McELROY METAL
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Family Owned - Quality Focused

McElroy Metal Guideline for Leadership in Energy and Environmental Design (LEED) version 4

This guideline provides a summary of the USGBC's LEEDv4 green building rating program. As of November 1, 2016 all new LEED projects must register under the new LEED version 4. An overview of how McElroy Metal's roof, wall or insulated metal panel components can help a building project to be certified in LEEDv4 is included in this guideline document as well.

A roof or wall system is only one component of an integrated building design program. LEED takes into account the building envelope and interior design technologies that affect the energy usage, environmental impact, health of occupants, and social quality of the design, construction and operation of a building.

This guideline describes potential points in the LEEDv4 Green Building Design and Construction credit qualifications related to metal roofing and wall products manufactured by McElroy Metal.

A. What is LEEDv4 ?

LEEDv4 was launched at GREENBUILD in November of 2013 in Philadelphia, PA. It represents a transformational change in USGBC's green building certification program. The LEED program has been revised over time to become more stringent relative to building and energy codes.

Single attributes of materials have been replaced in many sections of the rating program with an emphasis on multiple attributes and whole building performance, and transparency in the case of disclosure and optimization of environmental impact and the chemical ingredients of materials and products. Other changes over LEED 2009 include new categories and the consolidation of certain credits.

In many cases, the attributes of a McElroy Metal roof system or wall system are not specifically credited in LEEDv4. More performance-based and system-based considerations are recognized in credits within LEEDv4. The transparency of the environmental impacts of McElroy Metal products is often contributing along with many other products or systems to reduce energy or lower environmental impacts of the entire building project.

This latest version has re-structured the previous suite of LEED programs. Within LEEDv4 the primary rating systems are:

1. **LEED for Building Design and Construction:** Buildings that are new construction or major renovation.
2. **LEED for Interior Design and Construction:** Interior spaces that are complete interior fit-out.
3. **LEED for Building Operations and Maintenance:** Existing buildings that are undergoing improvement work or little to no construction.
4. **LEED for Neighborhood Development :** New land development projects or redevelopment projects containing residential uses, non-residential uses, or a mix.

The assessments attempt to comprise universally understood and accepted performance criteria in key areas of human and environmental health such as:

1. Location and Transportation
2. Sustainable Sites
3. Water Efficiency
4. Energy & Atmosphere
5. Materials & Resources
6. Indoor Environmental Quality

Other categories include:

1. Integrative Process
2. Innovation
3. Regional Priorities

The categories within each LEED rating tool are divided into credits. Each credit addresses an initiative that improves, or has the potential to improve, the sustainability or energy optimization of a building. Points are awarded under each credit for actions that demonstrate that the project has met the overall objectives of LEED. Some credits allow for more than one strategy to achieve the aim and award points, whereas others are more prescriptive. Some categories also have prerequisites, which mandate a particular action or feature. LEED assessments are third-party certified and there are four levels of LEED Certification that a building can receive:

1. Certified
2. Silver
3. Gold
4. Platinum

It is important to note that buildings, not products, qualify for certification in LEED.

B. LEEDv4 for Building Design and Construction (New Construction)

The LEEDv4 for New Construction rating system was designed primarily for new construction or major renovation of commercial buildings including schools, retail, data centers, warehouse and distribution centers, hospitality and healthcare buildings.

The nine categories in the assessment contain credits that total 118 possible points, which are translated into the four levels of certification. (see Tables 1 and 2).

Table 1: Summary of LEEDv4 for Building Design and Construction (New Construction)

Categories	Number of Credits	Number of Prerequisites	Total Possible Points
Integrative Process	1	1	1
Location and Transportation	8	0	32
Sustainable Sites	11	2	10
Water Efficiency	4	3	25
Energy & Atmosphere	7	4	11
Materials & Resources	9	3	13
Indoor Environmental Quality	9	3	16
Innovation	2	0	6
Regional Priority	1	0	4

Table 2: The certification levels in the LEEDv4 for Building Design and Construction (New Construction)

Achievement Level	Points Required
Certified	40 – 49
Silver	50 – 59
Gold	60 – 79
Platinum	80 and above

C. Content and intent of Credits in LEEDv4

This section of the guideline summarizes each of the credits in the LEEDv4 program. A more detailed look at the specific credits that are impacted by using McElroy Metal products is shown later in this Guideline

1. Integrative Process

A point is awarded in this credit for performing a preliminary "simple box" energy modeling analysis before the completion of schematic design that explores how to reduce energy loads in the building and accomplish related sustainability goals by questioning default assumptions. The analysis assesses strategies associated with site conditions, massing and orientation, basic envelope attributes, lighting level, thermal comfort ranges, plug and process load needs, and programmatic and operational parameters. It also assesses multifunctioning spaces, operating schedules, space allotment per person, teleworking, reduction of building area, and anticipated operations and maintenance.

2. Location and Transportation

Credit categories include:

- **LEED for Neighborhood Development Location**: This credit is designed to reduce vehicles' miles traveled, to enhance livability and to improve human health by encouraging daily physical activity. A project must be located within an area certified as LEED for Neighborhood Development.
- **Sensitive Land Protection**: The intent of this credit is to avoid the development of environmentally sensitive lands and reduce the environmental impact from the location of a building on a site. To comply, a project can be located on land that has been previously developed.
- **High Priority Site**: Encourages locating the project on an infill location in a historic district, a priority zone site or on a site undergoing brownfield remediation.
- **Surrounding Density and Diverse Uses**: This credit encourages a project team to conserve land and protect farmland and wildlife habitat by locating the building in areas with existing infrastructure. This promotes walkability, transportation efficiency and reduced vehicle distance traveled.
- **Access to Quality Transit**: To comply with this credit, the building site must be within walking distance of an existing or planned bus stop, light or heavy rail station, or commuter ferry terminal.
- **Bicycle Facilities**: This credit intends to promote bicycling and transportation efficiency and reduce vehicle distance traveled.
- **Reduced Parking Footprint**: To comply with this credit, the project must provide parking capacity that is below the base ratios recommended by the Parking Consultants Council. This helps to minimize the environmental harms associated with parking facilities.
- **Green Vehicles**: This credit reduces pollution by promoting alternatives to conventionally fueled automobiles. Compliance is based on providing preferred parking for green vehicles or providing electric vehicle charging facilities.

3. Sustainable Sites

There are two prerequisites in this category.

- **Construction Activity Pollution Prevention**: An Erosion and Sediment Control (ESC) plan must be implemented for all construction activities to minimize soil loss, sedimentation of receiving waters and dust and particulate pollution.
- **Environmental Site Assessment**: This is a prerequisite only for school and healthcare projects. It requires a Phase 1 Environmental Site Assessment as described in ASTM E527-5 to determine whether environmental contamination exists at the site.

Credits in this category include:

- **Site Assessment**: A point is awarded when a site is assessed and documented for how the design will be influenced by the topography, hydrology, climate, vegetation, soils, human use and human health effects.
- **Site Development- Protect or Restore Habitat**: Points are awarded for conserving existing natural areas and restoring damaged areas to provide habitat and promote biodiversity. This can be achieved by preserving and protecting 40% of the greenfield area on the site (if it exists) from all development and construction activity.
- **Open Spaces**: Recognizes a portion of the total site area that is an outdoor space, a portion of which must be vegetated, to encourage interaction with the environment, social interaction, passive recreation and physical activities.
- **Heat Island Reduction**: Points are awarded for shading the building area, using paving and roofing materials with high solar reflectance; and/or vegetating the roof area.
- **Rainwater Management** : Points are awarded for reducing runoff volume and improving water quality by replicating the natural hydrology and water balance of the site, based on historical conditions and undeveloped ecosystems in the region. This can be achieved by minimizing land disturbance, preserving vegetation, minimizing impervious cover, rain gardens, vegetated swales and buffers, permeable pavement, rainwater harvesting, and soil amendments.
- **Light Pollution Reduction**: Recognizes designs that reduce night sky pollution, taking into account uplight shielding, glare shielding and backlight shielding.
- **Site Master Plan:** This credit applies only to school projects. A site master plan must be developed in collaboration with school authorities.
- **Tenant Design and Construction Guidelines:** This credit applies only to Core and Shell projects. This credit requires the team to prepare guidelines for extending the sustainable design of the base building into tenants' individual spaces.
- **Places of Respite:** This credit applies only to healthcare projects. The team must provide places of respite for patients, visitors and staff that are outdoors or located in interior atria, greenhouses, solaria or conditioned spaces.
- **Direct Exterior Access:** This credit applies only to healthcare projects. Direct access to an exterior courtyard, terrace, garden or balcony must be provided.
- **Joint Use of Facilities:** This credit applies only to school projects. This credit is for making building space open to the general public or to specific organizations.

