INFORMATION

Note: This document contains addenda information that is supplemental to that found in the LEED Interpretations and Addenda database, found on http://www.usgbc.org.

Addendum Details:

Addenda Number	Post Date	Rating System	Category	Credit ID	Ref Guide	Issue Type	Page	Location
100000892	5/9/2011		Indoor Environmental Quality	IEQc8.1: Daylight and Views-Daylight	Green Building Design and Construction, 2009 edition	Non-grammatical	549-563	All
ISSUE: Replace credit text with that provided below.								

Supplemental Document:

DAYLIGHT AND VIEWS—DAYLIGHT

IEQ CREDIT 8.1

	NC	SCHOOLS	CS
Credit	IEQ Credit 8.1	IEQ Credit 8.1	IEQ Credit 8.1
Points	1 point	1-3 points	1 point

Intent

To provide for the building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

Requirements

Through 1 of the 4 options, achieve daylighting in at least the following spaces[1]:

SCHOOLS

Classroom and Core Learning Spaces	Points
75%	1
90%	2

Other Regularly Occupied Spaces	Points
75%	1 additional[2]

NC & CS

Regularly Occupied Spaces	Points
75%	1

NC, SCHOOLS & CS

OPTION 1. Simulation

Demonstrate through computer simulations that the applicable spaces achieve daylight illuminance levels of a minimum of 10 footcandles (fc) and a maximum of 500 fc in a clear sky condition on September 21 at 9 a.m. and 3 p.m.

Provide glare control devices to avoid high-contrast situations that could impede visual tasks. However, designs that incorporate view-preserving automated shades may demonstrate compliance for only the minimum 10 fc illuminance level.

OR

OPTION 2. Prescriptive

For slidelighting zones:

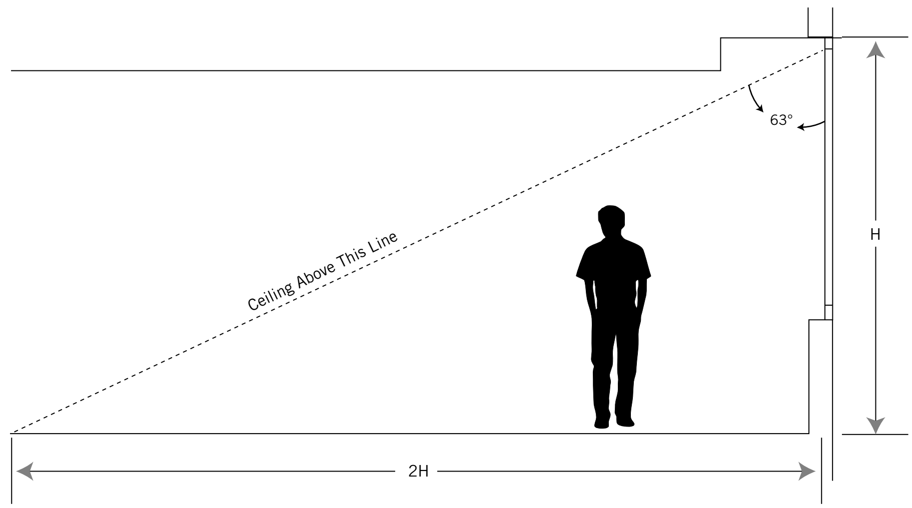
- Achieve a value, calculated as the product of the visible light transmittance (VLT) and window-to-floor area ratio (WFR) between 0.150 and 0.180.

$$0.150 < VLT \times WFR < 0.180$$

1 Exceptions for areas where tasks would be hindered by the use of daylight will be considered on their merits.
2 Project teams may achieve a point for these other spaces only if they have also achieved at least 1 point for classroom and core learning spaces.

NC, SCHOOLS & CS (continued)

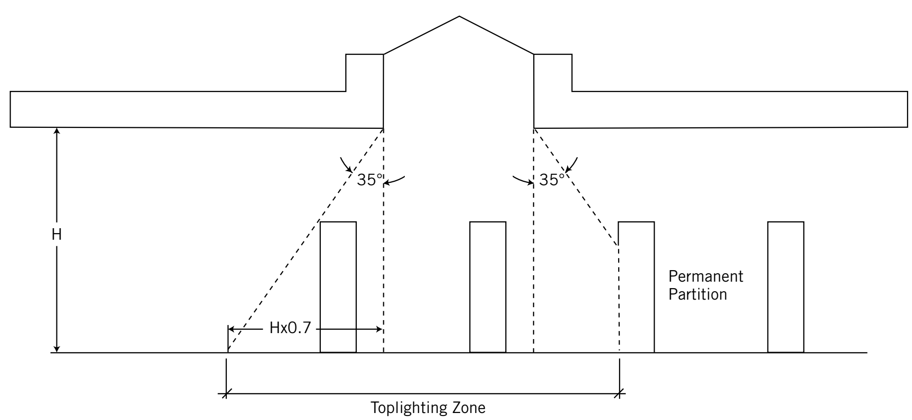
- The window area included in the calculation must be at least 30 inches above the floor.
- In section, the ceiling must not obstruct a line that extends from the window-head to a point on the floor that is located twice the height of the window-head from the exterior wall as measured perpendicular to the glass (see diagram below).



