For the Design, Construction and Major Renovation of Retail Projects
2009 Edition (Updated May 2011)
PREFACE FROM USGBC

The built environment has a profound impact on our natural environment, economy, health, and productivity. Breakthroughs in building science, technology, and operations are now available to designers, builders, operators, and owners who want to build green and maximize both economic and environmental performance.

Through the LEED® green building certification program, the U.S. Green Building Council (USGBC) is transforming the built environment. The green building movement offers an unprecedented opportunity to respond to the most important challenges of our time, including global climate change, dependence on non sustainable and expensive sources of energy, and threats to human health. The work of innovative building professionals is a fundamental driving force in the green building moment. Such leadership is a critical component to achieving USGBC’s mission of a sustainable built environment for all within a generation.

USGBC MEMBERSHIP

USGBC’s greatest strength is the diversity of our membership. USGBC is a balanced, consensus-based nonprofit with more than 18,000 member companies and organizations representing the entire building industry. Since its inception in 1993, USGBC has played a vital role in providing a leadership forum and a unique, integrating force for the building industry. USGBC’s programs have three distinguishing characteristics:

Committee-based
The heart of this effective coalition is our committee structure, in which volunteer members design strategies that are implemented by staff and expert consultants. Our committees provide a forum for members to resolve differences, build alliances, and forge cooperative solutions for influencing change in all sectors of the building industry.

Member-driven
Membership is open and balanced and provides a comprehensive platform for carrying out important programs and activities. We target the issues identified by our members as the highest priority. We conduct an annual review of achievements that allows us to set policy, revise strategies, and devise work plans based on members’ needs.

Consensus-focused
We work together to promote green buildings, and in doing so, we help foster greater economic vitality and environmental health at lower costs. We work to bridge ideological gaps between industry segments and develop balanced policies that benefit the entire industry.

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IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Healthcare Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
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INTRODUCTION

I. WHY MAKE YOUR BUILDING GREEN?
See the LEED 2009 Green Building Design and Construction Retail Supplement for this section of the Introduction.

II. LEED® GREEN BUILDING RATING SYSTEM
See the LEED 2009 Green Building Design and Construction Retail Supplement for this section of the Introduction.

III. OVERVIEW AND PROCESS
See the LEED 2009 Green Building Design and Construction Retail Supplement for additional guidance related to the Overview and Process section.

When to Use LEED 2009 Global Alternative Compliance Paths
Alternative Compliance Paths (ACPs) to LEED credits provide additional options or approaches that address unique circumstances and accommodate advancements in science and technology. ACPs allow LEED to be more flexible and applicable to a wider range of projects. The LEED 2009 Building Design and Construction (BD&C) Global ACPs were developed for new construction and major renovations of commercial and institutional buildings, core and shell developments, schools, healthcare facilities, and retail projects. These Global ACPs can be applied at the discretion of the project team, based on applicability; they are not mandatory for any project. Some Global ACPs are available only for projects outside the U.S., and others are available for all LEED projects regardless of location, as indicated in the credit language.

Projects may use none, some, or all of the LEED 2009 Global ACPs and do not need to apply them consistently across credits unless noted in the credit language. Each credit category’s Overview section includes a table identifying which credits have Global ACPs.

For specific guidance on which rating system to use, see the LEED 2009 Green Building Design and Construction Reference Guide and the Retail Supplement.

IV. LEED ONLINE DOCUMENTATION REQUIREMENTS
See the LEED 2009 Green Building Design and Construction Retail Supplement for this section of the Introduction.

V. CERTIFICATION APPLICATION
See the LEED 2009 Green Building Design and Construction Retail Supplement for this section of the Introduction.

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VI. CERTIFICATION STRATEGY
See the LEED 2009 Green Building Design and Construction Retail Supplement for this section of the Introduction.

VII. EXEMPLARY PERFORMANCE STRATEGIES
See the LEED 2009 Green Building Design and Construction Retail Supplement for this section of the Introduction.

VIII. REGIONAL PRIORITY
See the LEED 2009 Green Building Design and Construction Retail Supplement for this section of the Introduction.

IX. TOOLS FOR REGISTERED PROJECTS
See the LEED 2009 Green Building Design and Construction Retail Supplement for this section of the Introduction.

X. HOW TO USE THIS REFERENCE GUIDE
See the LEED 2009 Green Building Design and Construction Retail Supplement for additional guidance.

The LEED 2009 BD&C Global Alternative Compliance Path Reference Guide Retail Supplement is a supporting document to the LEED Global ACPs. This guide helps project teams understand the criteria, the reasons behind them, strategies for implementation, and documentation requirements. It includes examples of strategies that can be used in each category and additional resources. It does not provide an exhaustive list of strategies for meeting the criteria or all the information that a project team needs to determine the applicability of a credit to the project.

The LEED 2009 BD&C Global Alternative Compliance Path Reference Guide Retail Supplement should be consulted in conjunction with the LEED 2009 Green Building Design and Construction Reference Guide and the Retail Supplement. Information in the reference guide is not repeated in this supplement, which focuses instead on the following:

- information specific to considerations for projects outside the U.S.
- new information for existing credits with new Alternative Compliance Paths

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OVERVIEW


Project teams outside the U.S. face many of the same challenges as their American counterparts when determining where to locate a new project. However, American codes and regulations often prove difficult to apply abroad. The Global Alternative Compliance Paths for Sustainable Sites allow project teams outside the U.S. to select local equivalents to the prescribed U.S. codes and regulations for select credits. In many cases this will lower overall project costs by reducing the required documentation.

Local equivalent standards can be used in place of U.S. government regulations for SS Credit 1 (Site Selection). Project teams outside the U.S. can use a local code or regulation if it meets the intent of the prerequisite or credit.

A new path in Option 1 for SS Credit 4 (Alternative Transportation) allows project teams to include additional vehicle types when calculating alternative transportation use for building occupants. The new option for SS Credit 6.1 (Stormwater Design—Quantity Control) allows project teams to calculate stormwater runoff reduction using a method that may be more appropriate in areas where it is difficult to calculate the 1- and 2-year 24-hour design storm.

Table 1. SS Credits with Global Alternative Compliance Paths

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<th>TITLE</th>
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### Intent

To avoid the development of inappropriate sites and reduce the environmental impact from the location of a building on a site.

### Requirements

Do not develop buildings, hardscape, roads, or parking areas on portions of sites that meet any of the following criteria:

- Prime farmland as defined by the U.S. Department of Agriculture in the United States Code of Federal Regulations, Title 7, Volume 6, Parts 400 to 699, Section 657.5 (citation 7CFR657.5). Projects outside the U.S. may use a local equivalent.

- Previously undeveloped land whose elevation is lower than 5 feet (1.5 meters) above the elevation of the 100-year flood as defined by the Federal Emergency Management Agency (FEMA), an equivalent local regulatory agency, or a professional hydrologist.

- Land specifically identified as habitat for any species on federal or state threatened or endangered lists. Projects outside the U.S. may use a local equivalent.

- Land within 100 feet (30 meters) of any wetlands as defined by the U.S. Code of Federal Regulations 40 CFR, Parts 230–233 and Part 22 or a local equivalent definition outside the U.S., and isolated wetlands or areas of special concern identified by state or local rule, OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever are more stringent.

- Previously undeveloped land that is within 50 feet (15 meters) of a water body, defined as seas, lakes, rivers, streams, and tributaries that support or could support aquatic life, recreation, or industrial use, consistent with the terminology of the Clean Water Act.

- Land that prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner (park authority projects and projects which are operated by and support the function of the park are exempt).

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1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide and the Retail Supplement for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
No new standards are referenced; see the LEED 2009 Green Building Design and Construction Reference Guide for a summary of the standards referenced in this credit. If a local equivalent has been selected, substitute that standard for the listed standards.

4. Implementation
If the level of the 100-year flood is not defined in the project region or country, engage a professional hydrologist to determine the flood risk of the project site. The professional hydrologist should use the U.S. Federal Emergency Management Agency (FEMA) definition of the 100-year flood (the flood elevation that has a 1% chance of being reached or exceeded each year) to determine flood risk. If the professional hydrologist determines that the project site is less than 5 feet above the level of the 100-year flood, the project is not eligible to earn this credit.


5. Timeline and Team
If the level of the 100-year flood is not defined in the project region or country, use a professional hydrologist to determine the flood risk of the project site. See the LEED 2009 Green Building Design and Construction Reference Guide for additional guidance on the timeline and team.

6. Calculations
There are no calculations associated with this credit.

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.

- Record any special circumstances regarding compliance with the site selection criteria.
- If the level of level of the 100-year flood is defined by a local equivalent to FEMA, include the definition used and the name of the local authority.
- If the level of the 100-year flood is not defined in the project region or country, engage a professional hydrologist to determine the flood risk of the project site. The professional hydrologist should produce a report or an executive summary of findings and supporting documentation, such as site elevations and/or topographic maps and sections identifying the flood risk of the project site.

8. Examples
A project outside the U.S. is located in an area where no definition of the 100-year flood exists. The project team has hired a professional hydrologist to identify the flood risk of the project site and produce topographical maps and sections for the area surrounding the project site. The
resulting site elevation map identifies the elevation of the project in meters above sea level. A
topographic section identifies the water surface height of a nearby river during normal levels and
during a 100-year storm event in relation to the elevation of the project site. This documentation is
accompanied by a separate report from the professional hydrologist.

**Figure 1.** Topographic map identifying level of 100-year flood event and project site.

![Topographic map identifying level of 100-year flood event and project site.]

**Figure 2.** Letter from professional hydrologist explaining topographic map and level of 100-year flood.

Jane Doe  
Hydrologist  
August 13, 2011  
Project: Qingyuan Retail Center  
To Whom It May Concern,

Upon performing research on the vulnerability of the site located along the Beijang River in Qingyuan,
Guongdong Province, China, it is my professional determination that the project site lies above the level of
the 100-year flood. As the attached topographic maps and site elevations indicate, the level of the 100-year
flood event has been determined to be 26.4 meters above sea level, whereas the project site is situated
28.2 meters above sea level. This means that the project is located 1.8 meters above the 100-year flood
event.

Please see the attached report identifying the project site and its relation to the 100-year floodplain for
further verification purposes. This report includes the methodology used to determine the level of the 100-
year flood and all associated topographic maps and site plans.

Sincerely,

Jane Doe  
Hydrologist  
ACME Geological Consulting, Inc.

9. Exemplary Performance
This credit is not eligible for exemplary performance under the Innovation in Design section of the
LEED 2009 rating system.

10. Regional Variations
There are no regional variations associated with this credit.
11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.
BROWNFIELD REDEVELOPMENT

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**Intent**
To rehabilitate damaged sites where development is complicated by environmental contamination, to reduce pressure on undeveloped land

**Requirements**

**OPTION 1**
Develop on a site documented as contaminated by means of an ASTM E1903–97 Phase II Environmental Site Assessment or a local voluntary cleanup program. Projects outside the U.S. may use a local equivalent to ASTM E1903-97 Phase II Environmental Site Assessment.

**OR**

**OPTION 2**
Develop on a site defined as a brownfield by a local, state, tribal or national government agency, whichever is most stringent.

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1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
No new standards are referenced; see the LEED 2009 Green Building Design and Construction Reference Guide for summaries of the U.S. EPA definition of brownfields; ASTM E1527-05, Phase I Environmental Site Assessment; and ASTM E1903-97, Phase II Environmental Site Assessment. If a local equivalent to the ASTM Phase II site assessment has been selected, substitute that standard for the listed standard.

4. Implementation
If a local equivalent to the ASTM Phase II Environmental Site Assessment has been selected, ensure that it is the most widely used and accepted by remediation experts in the project country. It should, at a minimum, require that an environmental professional test the soil, air, and water of the project site to identify what kinds of contaminants exist and at what levels. If contaminants are found on site, follow the Implementation guidance in the LEED 2009 Green Building Design and Construction Reference Guide.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations
There are no calculations associated with this credit.

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.

- For projects using Option 1, prepare descriptions of site contamination and remediation efforts undertaken by the project and show how those efforts are equivalent to an ASTM Phase II Environmental Site Assessment.
- For projects using Option 2, identify the local, state, tribal, or national government agency that defines the site as a brownfield and provide documentation of the remediation efforts that were undertaken.

8. Examples
There are no examples for this credit.

9. Exemplary Performance
This credit is not eligible for exemplary performance under the Innovation in Design section of the LEED 2009 rating system.
10. Regional Variations
Preliminary screening levels or remediation criteria may differ by region or country. Please ensure that local equivalents to ASTM meet the intent of the credit and ensure that local or regional criteria at least match the stringency of the EPA and ASTM requirements.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.
ALTERNATIVE TRANSPORTATION

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Intent

To reduce pollution and land development impacts from automobile use.

Requirements

OPTION 1. Public Transportation Access (6 points)

PATH 1. Rail Station, Bus Rapid Transit Station & Ferry Terminal Proximity

Locate the project within 1/2-mile (800 meters) walking distance (measured from a main building entrance) of an existing (or planned and funded) commuter rail, light rail, subway station, bus rapid transit station or commuter ferry terminal.

OR

PATH 2. Bus Stop Proximity

Locate the project within 1/4-mile (400 meters) walking distance (measured from a main building entrance) of 1 or more stops for 2 or more public, campus, or private bus lines usable by tenant space occupants.

OR

PATH 3. Rideshare Proximity

Projects outside the U.S. may locate the project within 1/4-mile (400-meter) walking distance (measured from a main building entrance) of 1 or more stops for 2 or more existing rideshare options that meet the definition of public transportation and are authorized by the local transit authority if one exists.

OPTION 2. Bicycle Commuting (1 point)

Provide secure bicycle racks and/or storage within 200 yards (200 meters) of a building entrance according to the following guidelines based on project square footage:

- Up to 5,000 sf (465 square meters), 2 or more
- 5,001–20,000 sf (466–1,860 square meters), 3 or more
- 20,001–50,000 sf (1,861–4,600 square meters), 6 or more
- More than 50,000 sf (4,600 square meters), 10 or more

1 Bus rapid transit an enhanced bus system that operates on exclusive bus lanes or other transit rights-of-way; it is designed to combine the flexibility of buses with the efficiency of rail.

2 Rideshare is a transit service that involves sharing a single vehicle with multiple people, excluding large-scale vehicles such as buses and trains. The rideshare transit facility must include a signed stop and a clearly defined waiting area. Additionally, the rideshare must include an enclosed passenger seating area, fixed route service, fixed fare structure, continuous daily operation, and the ability to pick up and drop off multiple riders. Rideshare options must hold 4 or more passengers, except for human-powered conveyances which must hold 2 or more passengers.

3 Public transportation consists of bus, rail, or other transit services for the general public that operate on a regular, continual basis.
Institute 1 of the following: lockable changing areas, showers, bicycle maintenance program, or bicycle route assistance.

FOR PROJECTS THAT ARE PART OF A MULTITENANT COMPLEX
A multitenant complex is a master-planned development of stores, restaurants, and other businesses; retailers may share one or more services and/or common areas.

If bicycle racks have been provided by the development in which the project is located, the number that may be attributed to the project is determined by taking the square footage of the retail project and dividing by the total square footage of the development (buildings only). Multiply the resulting percentage by the total number of bicycle racks. If this number does not meet the credit requirement, the project should add additional spaces.

OPTION 3. Low-Emitting and Fuel-Efficient Vehicles (1 point)

PATH 1

Provide low-emitting and fuel-efficient vehicles for 3% of the full-time equivalent (FTE) occupants.

Provide preferred parking for these vehicles.

OR

PATH 2

Provide preferred parking for low-emitting and fuel-efficient vehicles for 5% of the total employee parking and 5% of customer parking provided for the project.

OR

PATH 3

Install alternative-fuel refueling stations for 3% of the total vehicle parking capacity of the site. Liquid or gaseous fueling facilities must be separately ventilated or located outdoors.

OR

PATH 4

Provide building occupants access to a low-emitting or fuel-efficient vehicle-sharing program. The following requirements must be met:

- One low-emitting or fuel-efficient vehicle must be provided for a minimum 3% of employee FTE occupants. Assuming that 1 shared vehicle can carry 8 persons, 1 vehicle per 267 employee FTE occupants is required. For buildings with fewer than 267 employee FTE occupants, at least 1 low-emitting or fuel-efficient vehicle must be provided.

4 For the purposes of this credit, low-emitting vehicles are vehicles that are classified as zero-emission vehicles (ZEVs) by the California Air Resources Board. Fuel-efficient vehicles are defined as vehicles that have achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide.

5 For customer parking, preferred parking refers to the parking spots that are closest to the main entrance of the project (exclusive of spaces designated for handicapped) or parking passes provided at a discounted price.

For employee parking, preferred parking refers to the spots that are closest to the entrance used by employees or parking passes provided at a discounted price.

To establish a meaningful incentive in all potential markets, the parking rate must be discounted at least 20%. The discounted rate must be available to all eligible customers (i.e. not limited to the number of customers equal to 5% of the vehicle parking capacity), publicly posted at the entrance of the parking area, and available for a minimum of 2 years. For projects that are part of a development for which there is no “assigned” parking, the number of parking spaces to be used in calculations under SS Credit 4 is determined by dividing the square footage of the retail project by the total square footage of the development (buildings only, excluding common areas). This percentage is the percentage of total parking spaces to be used in calculations.
- A vehicle-sharing contract must be provided that has an agreement of at least 2 years.
- The estimated number of riders served per vehicle must be supported by documentation.
- A narrative explaining the vehicle-sharing program and its administration must be submitted.
- Parking for low-emitting and fuel-efficient vehicles must be located in the nearest available spaces in the nearest available parking area. Provide a site plan or area map clearly highlighting the walking path from the parking area to the project site and noting the distance.

