtures which are non-lensed with a) 1 or 2 two lamps, b) reflector or louvers, c) 5-60 watt T-1, T-2, T-4, T-5, T-8 lamps, and d) hard-wired electronic dimming ballasts. Screw-in compact fluorescent fixtures do not qualify. 2. Metal Halide with a) reflector b) ceramic MH lamps <= 150w c) electronic ballasts 3. LED lights.

TABLE 15-1 Unit Lighting Power Allowance (LPA)

Use ¹	LPA ² (W/sf)	Use ¹	LPA ² (W/sf)
Automotive facility	0.9	Office buildings, office/administrative areas in facilities of other use types (including but not limited to schools, hospitals, institutions, museums, banks, churches) ^{5,7,11}	1.0
Convention center	1.2	Penitentiary and other Group I-3 Occupancies	1.0
Courthouse	1.2	Police and fire stations ⁹	1.0
Cafeterias, fast food establishments ⁵ , restaurants/bars ⁵	1.3	Post office	1.1
Dormitory	1.0	Retail ¹⁰ , retail banking, mall concourses, wholesale stores (pallet rack shelving)	1.5
Exercise center	1.0	School buildings (Group E Occupancy only), school classrooms, day care centers	1.2
Gymnasia ⁹ , assembly spaces ⁹	1.0	Theater, motion picture	1.2
Health care clinic	1.0	Theater, performing arts	1.6
Hospital, nursing homes, and other Group I-1 and I-2 Occupancies	1.2	Transportation	1.0
Hotel/motel	1.0	Warehouses ¹¹ , storage areas	0.5
Hotel banquet/conference/exhibition hall ^{3,4}	2.0	Workshops	1.4
Laboratory spaces (all spaces not classified "laboratory" shall meet office and other appropriate categories)	1.8	Parking garages	0.2
Laundries	1.2		
Libraries ⁵	1.3	Plans Submitted for Common Areas Only⁷	
Manufacturing facility	1.3	Main floor building lobbies ⁷ (except mall concourses)	1.2
Museum	1.1	Common areas, corridors, toilet facilities and washrooms, elevator lobbies	0.8

Footnotes for Table 15-1

- 1) In cases in which a general use and a specific use are listed, the specific use shall apply. In cases in which a use is not mentioned specifically, the Unit Power Allowance shall be determined by the building official. This determination shall be based upon the most comparable use specified in the table. See Section 1512 for exempt areas.
- 2) The watts per square foot may be increased, by two percent per foot of ceiling height above twenty feet, unless specifically directed otherwise by subsequent footnotes.
- 3) Watts per square foot of room may be increased by two percent per foot of ceiling height above twelve feet.
- 4) For all other spaces, such as seating and common areas, use the Unit Light Power Allowance for assembly.
- 5) Watts per square foot of room may be increased by two percent per foot of ceiling height above nine feet.
- 6) Reserved.
- 7) For conference rooms and offices less than 150ft² with full height partitions, a Unit Lighting Power Allowance of 1.10 w/ft² may be used.
- 8) Reserved.
- 9) For indoor sport tournament courts with adjacent spectator seating over 5,000, the *Unit Lighting Power Allowance* for the court area is 2.60 W/ft².
- 10) Display window illumination installed within 2 feet of the window, provided that the display window is separated from the retail space by walls or at least three-quarter-height partitions (transparent or opaque). and lighting for free-standing display where the lighting moves with the display are exempt.
An additional 1.5 w/ft² of merchandise display luminaires are exempt provided that they comply with all three of the following:
 - a) located on ceiling-mounted track or directly on or recessed into the ceiling itself (not on the wall).
 - b) adjustable in both the horizontal and vertical axes (vertical axis only is acceptable for fluorescent and other fixtures with two points of track attachment).
 - c) fitted with LED, tungsten halogen, fluorescent, or high intensity discharge lamps.
 This additional lighting power is allowed only if the lighting is actually installed.
- 11) Provided that a floor plan, indicating rack location and height, is submitted, the square footage for a warehouse may be defined, for computing the interior Unit Lighting Power Allowance, as the floor area not covered by racks plus the vertical face area (access side only) of the racks. The height allowance defined in footnote 2 applies only to the floor area not covered by racks.