4. Water Efficiency

There are three prerequisites in this category.

- **Outdoor Water Use Reduction**: Show that the project's landscape requires no permanent irrigation system or reduce the landscape water requirements by 30% through plant species selection and irrigation system efficiency.
- **Indoor Water Use Reductio**n: Reduce aggregate water consumption by 20% from baseline and ensure all newly installed lavatory fixtures that are eligible for labeling must be WaterSense labeled.
- **Building –Level Water Metering:** Install water meters measuring total potable water use for the building and grounds. Data must be compiled into reports to the USGBC over a five year period.

Credits in this category include:

- **Outdoor Water Use Reduction**: Points are awarded for reducing outdoor water consumption by 50% of the calculated baseline. This can be achieved by reducing irrigation through the use of rainwater harvesting systems.
- **Indoor Water Use Reduction**: Points are awarded for reducing indoor water consumption. This can be achieved by providing alternatives to potable water, including rainwater.
- **Cooling Tower Water Use:** The intent of this credit is to conserve water used for cooling tower makeup while controlling microbes, corrosion and scale in the condenser water system.
- **Water Metering**: Install permanent water meters to support water management and identify opportunities for additional water savings by tracking water consumption.

5. Energy and Atmosphere

There are four prerequisites in this category:

- **Fundamental Commissioning and Verification**: There must be independent verification that the building's process activities for mechanical, electrical, plumbing, and renewable energy systems are operating efficiently and according to design and owners' needs.
- **Minimum Energy Performance** : The proposed building must demonstrate an improvement of 5% compared to the baseline building performance rating according to ASHRAE 90.1-2010 using a simulation model; or comply with the mandatory and prescriptive provisions of ASHRAE 90.1-2010 and comply with the appropriate ASHRAE 50% Advanced Buildings Core Performance Guide.
- **Building-Level Energy Metering**: This involves the installation of building-level energy meters that measure total energy consumption which is shared with USGBC for a five year period.
- **Fundamental Refrigerant Management**: In order to reduce stratospheric ozone depletion, chlorofluorocarbons (CFCs) must not be part of new HVAC systems. Where existing HVAC systems are reused, a comprehensive CFC phase-out conversion must be completed.

Credits in this category include:

- **Enhanced Commissioning**: This builds on the prerequisite for owners to contract a commissioning Authority (CxA). The CxA must have documented commissioning process experience. The process activities include mechanical, electrical, plumbing, renewable energy, energy, water, and the building's thermal envelope.
- **Optimize Energy Performance**: This credit achieves increased levels of energy performance beyond the Minimum Energy Performance prerequisite. Improvement in proposed building performance rating can be done with energy simulation analyses or through a prescriptive path using the appropriate ASHRAE 50% Advanced Energy Design Guide.
- **Advanced Energy Metering:** This credit requires the installation of advanced energy metering for the energy sources used by the building and any individual energy end uses representing at least 10% of the total annual consumption of the building.
- **Demand Response:** This encourages the project team to design buildings and equipment for participation in demand response programs through load shedding or shifting.
- **Renewable Energy Production**: Points are awarded for the use of renewable energy systems that offset building energy use and cost.
- **Enhanced Refrigerant Management**: The intent of this credit is to reduce ozone depletion, support early compliance with the Montreal Protocol, and minimize direct contributions to climate change. Compliance requires either not using refrigerants or selecting HVAC&R systems that minimize or eliminate compounds that have global warming potential or ozone depleting potential. Design elements that take advantage of passive solar heating, passive cooling and natural ventilation can help reduce dependence on HVAC&R systems.
- **Green Power and Carbon Offsets**: This credit is designed to encourage the reduction of greenhouse gas emissions through the use of grid-source, renewable energy technologies and carbon mitigation projects. The project must engage in a contract for green power, carbon offsets or renewable energy certificates (RECs)

6. **Materials and Resources**

There are three prerequisites in this category:

- **Storage and Collection of Recyclables**: To reduce the waste that is generated by building occupants and hauled to and disposed of in landfills.
- **Construction and Demolition Waste Management Planning**: This helps to reduce construction and demolition waste and debris disposed of in landfills and incineration facilities by recovering, reusing and recycling materials. A construction and demolition management plan must be established that describe the diversion strategies.
- **PBT Source Reduction – Mercury**: This prerequisite is only for healthcare projects. To reduce mercury-containing products and devices and mercury release through product substitution, capture and recycling.

Credits in this category include:

- **Building Life-Cycle Impact Reduction**: This credit helps to demonstrate reduced environmental impacts of materials used on the project. A whole-building Life Cycle Assessment is required. For new construction, points are awarded if the proposed building shows a 10% reduction, compared with a baseline building, in at least three of six environmental impact categories.
- **Building Product Disclosure and Optimization – Environmental Product Declarations**: This credit encourages the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. Points are awarded for materials that disclose life cycle assessment, industry-wide environmental product declaration, or product-specific environmental product declaration.
- **Building Product Disclosure and Optimization – Sourcing of Raw Materials**: To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner. Points are awarded when manufacturers of materials have a publicly released report from raw material suppliers, related to extraction locations, responsible sourcing criteria, commitments to responsible land use, and commitments to reduce environmental harms.
- **Building Product Disclosure and Optimization- Material Ingredients**: To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. Points are awarded if materials demonstrate their chemical inventory, and/or the optimization of the ingredients against specific lists of chemicals of concern, or optimizing the product manufacturer supply chain.
- **PBT Source Reduction-Mercury**: This credit applies only to healthcare projects. Specify and install fluorescent lamps with low mercury content and long lamp life.
- **PBT Source Reduction – Lead, Cadmium and Copper**: This credit applies only to healthcare projects. To comply, the project must specify substitutes for materials manufactured with lead and cadmium. Specific uses of Copper are described in LEED.
- **Furniture and Furnishings:** This credit applies only to healthcare projects. This credit is to enhance the environmental and human health performance attributes associated with freestanding furniture and medical furnishings.
- **Design for Flexibility**: This credit applies only to healthcare projects. Intentionally design facilities for adaptive use to reduce the resource inputs and waste generation associated with renovation.
- **Construction and Demolition Waste Management**: To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials. Points are awarded if the project can reduce the total waste materials or divert a portion of the total construction and demolition materials into different material streams.

7. **Indoor Environmental Quality**

There are three prerequisites in this category:

- **Minimum Indoor Air Quality Performance:** Compliance with ASHRAE 62.1-2010 (Sections 4-7) sets the prerequisite minimum standard for indoor ventilation rates in both mechanically and naturally ventilated buildings.
- **Environmental Tobacco Smoke Control**: The prerequisite can be achieved through two prescriptive paths that prohibit smoking in the building, except in designated smoking areas that must be located 25 feet away from any building entry, air intake point, or operable window.

- **Minimum Acoustic Performance:** This applies only to school projects. The prerequisite is based on providing classrooms that facilitate teacher-to-student and student-to-student communication through effective acoustic design.