OPTION 4. Parking Capacity (3 points)

PATH 1

Size parking capacity must meet but not exceed minimum local zoning requirements.
Provide preferred parking for carpools or vanpools for 5% of the total parking spaces.

OR

PATH 2

For projects that provide parking for less than 5% of full-time equivalent (FTE) building occupants:
Provide preferred parking for carpools or vanpools, marked as such, equal to for 5% of the total employee parking and 5% of customer parking provided for the project.

OR

PATH 3

Provide no new parking.

OPTION 5. Delivery Service (1 point)

Provide a delivery service for purchases made from the retail project seeking LEED certification.

It is not required that the delivery service be free of charge, but the cost should not be prohibitive.

OPTION 6. Incentives (1 point)

Provide a comprehensive incentives program for employees who carpool or use alternative transportation to get to work. Three incentives must be provided for all staff upon hire. Potential incentives may include but are not limited to the following:

- Transit pass subsidies.
- Purchase of public transportation passes on a pretax basis.
- Preferred scheduling for carpoolers. While shifts cannot be guaranteed, a reasonable effort will be made to accommodate carpooling employees’ schedules.
- An “emergency ride home” program for carpoolers and vanpoolers who must leave work unexpectedly.
- Preferred parking for carpools or vanpools.
SS CREDIT 4

- Discounts on bicycle accessories and maintenance at local shops.

OPTION 7. Alternative Transportation Education (1 point)

Provide a board or computer display in the retail project, accessible to both employees and customers, that provides the following information:

- Information on carpooling programs.
- Transit trip planning assistance.
- Transit maps.
- Maps of bicycle routes and the locations of secure bicycle parking, lockers, and showers, if provided.
- Summary of the company transportation management plan.
- Contacts for more information.
1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
There are no standards referenced for this credit.

4. Implementation
If Option 1, Rail Station, Bus Rapid Transit Station & Ferry Terminal Proximity, is selected, see the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for implementation guidance.

If Option 3, Rideshare Proximity (Option 4 in Schools), is selected, ensure that the vehicles that serve the project site meet the definition of rideshare provided in the Definitions section. See the LEED 2009 Green Building Design and Construction Reference Guide and the Retail Supplement for additional implementation guidance.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations
If Option 3, Rideshare Proximity, is selected, please follow the calculations instructions for Options 1 and 2 in the LEED 2009 Green Building Design and Construction Reference Guide.

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.

- Identify local rail stations, bus rapid transit stations, commuter ferry terminals, and bus or rideshare routes serving the project building.
- Develop a site vicinity plan, to scale, and label walking paths between the project building’s main entrance and rail stations, bus rapid transit stations, commuter ferry terminals, and bus or rideshare stops.
- If the team anticipates rail service, obtain verification of funding for the rail project.
8. Examples
A retail project in Manila is within walking distance of multiple public rideshare lines. Figure 1 shows all rideshare routes within a 1/4-mile (400-meter) walking distance from the building’s main entrance. Rideshare stop locations are clearly identified on the vicinity map. The rideshare routes also connect to additional public transportation lines that traverse the city.

Figure 1. Sample area drawing: Vicinity map identifying rideshare stop locations and route destination information

Additionally, the project team has identified the type of vehicle, rideshare stop location, and route information for each route identified in a separate table, as shown in Figure 2.
9. Exemplary Performance
Project teams may earn an Innovation in Design credit for exemplary performance by complying with the requirements of 1 of the 2 options described in the Exemplary Performance section of the LEED 2009 Green Building Design and Construction Retail Supplement.

Projects located within 1/2 mile (800 meters) of bus rapid transit or commuter ferries are eligible for exemplary performance through Option 2, Double Transit Ridership.

Project teams that select Option 3, Rideshare Proximity, are not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations
There are no regional variations associated with this credit.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide and the Healthcare Supplement for resources related to this credit.

13. Definitions
**Bus rapid transit** is an enhanced bus system that operates on exclusive bus lanes or other transit rights-of-way; it is designed to combine the flexibility of buses with the efficiency of rail.

**Rideshare** is a transit service that involves sharing a single vehicle with multiple people, excluding large-scale vehicles such as buses and trains. The rideshare transit facility must include a signed stop and a clearly defined waiting area. Additionally, the rideshare must include an enclosed passenger seating area, fixed route service, fixed fare structure, continuous daily operation, and the ability to pick up and drop off multiple riders. Rideshare vehicles must hold 4 or more passengers, except for human-powered conveyances, which must hold 2 or more passengers.

**Public transportation** consists of bus, rail, or other transit services for the general public that operate on a regular, continual basis.

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**Figure 2. Rideshare transportation table**

<table>
<thead>
<tr>
<th>TRANSPORTATION TABULATION</th>
<th>LOCATION</th>
<th>ROUTE</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Padre Faura corner M.H. del Pilar</td>
<td>Sta. Cruz - Bacalaran</td>
</tr>
<tr>
<td>2</td>
<td>Padre Faura corner A. Mabini</td>
<td>Divisoria - F.B. Harrison</td>
</tr>
<tr>
<td>3</td>
<td>FX ROUTE</td>
<td>Roxas Boulevard</td>
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STORMWATER DESIGN—QUANTITY CONTROL

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<td>Credit</td>
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<td>Points</td>
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**Intent**

To limit disruption of natural water hydrology by reducing impervious cover, increasing onsite infiltration, reducing or eliminating pollution from stormwater runoff, and eliminating contaminants.

**Requirements**

**OPTION 1. Design Storms**

**CASE 1. SITES WITH EXISTING IMPERVIOUSNESS 50% OR LESS**

**PATH 1**

Implement a stormwater management plan that prevents the postdevelopment peak discharge rate and quantity from exceeding the predevelopment peak discharge rate and quantity for the 1- and 2-year 24-hour design storms.

**OR**

**PATH 2**

Implement a stormwater management plan that protects receiving stream channels from excessive erosion. The stormwater management plan must include stream channel protection and quantity control strategies.

**CASE 2. SITES WITH EXISTING IMPERVIOUSNESS GREATER THAN 50%**

Implement a stormwater management plan that results in a 25% decrease in the volume of stormwater runoff from the 2-year 24-hour design storm.

**OR**

**OPTION 2. Percentile Rainfall Events**

**CASE 1. Non-Zero Lot Line Projects**

In a manner best replicating natural site hydrology\(^1\) processes, manage onsite\(^2\) the runoff from the developed site for the 95th percentile of regional or local rainfall events using Low Impact Development\(^3\) (LID) and green infrastructure\(^4\).

Use daily rainfall data and the methodology in the United States Environmental Protection Agency’s Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act to

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1. Natural Site Hydrology is defined as the natural land cover function of water occurrence, distribution, movement, and balance.
2. Manage Onsite refers to capturing and retaining the specified volume of rainfall to mimic natural hydrologic function. This includes, but is not limited to, strategies that manage volume through evapotranspiration, infiltration, or capture and reuse.
3. Low Impact Development (LID) is defined as an approach to managing stormwater runoff that emphasizes on-site natural features to protect water quality by replicating the natural land cover hydrologic regime of watersheds and addressing runoff close to its source. Examples include better site design principles such as minimizing land disturbance, preserving vegetation, minimizing impervious cover, and design practices like rain gardens, vegetated swales and buffers, permeable pavement, rainwater harvesting, and soil amendments. These are engineered practices that may require specialized design assistance.
4. Green Infrastructure is a soil and vegetation-based approach to wet weather management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure management approaches and technologies infiltrate, evapotranspirate, capture and reuse stormwater to maintain or restore natural hydrologies (US EPA).
determine the 95th percentile amount.

OR

CASE 2: Zero Lot Line Projects

For zero lot line projects located in urban areas with a minimum density of 1.5 FAR (13,800 square meters per hectare net), in a manner best replicating natural site hydrology processes, manage onsite the runoff from the developed site for the 85th percentile of regional or local rainfall events using LID and green infrastructure.
1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Retail Supplement for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
Stormwater Management for Federal Facilities under Section 438 of the Energy Independence and Security Act (USA)
http://www.epa.gov/owow/NPS/lid/section438/
Stormwater runoff in urban areas is one of the leading sources of water pollution. Section 438 of the U.S. Energy Independence and Security Act sets guidelines for restoring project sites to their predevelopment hydrology. U.S. EPA’s technical guidance for Section 438 provides background information, definitions, and case studies. See the website for additional information and resources.

4. Implementation
If Option 1, Design Storms, is selected, see the LEED 2009 Green Building Design and Construction Reference Guide and the Retail Supplement for implementation guidance.

Option 2. Percentile Rainfall Events
Projects that fall under Case 1, Non-Zero Lot Line Projects, should obtain local rainfall data for at least the past 5 years, if available. This information may be obtained from various sources:
- Aquastat
- the local governing authority
- local airports
- universities
- water treatment plants
- other facilities whose monitoring stations record time and total precipitation depth during each time interval

With the rainfall data, calculate the 95th percentile of regional or local storm events using the methodology in Section E of the Technical Guidance on Implementing Stormwater Runoff Requirements from the referenced standard. Determine the volume of rainwater runoff for the project site. Based on the developed project site conditions, identify areas with potential to produce runoff (areas where rainwater will not infiltrate completely into the ground). For these developed site conditions, manage the runoff by using Low-Impact Development (LID) strategies and green infrastructure on site.

If rainfall data are not available for the project’s region, natural land cover maps may be used. Determine the natural land cover conditions of the project site and use these conditions to assign runoff curve numbers. Calculate the volume of rainfall using the method described in the LEED 2009 Green Building Design and Construction Reference Guide.

Design the site to manage the volume of runoff for the 95th percentile of regional or local events. There may be multiple low-impact development or green infrastructure rainwater...
management facilities on the site. Consult U.S. EPA for a list of potential LIDs. Consider the following:

- A project site can utilize one or multiple facilities
- Locate facilities strategically to best mimic natural site hydrology (direction of flow, etc)
- Facilities may have different infiltration rates and storage capacity.
- The contaminant removal potential of the facilities

Projects that fall under Case 2, Zero Lot Line Projects, should confirm the zero lot line designation. This means that the building limits align with the site limits and the LEED project boundary. Calculate the density of the area surrounding the project. If the density is 1.5 FAR (13,800 square meters per hectare net) or greater, the project is eligible to use this case.

Follow the steps in Option 2, Case 1, above but calculate the 85th percentile rather than the 95th percentile.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations
Instructions for calculating percentile storm events can be found in Section E of the Technical Guidance on Implementing Stormwater Runoff Requirements from the referenced standard. Calculate the runoff volume based on the project’s developed conditions; refer to the LEED 2009 Green Building Design and Construction Reference Guide. Size the LID facility based on the projected volume of runoff water for the percentile storm event. All calculated runoff from the percentile storm events must be managed.

Alternatively, if using natural land cover condition maps, refer to the LEED 2009 Green Building Design and Construction Reference Guide and manage the runoff for the developed site conditions.

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.

- Gather rainfall event data over at least 5 years and document the source of that information.
- Show the calculations for the 85th or 95th percentile and for volume of runoff based on the developed site area.
- Describe the proposed stormwater management practices used on site, explain what qualifies them as LID or green infrastructure, and show how the design replicates natural site hydrology.

8. Examples
See the Technical Guidance on Implementing Stormwater Runoff Requirements from the referenced standard for examples of how to implement LID and green infrastructure practices to manage runoff for the percentile storm event.
9. Exemplary Performance
Projects using Option 2, Percentile Rainfall Events, are not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations
There are no regional variations associated with Option 2, Percentile Rainfall Events.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Retail Supplement for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

Websites
Aquastat
This international resource for precipitation data is maintained by the Food and Agriculture Organization of the United Nations.

U.S. EPA, Low-Impact Development, Stormwater Management, Section 438
http://www.epa.gov/owow/NPS/lid/section438/
This website provides valuable information, including technical guidance and fact sheets, on low-impact development strategies that can be used to mitigate stormwater runoff.

See the LEED 2009 Green Building Design and Construction Healthcare Supplement for additional resources related to this credit.

13. Definitions
Natural site hydrology is the natural land cover function of water occurrence, distribution, movement, and balance.

Manage onsite refers to capturing and retaining the specified volume of rainfall to mimic natural hydrologic function. Strategies may include evapotranspiration, infiltration, and capture and reuse.

Low-Impact Development (LID) is an approach to managing stormwater runoff that emphasizes onsite natural features to protect water quality by replicating the natural land cover hydrologic regime of watersheds and addressing runoff close to its source. Examples include better site design principles, such as minimizing land disturbance, preserving vegetation, and minimizing impervious cover, and design practices like rain gardens, vegetated swales and buffers, permeable pavement, rainwater harvesting, and soil amendments. These engineered practices may require specialized design assistance.

Green infrastructure is a soil- and vegetation-based approach to wet weather management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure management approaches and technologies infiltrate, evapotranspire, capture and reuse stormwater to maintain or restore natural hydrologies (U.S. EPA).
OVERVIEW

Clean water is a precious resource that is in constant demand. As human development spreads and the world’s population continues to increase, it is imperative that water resources be preserved. Project teams outside the U.S. encounter seasonal differences when trying to limit the water use of a new building.

Accordingly, the language in WE Credit 1 (Water-Efficient Landscaping) has been revised to accommodate projects in locations where the month with the highest irrigation demand may not be in summer. Project teams can now more accurately determine a baseline for irrigation water usage.

Table 1. WE Credits with Global Alternative Compliance Paths

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<tr>
<td>WE Credit 1</td>
<td>Water Efficient Landscaping</td>
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<tr>
<td>WE Credit 2</td>
<td>Innovative Wastewater Technologies</td>
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<tr>
<td>WE Credit 3</td>
<td>Water Use Reduction</td>
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IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
**WATER-EFFICIENT LANDSCAPING**

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**Intent**

To limit or eliminate the use of potable water, or other natural surface or subsurface water resources available on or near the project site, for landscape irrigation.

**Requirements**

**OPTION 1. Reduce by 50% (2 points)**

Reduce potable water consumption for irrigation by 50% from a calculated midsummer baseline case or using the month with the highest irrigation demand.

Reductions must be attributed to any combination of the following items:

- Plant species density and microclimate factor.
- Irrigation efficiency.
- Use of captured rainwater.
- Use of recycled wastewater.
- Use of water treated and conveyed by a public agency specifically for nonpotable uses.

Groundwater seepage that is pumped away from the immediate vicinity of building slabs and foundations can be used for landscape irrigation to meet the intent of this credit. However, the developer or owner must demonstrate that doing so does not affect site stormwater management systems.

OR

**OPTION 2. No Potable Water Use or Irrigation**¹ (4 points)

Meet the requirements for Option 1.

AND

**PATH 1**

Use only captured rainwater, recycled wastewater, recycled graywater, or water treated and conveyed by a public agency specifically for nonpotable uses for irrigation.

OR

**PATH 2**

Install landscaping that does not require permanent irrigation systems. Temporary irrigation systems used for establishing plants are allowed only if removed within 1 year of installation.

¹ If the percent reduction of potable water is 100% AND the percent reduction of total water is equal to or greater than 50%, then Option 2 is earned, for a total of 4 points.
A multitenant complex is a master-planned development of stores, restaurants, and other businesses; retailers may share one or more services and/or common areas.

If landscape irrigation for the project is part of a master plan, enter aggregate data in the submittal template. Submit documentation for the design of the rainwater collection system, the landscape design, and the extent of the supplemental temporary irrigation system.

Landscaping on the large scale of a multitenant complex provides abundant opportunity to implement solutions that require less water and use captured rainwater or recycled water. Large developments may find it cost-effective to treat buildings’ wastewater to standards for nonpotable uses.
1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
There are no standards referenced for this credit.

4. Implementation
See the LEED 2009 Green Building Design and Construction Reference Guide for complete implementation guidance, including Steps 1–4 and 6.

   Step 5. Effective and efficient watering practices should read as follows:
   - Regularly check irrigation systems for efficient and effective operation; verify watering schedules and duration on a monthly basis.
   - Use drip, micromist, and subsurface irrigation systems where applicable; use smart irrigation controllers throughout. Provide computer-controlled monitoring and schedule modifications from a central location.
   - Do not irrigate plants or turf during winter months.
   - Do not irrigate shrubs during fall, winter, or spring months.
   - To prevent mold growth, make sure irrigation systems do not allow buildings to become saturated or water to be introduced into building air intakes. Systems should be designed to keep water away from buildings.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations
See the LEED 2009 Green Building Design and Construction Reference Guide for calculations regarding this credit. The following should replace the first bullet under Standard Assumptions and Variables:
   - All calculations are based on irrigation during the month with the highest irrigation demand. The evapotranspiration rate (ET0) for the month with the greatest irrigation demand should be determined by the project’s landscape designer based on local climate data; project teams may also refer to the International Water Management Institute (http://www.iwmi.cgiar.org/WAtlas/Default.aspx) or the EPA Water Budget Data Finder in determining the peak watering month with the greatest irrigation demand (http://www.epa.gov/WaterSense/new_homes/wb_data_finder.html).

7. Documentation Guidance
See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.
8. Examples
See the LEED 2009 Green Building Design and Construction Reference Guide for an example of implementing a rainwater harvesting system to reduce potable water used for irrigation on a project. The example is applicable to projects using the month with the highest irrigation demand rather than July.

9. Exemplary Performance
This credit is not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations
Much of the world is faced with increasing demands on existing water supplies, making it important to landscape sites appropriately for the climate. Landscaping should fit the site's climate and microclimate, sun exposure, soil type, drainage, and topography.