Exterior Lighting Summary

LTG-EXT

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Project Info	Proj Address: 1 -	Date
	2 -	For Building Department Use
	3 -	
	Name: 4 -	
	Appl. Name 5 -	
	Appl. Phone 6 -	

Project Description	<input type="checkbox"/> New <input type="checkbox"/> Addition <input type="checkbox"/> Alteration <input type="checkbox"/> Plans Included Refer to WSEC Section 1513 for controls and commissioning requirements.
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Compliance Option	<input type="radio"/> Lighting Power Allowance <input type="radio"/> Systems Analysis
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Building Grounds (luminaires > 100 Watts)	<input type="checkbox"/> Efficacy > 60 lumens/W <input type="checkbox"/> Controlled by motion Sensor <input type="checkbox"/> Exemption (list) _____
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Alteration Exceptions (check appropriate box - sec. 1132.3)	<input type="checkbox"/> No changes are being made to the lighting <input type="checkbox"/> Less than 60% of the fixtures new, installed wattage not increased, & space use not changed.
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Tradable Maximum Allowed Lighting Wattage

Tradable Locations	Description	Allowed Watts per ft ² or per lf	Area (ft ²), perimeter (lf) or # of items	Allowed Watts x ft ² (or x lf)
Total Allowed Watts				

Use mfg listed maximum input wattage. For fixtures with hard-wired ballasts only, the default table in the NREC Technical Reference Manual may also be used.

Tradable Proposed Lighting Wattage

Location	Fixture Description	Number of Fixtures	Watts/ Fixture	Watts Proposed
Total Proposed Watts may not exceed Total Allowed Watts for Exterior				

Non-Tradable Maximum Allowed Lighting Wattage

Non-Tradable Locations	Description	Allowed Watts per ft ² or per lf	Area (ft ²), perimeter (lf) or # of items	Allowed Watts x ft ² (or x lf)

Non-Tradable Proposed Lighting Wattage

Location	Fixture Description	Number of Fixtures	Watts/ Fixture	Watts Proposed

Proposed Watts may not exceed Allowed Watts for Category

Exterior Lighting Lookup Tables

Non-Tradeable	Allowance	
	text	W/unit
Bldg. Facade (by area)	0.2 W/ft ²	0.2
Bldg. Façade (by perim)	5.0 W/lf	5.0
Automated Teller	V + 90W per	270.0
Gate House	1.25 W/ft ²	1.3
Loading Areas - Law & EMS	0.5 W/ft ²	0.5
Material Handling & Storage	0.5 W/ft ²	0.5
Fast Food Drive up	0W per drive	400.0
Parking Near 24 Hour Entrance	0W per Ent	800.0

allowed

proposed

fail flag

fail msg

Tradeable Locations		
Uncovered Parking and drives	0.15 W/ft ²	0.2
Grounds Walkways <10' wide	1.0 W/LF	1.0
Grounds Walkways >10' wide	0.2 W/ft ²	0.2
Main Entry	W/LF of door	30.0
Other Entries	W/LF of door	20.0
Canopies and Overhangs	1.25 W/ft ²	1.3
Open Sales	0.5 W/ft ²	0.5
Car Sales Street Frontage	W/LF of front	20.0

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**TABLE 15-2
LIGHTING POWER DENSITIES FOR BUILDING EXTERIORS**

Tradable Surfaces (Lighting power densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs and outdoor sales areas may be traded.)	Uncovered Parking Areas	
	Parking lots and drives	0.15 W/ft ²
	Building Grounds	
	Walkways less than 10 feet wide	1.0 W/linear foot
	Walkways 10 feet wide or greater Plaza areas Special feature areas	0.2W/ft ²
	Stairways	1.0 W/ft ²
	Building Entrances and Exits	
	Main entries	30 W/linear foot of door width
	Other doors	20 W/linear foot of door width
	Canopies and Overhangs	
	Canopies (free standing and attached and overhangs)	1.25 W/ft ²
	Outdoor Sales	
	Open areas (including vehicle sales lots)	0.5 W/ft ²
	Street frontage for vehicle sales lots in addition to "open area" allowance	20 W/linear foot
Non-Tradable Surfaces (Lighting power density calculations for the following applications can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the "Tradable Surfaces" section of this table.)	Building Facades	
		0.2 W/ft ² for each illuminated wall or surface or 5.0W/linear foot for each illuminated wall or surface length
	Automated teller machines and night depositories	270 W per location plus 90 W per additional ATM per location
	Entrances and gatehouse inspection stations at guarded facilities	1.25 W/ft ² of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
	Loading areas for law enforcement, fire, ambulance and other emergency service vehicles	0.5 W/ft ² of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
	Material handling and associated storage	0.5 W/ft ²
	Drive-up windows at fast food restaurants	400W per drive-through
	Parking near 24-hour retail entrances	800 W per main entry

Lighting, Motor, and Transformer Permit Plans Checklist LTG-CHK

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Project Address <p style="text-align: center;">1 -</p>	Date
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The following information is necessary to check a permit application for compliance with the lighting, motor, and transformer requirements in the 2006 Washington State Nonresidential Energy Code.