- Provide glare control devices to avoid high-contrast situations that could impede visual tasks. However, designs that incorporate view-preserving automated shades for glare control may demonstrate compliance for only the minimum 0.150 value.

For toplighting zones:

- The toplighting zone under a skylight is the outline of the opening beneath the skylight, plus in each direction the lesser of (see diagram below):
  - 70% of the ceiling height,
  - 1/2 the distance to the edge of the nearest skylight,
  - The distance to any permanent partition that is closer than 70% of the distance between the top of the partition and the ceiling.



NC, SCHOOLS & CS (continued)

- Achieve skylight coverage for the applicable space (containing the toplighting zone) between 3% and 6% of the total floor area.
- The skylight must have a minimum 0.5 VLT.
- A skylight diffuser, if used, must have a measured haze value of greater than 90% when tested according to ASTM D1003.

OR

OPTION 3. Measurement

Demonstrate through records of indoor light measurements that a minimum daylight illumination level of 10 fc and a maximum of 500 fc has been achieved in the applicable spaces. Measurements must be taken on a 10-foot grid for and shall be recorded on building floor plans.

Provide glare control devices to avoid high-contrast situations that could impede visual tasks. However, designs that incorporate view-preserving automated shades for glare control may demonstrate compliance for only the minimum 10 fc illuminance level.

OR

OPTION 4. Combination

Any of the above calculation methods may be combined to document the minimum daylight illumination in the applicable spaces.

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CS	Credit 8.1

1. Benefits and Issues to Consider

This credit addresses the availability of daylight to a building's occupants. When designing for maximum daylight, designers must evaluate and balance a number of environmental factors, such as heat gain and loss, glare control, visual quality, and variations in daylight availability.

Environmental Issues

Buildings emphasizing daylighting may need larger daylighting apertures. Daylighting reduces the need for electric lighting of building interiors, which, if integrated into the overall approach to lighting, can result in decreased energy use. A well-designed daylighted building is estimated to reduce lighting energy use by 50% to 80%.[1] This conserves natural resources and reduces air pollution impacts due to energy production and consumption.

Daylighting design involves a careful balance of heat gain and loss, glare control, visual quality, and variations in daylight availability. Shading devices, light shelves, courtyards, atriums, and glazing materials are all strategies employed in daylighting design. Important considerations include the selected building's orientation, glazing size and spacing, glass glazing selection, reflectance of interior finishes, and locations of interior walls.

Large expanses of unfragmented or untreated glazing can give the illusion of transparency or reflect sky and habitat, causing birds in flight to collide into the glazing. See the Implementation sections for measures to reduce bird collisions.

Economic Issues

Adequate daylighting creates environments that are more pleasant and comfortable for building occupants, while also providing opportunities to reduce on-going energy demand. Research has demonstrated that direct access to daylighting results in greater overall occupant satisfaction.[2] Improved occupant comfort and satisfaction can reduce absenteeism, result in greater productivity, and create greater employee retention than in comparable poorly-lit spaces. Similarly, research conducted in a variety of elementary school classrooms concluded that students in daylighted schools consistently performed better on math and reading tests.[3] In some cases, extensive glazing may lead to over-lighting due to the combination of interior lighting and daylight, resulting in unnecessary energy use within the space. This condition can be addressed by designing interior lighting systems to effectively respond to daylighting levels via dimmers that maintain optimal lighting for occupants, while also producing energy savings. Additionally, excessive heat gain can be avoided through the installation of shading and glare control devices. Good daylighting design integrates with the effective lighting design to create more productive spaces that use less energy.

2. Related Credits

Increasing the area of vision glazing is likely to provide greater access to views from the building interior, which is covered under the following credit:

- IEQ Credit 8.2: Daylight and Views—Views

The increased window-to-wall ratio in a design can alter energy performance and has a direct correlation to lighting design strategies to conserve energy. The interior lighting design can be used to maximize the energy savings by providing daylighting controls. Refer to the following:

- EA Prerequisite 2: Minimum Energy Performance
- EA Credit 1: Optimize Energy Performance
- IEQ Credit 6.1: Controllability of Systems—Lighting

1 Abraham, Loren E. Sustainable Building Technical Manual: Green Building Design, Construction, and Operations. Public Technology Inc. and U.S. Green Building Council, 1996.
2 Environmental Building News, 1999; Figueiro, M.G., et al. 2002; California Energy Commission, 2003b
3 California Energy Commission, 2003a

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3. Summary of Referenced Standard

ASTM D1003 - 07e1, Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics

http://www.astm.org

This test method covers the evaluation of specific light-transmitting and wide-angle-light-scattering properties of planar sections of materials such as essentially transparent plastic.