In hot, dry climates, emphasize drought-tolerant plants and xeriscape designs that mimic the natural landscape. Reducing or eliminating turf grass will lessen the demand on potable water. If turf grass is desired, select a species that can endure drought.

In hot, humid, and temperate climates, use native plants combined with rain or moisture sensors to avoid unnecessary watering during wet seasons. The use of captured rainwater can help eliminate the use of potable water for irrigation.

In cold climates, install hardy, native plants that will survive the winter months. Rain or moisture sensors will help prevent excessive watering.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

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

Websites
EPA Water Budget Data Finder
http://www.epa.gov/WaterSense/new_homes/wb_data_finder.html
U.S. EPA provides guidance in determining the peak watering month with the greatest irrigation demand.

International Water Management Institute
This organization provides monthly evapotranspiration and rainfall data worldwide.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional resources related to this credit.

13. Definitions
Month with the highest irrigation demand is the maximum monthly delta between evapotranspiration rate (ET0) and mean monthly rainfall.

See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of other terms used in this credit.
OVERVIEW


Buildings are a major consumer of energy and electricity across the globe, and predicting and lowering energy consumption in buildings are significant components of LEED. Because energy modeling is a very complex process that involves the use of computer-generated models and stringent energy standards, project teams outside the U.S. seeking to use an alternative to ANSI/ASHRAE/IESNA Standard 90.1–2007 in EA Prerequisite 2 (Minimum Energy Performance) and EA Credit 1 (Optimize Energy Performance) must first submit to a review process, as outlined later in this document.

Project teams seeking to achieve EA Credit 6 (Green Power) may now purchase renewable power from local sources as long as it meets the major Green-e Energy program criteria.

Table 1. EA Credits with Global Alternative Compliance Paths

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<tr>
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<tr>
<td>EA Prerequisite 1</td>
<td>Fundamental Commissioning of Building Energy Systems</td>
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<td>EA Prerequisite 2</td>
<td>Minimum Energy Performance</td>
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MINIMUM ENERGY PERFORMANCE

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<td>Prerequisite</td>
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<td>Points</td>
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**Intent**
To establish the minimum level of energy efficiency for the proposed building and systems to reduce environmental and economic impacts associated with excessive energy use.

**Requirements**

**OPTION 1. Whole Building Energy Simulation**
Demonstrate a 10% improvement in the proposed building performance rating for new buildings, or a 5% improvement in the proposed building performance rating for renovations to existing buildings, compared with the baseline building performance rating. Calculate the baseline building performance rating according to the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1–2007 (with errata but without addenda) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard.

Appendix G of Standard 90.1–2007 requires that the energy analysis done for the building performance rating method include all energy costs associated with the building project. To achieve points using this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4) in Standard 90.1–2007 (with errata but without addenda) or USGBC approved equivalent.
- Inclusion of all the energy costs associated with the building project.
- Comparison against a baseline building that complies with Appendix G of Standard 90.1–2007 (with errata but without addenda) or USGBC approved equivalent. There is no default process energy cost.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment), and other (e.g., waterfall pumps).

Regulated (nonprocess) energy includes lighting (for the interior, parking garage, surface parking, façade, building grounds, etc., except as noted above); heating, ventilation, and air-conditioning (HVAC) (for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.); and service water heating (for domestic or space heating purposes).

Process loads shall be identical for both the baseline building performance rating and for the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1–2007, G2.5) or USGBC approved equivalent to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and the

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*Project teams wishing to use addenda approved by ASHRAE for the purposes of this prerequisite may do so at their discretion. Addenda must be applied consistently across all LEED credits.*

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proposed design, and theoretical or empirical information supporting these assumptions.

Many of the industry standard baseline conditions for commercial kitchen equipment and refrigeration have been defined in Tables 1–4 in the Requirements section of EA Credit 1. No additional documentation is necessary to substantiate these predefined baseline systems as industry standard. If USGBC approved equivalent addresses process loads within the standard rather than using an exceptional calculation method, demonstrate how the requirements of Tables 1-4 are being met by the standard.


OR


Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Small Retail Buildings 2006. Project teams must fully comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

The building must meet the following requirements:

- Less than 20,000 square feet (1,800 square meters).
- Retail occupancy.

OR


Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet (9,300 square meters).
- Comply with Section 1, Design Process Strategies, and Section 2, Core Performance Requirements.
- Projects less than 100,000 square feet (9,300 square meters) must comply with Section 1 and Section 2 of the Core Performance Guide.
- Health care, warehouse, and laboratory projects are ineligible for this option.

Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.
1. **Benefits and Issues to Consider**
   Refer to the Benefits and Issues section of EA Credit 1 in this supplement.

2. **Related Credits**
   See the Related Credits section in EA Credit 1 in this supplement.

3. **Summary of Referenced Standards**
   Refer to the Summary of Referenced Standards section in EA Credit 1 in this supplement.

4. **Implementation**
   Refer to the Implementation section in EA Credit 1 in this supplement.

5. **Timeline and Team**
   Refer to the Timeline and Team section in EA Credit 1 in this supplement.

6. **Calculations**
   Refer to the Calculations section in EA Credit 1 in this supplement.

7. **Documentation Guidance**
   Refer to the Documentation Guidance section in EA Credit 1 in this supplement.

8. **Examples**
   Refer to the Examples section in EA Credit 1 in this supplement.

9. **Exemplary Performance**
   This prerequisite is not eligible for exemplary performance under the Innovation in Design section.

10. **Regional Variations**
    Refer to the Regional Variations section in EA Credit 1 in this supplement.

11. **Operations and Maintenance Considerations**
    Refer to the Operations and Maintenance Considerations section in EA Credit 1 in this supplement.

12. **Resources**
    See EA Credit 1 in the LEED 2009 Green Building Design and Construction Reference Guide for additional resources.

13. **Definitions**
    Refer to the definitions section EA Credit 1 in this supplement.
OPTIMIZE ENERGY PERFORMANCE

<table>
<thead>
<tr>
<th></th>
<th>RETAIL: NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit</td>
<td>EA Credit 1</td>
</tr>
<tr>
<td>Points</td>
<td>1-19 points</td>
</tr>
</tbody>
</table>

**Intent**

To achieve levels of energy performance beyond those in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

**Requirements**

Select 1 of the 3 compliance path options described below. Project teams documenting achievement using any of the 3 options are assumed to be in compliance with EA Prerequisite 2, Minimum Energy Performance.

**OPTION 1. Whole Building Energy Simulation (1–19 points)**

Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1–2007 (with errata but without addenda1) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard. The minimum energy cost savings percentage for each point threshold is as follows:

<table>
<thead>
<tr>
<th>New Buildings</th>
<th>Existing Building Renovations</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>12%</td>
<td>8%</td>
<td>1</td>
</tr>
<tr>
<td>14%</td>
<td>10%</td>
<td>2</td>
</tr>
<tr>
<td>16%</td>
<td>12%</td>
<td>3</td>
</tr>
<tr>
<td>18%</td>
<td>14%</td>
<td>4</td>
</tr>
<tr>
<td>20%</td>
<td>16%</td>
<td>5</td>
</tr>
<tr>
<td>22%</td>
<td>18%</td>
<td>6</td>
</tr>
<tr>
<td>24%</td>
<td>20%</td>
<td>7</td>
</tr>
<tr>
<td>26%</td>
<td>22%</td>
<td>8</td>
</tr>
<tr>
<td>28%</td>
<td>24%</td>
<td>9</td>
</tr>
<tr>
<td>30%</td>
<td>26%</td>
<td>10</td>
</tr>
<tr>
<td>32%</td>
<td>28%</td>
<td>11</td>
</tr>
<tr>
<td>34%</td>
<td>30%</td>
<td>12</td>
</tr>
<tr>
<td>36%</td>
<td>32%</td>
<td>13</td>
</tr>
<tr>
<td>38%</td>
<td>34%</td>
<td>14</td>
</tr>
<tr>
<td>40%</td>
<td>36%</td>
<td>15</td>
</tr>
<tr>
<td>42%</td>
<td>38%</td>
<td>16</td>
</tr>
<tr>
<td>44%</td>
<td>40%</td>
<td>17</td>
</tr>
<tr>
<td>46%</td>
<td>42%</td>
<td>18</td>
</tr>
<tr>
<td>48%</td>
<td>44%</td>
<td>19</td>
</tr>
</tbody>
</table>

All building energy uses associated with the project must be included in the energy simulation model. Improvements to process loads must be documented as described below. Nonprocess energy systems include HVAC (heating, cooling, fans, and pumps), service water heating, and lighting. Process loads for retail may include refrigeration equipment, cooking and food preparation, clothes washing, and other major support appliances. Merchandise for sale that is plugged in and small movable appliances are not candidates for improved energy performance.

**IMPORTANT!** This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
Appendix G of Standard 90.1–2007 requires that the energy analysis done for the building performance rating method include all of the energy costs associated with the building project. To achieve points under this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4) in Standard 90.1–2007 (with errata but without addenda) or USGBC approved equivalent.
- Inclusion of all the energy costs within and associated with the building project.
- Comparison against a baseline building that complies with Appendix G of Standard 90.1–2007 (with errata but without addenda) or USGBC approved equivalent. There is no default process energy cost.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment), and other (e.g., waterfall pumps).

Regulated (nonprocess) energy includes lighting (for the interior, parking garage, surface parking, façade, building grounds, etc., except as noted above), heating, ventilating, and air-conditioning (HVAC) (for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, etc.), and service water heating (for domestic or space heating purposes).

For this credit, process loads must be identical both for the baseline building performance rating and for the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1–2007, G2.5) or USGBC approved equivalent to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and the proposed design, and theoretical or empirical information supporting these assumptions.


Many of the industry standard baseline conditions for commercial kitchen equipment and refrigeration have been defined in Tables 1–4. No additional documentation is necessary to substantiate these predefined baseline systems as industry standard.

For process loads, provide cutsheets or other documentation demonstrating proposed equipment and budget equipment not covered in Tables 1–4. A clear baseline must be described and documented to compare proposed improvements in process load categories. The baseline and design must be documented in the following ways:

- For appliances and equipment, provide cutsheets of proposed equipment and budget equipment not covered in Tables 1–4 that indicate hourly energy use. Provide a spreadsheet calculation estimating the daily use hours for each piece of equipment listed. Use the total estimated energy use in the energy simulation model as a plug load. Reduced use time (schedule change) is not a category of energy improvement in this credit. ENERGY STAR ratings and evaluations are a valid basis for performing this calculation.

- Spreadsheet calculation may also be utilized for calculation of commercial appliances energy consumption, and input into the Energy Cost Budget (ECB), in lieu of energy
simulation modeling as a plug load.

For display lighting, the space-by-space method of determining allowed lighting power under ANSI/ASHRAE/IESNA Standard 90.1–2007 must be used to determine the appropriate baseline for both the general building space and the display lighting. Installed lighting in the proposed building, including display lighting, is compared with this baseline in the simulation.

For hard-wired refrigeration loads, the impact of energy performance improvements must be modeled with a simulation program specifically designed to account for refrigeration equipment. For example, eQUEST has a refrigeration module that can be used to simulate performance improvements in refrigeration equipment.

To establish the baseline and design conditions for the energy cost budget, use Tables 1 and 2.

OR

OPTION 2. Prescriptive Compliance Path: ASHRAE Advanced Energy Design Guide (1 point)


Project teams must fully comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

The building must meet the following requirements:

- Less than 20,000 square feet (1,800 square meters).
- Retail occupancy.

AND

Projects must comply with the prescriptive measures on Tables 1–4 for 90% of total energy consumption for all process equipment.

OR


Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet (9,300 square meters).
- Comply with Section 1, Design Process Strategies, and Section 2, Core Performance Requirements.
- Health care, warehouse, or laboratory projects are ineligible for this path.

Points achieved under Option 3 (1 point):

- 1 point is available for all office, school, public assembly, and retail projects less than 100,000 square feet (9,300 square meters) that comply with Sections 1 and 2 of the Core Performance Guide.
EA CREDIT 1

- Up to 2 additional points are available to projects that implement performance strategies listed in Section 3, Enhanced Performance. For every 3 strategies implemented from this section, 1 point is available.

- The following strategies are addressed by other aspects of LEED and are not eligible for additional points under EA Credit 1:
  - 3.1—Cool Roofs
  - 3.8—Night Venting
  - 3.13—Additional Commissioning

Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

AND

Projects must comply with the prescriptive measures in Tables 1–4 for 90% of total energy consumption for all process equipment.
EA CREDIT 1

IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
### Table 1. Commercial Kitchen Appliance Prescriptive Measures and Baseline for Energy Cost Budget