Applicability (yes, no, n.a.)	Code Section	Component	Information Required	Location on Plans	Building Department Notes
LIGHTING CONTROLS (Section 1513)					
	1513.1	Local control/access	Schedule with type, indicate locations		
	1513.2	Area controls	Maximum limit per switch		
	1513.3	Daylight zone control	Schedule with type and features, indicate locations		
		vertical glazing	Indicate vertical glazing on plans		
		overhead glazing	Indicate overhead glazing on plans		
	1513.4	Display/exhib/special	Indicate separate controls		
	1513.5	Exterior shut-off	Schedule with type and features, indicate location		
		(a) timer w/backup	Indicate location		
		(b) photocell.	Indicate location		
	1513.6	Inter. auto shut-off	Indicate location		
	1513.6.1	(a) occup. sensors	Schedule with type and locations		
	1513.6.2	(b) auto. switches	Schedule with type and features (back-up, override capability); Indicate size of zone on plans		
	1513.7	Commissioning	Indicate requirements for lighting controls commissioning		
EXIT SIGNS (Section 1514)					
	1514	Max. watts	Indicate watts for each exit sign		
LIGHTING POWER ALLOWANCE (Section 1530-1532)					
	1531	Interior Lighting Summary Form	Completed and attached. Schedule with fixture types, lamps, ballasts, watts per fixture		
	1532	Exterior Lighting Summary Form	Completed and attached. Schedule with fixture types, lamps, ballasts, watts per fixture		
MOTORS (Section 1511)					
	1511	Elec motor efficiency	MECH-MOT or Equipment Schedule with hp, rpm, efficiency		
TRANSFORMERS (Section 1540)					
	1540	Transformers	Indicate size and efficiency		

If "no" is circled for any question, provide explanation:

Lighting, Motor, and Transformer Permit Plans Checklist LTG-CHK

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Lighting - General Requirements

1513 Lighting Controls: Lighting, including exempt lighting in Section 1512, shall comply with this section. Where occupancy sensors are cited, they shall have the features listed in Section 1513.6.1. Where automatic time switches are cited, they shall have the features listed in Section 1513.6.2.

1513.1 Local Control and Accessibility: Each space, enclosed by walls or ceiling-height partitions, shall be provided with lighting controls located within that space. The lighting controls, whether one or more, shall be capable of turning off all lights within the space. The controls shall be readily accessible, at the point of entry/exit, to personnel occupying or using the space.

EXCEPTIONS: The following lighting controls may be centralized in remote locations:

1. Lighting controls for spaces which must be used as a whole.
2. Automatic controls.
3. Controls requiring trained operators.
4. Controls for safety hazards and security.

1513.2 Area Controls: The maximum lighting power that may be controlled from a single switch or automatic control shall not exceed that which is provided by a 20 ampere circuit loaded to not more than 80%. A master control may be installed provided the individual switches retain their capability to function independently. Circuit breakers may not be used as the sole means of switching.

EXCEPTIONS: 1. Industrial or manufacturing process areas, as may be required for production.

2. Areas less than 5% of the building footprint for footprints over 100,000 ft².

1513.3 Daylight Zone Control: All daylighted zones, as defined in Chapter 2, both under overhead glazing and adjacent to vertical glazing, shall be provided with individual controls, or daylight- or occupant-sensing automatic controls, which control the lights independent of general area lighting.

Contiguous daylight zones adjacent to vertical glazing are allowed to be controlled by a single controlling device provided that they do not include zones facing more than two adjacent cardinal orientations (i.e. north, east, south, west). Daylight zones under overhead glazing more than 15 feet from the perimeter shall be controlled separately from daylight zones adjacent to vertical glazing.

EXCEPTION: Daylight spaces enclosed by walls or ceiling height partitions and containing 2 or fewer light fixtures are not required to have a separate switch for general area lighting.