4. Implementation

Daylighting is affected by design decisions that start with building massing and orientation, shape of floorplate design, floor to ceiling heights. A building may have limited daylighting potential because of site constraints that restrict the orientation of the building. Vertical site elements, such as neighboring buildings and trees, might reduce the potential for daylighting. The design of the exterior envelope and the depth of the floor plate can allow more daylight into the building, and are critical for credit achievement.

Evaluate the impact of the selected building's orientation on possible daylighting options, and opt for designs with higher ceiling heights, shallow floor plates, courtyards, atriums, clerestory windows, or toplighting. Consider adding exterior shading devices, interior light shelves, louvers and view-preserving shades.

Attention to daylight should also be addressed during the design phase of the building. Furniture systems, wall partitions, surface color, and texture all have the ability to reflect daylight into the space. High surface reflections should also be considered, as they can improve the daylight distribution in a space.

The desired amount of daylight will differ depending on how each space is used. Daylighted buildings often have several daylight zones with differing target light levels. In addition to light levels, daylighting strategies should address interior color schemes, direct sun penetration, and integration with the electric lighting system. Unwanted glare without occupant control over it is a common failure. Typically, low-luminance ratios and lighting primary surfaces will enhance visual quality. Glare control should be designed for all glazing areas that affect tasks.

Computer modeling software can be used to simulate daylighting conditions and can provide valuable input into the development of an effective, integrated daylighting design. Daylighting software simulates the daylighting conditions of interior spaces at various times during the day and shows the combined effects of multiple windows within a daylighted space.

Photo-responsive controls for dimming electric lighting can be incorporated into daylighting strategies to maintain consistent light levels and help save energy by reducing electric lighting in high-daylight conditions while preserving illuminance levels on the task surface. These types of automatic controls require commissioning attention to avoid over-dimming, under-dimming or cycling of electric lights.

Effectively managing glare in a space should not be perceived as requiring a trade-off with occupant views. Many manufacturers offer view-preserving shades and blinds that control glare while also allowing occupants to see directly to the outdoors. The preservation of both daylighting and views can significantly increase occupant comfort and productivity.

Despite the known benefits of views in buildings, a potential downside is the likelihood that birds may fly into the windows. Larger areas of unfragmented or untreated glazing increase the risk. To reduce these collisions, consider treating the window glazing. Use exterior shading devices, introduce etched or fritt patterns, and/or create appropriate visual markers, such as differentiated

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planes, materials, textures, colors, opacity, or other features that help fragment glass reflections and reduce apparent overall transparency and reflectivity.

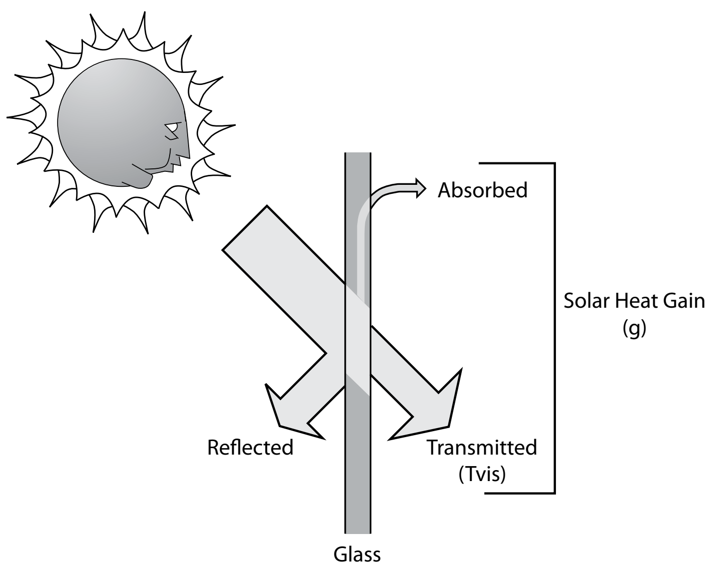
Common glare control devices are:

- Fixed exterior shading devices such as overhangs or fins
- Exterior light shelves
- Interior light shelves preferably with some translucency (3 to 5%) to avoid dark shadows under the light shelves.
- Louvers
- View preserving blinds with manual, motorized or automated controls
- Operable draperies

CS The decisions of the Core & Shell project design team may affect the ability of future tenants to optimize the daylighting of their spaces. Decisions made by the team designing the core and shell can, in some cases, preclude the tenant from achieving this credit in LEED for Commercial Interiors.

optimize daylighting, select glazing with an appropriate visible transmittance (Tvis). See Figure 1 for glass characteristics.