<table>
<thead>
<tr>
<th>Appliance Type</th>
<th>Fuel Source</th>
<th>Pre-EEM Efficiency</th>
<th>Pre-EEM Idle Rate</th>
<th>Pre-EEM Water Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Fryers</td>
<td>Elec</td>
<td>75%</td>
<td>1050 W (1)</td>
<td>Na</td>
</tr>
<tr>
<td>Large Vat Fryers</td>
<td>Elec</td>
<td>75%</td>
<td>1350 W</td>
<td>Na</td>
</tr>
<tr>
<td>Steam Cooker – Batch Cooking</td>
<td>Elec</td>
<td>26%</td>
<td>200 W/pan</td>
<td>30 gph per compartment (113.56 lph per pan)</td>
</tr>
<tr>
<td>Steam Cooker – High Production/cook to order</td>
<td>Elec</td>
<td>26%</td>
<td>330 W/pan</td>
<td>40 gph per compartment (151.42 lph per pan)</td>
</tr>
<tr>
<td>Hot Food Holding Cabinets (excluding drawer warmers and heated display)</td>
<td>Elec</td>
<td>125w/ft² (4.464.29 w/m²)</td>
<td>Na</td>
<td></td>
</tr>
<tr>
<td>Solid Door Reach-in Refrigerators</td>
<td>Elec</td>
<td>1V + 2.4 kWh/day</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Solid Door Reach-in Freezers</td>
<td>Elec</td>
<td>0.4V + 1.38 kWh/day</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Solid Door Reach-in Refrigerator / Freezer</td>
<td>Elec</td>
<td>0.52V – 0.8165 kWh/day</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Glass Door Reach-in Refrigerators</td>
<td>Elec</td>
<td>12V + 3.34 kWh/day</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Ice Cream Freezer</td>
<td>Elec</td>
<td>0.45V + 0.943 kWh/day</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Undercounter Dish Machines – High Temp</td>
<td>Elec</td>
<td>0.9 kW</td>
<td>1.98 gph (7.50 lpm)</td>
<td></td>
</tr>
<tr>
<td>Undercounter Dish Machines – Low Temp</td>
<td>Elec</td>
<td>0.5 kW</td>
<td>1.95 gph (7.38 lpm)</td>
<td></td>
</tr>
<tr>
<td>Door Type Dishmachine – High Temp</td>
<td>Elec</td>
<td>1.0 kW</td>
<td>1.44 gph (5.45 lpm)</td>
<td></td>
</tr>
<tr>
<td>Door Type Dishmachine – Low Temp</td>
<td>Elec</td>
<td>0.6 kW</td>
<td>1.85 gph (7.00 lpm)</td>
<td></td>
</tr>
<tr>
<td>Single Tank Rack Conveyor Dishmachine – High Temp</td>
<td>Elec</td>
<td>2.0 kW</td>
<td>1.13 gph (4.66 lpm)</td>
<td></td>
</tr>
<tr>
<td>Single Tank Rack Conveyor Dishmachine – Low Temp</td>
<td>Elec</td>
<td>1.5 kW</td>
<td>1.23 gph (4.66 lpm)</td>
<td></td>
</tr>
<tr>
<td>Multi-tank Rack Conveyor Dishmachine – High Temp</td>
<td>Elec</td>
<td>2.6 kW</td>
<td>1.1 gph (4.16 lpm)</td>
<td></td>
</tr>
<tr>
<td>Multi-tank Rack Conveyor Dishmachine – Low Temp</td>
<td>Elec</td>
<td>2.0 kW</td>
<td>0.99 gph (3.75 lpm)</td>
<td></td>
</tr>
<tr>
<td>Ice Machine (Ice making head) (IMH) H &lt; 450 lb/day (&lt; 204.11 kg/day)</td>
<td>Elec</td>
<td>10.26 – 0.00866 kWh/100 lb ice (46 kg)</td>
<td>Na</td>
<td>&lt; 0.3 gph/100 lb ice (&lt; 114 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine (Ice making head) (IMH) H &gt; 450 lb/day (&gt; 204.11 kg/day)</td>
<td>Elec</td>
<td>6.89 – 0.00111 kWh/100 lb ice (46 kg)</td>
<td>Na</td>
<td>&lt; 0.3 gph/100 lb ice (&lt; 114 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine RCU (w/o remote compressor) H &lt; 1000 lb/day (&lt; 453.59 kg/day)</td>
<td>Elec</td>
<td>8.45 – 0.00338 kWh/100 lb ice (46 kg)</td>
<td>Na</td>
<td>&lt; 0.3 gph/100 lb ice (&lt; 114 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine RCU (w/o remote compressor) H &gt; 1000 lb/day (&gt; 453.59 kg/day)</td>
<td>Elec</td>
<td>5.10 kWh/100 lb ice (46 kg)</td>
<td>Na</td>
<td>&lt; 0.3 gph/100 lb ice (&lt; 114 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine RCU (with remote compressor) H &lt; 934 lb/day (&lt; 423.66 kg/day)</td>
<td>Elec</td>
<td>8.85 – 0.00394 kWh/100 lb ice (46 kg)</td>
<td>Na</td>
<td>&lt; 0.3 gph/100 lb ice (&lt; 114 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine RCU (with remote compressor) H &gt; 934 lb/day (&gt; 423.66 kg/day)</td>
<td>Elec</td>
<td>5.30 kWh/100 lb ice (46 kg)</td>
<td>Na</td>
<td>&lt; 0.3 gph/100 lb ice (&lt; 114 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine Self Contained Unit (SCU) H &lt; 175 lb/day (&lt; 79.38 kg/day)</td>
<td>Elec</td>
<td>18.0 – 0.04040 kWh/100 lb ice (46 kg)</td>
<td>Na</td>
<td>&lt; 0.4 gph/100 lb ice (&lt; 152 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine Self Contained Unit (SCU) H &gt; 175 lb/day (&gt; 79.38 kg/day)</td>
<td>Elec</td>
<td>9.80 kWh/100 lb ice (46 kg)</td>
<td>Na</td>
<td>&lt; 0.4 gph/100 lb ice (&lt; 152 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine Water Cooled IMH H &lt; 500 lb/day (&lt; 226.80 kg/day)</td>
<td>Elec</td>
<td>7.80 – 0.00353 kWh/100 lb ice (46 kg)</td>
<td>(3)</td>
<td>&lt; 0.3 gph/100 lb ice (&lt; 114 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine Water Cooled IMH H &gt; 500 lb/day (&gt; 226.80 kg/day)</td>
<td>Elec</td>
<td>5.58 – 0.00131 kWh/100 lb ice (46 kg)</td>
<td>(3)</td>
<td>&lt; 0.3 gph/100 lb ice (&lt; 114 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine Water Cooled IMH H &gt; 1436 lb/day (&gt; 651.36 kg/day)</td>
<td>Elec</td>
<td>4.0 kWh/100 lb ice (46 kg)</td>
<td>(3)</td>
<td>&lt; 0.3 gph/100 lb ice (&lt; 114 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine Water Cooled SCU H &lt; 200 lb/day (&lt; 90.72 kg/day)</td>
<td>Elec</td>
<td>11.4 – 0.01936 kWh/100 lb ice (46 kg)</td>
<td>(4)</td>
<td>&lt; 0.4 gph/100 lb ice (&lt; 152 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine Water Cooled SCU H &gt; 200 lb/day (&gt; 90.72 kg/day)</td>
<td>Elec</td>
<td>7.6 kWh/100 lb ice (46 kg)</td>
<td>(4)</td>
<td>&lt; 0.4 gph/100 lb ice (&lt; 152 L/46 kg ice)</td>
</tr>
<tr>
<td>Ice Machine once through water cooled</td>
<td>Banned</td>
<td>Banned</td>
<td>Banned</td>
<td>Banned</td>
</tr>
<tr>
<td>Griddles (based on 3 inch (9.44 cm) model)</td>
<td>Elec</td>
<td>420 W/ft²</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Convection Ovens (full size)</td>
<td>Elec</td>
<td>70% burner efficiency</td>
<td>2.0 kW</td>
<td>Na</td>
</tr>
<tr>
<td>Combination Ovens</td>
<td>Elec</td>
<td>44%</td>
<td>1.25 kW/pan</td>
<td>&lt; 4.0 gph (15.14 lph) per pan</td>
</tr>
<tr>
<td>Toaster</td>
<td>Elec</td>
<td>1.8 kW (100% duty cycle @ 4 slices per min.) = 1 conveyor</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Pre-rinse Spray valves (MANDATORY)</td>
<td>Na</td>
<td>Na</td>
<td>Na</td>
<td>1.6 gpm (6 lpm)</td>
</tr>
<tr>
<td>Kitchen Exhaust Hood</td>
<td>Na</td>
<td>Na</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Fryers</td>
<td>Gas</td>
<td>35%</td>
<td>14000 BTU/hr (4.1 kW) (1)</td>
<td>Na</td>
</tr>
<tr>
<td>Large Vat Fryers</td>
<td>Gas</td>
<td>35%</td>
<td>20000 BTU/hr (5.86 kW)</td>
<td>Na</td>
</tr>
<tr>
<td>Steam Cooker – Batch Cooking</td>
<td>Gas</td>
<td>15%</td>
<td>1600 BTU/pan (0.53 kW/pan)</td>
<td>30 gph (113.56 lph) per compartment</td>
</tr>
<tr>
<td>Steam Cooker – High Production/cook to order</td>
<td>Gas</td>
<td>15%</td>
<td>3000 BTU/pan (0.88 kW/pan)</td>
<td>40 gph (151.42 lph) per compartment</td>
</tr>
<tr>
<td>Griddles</td>
<td>Gas</td>
<td>32%</td>
<td>3200 BTU/hr² (10.09 kW/m²)</td>
<td>Na</td>
</tr>
<tr>
<td>Convocation Ovens (full size)</td>
<td>Gas</td>
<td>30%</td>
<td>18000 BTU/hr (5.27 kW)</td>
<td>Na</td>
</tr>
<tr>
<td>Combination Ovens</td>
<td>Gas</td>
<td>35%</td>
<td>4700 BTU/pan (1.38 kW/pan)</td>
<td>40 gph (151.42 lph) per pan</td>
</tr>
<tr>
<td>Rack Ovens – Single</td>
<td>Gas</td>
<td>30%</td>
<td>43000 BTU (12.59 kW)</td>
<td>Na</td>
</tr>
<tr>
<td>Rack Ovens – Double</td>
<td>Gas</td>
<td>30%</td>
<td>65000 BTU (19.03 kW)</td>
<td>Na</td>
</tr>
<tr>
<td>Broiler (underfired)</td>
<td>Gas</td>
<td>30%</td>
<td>20,000 BTU/hr² peak input (63.04 kW/m²)</td>
<td>Na</td>
</tr>
<tr>
<td>Range</td>
<td>Gas</td>
<td>35% burner efficiency</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Convoyer oven (small) = &lt; 25 inch (63.5 cm) belt</td>
<td>Gas</td>
<td>30%</td>
<td>45,000 BTU/hr (13.18 kW)</td>
<td>Na</td>
</tr>
<tr>
<td>Convoyer oven (large) = &gt; 25 inch (63.5 cm) belt</td>
<td>Gas</td>
<td>20%</td>
<td>70000 BTU/hr (20.50 kW)</td>
<td>Na</td>
</tr>
<tr>
<td>High Efficiency Hot Water heater</td>
<td>Gas</td>
<td>82%</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Instantaneous water heater</td>
<td>Gas</td>
<td>82%</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>Clothes Washer</td>
<td>Gas</td>
<td>1.72 MEF</td>
<td>8.0 WF</td>
<td>Na</td>
</tr>
</tbody>
</table>

ABBREVIATIONS:
- ES = EPA Energy Star
- CEE = Consortium for Energy Efficiency
- CAIOU = California Energy Commission
- FSTC = Food Service Technology Center

**Notes:**
1. Based on 15 inch (38.1 cm) fryer
2. All Adjusted Volume = 1.6 x freezer volume + refrigerator volume
3. Condenser water use = 200 – 0.0292 gal/100 lb (46 kg) ice
4. Condenser water use = 191 – 0.0315 gal/100 lb (46 kg) ice
### Levels for Prescriptive Path

<table>
<thead>
<tr>
<th>LEED efficiency</th>
<th>LEED idle rate</th>
<th>LEED water use</th>
<th>Prescriptive criteria based on:</th>
<th>Energy Star Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>80%</td>
<td>1000 W (1)</td>
<td>na</td>
<td>CEE, ES, CAIOU</td>
<td>yes</td>
</tr>
<tr>
<td>80%</td>
<td>1250 W</td>
<td>na</td>
<td>CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>50%</td>
<td>135 W/pan</td>
<td>10 gph (37.85 lph) per compartment</td>
<td>ES</td>
<td>pending</td>
</tr>
<tr>
<td>50%</td>
<td>275 W/pan</td>
<td>15 gph (56.78 lph) per compartment</td>
<td>ES – modified</td>
<td>pending</td>
</tr>
<tr>
<td>0.06V + 1.22 kWh/day</td>
<td>na</td>
<td>na</td>
<td>CEE Tier II, CAIOU</td>
<td>yes</td>
</tr>
<tr>
<td>0.28V + 0.97 kWh/day</td>
<td>na</td>
<td>na</td>
<td>CEE Tier II, CAIOU</td>
<td>yes</td>
</tr>
<tr>
<td>0.27V or 0.71 kWh/day</td>
<td>na</td>
<td>na</td>
<td>CEE Tier II, CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>0.3W + 0.82 kWh/day</td>
<td>na</td>
<td>na</td>
<td>CEE Tier II, CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>na</td>
<td>0.9 kW</td>
<td>1 gph (3.79 lph)</td>
<td>ES</td>
<td>yes</td>
</tr>
<tr>
<td>na</td>
<td>0.5 kW</td>
<td>1.7 gph (6.44 lph)</td>
<td>ES</td>
<td>yes</td>
</tr>
<tr>
<td>na</td>
<td>1.0 kW</td>
<td>0.95 gph (3.60 lph)</td>
<td>ES</td>
<td>yes</td>
</tr>
<tr>
<td>na</td>
<td>0.5 kW</td>
<td>1.18 gph (4.47 lph)</td>
<td>ES</td>
<td>yes</td>
</tr>
<tr>
<td>na</td>
<td>2.0 kW</td>
<td>0.7 gph (2.85 lph)</td>
<td>ES</td>
<td>yes</td>
</tr>
<tr>
<td>na</td>
<td>1.5 kW</td>
<td>0.79 gph (2.99 lph)</td>
<td>ES</td>
<td>yes</td>
</tr>
<tr>
<td>na</td>
<td>2.5 kW</td>
<td>0.54 gph (2.04 lph)</td>
<td>ES</td>
<td>yes</td>
</tr>
<tr>
<td>na</td>
<td>2.0 kW</td>
<td>0.54 gph</td>
<td>ES</td>
<td>yes</td>
</tr>
<tr>
<td>9.23 - 0.0077 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 25 gal/lb ice (&lt;95 L/46 kg)</td>
<td>CEE Tier II, ES</td>
<td>yes</td>
</tr>
<tr>
<td>6.20 - 0.0010 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 25 gal/lb ice (&lt;95 L/46 kg)</td>
<td>CEE Tier II, ES</td>
<td>yes</td>
</tr>
<tr>
<td>8.05 - 0.0035 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 25 gal/lb ice (&lt;95 L/46 kg)</td>
<td>CEE Tier II, ES</td>
<td>yes</td>
</tr>
<tr>
<td>4.64 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 25 gal/lb ice (&lt;95 L/46 kg)</td>
<td>CEE Tier II, ES</td>
<td>yes</td>
</tr>
<tr>
<td>8.05 - 0.0035 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 25 gal/lb ice (&lt;95 L/46 kg)</td>
<td>CEE Tier II, ES</td>
<td>yes</td>
</tr>
<tr>
<td>4.82 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 25 gal/lb ice (&lt;95 L/46 kg)</td>
<td>CEE Tier II, ES</td>
<td>yes</td>
</tr>
<tr>
<td>16.7 - 0.045 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 35 gal/lb ice (133 L/46 kg)</td>
<td>CEE Tier II, ES</td>
<td>yes</td>
</tr>
<tr>
<td>9.11 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 35 gal/lb ice (133 L/46 kg)</td>
<td>CEE Tier II, ES</td>
<td>yes</td>
</tr>
<tr>
<td>7.02 - 0.0095 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 25 gal/lb ice (&lt;95 L/46 kg)</td>
<td>CEE Tier II, ES</td>
<td>yes</td>
</tr>
<tr>
<td>5.13 - 0.0131 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 25 gal/lb ice (&lt;95 L/46 kg)</td>
<td>CEE Tier II, ES</td>
<td>yes</td>
</tr>
<tr>
<td>3.7 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 25 gal/lb ice (&lt;95 L/46 kg)</td>
<td>CEE Tier II</td>
<td>x</td>
</tr>
<tr>
<td>10.6 - 0.177 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 35 gal/lb ice (133 L/46 kg)</td>
<td>CEE Tier II</td>
<td>x</td>
</tr>
<tr>
<td>7.07 kWh/lb ice (46 kg)</td>
<td>na</td>
<td>&lt; 35 gal/lb ice (133 L/46 kg)</td>
<td>CEE Tier II</td>
<td>x</td>
</tr>
<tr>
<td>70%</td>
<td>1.5 kW</td>
<td>na</td>
<td>CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>60%</td>
<td>0.85 kW/pan</td>
<td>&lt; 15 gph per pan (&lt;13.25 gph per pan)</td>
<td>CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>3.6 kW (8% duty cycle) = 2 pop-ups</td>
<td>na</td>
<td>&lt; 1.2 gpm per pan (&lt;4.54 lpm)</td>
<td>epact 2005</td>
<td>na</td>
</tr>
<tr>
<td>35% reduction in design (full speed) ventilation rate (cfm) plus demand controlled ventilation</td>
<td>na</td>
<td>na</td>
<td>FSTC recommendation</td>
<td>no</td>
</tr>
<tr>
<td>50%</td>
<td>9000 BTU/h (3.24 kW)</td>
<td>na</td>
<td>CEE, ES</td>
<td>yes</td>
</tr>
<tr>
<td>50%</td>
<td>12000 BTU/h (3.51 kW)</td>
<td>na</td>
<td>CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>38%</td>
<td>2100 BTU/h/pan (8.51 kW/pan)</td>
<td>10 gph (37.85 lph) per compartment</td>
<td>CEE, ES, CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>38%</td>
<td>4500 BTU/h/pan (12.26 kW/pan)</td>
<td>15 gph (56.78 lph) per compartment</td>
<td>CEE, ES, CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>38%</td>
<td>3000 BTU/h (9.46 kW/m²)</td>
<td>na</td>
<td>CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>43%</td>
<td>13000 BTU/h (3.81 kW)</td>
<td>na</td>
<td>FSTC recommendation based on anticipated ES level</td>
<td>pending</td>
</tr>
<tr>
<td>40%</td>
<td>2850 BTU/h/pan (8.83 kW/pan)</td>
<td>≤ 15 gph per pan (56.78 lph)</td>
<td>CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>50%</td>
<td>29000 BTU/h (8.49 kW)</td>
<td>na</td>
<td>CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>50%</td>
<td>35000 BTU/h (10.25 kW)</td>
<td>na</td>
<td>CAIOU</td>
<td>pending</td>
</tr>
<tr>
<td>35%</td>
<td>12500 BTU/h/ft² peak input (39.40 kW/m²)</td>
<td>na</td>
<td>FSTC recommendation no</td>
<td>x</td>
</tr>
<tr>
<td>40% burn efficiency</td>
<td>3%</td>
<td>na</td>
<td>FSTC recommendation</td>
<td>x</td>
</tr>
<tr>
<td>42%</td>
<td>30000 BTU/h (8.78 kW)</td>
<td>na</td>
<td>FSTC recommendation</td>
<td>pending</td>
</tr>
<tr>
<td>42%</td>
<td>57000 BTU/h (16.83 kW)</td>
<td>na</td>
<td>FSTC recommendation</td>
<td>pending</td>
</tr>
<tr>
<td>90%</td>
<td>na</td>
<td>na</td>
<td>FSTC recommendation</td>
<td>x</td>
</tr>
<tr>
<td>90%</td>
<td>na</td>
<td>na</td>
<td>FSTC recommendation</td>
<td>x</td>
</tr>
<tr>
<td>2.00 MEF</td>
<td>6.0 Wf</td>
<td>CAIOU</td>
<td>na</td>
<td>x</td>
</tr>
</tbody>
</table>

**Abbreviations:**
- elec: electrical
- gas: gas
- CAIOU: California Investor Owned Utilities
- ES: EPA Energy Star
- CEE: California Energy Commission
- FSTC: Food Service Technology Center
### Table 2. Supermarket Refrigeration Prescriptive Measures and Baseline for Energy Cost Budget

<table>
<thead>
<tr>
<th>Item</th>
<th>Attribute</th>
<th>Prescriptive Measures</th>
<th>Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evaporator</strong></td>
<td>Evaporator fan speed control</td>
<td>Variable speed evaporator fan</td>
<td>Constant volume, constant operation</td>
</tr>
<tr>
<td></td>
<td>Evaporator design approach</td>
<td>10°F (-12.2°C)</td>
<td>10°F (-12.2°C)</td>
</tr>
<tr>
<td><strong>Condenser</strong></td>
<td>Air cooled condenser fan speed</td>
<td>Variable Speed Condenser Fan (electronically commutated motors if single phase and less than 1 hp)</td>
<td>Cycling one speed fan</td>
</tr>
<tr>
<td></td>
<td>design approach</td>
<td>Floating head pressure, min of 70°F, (21.1°C) 5°F (-15°C) drybulb offset</td>
<td>10°F to 15°F (-12.2°C to -9.4°C) depending on suction temperature</td>
</tr>
<tr>
<td></td>
<td>Air cooled condenser fan power</td>
<td>80 Btu/Watt-hr at 10°F (-12.2°C) approach temperature</td>
<td>53 Btu/Watt-hr at 10°F (-12.2°C) approach temperature</td>
</tr>
<tr>
<td></td>
<td>Evaporative condenser fan speed control</td>
<td>Variable speed condenser fan (electronically commutated motors if single phase and less than 1 hp)</td>
<td>Cycling one speed fan</td>
</tr>
<tr>
<td></td>
<td>Evaporative condenser design approach temperature</td>
<td>Floating head pressure, min of 70°F, (21.1°C) 9°F (-12.8°C) wetbulb offset</td>
<td>18°F to 25°F (-7.8°C to -3.9°C) based on design wetbulb temperature</td>
</tr>
<tr>
<td></td>
<td>Evaporative condenser fan and pump power</td>
<td>400 Btu/Watt-hr at 100°F (37.8°C) saturated condensing temperature and 70°F (21.1°C) wetbulb temperature</td>
<td>330 Btu/Watt-hr at 100°F (37.8°C) saturated condensing temperature and 70°F (21.1°C) wetbulb temperature</td>
</tr>
<tr>
<td><strong>Refrigeration System</strong></td>
<td>Suction pressure control</td>
<td>Not addressed</td>
<td>Not addressed</td>
</tr>
<tr>
<td></td>
<td>Condensing temperature control</td>
<td>85°F (29.4°C) minimum condensing temperature, fixed setpoint</td>
<td>85°F (29.4°C) minimum condensing temperature, fixed setpoint</td>
</tr>
<tr>
<td></td>
<td>Defrost control</td>
<td>No electrical defrost. Hot gas defrost only</td>
<td>Not addressed</td>
</tr>
<tr>
<td><strong>Compressor</strong></td>
<td>Compressor capacity modulation</td>
<td>Variable speed drive trim compressor</td>
<td>Slide valves on screw compressors, multiple compressor racks on reciprocating compressor plants</td>
</tr>
</tbody>
</table>
### Table 3. Walk-in Coolers and Freezers Prescriptive Measures and Baseline for Energy Cost Budget