Credits in this category include:

- **Enhanced Indoor Air Quality Strategies**: This credit promotes occupant's comfort, well-being, and productivity by improving indoor air quality. Strategies for air filtration, natural ventilation designs, and prevention of cross-contamination are paths toward compliance.
- **Low-Emitting Materials**: Points are awarded for complying with standards which specify maximum volatile organic compound (VOC) concentrations of materials used in the building interior and exterior. Materials such as paints, coatings, adhesives and sealants are included.
- **Construction Indoor Air Quality Management Plan:** This credit involves the development and implementation of an indoor air quality management plan for the construction and pre-occupancy phases of the project. The SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 2nd edition, 2007, Chapter 3 must be met or exceeded.
- **Indoor Air Quality Assessment**: The intent of this credit is to establish better quality indoor air in the building after construction and during occupancy. Before occupancy new filtration media must be installed and the building must perform a flush-out of outdoor air. An option is to conduct baseline IAQ testing using a variety of protocols.
- **Thermal Comfort**: To promote occupants' productivity, comfort and well-being by designing HVAC systems and the building envelope to meet ASHRAE 55-2010.
- **Interior Lighting**: This credit covers ways to provide high quality lighting in occupant spaces by providing individual lighting controls and using other strategies.
- **Daylight**: This credit helps to reduce the use of electrical lighting by introducing daylight into the regularly occupied spaces. This is done with computer simulations of the daylight quality and daylight levels. Glare control is another strategy covered in this credit.
- **Quality Views**: To comply with this credit, the building must be designed to provide a direct line of sight to the natural outdoor environment and by a variety of strategies to improve the quality of the views offered to the regularly occupied spaces.
- **Acoustic Performance**: This credit covers HVAC background noise, sound transmission, reverberation time and sound masking strategies. Compliance is based on the 2011 ASHRAE Handbook, HVAC Applications Chapter 48.

8. Innovation

Credits in this category include:

- **Innovation**: This credit is designed to encourage and reward designs that perform above LEED standards and/or innovations not specifically addressed by LEED.
- **LEED Accredited Professional**: This credit encourages the project team to use a LEED Accredited Professional as at least one principal participant, in order to streamline the application and certification process.

9. Regional Priority

Credit in this category includes:

- **Regional Priority**: This provides an incentive for suggesting a credit that has regional importance for the project, as identified by USGBC Regional Chapters.
  PAC metal roofing products can be utilized in greener building design to improve energy efficiency and thermal comfort, reduce energy and reduce water consumption.

D. LEED Credits Impacted by McElroy Metal products

The credits in which McElroy Metal products can help a building project to become LEEDv4 certified are listed in Table 3.

Table 3: Credits available to a LEEDv4 registered building project where McElroy Metal roofing products are used.

Category	Credit	Maximum points in credit
Integrative process	Integrative process	1
Sustainable sites	Heat island reduction	2
	Rain water management	3
Water efficiency	Outdoor water use reduction	2
	Indoor water use reduction	6
Energy & Atmosphere	Optimize energy performance	18
	Renewable energy production	3
Materials and resources	Building life-cycle impact reduction	5
	Building product disclosure and optimization- Environmental product declarations	2
	Building product disclosures and optimization – Sourcing raw materials	2
	Building product disclosures and optimization – Material ingredients	2
	Construction and demolition waste management	2
Indoor environmental quality	Acoustic performance	1
	Low emitting materials	3
	Thermal comfort	1
Innovation	Innovation	5

E. Details of credits listed in Table 3

Integrative Process Category

- **Integrative Process**

Integrative Process Credit (possible 1 point)

Requirements

Beginning in pre-design and continuing throughout the design phases, identify and use opportunities to achieve synergies across disciplines and building systems described below. Use the analyses to inform the owner's project requirements (OPR), basis of design (BOD), design documents, and construction documents.

Energy-Related Systems

Discovery:

Perform a preliminary "simple box" energy modeling analysis before the completion of schematic design that explores how to reduce energy loads in the building and accomplish related sustainability goals by questioning default assumptions. Assess at least two potential strategies associated with each of the following:

- *Site conditions. Assess shading, exterior lighting, hardscape, landscaping, and adjacent site conditions.*
- *Massing and orientation. Assess massing and orientation affect HVAC sizing, energy consumption, lighting, and renewable energy opportunities.*
- *Basic envelope attributes. Assess insulation values, window-to-wall ratios, glazing characteristics, shading, and window operability.*
- *Lighting levels. Assess interior surface reflectance values and lighting levels in occupied spaces.*
- *Thermal comfort ranges. Assess thermal comfort range options.*
- *Plug and process load needs. Assess reducing plug and process loads through programmatic solutions (e.g., equipment and purchasing policies, layout options).*
- *Programmatic and operational parameters. Assess multifunctioning spaces, operating schedules, space allotment per person, teleworking, reduction of building area, and anticipated operations and maintenance.*

Before design of the building form begins, a building massing ("simple box") energy analysis can be used to evaluate potential energy and load reduction strategies, such as insulation levels and window performance levels. Within that analysis, USGBC recommends evaluating " the Building Envelope performance which includes R-value (insulation) of walls, roofs, and conditioned below-grade structures in low, medium and high ranges."

The use of energy efficient insulated McElroy Metal roofs and/or wall panel systems can be factored into the energy modeling that is recommended in the integrative process of LEEDv4.

This credit also applies to any of the McElroy Metal IMP products for wall or roof applications.

Sustainable Sites Category

- Heat Island Reduction Credit
- Rainwater Management

Heat Island Reduction Credit (possible 2 points)

Intent

To minimize effects on microclimates and human and wildlife habitats by reducing heat islands.

Requirements

Choose one of the following options:

Option 1. nonroof and roof (2 points except Healthcare, 1 point Healthcare)

Meet the following criterion:

$$\frac{\text{Area of Nonroof Measures}}{0.5} + \frac{\text{Area of High-Reflectance Roof}}{0.75} + \frac{\text{Area of Vegetated Roof}}{0.75} \geq \text{Total Site Paving Area} + \text{Total Roof Area}$$

Alternatively, an SRI and SR weighted average approach may be used to calculate compliance.

Use any combination of the following strategies.

Nonroof measures

- *Use the existing plant material or install plants that provide shade over paving areas (including playgrounds) on the site within 10 years of planting. Install vegetated planters. Plants must be in place at the time of occupancy permit and cannot include artificial turf.*
- *Provide shade with structures covered by energy generation systems, such as solar thermal collectors, photovoltaics, and wind turbines.*
- *Provide shade with architectural devices or structures that have a three-year aged solar reflectance (SR) value of at least 0.28. If three-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation.*
- *Provide shade with vegetated structures.*
- *Use paving materials with a three-year aged solar reflectance (SR) value of at least 0.28. If three-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation.*
- *Use an open-grid pavement system (at least 50% unbound).*

High-reflectance roof

Use roofing materials that have an SRI equal to or greater than the values in Table 1. Meet the three-year aged SRI value. If three-year aged value information is not available, use materials that meet the initial SRI value.

Table 1. Minimum solar reflectance index value, by roof slope

	Slope	Initial SRI	3-year aged SRI
Low-sloped roof	*≤ 2:12*	*82*	*64*
Steep-sloped roof	*> 2:12*	*39*	*32*

Vegetated roof
Install a vegetated roof.

OR

Option 2. parking under cover (1 point)

Place a minimum of 75% of parking spaces under cover. Any roof used to shade or cover parking must (1) have a three-year aged SRI of at least 32 (if three-year aged value information is not available, use materials with an initial SRI of at least 39 at installation), (2) be a vegetated roof, or (3) be covered by energy generation systems, such as solar thermal collectors, photovoltaics, and wind turbines.

McElroy Metal roofing systems can be offered with high Solar Reflectance Index (SRI) values. These products reflect a higher proportion of incoming solar energy away from a roof surface. By reflecting more of the solar energy, the surface temperature of a metal roof surface is lowered which helps to reduce the intensity of urban heat islands and help a LEED registered building to qualify for this point in either option 1 or 2. If the roof surface meets the SRI requirements the equation for roof and non roof surfaces can be used. If the roof surface does not meet the SRI requirements, the weighted average equation in this credit description for the roof and non-roof (hardscape, landscape, shading mechanisms) surfaces can be used.