Figure 1. Glazing Characteristics



5. Timeline and Team

During the predesign stage, the owner, architect, and engineers should discuss general lighting design and the goals for occupants' work environment. Specific daylighting performance criteria should be included in the owner's project requirements.

During schematic design, the architect, lighting designer, civil engineer, and landscape architect should orient the building on its site to allow for passive solar strategies. Daylighting simulations should be run early to ensure effective daylighting while minimizing potential for glare and any undesirable glazing and building solar exposure. Consider the preservation of existing topography and landscape features that shade the building and minimize glare. Also consider proximity to

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neighboring buildings and their effect on the daylighting approach. Determine how best to allocate the interior building spaces and consider locating regularly used spaces at the building perimeter, toward sources of daylight. The architect, lighting designer, and engineers should evaluate the building footprint, the structural floor to floor height, and finished ceiling clearances to ensure an adequate ratio of window to floor area. Consider strategies to increase the amount of daylight glazing when designing the massing of the building, and carefully weigh the effects of the envelope design on energy efficiency. Electric lighting in the daylighting zone should be considered for dimming in response to daylight availability. In addition, identify initial glare control strategies.

During the preparation of construction documents, the LEED calculations and/or computer simulation model should be developed in greater detail to inform the design decisions and verify compliance of the design. Refer again to the owner's project requirements. Use preliminary calculations to guide specifications for glare control devices. Once the design is complete, finalize the LEED calculations and supporting documentation.

During construction, the design and construction team should confirm that the submitted products and systems meet the owner's project requirements, the design performance specifications, and the original design intent.

During building operations, the owner should verify that occupants are not subject to glare and ensure that the installed glare control devices are performing as intended. Facility managers should be advised on proper maintenance of interior and exterior light shelves and other shading devices to ensure performance.

6. Calculations

NC & CS To calculate the daylighting percentage of regularly occupied spaces, divide the total daylighted regularly occupied area by the total regularly occupied area. If the percentage is 75% or more, the credit requirements are met for 1 point.

SCHOOLS To calculate the daylighting percentage of classroom and core learning spaces, divide the total daylighted classroom and core learning spaces area by the total classroom and core learning spaces area. If the percentage is 75% or more, the credit requirements are met for 1 point under this credit. If the percentage is 90% or more, the credit requirements are met for 2 points.

To calculate the daylighting percentage of other regularly occupied spaces (non-classroom/core learning spaces), divide the total other daylighted regularly occupied area by the total other regularly occupied area. If the percentage is 75% or more and the project qualifies for at least 1 point for classroom and core learning spaces, the credit requirements are met for 1 additional point.

Calculating Regularly Occupied Areas

Identify all regularly occupied spaces within the project and calculate their associated floor areas. The regularly occupied spaces and total area calculated for this credit should be consistent with the regularly occupied areas identified in other credits, such as IEQ Credit 8.2.

Any spaces dedicated to tasks that would be compromised or hindered by the inclusion of daylighting should be identified and the reason for their exclusion should be explained, for documentation purposes, in a supporting narrative. Any exclusion must be based solely on the basis of the task performed in the space, not the length of time an occupant will spend there. In addition, exceptions to the requirement are solely based on visual considerations, not based on sound.

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Multipurpose rooms must be included in the credit calculations. Because some activities in these spaces may be hindered by daylight, effective shades, view preserving blinds, and lighting controls should be included in the design.

For veterinary, boarding, or animal shelter facilities, include the area regularly occupied by the animals.

Calculating Daylighting Performance

The requirements for any option can be met even if 100% of each room does not meet the minimum requirements when using the daylight simulation, prescriptive, or measurement approaches. The portion of the room within the daylight zone or meeting the illumination level requirements counts toward the percentage of daylighted area, and the rest of the space is included in the calculation of total area. The floor area of all compliant spaces is tallied and then divided by the floor area of all applicable spaces.

OPTION 1. Simulation

- Create a daylight simulation model for the building, or each applicable area. The model should include glazing properties, as well as representative surface reflectance settings for interior finishes.
- For each applicable area, include a horizontal calculation grid at 30 inches above the floor, or measured at the appropriate desk or work height level for the intended use of the space. This represents the typical work plane height. It is recommended that the calculation grid be set up with a regular size interval so that the grid has at least 9 measuring points in a room but with a maximum interval of 5-feet to provide a detailed illumination diagram for each room.
- Calculate the daylight illumination for each applicable space using the following daylight criterion: clear-sky conditions at both 9:00 a.m. and 3:00 p.m. on September 21 for the project's geographic location.
- Identify the area of the room that has daylight illumination between 10 footcandles and 500 footcandles at both times (9:00 am and 3:00 pm). Spaces that do not meet the daylight illumination levels at both times do not qualify.
- If the space uses automated view preserving shades, the maximum footcandle requirement does not apply.
- Sum the square footage of all daylighted rooms or areas and divide by the total square footage of all applicable spaces.