<table>
<thead>
<tr>
<th>Item</th>
<th>Attribute</th>
<th>Prescriptive Measures</th>
<th>Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Envelope</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Freezer insulation</td>
<td>R-46</td>
<td>R-36</td>
</tr>
<tr>
<td></td>
<td>Cooler insulation</td>
<td>R-36</td>
<td>R-20</td>
</tr>
<tr>
<td></td>
<td>Automatic closer doors</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>High efficiency low/no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>heat reach-in doors</td>
<td>(low temperature) 17W/ft (5.58 W/mm) of door frame (medium temperature)</td>
<td>(low temperature) 17W/ft (5.58 W/mm) of door frame (medium temperature)</td>
</tr>
<tr>
<td><strong>Evaporator</strong></td>
<td>Evaporator fan motor and control</td>
<td>Shaded pole and split phase motors are prohibited. Use PSC or EMC motors.</td>
<td>Constant speed fan</td>
</tr>
<tr>
<td></td>
<td>Hot gas defrost</td>
<td>Yes, no electrical defrosting</td>
<td>Electric defrost</td>
</tr>
<tr>
<td><strong>Condenser</strong></td>
<td>Air cooled condenser fan</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>motor and control</td>
<td>Shaded pole and split phase motors are prohibited. Use PSC or EMC motors. Add condenser fan controllers</td>
<td>Cycling one speed fan</td>
</tr>
<tr>
<td></td>
<td>Air cooled condenser</td>
<td>Floating head pressure controls or ambient sub-cooling</td>
<td>10°F to 15°F (-12.2°C to -9.4°C) dependent on suction temperature</td>
</tr>
<tr>
<td></td>
<td>design approach</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lighting</strong></td>
<td>Lighting power density</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(W/sq.ft.) (W/m²)</td>
<td>0.6 W/sq.ft. (6.46 W/m²)</td>
<td>0.6 W/sq.ft. (6.46 W/m²)</td>
</tr>
</tbody>
</table>


### Table 4. Commercial Kitchen Ventilation Prescriptive Measures and Baseline for Energy Cost Budget

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Prescriptive Measures</th>
<th>Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make-up air strategies</td>
<td>Dedicated make-up air system</td>
<td>Transfer air through dining area</td>
</tr>
<tr>
<td>Exhaust rate control</td>
<td>Demand control package</td>
<td>Constant volume</td>
</tr>
</tbody>
</table>

**IMPORTANT!** This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards

Any local alternative to ANSI/ASHRAE/IESNA Standard 90.1–2007 must be approved by USGBC as an equivalent standard, using the process described in the Implementation section.

ASHRAE/ASHRAE/IESNA Standard 90.1–2007, Appendixes B and D
American National Standards Institute
American Society of Heating, Refrigerating and Air-Conditioning Engineers
Illuminating Engineering Society of North America
www.ashrae.org

Appendix B of the standard identifies U.S. and global climate zones. Appendix D provides U.S. and global climatic data that can be used to determine the climate zone for the project location.

4. Implementation
Option 1
The following process is used to determine the equivalency of a local standard to ANSI/ASHRAE/IESNA Standard 90.1–2007.

1. A group interested in determining equivalency of a particular standard should email a request to USGBC through commonlanguage@usgbc.org.

2. USGBC will collaborate with the group to establish a method for creating an equivalency study and a timeline for completion.

3. The group will conduct the study.

4. USGBC will review the study and bring its recommendation to the LEED International Roundtable with approval by the LEED Steering Committee.

5. Typically, the group putting forward the standard will cover the cost of the study and USGBC review.

6. Priority of USGBC review will be determined based on market transformation potential and representation of the country on the LEED International Roundtable.

7. Approval of equivalency will be determined by the LEED Steering Committee and communicated to the group.

8. Upon approval by the LEED Steering Committee, the equivalency will be made available to projects through a USGBC-administered LEED Interpretation.

Additional information on the LEED International Roundtable can be found at www.usgbc.org.
Option 2 or 3
If Option 2 or 3 is selected, identify the proper climate zone for the project location by using ANSI/ASHRAE/IESNA Standard 90.1–2007, Appendixes B and D.

Appendix B, Table B-3, gives the climate zones of major U.S. and Canadian cities and select international cities, plus the thermal criteria and climate type definitions for each zone. If the project location is not included in Table B-3, use the climate zone definitions in Table B-4.

Appendix D provides a more extensive list of U.S., Canadian, and international cities. The data in this appendix can be used to determine the proper climate zone for the project location.


5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit. Project teams wishing to use a local equivalent should contact USGBC early in the design phase to ensure that the alternative standard is acceptable.

6. Calculations
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for calculations associated with this credit.

7. Documentation Guidance
Any local alternative to ANSI/ASHRAE/IESNA Standard 90.1–2007 is desired must be determined equivalent to the U.S. standard, as described in the Implementation section.

See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for documentation guidance related to this credit.

8. Examples
A project team in Beijing consults ANSI/ASHRAE/IESNA Standard 90.1–2007, Appendix B, to determine the appropriate climate zone for compliance with Option 3 of the credit.

Table B-3 does not give a climate zone for Beijing. The project team finds Beijing in Table D-2, which lists the values for heating degree-days to base 65°F (HDD65) as 5252, and cooling degree-days to base 50°F (CDD50) as 4115. The team uses these values to determine Beijing’s climate zone as defined in Appendix B, Section B2 and Table B-4.

The project team finds that Beijing is in a “moist climate” because its warmest month has a mean temperature higher than 72°F (22.2°C) and is therefore too warm to be a “marine climate,” and annual rainfall data indicate that the city is not in a “dry climate.”

Finally, the project team uses the values found in Table D-2 for HDD65 (5252) and CDD50 (4115) in Table B-4 and determines that Beijing is in Zone 4A (“mixed-humid”) because the CDD50 value is 4500 or less, and the HDD65 value is between 3600 and 5400.

9. Exemplary Performance
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance on exemplary performance for this credit.
10. Regional Variations
See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for definitions of terms used in this credit.
**GREEN POWER**

<table>
<thead>
<tr>
<th>RETAIL: NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit</td>
</tr>
<tr>
<td>Points</td>
</tr>
</tbody>
</table>

**Intent**

To encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.

**Requirements**

Engage in at least a 2-year renewable energy contract to provide at least 35% of the building’s electricity from renewable sources, as defined by the Center for Resource Solutions’ Green-e Energy product certification requirements or an equivalent.

All purchases of green power shall be based on the quantity of energy consumed, not the cost.

If the green power is not Green-e Energy certified, equivalence must exist for both major Green-e Energy program criteria: 1) current green power performance standards, and 2) independent, third-party verification that those standards are being met by the green power supplier over time.

**OPTION 1. Determine Baseline Electricity Use**

Use the annual electricity consumption from the results of EA Credit 1: Optimize Energy Performance.

**OR**

**OPTION 2. Estimate Baseline Electricity Use**

Use the U.S. Department of Energy's Commercial Buildings Energy Consumption Survey database to determine the estimated electricity use.
1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
No new standards are referenced; see the LEED 2009 Green Building Design and Construction Reference Guide for a summary of Green-e. If a local equivalent to Green-e is selected, ensure that the power performance and independent, third-party verification requirements are equivalent to those of Green-e.

4. Implementation
See the LEED 2009 Green Building Design and Construction Reference Guide Implementation section for more information on establishing Green-e equivalency and for more information on other approaches to achieving this credit.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations
See the LEED 2009 Green Building Design and Construction Reference Guide for calculations associated with this credit.

7. Documentation Guidance
See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.

8. Examples
There are no examples for this credit.

9. Exemplary Performance
Exemplary performance is available to projects that purchase 70% of their electricity from renewable sources.

10. Regional Variations
Renewable energy certificates (RECs) make it possible to substitute green energy even if the project does not have access to green power through the local utility or a competitive electricity marketer. RECs are now widely available in nearly all U.S. states but less prevalent in other countries. Projects outside the U.S. have the option of meeting this credit either by establishing Green-e equivalency, as detailed in the Implementation section of the LEED 2009 Green Building Design and Construction Reference Guide, or by purchasing U.S.-based Green-e certified RECs.

11 Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.
12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.
See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.
OVERVIEW
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for additional guidance.

The responsible harvest or extraction of materials used in building products is of universal importance, as is the way they are transported to the project site. Because some transportation methods cause significantly less environmental harm than others, a new option has been added to MR Credit 5 (Regional Materials) to allow for items that are shipped long distances via rail and water. The option involves calculating a weighted total distance rather than using a simple 500-mile (800-kilometer) radius.

Table 1. MR Credits with Global Alternative Compliance Paths

<table>
<thead>
<tr>
<th>CREDIT</th>
<th>TITLE</th>
<th>RETAIL: NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR Prerequisite 1</td>
<td>Storage and Collection of Recyclables</td>
<td></td>
</tr>
<tr>
<td>MR Credit 1.1</td>
<td>Building Reuse—Maintain Existing Walls, Floors, and Roof</td>
<td></td>
</tr>
<tr>
<td>MR Credit 1.2</td>
<td>Building Reuse—Maintain Existing Interior Nonstructural Elements</td>
<td></td>
</tr>
<tr>
<td>MR Credit 2</td>
<td>Construction Waste Management</td>
<td></td>
</tr>
<tr>
<td>MR Credit 3</td>
<td>Materials Reuse</td>
<td></td>
</tr>
<tr>
<td>MR Credit 4</td>
<td>Recycled Content</td>
<td></td>
</tr>
<tr>
<td>MR Credit 5</td>
<td>Regional Materials</td>
<td></td>
</tr>
<tr>
<td>MR Credit 6</td>
<td>Rapidly Renewable Materials</td>
<td></td>
</tr>
<tr>
<td>MR Credit 7</td>
<td>Certified Wood</td>
<td></td>
</tr>
</tbody>
</table>
**REGIONAL MATERIALS**

<table>
<thead>
<tr>
<th>Points</th>
<th>1-2 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit</td>
<td>MR Credit 5</td>
</tr>
</tbody>
</table>

**Intent**

To increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

**Requirements**

Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within a specified distance of the project site for a minimum of 10% or 20%, based on cost, of the total materials value. If only a fraction of a product or material is extracted, harvested, or recovered and manufactured locally, then only that percentage (by weight) can contribute to the regional value. The minimum percentage of regional materials for each point threshold is as follows:

<table>
<thead>
<tr>
<th>Regional Materials</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>1</td>
</tr>
<tr>
<td>20%</td>
<td>2</td>
</tr>
</tbody>
</table>

**OPTION 1**

All building materials or products have been extracted, harvested or recovered, as well as manufactured within a 500 mile (800 kilometer) radius of the project site.

OR

**OPTION 2**

Building materials or products shipped by rail or water have been extracted, harvested or recovered, as well as manufactured within a 500 mile (800 kilometer) total travel distance of the project site using a weighted average determined through the following formula:

\[
\frac{\text{Distance by rail}}{3} + \frac{\text{Distance by inland waterway}}{2} + \frac{\text{Distance by sea}}{15} + \text{Distance by all other means} \leq 500 \text{ miles [800 kilometers]}
\]

Mechanical, electrical, and plumbing components and specialty items, such as elevators and equipment, cannot be included in all calculations. Include only materials permanently installed in the project. Furniture may be included if it is included consistently in MR Credit 3: Materials Reuse through MR Credit 7: Certified Wood.

Please note that casework and built-in millwork items must be included in the base building calculations.

**IMPORTANT!** This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
There are no standards referenced for this credit.

4. Implementation
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for implementation guidance related to this credit.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations
Follow the instructions in the LEED 2009 Green Building Design and Construction Reference Guide for determining the total materials cost, the percentage of regional materials in assembly items, and the total percentage of local materials used in the project.

Option 2 considers the total weighted distance that the project’s materials have traveled by rail or water, from extraction or harvest through manufacturing to installation at the project site. The project team must determine the means of transportation for each leg of that journey.

Calculate the weighted average of materials transported to the project site according to the following equation:

\[
\text{Total weighted distance} = \left(\frac{\text{DR}}{3}\right) + \left(\frac{\text{DI}}{2}\right) + \left(\frac{\text{DS}}{15}\right) + \text{DO}
\]

where

- DR = distance by rail
- DI = distance by inland waterway
- DS = distance by sea
- DO = distance by other transportation modes

If the result is 500 miles (800 kilometers) or less, the material qualifies as a regional product.

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.

1. Compile a list of product purchases manufactured, extracted, or harvested regionally.

2. Record manufacturers’ names and product costs for all applicable materials installed at the project site.

3. Record distances and transportation modes for each product, from extraction or harvest through fabrication and delivery to the project site.
4. Where appropriate, retain cutsheets that document materials’ origin and manufacture within a 500-mile (800-kilometer) total weighted distance of the project site.

5. Where appropriate, maintain a list of materials costs, excluding labor and equipment, for CSI Divisions 03-10, 31 (Section 31.60.00 Foundations), and 32 (Sections 32.10.00 Paving, 32.30.00 Site Improvements, and 32.90.00 Planting); including Division 12 is optional.

8. Examples

A project in Berlin has imported wood from Norway. The wood was harvested in a forest outside Harestua and transported by truck to Oslo, where it was placed on a ship bound for Germany. Upon arriving at port in Kiel, Germany, the wood was loaded onto a train to Leipzig, where it was milled for use on the project. The finished wood product was transported by truck to the project site in Berlin.

First, the team determines the travel distances for each leg of the trip (Figure 1).

**Figure 1.** Example transport of wood from harvest to project site (generated using Google Maps)

Then the team divides each distance by the divisors in the total weighted distance equation (see Calculations), as shown in Table 1. Transport by truck falls under “other” and thus has no divisor.
Table 1. Example determination of weighted distance for wood products

<table>
<thead>
<tr>
<th>Mode</th>
<th>Leg</th>
<th>Actual distance</th>
<th>Calculation</th>
<th>Weighted distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck</td>
<td>Harestua to Oslo</td>
<td>41 km (25 miles)</td>
<td>41 (25)</td>
<td>41 km (25 miles)</td>
</tr>
<tr>
<td>Ship</td>
<td>Oslo to Kiel</td>
<td>682 km (424 miles)</td>
<td>682/15 (424/15)</td>
<td>45 km (28 miles)</td>
</tr>
<tr>
<td>Rail</td>
<td>Kiel to Leipzig</td>
<td>454 km (285 miles)</td>
<td>454/3 (285/3)</td>
<td>151 km (95 miles)</td>
</tr>
<tr>
<td>Truck</td>
<td>Leipzig to Berlin (project)</td>
<td>190 km (118 miles)</td>
<td>190 (118)</td>
<td>190 km (118 miles)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1367 km (852 miles)</td>
<td></td>
<td>427 km (266 miles)</td>
</tr>
</tbody>
</table>

Because the total weighted distance traveled is less than 500 miles (800 km), the wood qualifies as a regional material.

9. Exemplary Performance
Project teams may earn an Innovation in Design credit for exemplary performance by achieving a total value of regionally harvested, extracted, and manufactured materials of 30% or more.

10. Regional Variations
See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools [http://www.usgbc.org/projecttools](http://www.usgbc.org/projecttools) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions
An **inland waterway** is a navigable body of water, such as a river, canal, or lake, that is deep, wide, and slow enough for a vessel to pass.
Overview
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for additional guidance.

Approaches to indoor environmental quality issues often vary by country. Because of differences in climate, ventilation systems, and environmental standards, many of the prescribed approaches to the credits in the Indoor Environmental Quality section have been difficult to apply outside the U.S. New language allows for local equivalents to many of the standards referenced in IEQ credits.

IEQ Prerequisite 1 (Indoor Air Quality Performance) and its associated credits now have multiple alternatives to help project teams outside the U.S. earn points while maintaining the technical rigor and stringency of the requirements. Many project teams will be able to use CEN standards in place of the ASHRAE; others may choose a local equivalent to ASHRAE. CEN standards and local equivalents are also available for IEQ Credits 6.2, 7, 7.1, and 7.2 (Thermal Comfort).

Project teams outside the U.S. can now use local equivalent standards for air filtration during and after construction when seeking to achieve IEQ Credits 3 and 3.1 (Construction Indoor Air Quality Management Plan During Construction) and 5 (Indoor Chemical and Pollutant Source Control). IEQ Credit 4.3 (Low-Emitting Materials—Flooring Systems) accommodates products that meet widely used VOC testing requirements.