Rainwater Management Credit (possible 3 points)

Intent

To reduce runoff volume and improve water quality by replicating the natural hydrology and water balance of the site, based on historical conditions and undeveloped ecosystems in the region.

Requirements

Option 1. Percentile of rainfall events

Path 1. 95th percentile (2 points except Healthcare, 1 point Healthcare)

In a manner best replicating natural site hydrology processes, manage on site the runoff from the developed site for the 95th percentile of regional or local rainfall events using low-impact development (LID) and green infrastructure.

Use daily rainfall data and the methodology in the U.S. Environmental Protection Agency (EPA) Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act to determine the 95th percentile amount.

OR

Path 2. 98th percentile (3 points except Healthcare, 2 points Healthcare)

Achieve Path 1 but for the 98th percentile of regional or local rainfall events, using LID and green infrastructure.

OR

Path 3. Zero lot line projects only – 85th Percentile (3 points except Healthcare, 2 points Healthcare))

The following requirement applies to zero lot line projects in urban areas with a minimum density of 1.5 FAR. In a manner best replicating natural site hydrology processes, manage on site the runoff from the developed site for the 85th percentile of regional or local rainfall events, using LID and green infrastructure.

OR

Option 2. Natural land cover conditions (3 points except Healthcare, 2 points Healthcare)

Manage on site the annual increase in runoff volume from the natural land cover condition to the post developed condition.

For path 3 USGBC describes green roofs and rainwater harvesting approaches are the most likely green infrastructure (GI) and low-impact development (LID) strategies to help zero lot line projects meet the credit requirements.

USGBC ***defines Low Impact Development*** *as "an approach to managing rainwater 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 (e.g., minimizing land disturbance, preserving vegetation, minimizing impervious cover) and design practices (e.g., rain gardens, vegetated swales and buffers, permeable pavement, rainwater harvesting, soil amendments). These are engineered practices that may require specialized design assistance."*

USGBC defines ***manage (rainwater) on site*** *as "to capture and retain a specific volume of rainfall to mimic natural hydrologic function. Examples of rainwater management include strategies that involve evapotranspiration, infiltration, and capture and reuse.*

A rainwater harvesting system integrated into a McElroy Metal roofing system will help to manage rainwater on site. Techniques that harvest or divert rainwater allow for stormwater to be used on-site and is not contributing to the erosion of soil on-site or in the receiving environment. Rainwater harvesting systems can help a LEED registered building project to qualify for the points in this credit.

Water Efficiency Category

- **Outdoor Water Use Reduction**
- **Indoor Water Use Reduction**

Outdoor Water Use Reduction Credit (possible 2 points)

Intent

To reduce outdoor water consumption.

Requirements

Reduce outdoor water use through one of the following options. Nonvegetated surfaces, such as permeable or impermeable pavement, should be excluded from landscape area calculations. Athletic fields and playgrounds (if vegetated) and food gardens may be included or excluded at the project team's discretion.

Option 1. No irrigation required (2 points except Healthcare, 1 point Healthcare)

Show that the landscape does not require a permanent irrigation system beyond a maximum two-year establishment period.

OR

Option 2. Reduced irrigation (1-2 points except Healthcare, 1 point Healthcare)

Reduce the project's landscape water requirement (LWR) by at least 50% from the calculated baseline for the site's peak watering month. Reductions must first be achieved through plant species selection and irrigation system efficiency as calculated in the Environmental Protection Agency (EPA) WaterSense Water Budget Tool.

Additional reductions beyond 30% may be achieved using any combination of efficiency, alternative water sources, and smart scheduling technologies.

Table 1. Points for reducing irrigation water

Percentage reduction from baseline	*Points (except Healthcare)*	*Points (Healthcare)*
50%	*1*	*1*
100%	*2*	—

A McElroy Metal roofing system that is integrated with a rainwater harvesting system tied in to a landscape irrigation system can help a LEED registered building project to qualify for the points in option 2 of this credit.

Indoor Water Use Reduction Credit (possible 6 points)

Intent

To reduce indoor water consumption.

Requirements

Further reduce fixture and fitting water use from the calculated baseline in WE Prerequisite Indoor Water Use Reduction. Additional potable water savings can be earned above the prerequisite level using alternative water sources. Include fixtures and fittings necessary to meet the needs of the occupants. Some of these fittings and fixtures may be outside the tenant space (for Commercial Interiors) or project boundary (for New Construction). Points are awarded according to Table 1.

Table 1. Points for reducing water use

Percentage reduction	*Points (BD&C)*	*Points (Schools, Retail, Hospitality, Healthcare)*	*Points (ID&C)*	*Points (CI Retail)*	*Points (CI Hospitality)*
25%	*1*	*1*	*2*	*2*	*2*
30%	*2*	*2*	*4*	*4*	*4*
35%	*3*	*3*	*6*	*6*	*6*
40%	*4*	*4*	*8*	*8*	*8*
45%	*5*	*5*	*10*	*10*	*10*
50%	*6*	*--*	*12*	*--*	*11*

USGBC states that alternatives to potable water include municipally supplied reclaimed water ("purple pipe water"),graywater, rainwater, stormwater, condensate, foundation dewatering water, used process water, and reverse osmosis reject water. In most cases water can be reused outside the building (for irrigation) or inside (for toilet flushing) with minimal treatment, but other uses will require more energy-intensive treatment.

A McElroy Metal roofing system that is integrated with a rainwater harvesting system that is plumbed into a graywater system to reduce potable water inside a building can help a LEED registered building project to qualify for the points in this credit.

Energy and Atmosphere Category

- **Minimum Energy Performance (prerequisite)**
- **Optimize Energy Performance**
- **Renewable Energy Production**

Minimum Energy Performance (prerequisite)

Intent

To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems.

Requirements

Option 1. Whole-building energy simulation

Demonstrate an improvement of 5% for new construction, 3% for major renovations, or 2% for core and shell projects in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), using a simulation model.

Projects must meet the minimum percentage savings before taking credit for renewable energy systems.

The proposed design must meet the following criteria:

- *compliance with the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.);*
- *inclusion of all energy consumption and costs within and associated with the building project; and*
- *comparison against a baseline building that complies with Standard 90.1–2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.).*

Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the building.

If unregulated loads are not identical for both the baseline and the proposed building performance rating, and the simulation program cannot accurately model the savings, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1–2010, G2.5). Alternatively, use the COMNET Modeling Guidelines and Procedures to document measures that reduce unregulated loads.

OR

Option 2. Prescriptive compliance: ASHRAE 50% Advanced Energy Design Guide

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.).

Comply with the HVAC and service water heating requirements, including equipment efficiency, economizers, ventilation, and ducts and dampers, in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone:

- *ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings, for office buildings smaller than 100,000 square feet (9 290 square meters);*
- *ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings, for retail buildings with 20,000 to 100,000 square feet (1 860 to 9 290 square meters);*
- *ASHRAE 50% Advanced Energy Design Guide for K–12 School Buildings; or*
- *ASHRAE 50% Advanced Energy Design Guide for Large Hospitals.*
- *• Over 100,000 square feet (9 290 square meters)*

For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1–2010, Appendixes B and D, to determine the appropriate climate zone.

OR

Option 3. Prescriptive compliance: Advanced Buildings™ Core Performance™ Guide

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or USGBC approved equivalent standard for projects outside the U.S.).

Comply with Section 1: Design Process Strategies, Section 2: Core Performance Requirements, and the following three strategies from Section 3: Enhanced Performance Strategies, as applicable. Where standards conflict, follow the more stringent of the two. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

To be eligible for Option 3, the project must be less than 100,000 square feet (9 290 square meter

Note: Healthcare, Warehouse or Laboratory projects are ineligible for Option 3.

Table 3 in this credit describes common issues with energy modeling by ASHRAE 90.1. In the category of "Building Envelope" the table states "Construction type and maximum U-factors for baseline walls, roofs, and floors are specified by Table G3.1-5 Baseline (b), The construction for walls, roofs and floors are specified by the standard and do not depend on the proposed design. For example, if a building will have concrete masonry walls, the baseline model will still have steel-framed walls.."