OPTION 2. Prescriptive

To demonstrate compliance via Option 2, project floor plans should be evaluated to categorize internal areas as sidelighting or toplighting daylight zones. Per the methodologies below, daylighted areas adjacent side windows (i.e. vision and daylighting glazing) and below any skylights/toplights should be calculated. These two areas taken together represent the compliant area for the project and are divided by the total floor area to demonstrate credit compliance. Care should be taken not to double-count compliant areas that may fall under both categories.

Sidelighting

This option provides a relatively simple method of determining whether the daylighting requirements are met. It is applicable to many standard building designs, primarily

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rectangular floor plates with a central core. The project team needs the following basic information to determine compliance:

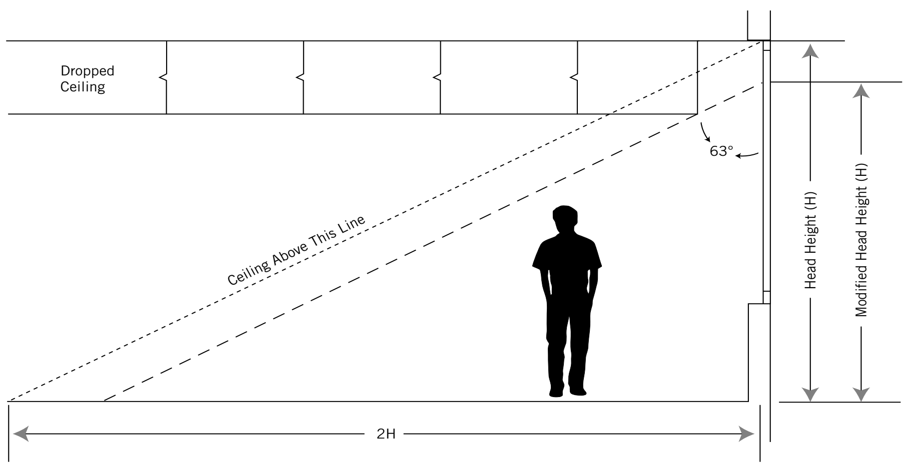
- Window head height
- Window sill height
- Window area
- Visible light transmittance (abbreviated as VLT or T_{vis})
- Floor area

Perform the following calculation for the applicable space:

- Determine the eligible window area (WA) for the space.
  - Determine whether a modified head height must be used. As shown in Figure 2, draw a 63-degree angle from the vertical, in section, from the window head to the floor. If the ceiling obstructs this line, a modified head height must be used.
  - Draw a 63-degree angle from the vertical, in section, using the ceiling corner that obstructed the previous line as a starting point. The point at which this line intersects the window is the modified head height. If a modified head height is used, count only window area below the modified head height. See Figure 2.
- Determine the floor area (FA).
- Determine the ratio of the window area to the floor area (WFR)—that is, WA/FA.
- Determine the product of the visible light transmittance and window to floor area—that is, (T_{vis}) (WFR).
- If the result is between 0.150 and 0.180, the space counts as a daylight zone. If the result is between 0.000 and 0.150, a portion of the space is compliant. Calculate the compliant floor area as follows:
  - Divide the calculated result by 0.150 and multiply by the floor area of the space. This fractional result represents the floor area to be counted as qualifying daylighted area.
- When using this method in conjunction with toplighting, the qualifying floor area from sidelighting is assumed to be the floor area immediately adjacent to the windows.

An example of the sidelighting calculation is shown in Table 1.

Figure 2. Sample Modified Window Head Height



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Toplighting

This method is applicable for many standard building designs and might be particularly useful for single-floor retail developments. The project team needs the following basic information to determine compliance:

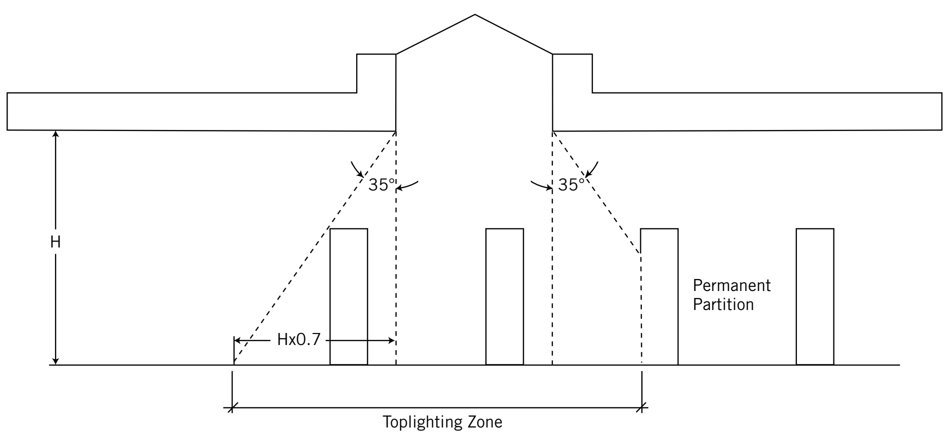
- Area of skylights or toplighting (SA)
- Visible light transmittance (VLT or T_{vis}) of skylights or toplighting
- Floor area of the space (FA)
- Measured haze value of skylight or toplighting diffuser

Perform the following calculation for each space:

- Determine the skylight or toplighting coverage, which is the ratio of skylights or toplighting area to floor area—that is, (SA/FA) (100).
- Determine the toplight daylight area, which is the outline of the opening beneath the skylight, plus in each direction the lesser of- 70% of the ceiling height, 1/2 the distance to the edge of the nearest skylight, the distance to any permanent partition that is closer than 70% of the distance between the top of the partition and the ceiling (see Figure 3).
- Confirm a minimum 0.5 VLT for skylights or toplight.
- Confirm that the skylight or toplight diffuser has a measured haze value greater than 90% per the ASTM D1003 testing methodology.
- The area of the toplighting zone complies if the skylight or toplight roof coverage is between 3% and 6%, the measured haze value is greater than 90%, and the minimum 0.5 VLT criteria is achieved.

An example of the toplighting calculation is shown in Table 1.

Figure 3. Toplighting Daylight Zone



Combined Slidelighting and Toplighting Daylight Zone

For buildings that have both slidelighting and toplighting conditions, a combination of the above 2 methodologies can be utilized to demonstrate compliance.

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OPTION 3

- Take field measurements of illuminance levels at 30 inches above the floor within all applicable areas, or measured at the appropriate desk or work height level for the intended use of the space.
- Record indoor light measurements of all regularly occupied spaces on a grid that has at least 4 points in a room and with a maximum grid interval of 10-feet. Enter the gross floor area with daylight illuminance levels of 10 footcandles or above into a summary table. See Table 2.
- For spaces where some of the measurements meet the minimum 10 footcandle requirement, only the floor area meeting the minimum criteria is counted as the daylight zone.

OPTION 4

The above calculation methods may be combined to document the minimum daylight percentage of applicable spaces. To combine the methods, determine for each space which single method will be used to determine the daylight zone. Once the daylight zone has been determined for each applicable space, sum the daylight zone areas, this sum is the total daylighted area.

Divide the total daylighted area by the total combined floor area for all applicable spaces to determine the qualifying floor area percentage.

7. Documentation Guidance

As a first step in preparing to complete the LEED Online documentation requirements, work through the following measures. Refer to LEED Online for the complete descriptions of all required documentation.

- Develop documentation—such as floor plans, sections, and elevations—showing the glare control methods used on the project.
- Maintain documentation—such as floor plans, sections, and elevations—showing the location of regularly occupied spaces with a qualifying amount of daylight.
- If using daylight simulation, update the computer model as the design progresses.
- If using measurement, record indoor light measurements of all applicable spaces on a maximum 10-foot grid on project floor plans.

8. Examples

Figure 4 provides an example of a daylight simulation model.

Figure 4. Sample Daylight Simulation Model Output

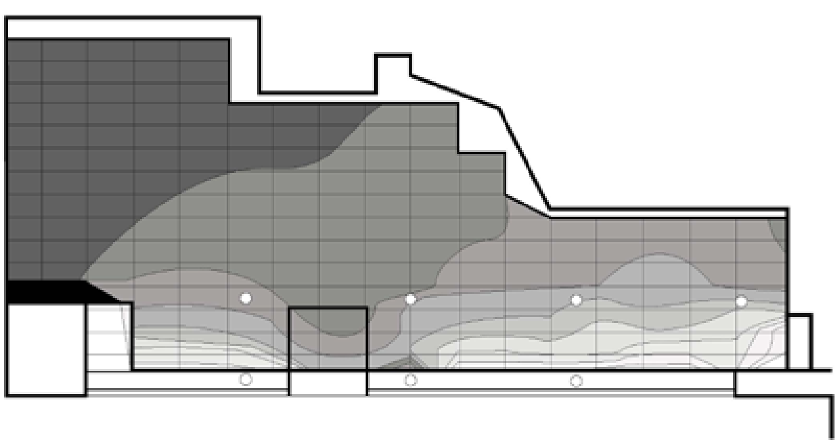

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Figure 5. Sample Prescriptive Diagram