Table 1. IEQ Credits with Global Alternative Compliance Paths

<table>
<thead>
<tr>
<th>CREDIT</th>
<th>TITLE</th>
<th>RETAIL: NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEQ Prerequisite 1</td>
<td>Minimum Indoor Air Quality Performance</td>
<td></td>
</tr>
<tr>
<td>IEQ Prerequisite 2</td>
<td>Environmental Tobacco Smoke (ETS) Control</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 1</td>
<td>Outdoor air Delivery Monitoring</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 2</td>
<td>Increased Ventilation</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 3.1</td>
<td>Construction Indoor Air Quality Management Plan During Construction</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 3.2</td>
<td>Construction Indoor Air Quality Management Plan Before Occupancy</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 4</td>
<td>Low-Emitting Materials</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 5</td>
<td>Indoor Chemical and Pollutant Source Control</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 6</td>
<td>Controllability of Systems —Lighting &amp; Thermal Comfort</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 7.1</td>
<td>Thermal Comfort —Design</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 7.2</td>
<td>Thermal Comfort —Employee Verification</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 8.1</td>
<td>Daylight and Views—Daylight</td>
<td></td>
</tr>
<tr>
<td>IEQ Credit 8.2</td>
<td>Daylight and Views—Views</td>
<td></td>
</tr>
</tbody>
</table>

IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
MINIMUM INDOOR AIR QUALITY PERFORMANCE

<table>
<thead>
<tr>
<th>RETAIL: NC</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>IEQ Prerequisite 1</td>
</tr>
<tr>
<td>Points</td>
<td>Required</td>
</tr>
</tbody>
</table>

**Intent**

To establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the comfort and well-being of the occupants.

**Requirements**

Meet the minimum requirements of Sections 4 through 7 of ASHRAE 62.1–2007, Ventilation for Acceptable Indoor Air Quality (with errata but without addenda1). Projects outside the U.S. may use a local equivalent to ASHRAE Standard 62.1-2007 for breathing zone minimum ventilation rates.

**CASE 1. Mechanically Ventilated Spaces**

**OPTION 1. ASHRAE Standard 62.1-2007 or Non-U.S. Equivalent**

Meet the minimum requirements of Sections 4 through 7 of ASHRAE 62.1-2007, Ventilation for Acceptable Indoor Air Quality (with errata but without addenda). Mechanical ventilation systems must be designed using the ventilation rate procedure as defined by ASHRAE 62.1-2007, or the applicable local code, whichever is more stringent. Projects outside the U.S. may use a local equivalent to ASHRAE Standard 62.1-2007 for breathing zone minimum ventilation rates.

**OR**

**OPTION 2. CEN Standard EN 15251: 2007**

Projects outside the U.S. may modify or maintain each outside air intake, supply air fan and/or ventilation distribution system to supply at least the outdoor air ventilation rate required by Annex B of Comité Européen de Normalisation (CEN) Standard EN 15251: 2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics.

**OR**

**CASE 2. Naturally Ventilated Spaces**

Naturally ventilated buildings must comply with ASHRAE 62.1–2007, paragraph 5.1 (with errata but without addenda).

---

1 Project teams wishing to use addenda approved by ASHRAE for the purposes of this prerequisite may do so at their discretion. Addenda must be applied consistently across all LEED credits.
ADDITIONAL GUIDANCE FOR THIS PREREQUISITE IS FORTHCOMING

1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide for information on environmental and economic issues related to this prerequisite.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this prerequisite.

3. Summary of Referenced Standards
CEN Standard EN 15251: 2007, Annex B, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics

CEN Standard EN 13779: 2007, Ventilation for nonresidential buildings, Performance requirements for ventilation and room conditioning systems

4. Implementation
Mechanically Ventilated Spaces
Local standards for projects outside the United States will be compared with ASHRAE 67.1–2007 in terms of scope, metrics, and thresholds. Project teams that wish to ensure acceptance of a proposed equivalent to ASHRAE 67.1-2007 prior to submission for review may choose to submit a Formal Inquiry for a Credit Interpretation Ruling for a single project, or a LEED Interpretation for multi-project use.

Any local equivalent for Case 1, Option 1, must address the following to demonstrate equivalency with ASHRAE Standard 62.1–2007, Sections 4–7 (with errata but without addenda):

- Outdoor air quality
- Systems and equipment
- Minimum outside airflow rates based on space occupancy category
- Construction and system start-up

Local equivalents for projects outside the United States will be compared with ASHRAE 67.1-2007 in terms of scope, metrics, and thresholds.

If Case 1, Option 2 is selected, meet the minimum requirements of Annex B of CEN Standard EN 15251: 2007, and the requirements of CEN Standard EN 13779: 2007, except Section 7.3 – Thermal environment, 7.6 – Acoustic Environment, A.16, and A.17.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this prerequisite. Project teams wishing to use a local equivalent should contact USGBC early in the design phase to ensure that the alternative standard is acceptable.

6. Calculations
To show compliance for mechanically ventilated spaces, use the calculations in the selected standard’s user manual and the IEQ calculators located in Credit Resources in LEED Online.

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.

▪ For projects using Case 1, Option 1, demonstrate compliance with the applicable sections of a local equivalent to ASHRAE 62.1–2007.
▪ For projects using Case 1, Option 2, demonstrate compliance with the applicable sections of CEN Standards EN 15251: 2007 and EN 13779: 2007; see Calculations.
▪ For Core & Shell projects, create a description of future tenants, space types, and expected uses. Core & Shell projects may use the default population number provided in the standard; all other projects are expected to use the design population.

8. Examples
There are no examples for this prerequisite.

9. Exemplary Performance
This prerequisite is not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations
There are no regional variations associated with this prerequisite.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for information on Operations and Maintenance considerations relating to the ventilation rate procedure.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

Websites
Comité Européen de Normalisation
http://www.cen.eu
CEN seeks to foster the European economy in global trading, the welfare of European citizens, and the environment by removing trade barriers for European industry and consumers. It provides a platform for the development of European standards and other technical specifications. To purchase CEN standards, visit the Products section on the CEN website.
See the LEED 2009 Green Building Design and Construction Reference Guide for additional resources related to this prerequisite.

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this prerequisite.
OUTDOOR AIR DELIVERY MONITORING

<table>
<thead>
<tr>
<th>RETAIL: NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit</td>
</tr>
<tr>
<td>Points</td>
</tr>
</tbody>
</table>

**Intent**

To provide capacity for ventilation system monitoring to help promote occupants’ comfort and well-being.

**Requirements**

Install permanent monitoring systems to ensure that ventilation systems maintain design minimum requirements. Configure all monitoring equipment to generate an alarm when airflow values or carbon dioxide (CO2) levels vary by 10% or more from the design values either via a building automation system alarm to the building operator or via a visual or audible alert to the building occupants.

AND

**CASE 1. Mechanically Ventilated Spaces**

Monitor CO2 concentrations within all densely occupied spaces (those with a design occupant density of 25 people or more per 1,000 square feet [95 square meters]). CO2 monitors must be between 3 and 6 feet (1 and 2 meters) above the floor.

Provide a direct outdoor airflow measurement device capable of measuring the minimum outdoor air intake flow with an accuracy of plus or minus 15% of the design minimum outdoor air rate, based on the value determined in IEQ Prerequisite 1: Minimum Indoor Air Quality Performance, for mechanical ventilation systems where 20% or more of the design supply airflow serves nondensely occupied spaces.

**CASE 2. Naturally Ventilated Spaces**

Monitor CO2 concentrations within all naturally ventilated spaces. CO2 monitors must be located between 3 and 6 feet (1 and 2 meters) above the floor. One CO2 sensor may be used to monitor multiple nondensely occupied spaces if the natural ventilation design uses passive stacks or other means to induce airflow through those spaces equally and simultaneously without intervention by building occupants.

IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
ADDITIONAL GUIDANCE FOR THIS CREDIT IS FORTHCOMING

1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
CEN Standard EN15251: 2007, Annex B, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics
Comité Européen de Normalisation
http://www.cen.eu
This standard outlines the parameters used in many EU countries to design and assess energy performance of buildings. Annex B of the standard, when used in conjunction with the identified sections of CEN Standard EN 13779: 2007, is considered equivalent to ASHRAE 62.1–2007 for the purposes of this credit.

CEN Standard EN 13779: 2007, Ventilation for nonresidential buildings, Performance requirements for ventilation and room conditioning systems
Comité Européen de Normalisation
http://www.cen.eu
This standard identifies the requirements for ventilation and room-conditioning systems and is used in conjunction with CEN Standard EN 15251: 2007, Annex B. All sections of this standard are applicable except Sections 7.3, Thermal environment; 7.6, Acoustic Environment; A.16; and A.17.

4. Implementation
Local standards for projects outside the United States will be compared with ASHRAE 67.1–2007 in terms of scope, metrics, and thresholds. Project teams that wish to ensure acceptance of a proposed equivalent to ASHRAE 67.1–2007 prior to submission for review may choose to submit a Formal Inquiry for a Credit Interpretation Ruling for a single project, or a LEED Interpretation for multi-project use.

See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for implementation guidance.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations
There are no calculations required for this credit.

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.
- Indicate the locations of airflow monitors and CO2 sensors on floor plans, schematics, and elevations (where applicable). Incorporate checks of ventilation systems into mechanical schedules.
- Commission ventilation systems and monitor them for excess energy use.
- Check alarm systems for mechanical ventilation systems to verify settings according to either CEN Standard EN 13779: 2007 or the local equivalent to ANSI/ASHRAE 62.1–2007.
- Calibrate any building automation systems used in the project according to manufacturers’ guidelines. Routine function checks of alarm systems are recommended.

8. Examples
There are no examples for this credit.

9. Exemplary Performance
This credit is not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations
See the LEED 2009 Green Building Design and Construction Reference Guide for information on regional variations associated with this credit.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for information on Operations and Maintenance considerations relating to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

Websites
Comité Européen de Normalisation
http://www.cen.eu
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See the LEED 2009 Green Building Design and Construction Reference Guide for additional resources related to this credit.

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.
**INCREASED VENTILATION**

<table>
<thead>
<tr>
<th>RETAIL: NC</th>
<th>Credit</th>
<th>IEQ Credit 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>1 point</td>
<td></td>
</tr>
</tbody>
</table>

**Intent**

To provide additional outdoor air ventilation to improve indoor air quality (IAQ) for improved occupant comfort, well-being, and productivity.

**Requirements**

**CASE 1. Mechanically Ventilated Spaces**

**OPTION 1. ASHRAE Standard 62.1-2007 or Non-U.S. Equivalent**

Increase breathing zone outdoor air ventilation rates to all occupied spaces by at least 30% above the minimum rates required by ASHRAE Standard 62.1–2007 (with errata but without addenda1) as determined by IEQ Prerequisite 1: Minimum Indoor Air Quality Performance. Projects outside the U.S. may use a local equivalent to ASHRAE Standard 62.1-2007, if the same is used for IEQ Prerequisite 1: Minimum Indoor Air Quality Performance.

OR

**OPTION 2. CEN Standard EN 15251: 2007**

Projects outside the U.S. may earn this credit by increasing breathing zone outdoor air ventilation rates to all occupied spaces by at least 30% above the minimum rates required by Annex B of Comité Européen de Normalisation (CEN) Standard EN 15251: 2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics, as determined by IEQ Prerequisite 1: Minimum Indoor Air Quality Performance.

**CASE 2. Naturally Ventilated Spaces**

Determine that natural ventilation is an effective strategy for the project by following the flow diagram process shown in Figure 2.8 of the Chartered Institution of Building Services Engineers (CIBSE) Applications Manual 10: 2005, Natural Ventilation in Non-Domestic Buildings.

AND

**OPTION 1. CIBSE or Non-U.S. Equivalent**

Show that the natural ventilation systems design meets the recommendations set forth in the CIBSE manuals appropriate to the project space.


PATH 2. Use CIBSE AM 13:2000, Mixed Mode Ventilation. Projects outside the U.S. may use a local equivalent.

---

1 Project teams wishing to use addenda approved by ASHRAE for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

**IMPORTANT!** This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
OR

OPTION 2. Airflow Model

Use a macroscopic, multizone, analytic model to predict that room-by-room airflows will effectively naturally ventilate, defined as providing the minimum ventilation rates required by ASHRAE 62.1–2007, section 6 (with errata but without addenda), for at least 90% of occupied spaces. Projects outside the U.S. may use Annex B of Comité Européen de Normalisation (CEN) Standard EN 15251: 2007, or a local equivalent to section 6 of ASHRAE Standard 62.1-2007 to define the minimum ventilation rates.
ADDITIONAL GUIDANCE FOR THIS CREDIT IS FORTHCOMING

1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
CEN Standard EN15251: 2007, Annex B, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics
Comité Européen de Normalisation
http://www.cen.eu
This standard outlines the parameters used in many EU countries to design and assess energy performance of buildings. Annex B of the standard, when used in conjunction with the identified sections of CEN Standard EN 13779: 2007, is considered equivalent to ASHRAE 62.1–2007 for the purposes of this credit.

4. Implementation
Mechanically Ventilated Spaces
Local standards for projects outside the United States will be compared with ASHRAE 67.1–2007 in terms of scope, metrics, and thresholds. Project teams that wish to ensure acceptance of a proposed equivalent to ASHRAE 67.1-2007 prior to submission for review may choose to submit a Formal Inquiry for a Credit Interpretation Ruling for a single project, or a LEED Interpretation for multi-project use.

Naturally Ventilated Spaces
Local standards for projects outside the United States will be compared with the CIBSE Applications Manual 10: 2005 in terms of scope, metrics, and thresholds. Project teams that wish to ensure acceptance of a proposed equivalent to the CIBSE Applications Manual 10:2005 prior to submission for review may choose to submit a Formal Inquiry for a Credit Interpretation Ruling for a single project, or a LEED Interpretation for multi-project use.

Project teams may demonstrate compliance in either of two ways:

- Use a local equivalent to the compliance path in the CIBSE Applications Manual 10:2005 (AM10), Chapter 2, which specifies the opening sizes for operable windows, trickle vents, and louvers.


5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit. Project teams wishing to use a local equivalent should contact USGBC early in the design phase to ensure that the alternative standard is acceptable.
6. Calculations
Mechanically Ventilated Spaces
Use the calculations in the selected standard’s user manual and the IEQ Prerequisite 1 calculators, available on the LEED Resources & Tools page of the USGBC website. The same calculations are used to document IEQ Prerequisite 1.

See the LEED 2009 Green Building Design and Construction Reference Guide for calculations associated with this credit.

7. Documentation Guidance
See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.

8. Examples
There are no examples for this credit.

9. Exemplary Performance
This credit is not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations
See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

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

Websites
Comité Européen de Normalisation
http://www.cen.eu
CEN seeks to foster the European economy in global trading, the welfare of European citizens, and the environment by removing trade barriers for European industry and consumers. It provides a platform for the development of European standards and other technical specifications. To purchase CEN standards, visit the Products section on the CEN website.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional resources related to this credit.

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.
**CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT PLAN—DURING CONSTRUCTION**

<table>
<thead>
<tr>
<th>RETAIL: NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit</td>
</tr>
<tr>
<td>Points</td>
</tr>
</tbody>
</table>

**Intent**
To reduce indoor air quality (IAQ) problems resulting from the construction or renovation and promote the comfort and well-being of construction workers and building occupants.

**Requirements**
Develop and implement an IAQ management plan for the construction and preoccupancy phases of the building as follows:

- Protect stored onsite and installed absorptive materials from moisture damage.
- If permanently installed air handlers are used during construction, filtration media must be used at each return air grille that meets one of the following criteria below. Replace all filtration media immediately prior to occupancy.
  - Filtration media with a minimum efficiency reporting value (MERV) of 8 as determined by ASHRAE Standard 52.2-1999 (with errata but without addenda)
  - Filtration media is Class F5 or higher, as defined by CEN Standard EN 779-2002, Particulate air filters for general ventilation, Determination of the filtration performance
  - Filtration media with a minimum dust spot efficiency of 30% or higher and greater than 90% arrestance on a particle size of 3–10 µg

---

1. Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

**IMPORTANT!** This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
CEN Standard EN 779: 2002, Particulate air filters for general ventilation, Determination of the filtration performance
Comité Européen de Normalisation
http://www.cen.eu
This standard outlines the parameters used in many EU countries for determining filter class for all filtration media.

4. Implementation
HVAC Protection
Protect all HVAC equipment from both dust and odors and seal all duct and equipment openings with plastic. If the system must be operated to maintain service to occupied portions of the building or to protect finished work, protect the return (negative pressure) side of the system. If the returns cannot be closed, install and maintain temporary filters over the grilles and openings. All filtration media must be Class F5 or higher or have a minimum dust spot efficiency of 30% and at least 90% arrestance on a particle size of 3–10 µg. If an unducted plenum over the construction zone must be used, isolate it by having all ceiling tiles in place. Check for leaks in the return ducts and air handlers and make needed repairs promptly. The contractor should avoid using the mechanical rooms for construction storage.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations
There are no calculations required for this credit.

7. Documentation Guidance
See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.

8. Examples
See the LEED 2009 Green Building Design and Construction Reference Guide for an example of an indoor air quality management plan. Ensure that the plan includes HVAC protection and specifies filters that are Class F5 or higher or have a minimum dust spot efficiency of 30% and at least 90% arrestance on a particle size of 3–10 µg.