McElroy Metal insulated Roof systems, insulated wall systems and Insulated Metal Panel (IMP) wall systems can contribute along with other energy saving measures, products and systems to help a LEED registered building project comply with this prerequisite.

Optimize Energy Performance Credit (possible 18 points)

Intent

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

Requirements

Establish an energy performance target no later than the schematic design phase. The target must be established as kBtu per square foot-year (kW per square meter-year) of source energy use.

Choose one of the options below.

Option 1. Whole-building energy simulation (1–18 points except Schools and Healthcare, 1–16 points Schools, 1–20 points Healthcare)

Analyze efficiency measures during the design process and account for the results in design decision making. Use energy simulation of efficiency opportunities, past energy simulation analyses for similar buildings, or published data (e.g., Advanced Energy Design Guides) from analyses for similar buildings.

Analyze efficiency measures, focusing on load reduction and HVAC-related strategies (passive measures are acceptable) appropriate for the facility. Project potential energy savings and holistic project cost implications related to all affected systems.

Project teams pursuing the Integrative Process credit must complete the basic energy analysis for that credit before conducting the energy simulation.

Follow the criteria in EA Prerequisite Minimum Energy Performance to demonstrate a percentage improvement in the proposed building performance rating compared with the baseline. Points are awarded according to Table 1.

Table 1. Points for percentage improvement in energy performance

New Construction	*Major Renovation*	*Core and Shell*	*Points (except Schools, Healthcare)*	*Points Healthcare*	*Points Schools*
6%	*4%*	*3%*	*1*	*3*	*1*
8%	*6%*	*5%*	*2*	*4*	*2*
10%	*8%*	*7%*	*3*	*5*	*3*
12%	*10%*	*9%*	*4*	*6*	*4*
14%	*12%*	*11%*	*5*	*7*	*5*
16%	*14%*	*13%*	*6*	*8*	*6*
18%	*16%*	*15%*	*7*	*9*	*7*
20%	*18%*	*17%*	*8*	*10*	*8*

22%	*20%*	*19%*	*9*	*11*	*9*
24%	*22%*	*21%*	*10*	*12*	*10*
26%	*24%*	*23%*	*11*	*13*	*11*
29%	*27%*	*26%*	*12*	*14*	*12*
32%	*30%*	*29%*	*13*	*15*	*13*
35%	*33%*	*32%*	*14*	*16*	*14*
38%	*36%*	*35%*	*15*	*17*	*15*
42%	*40%*	*39%*	*16*	*18*	*16*
46%	*44%*	*43%*	*17*	*19*	-
50%	*48%*	*47%*	*18*	*20*	-

OR

Option 2. Prescriptive compliance: ASHRAE Advanced Energy Design Guide (1–6 points)

To be eligible for Option 2, projects must use Option 2 in EA Prerequisite Minimum Energy Performance.

Implement and document compliance with the applicable recommendations and standards in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1–2010, Appendixes B and D, to determine the appropriate climate zone.

ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings

- *Building envelope, opaque: roofs, walls, floors, slabs, doors, and continuous air barriers (1 point)*
- *Building envelope, glazing: vertical fenestration (1 point)*
- *Interior lighting, including daylighting and interior finishes (1 point)*
- *Exterior lighting (1 point)*
- *Plug loads, including equipment and controls (1 point)*

ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings

- *Building envelope, opaque: roofs, walls, floors, slabs, doors, and vestibules (1 point)*
- *Building envelope, glazing: fenestration - all orientations (1 point)*
- *Interior lighting, excluding lighting power density for sales floor (1 point)*
- *Additional interior lighting for sales floor (1 point)*
- *Exterior lighting (1 point)*
- *Plug loads, including equipment choices and controls (1 point)*

ASHRAE 50% Advanced Energy Design Guide for K–12 School Buildings

- *Building envelope, opaque: roofs, walls, floors, slabs, and doors (1 point)*
- *Building envelope, glazing: vertical fenestration (1 point)*
- *Interior lighting, including daylighting and interior finishes (1 point)*
- *Exterior lighting (1 point)*
- *Plug loads, including equipment choices, controls, and kitchen equipment (1 point)*

ASHRAE 50% Advanced Energy Design Guide for Large Hospitals

- *Building envelope, opaque: roofs, walls, floors, slabs, doors, vestibules, and continuous air barriers (1 point)*
- *Building envelope, glazing: vertical fenestration (1 point)*
- *Interior lighting, including daylighting (form or nonform driven) and interior finishes (1 point)*
- *Exterior lighting (1 point)*
- *Plug loads, including equipment choices, controls, and kitchen equipment (1 point)*

Energy efficient McElroy Metal cool metal roofing systems, cool wall systems and IMP can help realize many of the design elements that are key to reducing energy demand. Energy efficient building envelope systems, such as cool roofing help to reduce heat gain/loss, reduce peak energy demand, and improve energy performance of the building. In warmer climates, light colored reflective roofs can be used to reflect energy away from the building and reduce energy demand for internal cooling. Further, the high thermal emittance of painted steel products means that solar energy that is absorbed into the building space below the roof is quickly re-radiated at night. Metal roofing can also be used in cool climates to create more energy efficient buildings. Dark roofs are effective at absorbing solar energy and result in warmer buildings that require less energy to heat.

Renewable energy production Credit (possible 3 points)

Intent

To reduce the environmental and economic harms associated with fossil fuel energy by increasing self-supply of renewable energy.

Requirements

Use renewable energy systems to offset building energy costs. Calculate the percentage of renewable energy with the following equation:

$$\%\ \text{renewable energy} = \frac{\text{Equivalent cost of usable energy produced by the renewable energy system}}{\text{Total building annual energy cost}}$$

Use the building's annual energy cost, calculated in EA Prerequisite Minimum Energy Performance, if Option 1 was pursued; otherwise use the U.S. Department of Energy's Commercial Buildings Energy Consumption Survey (CBECS) database to estimate energy use and cost.

The use of solar gardens or community renewable energy systems is allowed if both of the following requirements are met.

- *The project owns the system or has signed a lease agreement for a period of at least 10 years.*
- *The system is located with the same utility service area as the facility claiming the use.*

Credit is based on the percentage of ownership or percentage of use assigned in the lease agreement. Points are awarded according to Table 1.

Table 1. Points for renewable energy

Percentage renewable energy	*Points (except CS)*	*Points (CS)*
1%	*1*	*1*
3%	—	*2*
5%	*2*	*3*
10%	*3*	—

USGBC emphasizes the use of on-site renewable energy projects, such as solar (power and/or water heating), wind, waste wood or biomass fuels.

Metal roofing is the ideal platform for photovoltaic and/or wind generation, outlasting the equipment and allowing attachment with no penetrations. This helps to reduce the environmental footprint of the building by offsetting fossil fuel based energy sources while maintaining roof integrity for decades. Building (rooftop) Integrated PV or solar thermal technologies used with McElroy Metal roof systems can help a LEED-registered building project to qualify for these credits.

Materials and Resources Category

- **Construction and Demolition Waste Management Planning (prerequisite)**
- **Building Life-Cycle Impact Reduction**
- **Building Product Disclosure and Optimization - Environmental Product Declarations**
- **Building Product Disclosure and Optimization - Sourcing of Raw Materials**
- **Building Product Disclosure and Optimization – Material Ingredients**
- **Construction and Demolition Waste Management**

Construction and Demolition Waste Management Planning (prerequisite)

Intent

To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

Requirements

Develop and implement a construction and demolition waste management plan:

- *Establish waste diversion goals for the project by identifying at least five materials (both structural and nonstructural) targeted for diversion. approximate a percentage of the overall project waste that these materials represent.*
- *Specify whether materials will be separated or commingled and describe the diversion strategies planned for the project. Describe where the materials will be taken and how the recycling facility will process the material.*

Provide a final report detailing all major waste streams generated, including disposal and diversion rates.