1513.4 Display, Exhibition and Specialty Lighting

Controls: All display, exhibition or specialty lighting shall be controlled independently of general area lighting.

1513.5 Automatic Shut-off Controls, Exterior: Lighting for all exterior applications shall have automatic controls capable of turning off exterior lighting when sufficient daylight is available or when the lighting is not required during nighttime hours. Lighting not designated for dusk-to-dawn operation shall be controlled by either:

- a. A combination of a photosensor and a time switch; or
- b. An astronomical time switch.

Lighting designated for dusk-to-dawn operation shall be controlled by an astronomical time switch or photosensor. All time switches shall be capable of retaining programming and the time setting during loss of power for a period of at least 10 hours.

EXCEPTION: Lighting for covered vehicle entrances or exits from buildings or parking structures where required for safety, security, or eye adaptation.

1513.6 Automatic Shut-Off Controls, Interior: Buildings greater than 5,000 ft² and all school classrooms shall be equipped with separate automatic controls to shut off the lighting during unoccupied hours. Within these buildings, all office areas less than 300 ft² enclosed by walls or ceiling-height partitions, and all meeting and conference rooms, and all school classrooms, shall be equipped with occupancy sensors that comply with Section 1513.6.1. For other spaces, automatic controls may be an occupancy sensor, time switch or other device capable of automatically shutting off lighting.

EXCEPTIONS: 1. Areas that must be continuously illuminated (e.g., 24-hour convenience stores), or

illuminated in a manner requiring manual operation of the lighting.

2. Emergency lighting systems.
3. Switching for industrial or manufacturing process facilities as may be required for production.
4. Hospitals and laboratory spaces.
5. Areas in which medical or dental tasks are performed are exempt from the occupancy sensor requirement.

1513.6.1 Occupancy Sensors: Occupancy sensors shall be capable of automatically turning off all the lights in an area, no more than 30 minutes after the area has been vacated.

Light fixtures controlled by occupancy sensors shall have a wall-mounted, manual switch capable of turning off lights when the space is occupied.

EXCEPTION: Occupancy sensors in stairwells are allowed to have two step lighting (high-light and low-light) provided the control fails in the high-light position.

1513.6.2 Automatic Time Switches: Automatic time switches shall have a minimum 7 day clock and be capable of being set for 7 different day types per week and incorporate an automatic holiday "shut-off" feature, which turns off all loads for at least 24 hours and then resumes normally scheduled operations. Automatic time switches shall also have program back-up capabilities, which prevent the loss of program and time settings for at least 10 hours, if power is interrupted.

Automatic time switches shall incorporate an over-ride switching device which:

- a. is readily accessible;
- b. is located so that a person using the device can see the lights or the areas controlled by the switch, or so that the area being illuminated is annunciated;
- c. is manually operated;
- d. allows the lighting to remain on for no more than 2 hours when an over-ride is initiated; and
- e. controls an area not exceeding 5,000 ft² or 5% of the building footprint for footprints over 100,000 ft², whichever is greater.

1513.7 Commissioning Requirements: For lighting controls which include daylight or occupant sensing automatic controls, automatic shut-off controls, occupancy sensors, or automatic time switches, the lighting controls shall be tested to ensure that control devices, components, equipment and systems are calibrated, adjusted and operate in accordance with approved plans and specifications. Sequences of operation shall be functionally tested to ensure they operate in accordance with approved plans and specifications. A complete report of test procedures and results shall be prepared and filed with the owner. Drawing notes shall require commissioning in accordance with this paragraph.

1514 Exit Signs: Exit signs shall have an input power demand of 5 Watts or less per sign.

Motors - General Requirements

1511 Electric Motors: All permanently wired polyphase motors of 1 hp or more, which are not part of an HVAC system, shall comply with Section 1437.

EXCEPTIONS: 1. Motors that are an integral part of specialized process equipment.

2. Where the motor is integral to a listed piece of equipment for which no complying motor has been approved.

Transformers - General Requirements**SECTION 1540 — TRANSFORMERS**

The minimum efficiency of a low voltage dry-type distribution transformer shall be the Class I Efficiency Levels for distribution transformers specified in Table 4-2 of the "Guide for Determining Energy Efficiency for Distribution Transformers" published by the National Electrical Manufacturers Association (NEMA TP-1-2002).