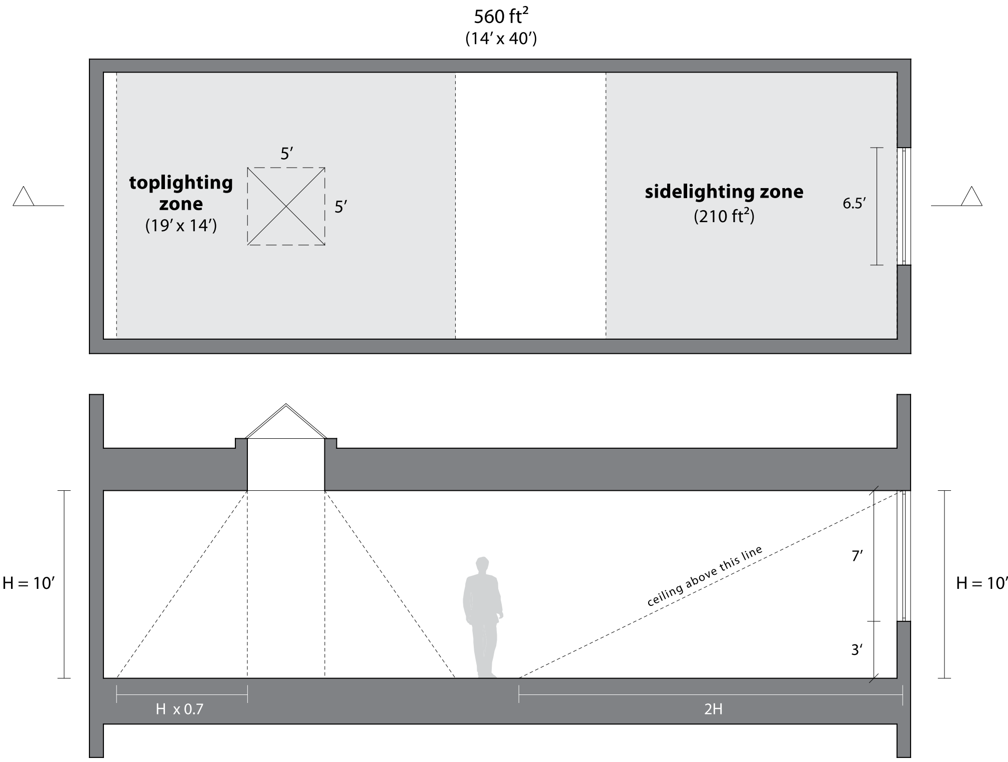

Table 1. Sample Prescriptive Calculation

Regularly Occupied Space ID	Space Type	Floor Area (sf)	Prescriptive											
			Sidelighting Daylight Zones						Toplighting Daylight Zones					Total Daylighted Area, Prescriptive (sf)
			Zone Floor Area (sf)	Window Area (sf)	Window to Floor Area Ratio (WFR)	VLT (T_{vis}) of Window	VLT x WFR	Sidelighted Area Subtotal (sf)	Zone Floor Area (sf)	Total Area of Skylight Openings (sf)	Skylight Coverage	VLT (T_{vis}) of Skylight	Toplighted Area Subtotal (sf)	
Room 119	Conference/ Meeting	1,090.00	1090.00	248.00	0.23	0.68	0.155	1090.00	0.00				0.00	1090.00
Room 123	Office: Private	455.00	298.00	64.00	0.21	0.70	0.150	298.00	0.00				0.00	298.00
Room 129	Office: Private	680.00	466.60	100.00	0.21	0.70	0.150	466.60	150.00	25.00	0.04	0.60	150.00	616.60
Room 144	Conference/ Meeting	905.00	905.00	200.00	0.22	0.70	0.155	905.00	0.00				0.00	905.00
Room 201	Other	220.00						0.00	220.00	8.00	0.04	0.60	220.00	220.00
Room 206	Office: Open	930.00						0.00	870.00	35.00	0.04	0.60	870.00	870.00
Room 210	Office: Open	1,180.00						0.00	1030.00	44.00	0.04	0.55	1030.00	1030.00
Picture Ex.	Conference/ Meeting	560.00	210.00	45.00	0.21	0.70	0.150	210.00	266.00	25.00	0.04	0.60	266.00	476.00
	Total regularly occupied area (sf)	6,020.00	Total daylighted area, prescriptive (sf)											5505.60

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Table 2. Sample Daylighting Measurement

Regularly Occupied Space ID	Space Type	Floor Area (sf)	Floor Area with Daylight Illuminance Levels between 10 fc and 500 fc
Room 101	Office- Private	400	400
Room 102	Office- Private	600	500
Room 103	Other	240	0
Room 104	Conference/Meeting	975	975
Room 110	Office- Open	2420	2120
Room 112	Office- Private	330	330
Room 114	Conference/Meeting	720	0
Room 115	Office- Private	604	604
	TOTAL	**6,289**	**4,929**

9. Exemplary Performance

NC & CS

This credit may be eligible for exemplary performance under the Innovation in Design section if the project achieves 95% daylighting based on the credit requirements and guidelines.