A construction waste management plan that includes steel or other metals in the building materials meets many of the goals to divert waste from landfills. Steel, aluminum and other metal waste materials have established recycling markets and programs that fit in nicely to a waste management plan suggested by LEED.

McElroy Metal roof or wall panel systems that are fully recyclable and used on a LEED-registered project will help the project qualify for this credit, provided a plan is developed.

Building Life-Cycle Impact Reduction Credit (possible 5 points)

Intent

To encourage adaptive reuse and optimize the environmental performance of products and materials.

Requirements

Demonstrate reduced environmental effects during initial project decision-making by reusing existing building resources or demonstrating a reduction in materials use through life-cycle assessment. Achieve one of the following options.

Option 1. historic building reuse (5 points)

Maintain the existing building structure, envelope, and interior nonstructural elements of a historic building or contributing building in a historic district. To qualify, the building or historic district must be listed or eligible for listing in the local, state, or national register of historic places. Do not demolish any part of a historic building or contributing building in a historic district unless it is deemed structurally unsound or hazardous. For buildings listed locally, approval of any demolition must be granted by the local historic preservation review board. For buildings listed in a state register or the U.S. National Register of Historic Places (or local equivalent for projects outside the U.S.), approval must appear in a programmatic agreement with the state historic preservation office or National Park Service (or local equivalent for projects outside the U.S.).

Any alteration (preservation, restoration, or rehabilitation) of a historic building or a contributing building in a historic district on the project site must be done in accordance with local or national standards for rehabilitation, whichever are applicable. If building is not subject to historic review, include on the project team a preservation professional who meets U.S. federal qualifications for historic architects (or local equivalent for projects outside the U.S.); the preservation professional must confirm conformance to the Secretary of Interior's Standards for the Treatment of Historic Properties (or local equivalent for projects outside the U.S.).

OR

Option 2. renovation of abandoned or blighted building (5 points)

Maintain at least 50%, by surface area, of the existing building structure, enclosure, and interior structural elements for buildings that meet local criteria of abandoned or are considered blight. The building must be renovated to a state of productive occupancy. Up to 25% of the building surface area may be excluded from credit calculation because of deterioration or damage.

OR

Option 3. building and material reuse (2–4 points)

Reuse or salvage building materials from off site or on site as a percentage of the surface area, as listed in Table 1

Include structural elements (e.g., floors, roof decking), enclosure materials (e.g., skin, framing), and permanently installed interior elements (e.g., walls, doors, floor coverings, ceiling systems). Exclude from the calculation window assemblies and any hazardous materials that are remediated as a part of the project.

Materials contributing toward this credit may not contribute toward MR Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials.

Table 1. Points for reuse of building materials

Percentage of completed project surface area reused	*Points BD&C*	*Points BD&C (Core and Shell)*
25%	*2*	*2*
50%	*3*	*3*
75%	*4*	*5*

OR

Option 4. whole-building life-cycle assessment (3 points)

For new construction (buildings or portions of buildings), conduct a life-cycle assessment of the project's structure and enclosure that demonstrates a minimum of 10% reduction, compared with a baseline building, in at least three of the six impact categories listed below, one of which must be global warming potential. No impact category assessed as part of the life-cycle assessment may increase by more than 5% compared with the baseline building.

The baseline and proposed buildings must be of comparable size, function, orientation, and operating energy performance as defined in EA Prerequisite Minimum Energy Performance. The service life of the baseline and proposed buildings must be the same and at least 60 years to fully account for maintenance and replacement. Use the same life-cycle assessment software tools and data sets to evaluate both the baseline building and the proposed building, and report all listed impact categories. Data sets must be compliant with ISO 14044.

Select at least three of the following impact categories for reduction:

- *global warming potential (greenhouse gases), in CO2e;*
- *depletion of the stratospheric ozone layer, in kg CFC-11;*
- *acidification of land and water sources, in moles H+ or kg SO2;*
- *eutrophication, in kg nitrogen or kg phosphate;*
- *formation of tropospheric ozone, in kg NOx or kg ethene; and*
- *depletion of nonrenewable energy resources, in MJ.*

The first three options in this credit pertain to building reuse projects. Option 4, whole building LCA, applies to new construction. USGBC states that the LCA must address, among other materials, "the complete building envelope and structural elements, including the material components of footings and foundations, structural wall assembly (from cladding to interior finishes), structural floors and ceilings (not including finishes), and roof assemblies. The system boundary of the LCA must be defined to account for cradle-to-grave environmental impacts associated with all the life-cycle stages for the building structure and enclosure as defined in ISO 21930 sections A-1 thru A-4, B-1 thru B-7, and C-1 thru C-4. The project team must take into account the entire building structure and enclosure, from design to demolition for an assumed 60-year service life.

Include structural elements (e.g., floors, roof decking), enclosure materials (e.g., skin, framing), and permanently installed interior elements (e.g., walls, doors, floor coverings, ceiling systems). Exclude from the calculation window assemblies and any hazardous materials that are remediated as a part of the project.

Materials contributing toward this credit may not contribute toward MR Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials.

Table 1. Points for reuse of building materials

Percentage of completed project surface area reused	*Points BD&C*	*Points BD&C (Core and Shell)*
25%	*2*	*2*
50%	*3*	*3*
75%	*4*	*5*

OR

Option 4. whole-building life-cycle assessment (3 points)

For new construction (buildings or portions of buildings), conduct a life-cycle assessment of the project's structure and enclosure that demonstrates a minimum of 10% reduction, compared with a baseline building, in at least three of the six impact categories listed below, one of which must be global warming potential. No impact category assessed as part of the life-cycle assessment may increase by more than 5% compared with the baseline building.

The baseline and proposed buildings must be of comparable size, function, orientation, and operating energy performance as defined in EA Prerequisite Minimum Energy Performance. The service life of the baseline and proposed buildings must be the same and at least 60 years to fully account for maintenance and replacement. Use the same life-cycle assessment software tools and data sets to evaluate both the baseline building and the proposed building, and report all listed impact categories. Data sets must be compliant with ISO 14044.

Select at least three of the following impact categories for reduction:

- *global warming potential (greenhouse gases), in CO2e;*
- *depletion of the stratospheric ozone layer, in kg CFC-11;*
- *acidification of land and water sources, in moles H+ or kg SO2;*
- *eutrophication, in kg nitrogen or kg phosphate;*
- *formation of tropospheric ozone, in kg NOx or kg ethene; and*
- *depletion of nonrenewable energy resources, in MJ.*

The first three options in this credit pertain to building reuse projects. Option 4, whole building LCA, applies to new construction. USGBC states that the LCA must address, among other materials, "the complete building envelope and structural elements, including the material components of footings and foundations, structural wall assembly (from cladding to interior finishes), structural floors and ceilings (not including finishes), and roof assemblies. The system boundary of the LCA must be defined to account for cradle-to-grave environmental impacts associated with all the life-cycle stages for the building structure and enclosure as defined in ISO 21930 sections A-1 thru A-4, B-1 thru B-7, and C-1 thru C-4. The project team must take into account the entire building structure and enclosure, from design to demolition for an assumed 60-year service life.

An industry-wide Life Cycle Assessment of the metal roof and wall cladding products and processes, as well as the manufacturing process for insulated metal panels (IMP) was conducted by Metal Construction Association. The life cycle inventory of the environmental impact data from that LCA project can be used in a whole-building LCA as required in credit

Building Product Disclosure and Optimization - Environmental Product Declarations Credit (possible 2 points)

Intent

To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products from manufacturers who have verified improved environmental life-cycle impacts.

Requirements

Achieve one or more of the options below, for a maximum of 2 points.

Option 1. environmental product declaration (EPD) (1 point)

Use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the disclosure criteria below.

- *Product-specific declaration.*
  - *Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope are valued as one quarter (1/4) of a product for the purposes of credit achievement calculation.*
- *Environmental Product Declarations which conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.*
  - *Industry-wide (generic) EPD -- Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator are valued as one half (1/2) of a product for purposes of credit achievement calculation.*
  - *Product-specific Type III EPD -- Products with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator are valued as one whole product for purposes of credit achievement calculation.*
- *USGBC approved program – Products that comply with other USGBC approved environmental product declaration frameworks.*

AND/OR

Option 2. Multi-attribute optimization (1 point)

Use products that comply with one of the criteria below for 50%, by cost, of the total value of permanently installed products in the project. Products will be valued as below.