9. Exemplary Performance
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance on exemplary performance for this credit.
10. Regional Variations
There are no regional variations applicable to this credit.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.
## Low-Emitting Materials

<table>
<thead>
<tr>
<th>Credit</th>
<th>IEQ Credit 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>1-5 points</td>
</tr>
</tbody>
</table>

### Intent

To reduce the quantity of indoor air contaminants that are odorous, irritating, and/or harmful to the comfort and well-being of installers and occupants.

### Requirements

**OPTION 1. Adhesives and Sealants (1 point)**

All adhesives and sealants used on the interior of the building (i.e., inside the weatherproofing system and applied onsite) must comply with the following requirements as applicable to the project scope:

- Adhesives, Sealants and Sealant Primers must comply with South Coast Air Quality Management District (SCAQMD) Rule #1168. Volatile organic compound (VOC) limits listed in the table below correspond to an effective date of July 1, 2005, and rule amendment date of January 7, 2005.

<table>
<thead>
<tr>
<th>Architectural Applications</th>
<th>VOC Limit [g/L less water]</th>
<th>Specialty Applications</th>
<th>VOC Limit [g/L less water]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor carpet adhesives</td>
<td>50</td>
<td>PVC welding</td>
<td>510</td>
</tr>
<tr>
<td>Carpet pad adhesives</td>
<td>50</td>
<td>CPVC welding</td>
<td>490</td>
</tr>
<tr>
<td>Wood flooring adhesives</td>
<td>100</td>
<td>ABS welding</td>
<td>325</td>
</tr>
<tr>
<td>Rubber floor adhesives</td>
<td>60</td>
<td>Plastic cement welding</td>
<td>250</td>
</tr>
<tr>
<td>Subfloor adhesives</td>
<td>50</td>
<td>Adhesive primer for plastic</td>
<td>550</td>
</tr>
<tr>
<td>Ceramic tile adhesives</td>
<td>65</td>
<td>Contact adhesive</td>
<td>80</td>
</tr>
<tr>
<td>VCT and asphalt adhesives</td>
<td>50</td>
<td>Special purpose contact adhesive</td>
<td>250</td>
</tr>
<tr>
<td>Drywall and panel adhesives</td>
<td>50</td>
<td>Structural wood member adhesive</td>
<td>140</td>
</tr>
<tr>
<td>Cove base adhesives</td>
<td>50</td>
<td>Sheet applied rubber lining operations</td>
<td>850</td>
</tr>
<tr>
<td>Multipurpose construction adhesives</td>
<td>70</td>
<td>Top and trim adhesive</td>
<td>250</td>
</tr>
<tr>
<td>Structural glazing adhesives</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Substrate Specific Applications</th>
<th>VOC Limit [g/L less water]</th>
<th>Sealants</th>
<th>VOC Limit [g/L less water]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal to metal</td>
<td>30</td>
<td>Architectural</td>
<td>250</td>
</tr>
<tr>
<td>Plastic foams</td>
<td>50</td>
<td>Nonmembrane roof</td>
<td>300</td>
</tr>
<tr>
<td>Porous material (except wood)</td>
<td>50</td>
<td>Roadway</td>
<td>250</td>
</tr>
<tr>
<td>Wood</td>
<td>30</td>
<td>Single-ply roof membrane</td>
<td>450</td>
</tr>
<tr>
<td>Fiberglass</td>
<td>80</td>
<td>Other</td>
<td>420</td>
</tr>
</tbody>
</table>


---

1 The use of a VOC budget is permissible for compliance with this credit.
Aerosol Adhesives

<table>
<thead>
<tr>
<th>Product Type</th>
<th>VOC Weight (g/L minus water)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General purpose mist spray</td>
<td>65% VOCs by weight</td>
</tr>
<tr>
<td>General purpose web spray</td>
<td>55% VOCs by weight</td>
</tr>
<tr>
<td>Special purpose aerosol adhesives (all types)</td>
<td>70% VOCs by weight</td>
</tr>
</tbody>
</table>

OPTION 2. Paints and Coatings (1 point)
Paints and coatings used on the interior of the building (i.e., weatherproofing system and applied onsite) must comply with the following criteria as applicable to the project scope:


- Anticorrosive and antirust paints applied to interior ferrous metal substrates must not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997.

- Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements must not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.

OPTION 3. Flooring (1 point)

PATH 1
All flooring must comply with the following as applicable to the project scope:

- All carpet installed in the building interior must meet one of the following requirements:
  - Meets the testing and product requirements of the Carpet and Rug Institute’s Green Label Plus program.
  - Maximum VOC concentrations are less than or equal to those specified in the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda, using the office scenario as defined in Table 7.5 within the practice. The additional VOC concentration limits listed in Section 9.1a must also be met.
  - Maximum VOC concentrations meet the California requirements specified above based on the following:
    - California Department of Public Health (CDPH) Standard Method V1.1-2010 using test results obtained at the 14 day time point
    - Projects outside the U.S. may use the German AgBB/DIBt testing method and all testing methods based on AgBB/DIBt method (GUT, EMICODE, Blue Angel) using test results obtained at the 3 day or 7 day or 14 day time point. For caprolactam, if test results obtained at the 3 day or 7 day time point is used, the emission concentration must be less than ½ of the concentration limit specified above because the emission may not have peaked at the measured time points.

1 The use of a VOC budget is permissible for compliance with this credit.
If a European testing method (AgBB/DIBt GUT, EMICODE, Blue Angel) had used parameters for calculating test results different from those specified in the referenced California method, then the European test results for carpets or floorings need to be converted into California air concentrations by multiplication with 0.7.

- All carpet cushion installed in the building interior must meet the requirements of the Carpet and Rug Institute Green Label program.

- All carpet adhesive must meet the requirements of IEQ Credit 4: Low-Emitting Materials, Option A, which lists a volatile organic compound (VOC) limit of 50 g/L.

- All hard surface flooring installed in the building interior must meet one of the following requirements:
  
  o Meet the requirements of the FloorScore standard (current as of the date of this rating system, or more stringent version) as shown with testing by an independent third-party.

  o Demonstrate maximum VOC concentrations less than or equal to those specified in the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda, using the office scenario as defined in Table 7.5 within the practice.

  o Maximum VOC concentrations meet the California requirements specified above based on the following:
    
    a. California Department of Public Health (CDPH) Standard Method V1.1-2010 using test results obtained at the 14 day time point

    b. Projects outside the U.S. may use the German AgBB/DIBt testing method and all testing methods based on AgBB/DIBt method (GUT, EMICODE, Blue Angel) using test results obtained at the 3 day or 7 day or 14 day time point. For caprolactam, if test results obtained at the 3 day or 7 day time point is used, the emission concentration must be less than half of the concentration limit specified above because the emission may not have peaked at the measured time points.

If a European testing method (AgBB/DIBt GUT, EMICODE, Blue Angel) had used parameters for calculating test results different from those specified in the referenced California method, then the European test results for carpets or floorings need to be converted into California air concentrations by multiplication with 0.7.

Mineral-based finish flooring products such as tile, masonry, terrazzo, and cut stone without integral organic-based coatings and sealants and unfinished/untreated solid wood flooring qualify for credit without any IAQ testing requirements. However, associated site-applied adhesives, grouts, finishes and sealers must be compliant for a mineral-based or unfinished/untreated solid wood flooring system to qualify for credit.
Concrete, wood, bamboo, and cork floor finishes such as sealer, stain, and finish must meet the requirements of South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.

Mineral-based finish flooring products such as tile, masonry, terrazzo, and cut stone without integral organic-based coatings and sealants and unfinished/untreated solid wood flooring qualify for credit without any IAQ testing requirements. However, associated site-applied adhesives, grouts, finishes and sealers must be compliant for a mineral-based or unfinished/untreated solid wood flooring system to qualify for credit.

Tile setting adhesives and grout must meet South Coast Air Quality Management District (SCAQMD) Rule 1168. VOC limits correspond to an effective date of July 1, 2005, and rule amendment date of January 7, 2005.

For carpet adhesive, concrete, wood, bamboo and cork floor finishes, and tile setting adhesives, compliance can be demonstrated with test results of:

- Total volatiles fraction, based on one of the following, provided that water and exempt compounds are subtracted from total volatiles test results and the mass VOC content is calculated consistent with SCAQMD Rule 1113 and Rule 1168:
  - ASTM D2369
  - EPA method 24
  - ISO 11890 part 1

- Total volatile organic compounds fraction, based on one of the following, provided that all VOCs with a boiling point up to 280°C (536°F) are included, and exempt compounds are subtracted from total volatiles test results and the mass VOC content is calculated consistent with SCAQMD Rule 1113 and Rule 1168.
  - ASTM D6886
  - ISO 11890 part 2

OR

PATH 2

All flooring products must meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

Mineral-based finish flooring products such as tile, masonry, terrazzo, and cut stone without integral organic-based coatings and sealants and unfinished/untreated solid wood flooring qualify for credit without any IAQ testing requirements. However, associated site-applied adhesives, grouts, finishes and sealers must be compliant for a mineral-based or unfinished/untreated solid wood flooring system to qualify for credit.

OPTION 4. Composite Wood and Agrifiber Products (1 point)

Composite wood and agrifiber products used on the interior of the building (i.e., inside the weatherproofing system) must contain no added urea-formaldehyde resins. Laminating
adhesives used to fabricate onsite and shop-applied composite wood and agrifiber assemblies must not contain added urea-formaldehyde resins.

Please note that built-in casework and built-in millwork items must be included in the base building calculations.

Products covered by IEQ Credit 4, Option E—Furniture shall be excluded from these requirements.

OPTION 5. Furniture and Furnishings (1 point)

For manufactured and custom furniture, components of furniture and their assembly must meet the requirements of IEQ Credit 4, Option A: Adhesives and Sealants, IEQ Credit 4 Option B—Paints and Coatings, and IEQ Credit 4, Option D: Composite Wood and Agrifiber Products.

Please note that built-in casework and built-in millwork items must be included in the base building.

AND

All systems furniture¹ and seating² introduced into the project space that have been manufactured, refurbished, or refinished within 1 year prior³ to occupancy must meet 1 of the requirements below.

PATH 1

Greenguard Indoor Air Quality Certified

OR

PATH 2

Calculated indoor air concentrations that are less than or equal to those established in Table 1 for furniture systems and seating determined by a procedure based on the EPA Environmental Technology Verification (ETV) Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol conducted in an independent air quality testing laboratory.

Table 1. Maximum Indoor Air Concentrations

<table>
<thead>
<tr>
<th>Chemical Contaminant</th>
<th>Emission Limits Systems Furniture</th>
<th>Emission Limits Seating</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVOC</td>
<td>0.5 mg/m³</td>
<td>0.25 mg/m³</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>50 parts per billion</td>
<td>25 parts per billion</td>
</tr>
<tr>
<td>Total Aldehydes</td>
<td>100 parts per billion</td>
<td>50 parts per billion</td>
</tr>
<tr>
<td>4 – Phenylcyclohexene (4-PCH)</td>
<td>0.0065 mg/m³</td>
<td>0.00325 mg/m³</td>
</tr>
</tbody>
</table>

OR

PATH 3

Calculated indoor air concentrations that are less than or equal to those established in Table 1 for furniture systems and seating determined by a procedure based on ANSI/

The requirement in ANSI/BIFMA X7.1-2007, Section 5, is waived for LEED purposes. Section 5 requires that laboratories used to perform the emissions testing and/or provide analytical results shall be independently accredited to ISO/IEC 17025, “General requirements for the competence of testing and calibration laboratories.”

OPTION 6. Ceiling and Wall Systems (1 point)
All gypsum board, insulation, acoustical ceiling systems, and wall coverings installed in the building interior shall meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
AgBB: Health-related Evaluation of Emissions of Volatile Organic Compounds (VOC and SVOC) from Building Products
Umwelt Bundes Amt
http://www.umweltbundesamt.de/produkte-e/bauprodukte/agbb.htm
This is the German method for VOC testing and evaluation. The evaluation scheme sets quality standards relevant to health for future manufacture of indoor building products and fosters the development of products with particularly low emissions. It is not aimed at subsequent evaluation of products already installed.

ASTM D2369: Standard Test Method for Volatile Content of Coatings
http://www.astm.org/
According to the ASTM website, “This test method is the procedure of choice for determining volatiles in coatings for the purpose of calculating the volatile organic content in coatings under specified test conditions. The weight percent solids content (nonvolatile matter) may be determined by difference. This information is useful to the paint producer and user and to environmental interests for determining the volatiles emitted by coatings.”

http://www.astm.org/
According to the ASTM website, “This test method is for the determination of the weight percent of individual volatile organic compounds in low VOC content waterborne latex air-dry coatings. The method is intended primarily for analysis of waterborne coatings in which the material VOC content is below 5 weight percent. The method has been used successfully with higher VOC content waterborne coatings.”

California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers
http://www.cal-iaq.org/
This is the emissions-testing standard for California. The practice applies to any material belonging to a product category generally used in an enclosed indoor environment. Examples include paints, other architectural coatings, sealants, adhesives, wall coverings, floor coverings, wood paneling, and furniture components, whether used in public and commercial office buildings, schools, medical buildings, residences, or other building types.

California Department of Public Health (CDPH) Standard Method V1.1-2010
http://www.cdph.ca.gov/
This is the emissions-testing and evaluation standard for California Specification Section 01350. The standard is applicable to the full range of building products including paints and adhesives that can be tested in small-scale chambers.
EPA Test Method 24, Determination of Volatile Matter Content, Water Content, Densite, Volume Solids, and Weight Solids of Surface Coatings
http://www.epa.gov/
EPA Test Method 24 provides testing parameters for identifying volatile content in coatings. This testing method references several ASTM sampling methods.

http://www.iso.org/
According to the ISO website, “ISO 11890-1:2007 specifies a method for the determination of the volatile organic compound (VOC) content of paints, varnishes and their raw materials. This part may be used where the expected VOC content is greater than 15 % by mass. When the expected VOC content is greater than 0,1 % by mass and less than 15 % by mass, ISO 11890-2 should be employed.”

http://www.iso.org/
According to the ISO website, “ISO 11890-2:2006 specifies a method for the determination of the volatile organic compound (VOC) content of paints, varnishes and their raw materials. ISO 11890-2 is preferred if the expected VOC content is greater than 0,1 % by mass and less than about 15 % by mass. When the VOC content is greater than about 15 % by mass, the less complicated method given in ISO 11890-1 may be used.”

4. Implementation
If the German AgBB/DIBt testing method or a testing method based on AgBB/DIBt method (GUT, EMICODE, Blue Angel) is used, use test results from the three-day, seven-day, or 14-day time point.
See the Implementation section of IEQ Credit 4.1 in the LEED 2009 Green Building Design and Construction Reference Guide for complete implementation guidance related to this credit.

5. Timeline and Team
See the Timeline and Team section of IEQc4.1 in the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit.

6. Calculations
There are no calculations required for this credit.

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.

- Maintain a list of each carpet, carpet cushion, and carpet adhesive installed in the building interior. Record the VOC content for each adhesive. If a European testing method has been selected, ensure that it meets the testing requirements outlined in the rating system.
- Maintain a list of each hard surface flooring product, tile setting adhesive, finishes, and grout installed in the building interior. Record the VOC content for each tile setting adhesive and grout.
8. Examples
A project team in Paris wants to use a linoleum flooring product that is marked with both the Blue Angel and the GUT logos. The team compares the product data sheet with the referenced testing standards. The product meets the AgBB/DIBt VOC testing standards and therefore qualifies for credit.

**Figure 1.** Example product data sheet on emissions

### LINOLEUM

<table>
<thead>
<tr>
<th>Produktbeschreibung nach EN 548</th>
<th>Marmorette 2.5mm</th>
<th>Marmorette 3.2mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belagsart</td>
<td>EN 546</td>
<td>Linoleum mit LPL Finish</td>
</tr>
<tr>
<td>Mustergang</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gesamtdicke</td>
<td>EN 428</td>
<td>2,5 mm</td>
</tr>
<tr>
<td>Unterschicht</td>
<td>Jutegewebe</td>
<td></td>
</tr>
<tr>
<td>Klassifizierung</td>
<td>EN 666</td>
<td>Klasse 23/34/42</td>
</tr>
<tr>
<td>Rollenbreite</td>
<td>EN 426</td>
<td>200 cm</td>
</tr>
<tr>
<td>Rollenlänge</td>
<td>EN 426</td>
<td>20–31 m</td>
</tr>
<tr>
<td>Gesamtgewicht</td>
<td>EN 430</td>
<td>2900 g / m²</td>
</tr>
</tbody>
</table>

| Brandverhalten | EN 13501-1 | Cfl – s1 | Cfl – s1 |
| Rutschsicherheit | BGR 101 | R 9 | R 9 |
| Sicherheit | | | |
| Rutschhemmung BFU | bfu Reglement | GS I Klasse | |
| Gletschermeter | EN 13893 | DS (> 0,30) | DS (> 0,30) |
| Blauer Engel | RAL-UZ 38 | Ja | Ja |
| REACH | | enthält keine Stoffe die in der SVHC-Liste enthalten sind | enthält keine Stoffe die in der SVHC-Liste enthalten sind |
| Allgemeine Bauaufsichtliche Zulassung | Z-156.604-376 | geeignet für die Verwendung in Aufenthaltsräumen | geeignet für die Verwendung in Aufenthaltsräumen |

| Funktion | | |
| Trittschallverbesserungsmaß | ISO 140-8 | 4 dB | 6 dB |
| Restbelästigung | EN 435 | ≤ 0,15 mm | ≤ 0,15 mm |
| Farblichteffekt | ISO 105-002 | Stufe ≥ 6 | Stufe ≥ 6 |
| Durchgangswiderstand | EN 1001 | – | – |
| Standortisolierung | VDE 0100 | > 200 kOhm | > 200 kOhm |
| Aufladungsspannung | EN 1815 | ca. 2,0 kV | ca. 2,0 kV |
| Wärmeschutz klasse | EN 12907 | 0,015 m² K / W | 0,018 m² K / W |
| Wärmedurchgangswiderstand | EN 12524 | 0,17 W / mK | 0,17 W / mK |
| Chemikaliensicherheit | EN 423 | Mineralöl- und Fettsäurebeständigkeit und kurzzeitig beständig gegen verdiinnte Säuren | Mineralöl- und Fettsäurebeständigkeit und kurzzeitig beständig gegen verdiinnte Säuren |
| Stuhlrollen | EN 425 | geeignet (Typ W) | geeignet (Typ W) |
| Kegelzahl | EN 435-A | Ø 40 mm | Ø 50 mm |
| Einwirkung von Mikroorganismen | JIS Z 2261 | DLW Linoleum hat antibakterielle Eigenschaften | DLW Linoleum hat antibakterielle Eigenschaften |
| Beständigkeit gegen brennende Zigaretten | EN 1399 | geeignet | geeignet |
| Bodenheizung | | geeignet (max. 28°C) | geeignet (max. 28°C) |

*IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.*
9. Exemplary Performance
This credit is not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations
European VOC testing methods often vary from those used in the United States. If a European testing method has been selected, ensure that it follows the parameters of the referenced California testing methods. If the European testing methods and calculations differ, multiply the European test results for carpets or floorings by 0.7.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

Websites
ASTM International
http://www.astm.org

Blue Angel

California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers
http://www.cal-iaq.org/

California Department of Public Health
http://www.cdph.ca.gov/

EMICODE
http://www.emicode.com/index.php?id=1&L=1

GUT
http://www.pro-dis.info/gut.html

International Organization for Standardization (ISO)
http://www.iso.org

Umwelt Bundes Amt
http://http://www.umweltbundesamt.de
See the LEED 2009 Green Building Design and Construction Reference Guide for additional resources related to this credit.