SCHOOLS

This credit may be eligible for exemplary performance under the Innovation in Design section if the project achieves daylighting for 90% of all classroom and core learning spaces and 95% daylighting in all other regularly occupied spaces based on the credit requirements and guidelines.

10. Regional Variations

The building site orientation and its specific regional location will directly influence the available daylight throughout the day and during the year. For instance, in northern latitudes, winter days are short, and building occupants might spend the entire period of daylight inside. Seasonal variances in the sun's daily path should be evaluated during the project design development to minimize the potential for glare inside the building while maximizing the use of functional daylighting. The consistent availability of adequate daylight at a particular project site will also affect the potential for reduction in lighting power demand through the use of daylighting strategies, such as incorporation of photoresponsive controls for perimeter lighting zones. When selecting glazing systems, balance the visible light transmittance with overall building energy performance goals to minimize undesirable heat loss and/or gain through the glazing.

11. Operations and Maintenance Considerations

Glazing and shading systems should be regularly cleaned and maintained. Windows and skylights require periodic sealant and flashing inspections to ensure water tightness.

Alterations or additions, both interior and exterior, can directly affect the daylight that reaches the building interior. Care should be taken during tenant build out to minimize obstruction of daylight.

12. Resources

Please see USGBC's LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

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Websites

Analysis of the Performance of Students in Daylighted Schools
http://www.innovativedesign.net/studentperformance.htm
This website details Innovative Design researchers Michael Nicklas and Gary Bailey's 1996 study of 3 daylighted schools in North Carolina.

The Art of Daylighting
http://www.edcmag.com/Articles/Feature_Article/10e5869a47697010VgnVCM100000f932a8c0
This Environmental Design + Construction article provides a solid introduction to daylighting.

New Buildings Institute's Productivity and Building Science Program
http://windows.lbl.gov/software/comfen/comfen.html
This report provides case studies and information on the benefits of daylighting.

Radiance Software
http://radsite.lbl.gov/radiance/
This site offers free daylighting simulation software from the Lawrence Berkeley National Laboratory.

Whole Building Design Guide, Daylighting
http://www.wbdg.org/resources/daylighting.php

Whole Building Design Guide, Electric Lighting Controls
http://www.wbdg.org/resources/electriclighting.php?r=school_library
The Daylighting and Electric Lighting Controls sections provide a wealth of resources including definitions, fundamentals, materials, and tools.

American Bird Conservancy (ABC)
http://www.abcbirds.org
ABC is a national leader in reducing human effects on birds and wildlife. ABC's bird collision program supports national efforts to reduce bird mortality through education and advocacy.

City of Chicago, Department of Environment
http://www.cityofchicago.org/Environment/BirdMigration/sub/main.html
In 1 of the first cities to implement a mandatory lights-out program, Chicago's Department of Environment has many resources for bird-friendly design.

Fatal Light Awareness Program (FLAP)
http://www.flap.org
Initiated the Bird-Friendly Building Development Program for the City of Toronto, FLAP monitors and promotes bird-friendly design.

New York City Audubon
http://www.nycaudubon.org
This Audubon chapter takes a leadership role in reducing bird collisions with buildings. The chapter publishes Bird-Safe Building Guidelines, conducts monitoring, and, through its Project Safe Flight, promotes bird-friendly design.

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13. Definitions

Daylighting is the controlled admission of natural light into a space, used to eliminate electric lighting.

Daylighting zone is the total floor area that meets the performance requirements for daylighting.

Glare is any excessively bright source of light within the visual field that creates discomfort or loss in visibility.

Regularly occupied spaces in commercial buildings are areas where people sit or stand as they work. In residential applications these spaces include all living and family rooms and exclude bathrooms, closets, or other storage or utility areas. In schools, they are areas where students, teachers, or administrators are seated or standing as they work or study.

Visible light transmittance (**T_{vis}**) is the ratio of total transmitted light to total incident light. (I.e.,the amount of visible spectrum light passing through a glazing surface divided by the amount of light striking the glazing surface. The higher T_{vis} value, the more incident light passes through the glazing.

Vision glazing is that portion of exterior windows between 30 and 90 inches above the floor that permits a view to the exterior of the project space.

Window-to-floor ratio (**WFR**) is the total area of the window (measured vertically from 30 inches above the finished floor to the top of the glass, multiplied by the width of the glass) divided by the floor area.