- *Third party certified products that demonstrate impact reduction below industry average in at least three of the following categories are valued at 100% of their cost for credit achievement calculations.*
  - *global warming potential (greenhouse gases), in CO2e;*
  - *depletion of the stratospheric ozone layer, in kg CFC-11;*
  - *acidification of land and water sources, in moles H+ or kg SO2;*
  - *eutrophication, in kg nitrogen or kg phosphate;*
  - *formation of tropospheric ozone, in kg NOx or kg ethene; and*
  - *depletion of nonrenewable energy resources, in MJ.*
- *USGBC approved program -- Products that comply with other USGBC approved multi-attribute frameworks.*

For credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost.

Structure and enclosure materials may not constitute more than 30% of the value of compliant building products

USGBC defines product ***(permanently installed building product****) as "an item that arrives on the project site either as a finished element ready for installation or as a component to another item assembled on-site The product unit is defined by the functional requirement for use in the project; this includes the physical components and services needed to serve the intended function of the permanently installed building product. In addition, similar product within a specification, each contributes as a separate product.*

Industry-wide Environmental Product Declaration documents covering metal cladding (roof panels or wall panels) can be used for steel cladding on a LEED project. Declarations." There is a process available to allow McElroy Metal IMP, metal wall, and/or roof products to be considered one of the 20 permanently installed products that has a product-specific Type III EPD, based on at least a cradle-to-gate LCA making that product valued as one whole product for purposes of credit achievement calculation for the points in this credit.

In addition, for the credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles of the project site are valued at 200% of their base contributing cost, if this applies to a given LEED registered project location.

Building Product Disclosure and Optimization - Sourcing of Raw Materials Credit (possible 2 points)

Intent

To encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life cycle impacts. To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner.

Requirements

Option 1. raw material source and extraction reporting (1 point)

Use at least 20 different permanently installed products from at least five different manufacturers that have publicly released a report from their raw material suppliers which include raw material supplier extraction locations, a commitment to long-term ecologically responsible land use, a commitment to reducing environmental harms from extraction and/or manufacturing processes, and a commitment to meeting applicable standards or programs voluntarily that address responsible sourcing criteria.

- *Products sourced from manufacturers with self-declared reports are valued as one half (1/2) of a product for credit achievement.*
- *Third-party verified corporate sustainability reports (CSR) which include environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain, are valued as one whole product for credit achievement calculation. Acceptable CSR frameworks include the following:*
  - ***Global Reporting Initiative (GRI) Sustainability Report***
  - ***Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises***
  - ***U.N. Global Compact:*** *Communication of Progress*
  - ***ISO 26000:*** *2010 Guidance on Social Responsibility*
  - ***USGBC approved program:*** *Other USGBC approved programs meeting the CSR criteria.*

AND/OR

Option 2. leadership extraction practices (1 point)

Use products that meet at least one of the responsible extraction criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project.

- *Extended producer responsibility. Products purchased from a manufacturer (producer) that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility. Products meeting extended producer responsibility criteria are valued at 50% of their cost for the purposes of credit achievement calculation.*
- *Bio-based materials. Bio-based products must meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials must be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country. Exclude hide products, such as leather and other animal skin material. Products meeting bio-based materials criteria are valued at 100% of their cost for the purposes of credit achievement calculation.*
- *Wood products. Wood products must be certified by the Forest Stewardship Council or USGBC-approved equivalent. Products meeting wood products criteria are valued at 100% of their cost for the purposes of credit achievement calculation.*
- *Materials reuse. Reuse includes salvaged, refurbished, or reused products. Products meeting materials reuse criteria are valued at 100% of their cost for the purposes of credit achievement calculation.*
- *Recycled content. Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on cost. Products meeting recycled content criteria are valued at 100% of their cost for the purposes of credit achievement calculation*
- *USGBC approved program. Other USGBC approved programs meeting leadership extraction criteria.*

If McElroy Metal has publicly released a report from their raw material suppliers which includes raw material supplier extraction location and other criteria described above, the products could be included in the 20 required for a LEED-registered project to qualify for this credit in option 1.

Alternatively, the pre and post- consumer recycled content of the materials used for McElroy Metal's roof or wall products can be used in the calculation (post-consumer + ½ pre-consumer) and applied to the total cost of that material in option 2. The result of that calculation can then be counted towards the total overall cost requirement (ie.25% of the cost of all permanently installed building products).

In addition, for credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost, if this applies to a given LEED registered project location.

This credit applies to any of the McElroy Metal IMP products, roof systems or wall systems.

Building Product Disclosure and Optimization - Material Ingredients Credit (possible 2 points)

Intent

To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.

Requirements

Option 1. material ingredient reporting (1 point)

Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).

- *Manufacturer Inventory. The manufacturer has published complete content inventory for the product following these guidelines:*
  - *A publicly available inventory of all ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)*
  - *Materials defined as trade secret or intellectual property may withhold the name and/or CASRN but must disclose role, amount and GreenScreen benchmark, as defined in GreenScreen v1.2.*
- *Health Product Declaration. The end use product has a published, complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard.*
- *Cradle to Cradle. The end use product has been certified at the Cradle to Cradle v2 Basic level or Cradle to Cradle v3 Bronze level.*
- *USGBC approved program. Other USGBC approved programs meeting the material ingredient reporting criteria.*

AND/OR

Option 2. Material ingredient optimization (1 point)

Use products that document their material ingredient optimization using the paths below for at least 25%, by cost, of the total value of permanently installed products in the project.

- *GreenScreen v1.2 Benchmark. Products that have fully inventoried chemical ingredients to 100 ppm that have no Benchmark 1 hazards:*
  - *If any ingredients are assessed with the GreenScreen List Translator, value these products at 100% of cost.*
  - *If all ingredients have undergone a full GreenScreen Assessment, value these products at 150% of cost.*
- *Cradle to Cradle Certified. End use products are certified Cradle to Cradle. Products will be valued as follows:*
  - *Cradle to Cradle v2 Gold: 100% of cost*
  - *Cradle to Cradle v2 Platinum: 150% of cost*
  - *Cradle to Cradle v3 Silver: 100% of cost*
  - *Cradle to Cradle v3 Gold or Platinum: 150% of cost*
- *International Alternative Compliance Path – REACH Optimization. End use products and materials that do not contain substances that meet REACH criteria for substances of very high concern. If the product contains substances that meet REACH criteria for substances of very high concern. If the product contains no ingredients listed on the REACH Authorization or Candidate list, value at 100% of cost.*
- *USGBC approved program. Products that comply with USGGBC approved building product optimization criteria.*

AND/OR

Option 3. Product Manufacturer Supply Chain Optimization (1 point)

Use building products for at least 25%, by cost, of the total value of permanently installed products in the project that:

- *Are sourced from product manufacturers who engage in validated and robust safety, health, hazard, and risk programs which at a minimum document at least 99% (by weight) of the ingredients used to make the building product or building material, and*
- *Are sourced from product manufacturers with independent third party verification of their supply chain that at a minimum verifies:*
    - *Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation*
    - *Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients*
    - *Processes are in place to implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients*
    - *Processes are in place to optimize health, safety and environmental impacts when designing and improving chemical ingredients*
    - *Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain*
    - *Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain*

If McElroy Metal can generate a report on material ingredient chemicals, per requirements in Option 1, the product can be one of the 20 such products required to help the LEED-registered project comply with one point for disclosure.

To help the project qualify for the second point for optimization in option 2, McElroy Metal would need to demonstrate that they meet the criteria for achieving the levels of GreenScreen, Cradle-to-Cradle certification, or REACH with regard to the level and hazards from chemicals of concern.