U.S. Environmental Protection Agency (EPA)
http://www.epa.gov

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms identified in this credit.
**INDOOR CHEMICAL AND POLLUTANT SOURCE CONTROL**

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**Intent**
To minimize building occupants’ exposure to potentially hazardous particulates and chemical pollutants.

**Requirements**
Design to minimize and control the entry of pollutants into buildings and later cross-contamination of regularly occupied areas through the following strategies:

- Employ permanent entryway systems at least 10 feet (3 meters) long in the primary direction of travel to capture dirt and particulates entering the building at regularly used exterior entrances. Acceptable entryway systems include permanently installed grates, grills, and slotted systems that allow for cleaning underneath. Roll-out mats are acceptable only when maintained on a weekly basis by a contracted service organization.

- Sufficiently exhaust each space where hazardous gases or chemicals may be present or used (e.g., garages, housekeeping and laundry areas, copying and printing rooms) to create negative pressure with respect to adjacent spaces when the doors to the room are closed. For each of these spaces, provide self-closing doors and deck-to-deck partitions or a hard-lid ceiling. The exhaust rate shall be at least 0.50 cubic feet per minute (cfm) per square foot (0.15 cubic meters per minute per square meter), with no air recirculation. The pressure differential with the surrounding spaces shall be at least 5 Pascals (Pa) (0.02 inches of water gauge) on average and a minimum of 1 Pa (0.004 inches of water gauge) when the doors to the rooms are closed.

- In mechanically ventilated buildings, install new air filtration media in regularly occupied areas prior to occupancy; these filters must meet one of the following criteria:
  - Filtration media is rated at a minimum efficiency reporting value (MERV) of 13 or higher in accordance with ASHRAE Standard 52.2
  - Filtration media is Class F7 or higher, as defined by CEN Standard EN 779: 2002, Particulate air filters for general ventilation, Determination of the filtration performance
  - Filtration media has a minimum dust spot efficiency of 80% or higher and greater than 98% arrestance on a particle size of 3–10 µg.

  Filtration should be applied to process both return and outside air that is to be delivered as supply air.

- Provide containment (i.e., a closed container for storage for off-site disposal in a regulatory compliant storage area, preferably outside the building) for appropriate disposal of hazardous liquid wastes in places where water and chemical concentrate mixing occurs (e.g., housekeeping, janitorial laboratories).

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1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
CEN Standard EN 779: 2002, Particulate air filters for general ventilation, Determination of the filtration performance
Comité Européen de Normalisation
http://www.cen.eu
This standard outlines the parameters used in many EU countries for determining filter class for all filtration media.

4. Implementation
In mechanically ventilated buildings, ensure that all installed filtration media are rated Class F7 or higher or have a minimum dust spot efficiency of 80% and at least 98% arrestance on a particle size of 3–10 µg.

See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for additional implementation guidance related to this credit.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Retail Supplement for guidance related to this credit.

6. Calculations
There are no calculations required for this credit.

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.

- On floor plans, mark the location and size of all permanent entryway systems and walk-off mats.
- Create a table listing entryway systems.
- Prepare a building maintenance plan that includes a description of cleaning and maintenance for permanent entryway systems and walk-off mats necessary to manage contaminants brought into the building.
- List rooms or areas that require separation.
- Describe the deck-to-deck partitions or hard-lid conditions at rooms known to have contaminants.
- As the project evolves, review and record negative pressure calculations at hazardous chemical areas to ensure proper depressurization.
- Maintain product literature for filters, showing compliance with the requirements.
8. Examples
See the LEED 2009 Green Building Design and Construction Reference Guide for an example detailing an isolation area for hazardous gases or chemicals.

9. Exemplary Performance
This credit is not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations
See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

Websites
Comité Européen de Normalisation
http://www.cen.eu

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.
CONTROLLABILITY OF SYSTEMS—LIGHTING AND THERMAL COMFORT

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**Intent**

To provide a high level of lighting system and thermal comfort control for individual workstations to promote the productivity, comfort, and well-being of building occupants.

**Requirements**

Provide individual lighting controls for 90% (minimum) of retail employees in office and administrative spaces, enabling adjustments to suit individual task needs and preferences.

AND

Provide individual thermal comfort controls for 50% (minimum) of retail employees in office and administrative spaces to enable adjustments to suit individual task needs and preferences. Operable windows can be used in lieu of comfort controls for occupants of areas that are 20 feet (6 meters) inside of and 10 feet (3 meters) to either side of the operable part of the window. The areas of operable window must meet the requirements of ASHRAE 62.1–2007, paragraph 5.1, Natural Ventilation (with errata but without addenda)

Conditions for thermal comfort are described in IEQ credit 7.1: Thermal Comfort—Design and include the primary factors of air temperature, radiant temperature, air speed and humidity.

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1. Thermal comfort control is the ability to alter at least 1 of the following primary factors in the occupant’s vicinity: air temperature, radiant temperature, air speed, and humidity.
2. Project teams wishing to use addenda approved by ASHRAE for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

IMPORTANT! This reference guide supplement contains only the reference guide sections that pertain to projects using the LEED 2009 Global Alternative Compliance Paths. Use this supplement alongside the LEED Reference Guide for Green Building Design and Construction and the Retail Supplement for complete credit information. For the omitted sections, refer to the main reference guide.
1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Retail Supplement for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Retail Supplement for a list of credits related to this credit.

3. Summary of Referenced Standards
CEN Standard EN15251: 2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics
Comité Européen de Normalisation
http://www.cen.eu
This standard outlines the parameters used in many EU countries to design and assess energy performance of buildings. Used in conjunction with ISO Standard 7730: 2005, it is considered equivalent to ASHRAE 55–2004 for the purposes of this credit.

ISO Standard 7730: 2005, Ergonomics of the thermal environment, Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria
International Organization for Standardization
http://www.iso.org
This standard “presents methods for predicting the general thermal sensation and degree of discomfort (thermal dissatisfaction) of people exposed to moderate thermal environments” and should be used in conjunction with CEN Standard EN 15251: 2007.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional standards referenced in this credit.

4. Implementation
See the LEED 2009 Green Building Design and Construction Retail Supplement for implementation guidance related to this credit.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Retail Supplement for complete guidance for this credit.

During schematic design, building designers should evaluate the building’s orientation and consider how heat gain or loss will affect the occupants. Designers should also consider whether site-specific conditions, such as wind, sound, and odors, may affect the location of operable windows. During design development, locate the thermal comfort controls with the help of electrical and mechanical engineers and the construction or development manager. Consider thermal comfort needs as they pertain to ISO 7730: 2005 and CEN Standard EN 15251: 2007 requirements; survey future occupants’ preferences. Evaluate the controls for each space, considering the specific tools and equipment that occupants will use on a daily basis. When evaluating shared occupant spaces, consider the occupancy schedule.

Post installation commissioning of all thermal comfort systems will ensure proper operation. During building operation, the owner should provide training for building maintenance staff in using the controls. Property management and building engineers should periodically review of comfort control systems to ensure that occupants’ needs are met and that controls are working according to design.
6. Calculations
See the LEED 2009 Green Building Design and Construction Retail Supplement for calculations relating to this credit.

7. Documentation Guidance
See the LEED 2009 Green Building Design and Construction Retail Supplement for documentation guidance related to this credit.

8. Examples
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for examples relating to this credit.

9. Exemplary Performance
This credit is not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations
See the LEED 2009 Green Building Design and Construction Retail Supplement for regional variations associated with this credit.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Retail Supplement for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions
See the LEED 2009 Green Building Design and Construction Retail Supplement for definitions of terms used in this credit.
**THERMAL COMFORT—DESIGN**

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**Intent**

To provide a comfortable thermal environment that promotes occupant productivity and well-being.

**Requirements**

Design heating, ventilating, and air-conditioning (HVAC) systems and the building envelope to meet the requirements of one of the options below.

**OPTION 1. ASHRAE Standard 55-2004 or Non-U.S. Equivalent**

Meet the requirements of ASHRAE Standard 55-2004, Thermal Comfort Conditions for Human Occupancy (with errata but without addenda). Demonstrate design compliance in accordance with the Section 6.1.1 documentation. Projects outside the U.S. may use a local equivalent to ASHRAE Standard 55-2004 Thermal Comfort Conditions for Human Occupancy Section 6.1.1.


Projects outside the U.S. may earn this credit by designing heating, ventilating and air conditioning (HVAC) systems and the building envelope to meet the requirements of International Organization for Standardization (ISO) 7730: 2005 Ergonomics of the thermal environment, Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria; and CEN Standard EN 15251: 2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics.

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1 Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.
ADDENDUM GUIDANCE FOR THIS CREDIT IS FORTHCOMING

1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
CEN Standard EN15251: 2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics
Comité Européen de Normalisation
http://www.cen.eu
This standard outlines the parameters used in many EU countries to design and assess energy performance of buildings. Used in conjunction with ISO Standard 7730: 2005, it is considered equivalent to ASHRAE 55–2004 for the purposes of this credit.

ISO Standard 7730: 2005, Ergonomics of the thermal environment, Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria
International Organization for Standardization
http://www.iso.org
This standard “presents methods for predicting the general thermal sensation and degree of discomfort (thermal dissatisfaction) of people exposed to moderate thermal environments” and should be used in conjunction with CEN Standard EN 15251: 2007.

4. Implementation
Local standards for projects outside the United States will be compared with ASHRAE 55–2004 in terms of scope, metrics, and thresholds. Project teams that wish to ensure acceptance of a proposed equivalent to ASHRAE 55–2004 prior to submission for review may choose to submit a Formal Inquiry for a Credit Interpretation Ruling for a single project, or a LEED Interpretation for multi-project use.

Projects using any local equivalent should, at a minimum, provide the information required in ASHRAE 55–2004, Section 6.1.1, Documentation.

See the LEED 2009 Green Building Design and Construction Reference Guide for additional implementation guidance related to this credit.

5. Timeline and Team
See the LEED 2009 Green Building Design and Construction Reference Guide for guidance related to this credit. Project teams wishing to use a local equivalent should contact USGBC early in the design phase to ensure that the alternative standard is acceptable.

6. Calculations
There are no calculations required for this credit; however, project teams should be able to describe how thermal comfort conditions were established for the project and how the design of conditioning systems addresses the thermal comfort design.
7. Documentation Guidance
See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.

8. Examples
See the LEED 2009 Green Building Design and Construction Reference Guide for examples relating to this credit.

9. Exemplary Performance
This credit is not eligible for exemplary performance under the Innovation in Design section.

10. Regional Variations
See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.

See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.

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THERMAL COMFORT—EMPLOYEE VERIFICATION

RETAIL: NC

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*1 point in addition to IEQ Credit 7.1

Intent

To provide for the assessment of building occupants’ thermal comfort over time.

Requirements

Achieve IEQ Credit 7.1, Thermal Comfort—Design

AND

Provide a permanent monitoring system to ensure that building performance meets the desired comfort criteria as determined by IEQ Credit 7.1, Thermal Comfort—Design.

Agree to conduct a thermal comfort survey of building employees within a period of 6 to 18 months after occupancy. This survey should collect anonymous responses about thermal comfort in the building including an assessment of overall satisfaction with thermal performance and identification of thermal comfort-related problems. Agree to develop a plan for corrective action if the survey results indicate that more than 20% of occupants are dissatisfied with thermal comfort in the building. This plan should include measurement of relevant environmental variables in problem areas in accordance with the standard used for design in IEQ Credit 7.1: Thermal Comfort—Design.
1. Benefits and Issues to Consider
See the LEED 2009 Green Building Design and Construction Reference Guide for information on environmental and economic issues related to this credit.

2. Related Credits
See the LEED 2009 Green Building Design and Construction Reference Guide for a list of credits related to this credit.

3. Summary of Referenced Standards
CEN Standard EN15251: 2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics
Comité Européen de Normalisation
http://www.cen.eu
This standard outlines the parameters used in many EU countries to design and assess energy performance of buildings. Used in conjunction with ISO Standard 7730: 2005, it is considered equivalent to ASHRAE 55–2004 for the purposes of this credit.

ISO Standard 7730: 2005, Ergonomics of the thermal environment, Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria
International Organization for Standardization
http://www.iso.org
This standard “presents methods for predicting the general thermal sensation and degree of discomfort (thermal dissatisfaction) of people exposed to moderate thermal environments” and should be used in conjunction with CEN standard EN 15251: 2007.

4. Implementation
See the LEED 2009 Green Building Design and Construction Reference Guide and Retail Supplement for implementation guidance related to this credit.

5. Timeline and Team
The design team is primarily responsible for achieving this credit, which is based on the requirements of the standard chosen in IEQ Credit 7.1. Additionally, a member of the building operations team, an owner agent, or a commissioning authority should administer the postoccupancy survey required by this credit.

6. Calculations
There are no calculations associated with this credit.

7. Documentation Guidance
See the LEED 2009 Green Building Design and Construction Reference Guide for documentation guidance related to this credit.

8. Examples
There are no examples for this credit.

9. Exemplary Performance
This credit is not eligible for exemplary performance under the Innovation in Design section.
10. Regional Variations
See the LEED 2009 Green Building Design and Construction Reference Guide for regional variations associated with this credit.

11. Operations and Maintenance Considerations
See the LEED 2009 Green Building Design and Construction Reference Guide for Operations and Maintenance considerations related to this credit.

12. Resources
See USGBC’s LEED Resources & Tools (http://www.usgbc.org/projecttools) for additional resources and technical information.
See the LEED 2009 Green Building Design and Construction Reference Guide for resources related to this credit.

13. Definitions
See the LEED 2009 Green Building Design and Construction Reference Guide for definitions of terms used in this credit.
**Bus rapid transit** is an enhanced bus system that operates on exclusive bus lanes or other transit rights-of-way; it is designed to combine the flexibility of buses with the efficiency of rail.

**Green infrastructure** is a soil- and vegetation-based approach to wet weather management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure management approaches and technologies infiltrate, evapotranspire, capture and reuse stormwater to maintain or restore natural hydrologies (U.S. EPA).

An **inland waterway** is a navigable body of water, such as a river, canal, or lake, that is deep, wide, and slow enough for a vessel to pass.

**Low-Impact Development** (LID) is an approach to managing stormwater runoff that emphasizes onsite natural features to protect water quality by replicating the natural land cover hydrologic regime of watersheds and addressing runoff close to its source. Examples include better site design principles, such as minimizing land disturbance, preserving vegetation, and minimizing impervious cover, and design practices like rain gardens, vegetated swales and buffers, permeable pavement, rainwater harvesting, and soil amendments. These engineered practices may require specialized design assistance.

**Manage onsite** refers to capturing and retaining the specified volume of rainfall to mimic natural hydrologic function. Strategies may include evapotranspiration, infiltration, and capture and reuse.

**Month with the highest irrigation demand** is the maximum monthly delta between evapotranspiration rate (ETo) and mean monthly rainfall.

**Natural site hydrology** is the natural land cover function of water occurrence, distribution, movement, and balance.

**Public transportation** consists of bus, rail, or other transit services for the general public that operate on a regular, continual basis.

**Rideshare** is a transit service that involves sharing a single vehicle with multiple people, excluding large-scale vehicles such as buses and trains. The rideshare transit facility must include a signed stop and a clearly defined waiting area. Additionally, the rideshare must include an enclosed passenger seating area, fixed route service, fixed fare structure, continuous daily operation, and the ability to pick up and drop off multiple riders. Rideshare vehicles must hold 4 or more passengers, except for human-powered conveyances, which must hold 2 or more passengers.