Products meeting Option 3 criteria are valued at 100% of their cost for the purposes of credit achievement calculation.

For credit achievement calculation of options 2 and 3, products sourced (extracted, manufactured, purchased) within 100 miles of the project site are valued at 200% of their base contributing cost. For credit achievement calculation, the value of individual products compliant with either option 2 or 3 can be combined to reach the 25% threshold but products compliant with both option 2 and 3 may only be counted once.

Structure and enclosure materials may not constitute more than 30% of the value of compliant building products.

This credit applies to any of the McElroy Metal IMP products, roof systems or wall systems

Construction and Demolition Waste Management (possible 2 points)

Intent

To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

Requirements

Recycle and/or salvage nonhazardous construction and demolition materials. Calculations can be by weight or volume but must be consistent throughout.

Exclude excavated soil, land-clearing debris, and alternative daily cover (ADC). Include wood waste converted to fuel (bio-fuel) in the calculations; other types of waste-to-energy are not considered diversion for this credit.

However, for projects that cannot meet credit requirements using reuse and recycling methods, waste-to-energy systems may be considered waste diversion if the European Commission Waste Framework Directive 2008/98/EC and Waste Incineration Directive 2000/76/EC are followed and Waste to Energy facilities meet applicable European Committee for Standardization (CEN) EN 303 standards.

Option 1. diversion (1-2 points)

Path 1. divert 50% and three material streams (1 point)

Divert at least 50% of the total construction and demolition material; diverted materials must include at least three material streams.

OR

Path 2. divert 75% and four material streams (2 points)

Divert at least 75% of the total construction and demolition material; diverted materials must include at least four material streams.

OR

Option 2. reduction of total waste material (2 points)

Do not generate more than 2.5 pounds of construction waste per square foot (12.2 kilograms of waste per square meter) of the building's floor area.

McElroy Metal roof or wall panel systems that are fully recyclable and used on a LEED-registered project will contribute to the building project qualifying for this credit given the recyclability of the McElroy Metal products and their construction waste. One of the primary goals of the credit is to divert construction and demolition waste from landfills.

Indoor Environmental Quality Category

- **Minimum Acoustic Performance**
- **Acoustic Performance**
- **Low Emitting Materials**
- **Thermal Comfort**

Minimum Acoustic Performance (prerequisite-Schools only)

Intent

To provide classrooms that facilitate teacher-to-student and student-to-student communication through effective acoustic design.

Requirements

HVAC background noise

Achieve a maximum background noise level of 40 dBA from heating, ventilating, and air-conditioning (HVAC) systems in classrooms and other core learning spaces. Follow the recommended methodologies and best practices for mechanical system noise control in ANSI Standard S12.60–2010, Part 1, Annex A.1; the 2011 HVAC Applications ASHRAE Handbook, Chapter 48, Noise and Vibration Control (with errata); AHRI Standard 885–2008; or a local equivalent for projects outside the U.S.

Exterior noise

For high-noise sites (peak-hour Leq above 60 dBA during school hours), implement acoustic treatment and other measures to minimize noise intrusion from exterior sources and control sound transmission between classrooms and other core learning spaces. Projects at least one-half mile (800 meters) from any significant noise source (e.g., aircraft overflights, highways, trains, industry) are exempt.

Reverberation time

Adhere to the following reverberation time requirements.

Classrooms and core learning spaces < 20,000 cubic feet (566 cubic ceters)

Design classrooms and other core learning spaces to include sufficient sound-absorptive finishes for compliance with the reverberation time requirements specified in ANSI Standard S12.60–2010, Part 1, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools, or a local equivalent for projects outside the U.S.

Option 1

For each room, confirm that the total surface area of acoustic wall panels, ceiling finishes, and other sound-absorbent finishes equals or exceeds the total ceiling area of the room (excluding lights, diffusers, and grilles). Materials must have an NRC of 0.70 or higher to be included in the calculation.

OR

Option 2

Confirm through calculations described in ANSI Standard S12.60-2010 that rooms are designed to meet reverberation time requirements as specified in that standard.

Classrooms and core learning spaces ≥ 20,000 cubic feet (566 cubic meters)

Meet the recommended reverberation times for classrooms and core learning spaces described in the NRC-CNRC Construction Technology Update No. 51, Acoustical Design of Rooms for Speech (2002), or a local equivalent for projects outside the U.S.

Exceptions

Exceptions to the requirements because of a limited scope of work or to observe historic preservation requirements will be considered.

McElroy Metal wall and/or roof panel systems used on a LEED-School project can contribute to this prerequisite with wall panels that meet the prescribed acoustic performance criteria in either of the two options.

This credit applies to any of the McElroy Metal IMP products, walls or roof applications.

Acoustic performance Credit (possible 1 point)

Intent

To provide workspaces and classrooms that promote occupants' well-being, productivity, and communications through effective acoustic design.

Requirements

For all occupied spaces, meet the following requirements, as applicable, for HVAC background noise, sound isolation, reverberation time, and sound reinforcement and masking.

HVAC Background Noise

Achieve maximum background noise levels from heating, ventilating, and air conditioning (HVAC) systems per 2011 ASHRAE Handbook, HVAC Applications, Chapter 48, Table 1; AHRI Standard 885-2008, Table 15; or a local equivalent. Calculate or measure sound levels.

For measurements, use a sound level meter that conforms to ANSI S1.4 for type 1 (precision) or type 2 (general purpose) sound measurement instrumentation, or a local equivalent.

Comply with design criteria for HVAC noise levels resulting from the sound transmission paths listed in ASHRAE 2011 Applications Handbook, Table 6; or a local equivalent.

Sound Isolation

Meet the composite sound transmission class (STCC) ratings listed in Table 1, or local building code, whichever is more stringent.

Table 1. Maximum composite sound transmission class ratings for adjacent spacess

Adjacency combinations		***STC_C***
Residence (within a multifamily residence), hotel or motel room	*Residence, hotel or motel room*	*55*
Residence, hotel or motel room	*Common hallway, stairway*	*50*
Residence, hotel or motel room	*Retail*	*60*
Retail	*Retail*	*50*
Standard office	*Standard office*	*45*
Executive office	*Executive office*	*50*
Conference room	*Conference room*	*50*
Office, conference room	*Hallway, stairway*	*50*
Mechanical equipment room	*Occupied area*	*60*

Reverberation Time

Meet the reverberation time requirements in Table 3 (adapted from Table 9.1 in the Performance Measurement Protocols for Commercial Buildings[1]).

Table 3. Reverberation time requirements

Room type	Application	T60 (sec), at 500 Hz, 1000 Hz, and 2000 Hz
Apartment and condominium	—	*< 0.6*
Hotel/motel	*Individual room or suite*	*< 0.6*
	Meeting or banquet room	*< 0.8*
Office building	*Executive or private office*	*< 0.6*
	Conference room	*< 0.6*
	Teleconference room	*< 0.6*
	Open-plan office without sound masking	*< 0.8*
	Open-plan office with sound masking	*0.8*
Courtroom	*Unamplified speech*	*< 0.7*
	Amplified speech	*< 1.0*
Performing arts space	*Drama theaters, concert and recital halls*	*Varies by application*
Laboratories	*Testing or research with minimal speech communication*	*< 1.0*
	Extensive phone use and speech communication	*< 0.6*
Church, mosque, synagogue	*General assembly with critical music program*	*Varies by application*
Library		*< 1.0*
Indoor stadium, gymnasium	*Gymnasium and natatorium*	*< 2.0*
	Large-capacity space with speech amplification	*< 1.5*
Classroom	—	*< 0.6*

Sound Reinforcement and Masking Systems

Sound Reinforcement
For all large conference rooms and auditoriums seating more than 50 persons, evaluate whether sound reinforcement and AV playback capabilities are needed.

If needed, the sound reinforcement systems must meet the following criteria:

- ***Achieve a speech transmission index (STI) of at least 0.60 or common intelligibility scale (CIS) rating of at least 0.77 at representative points within the area of coverage to provide acceptable intelligibility.***
- ***Have a minimum sound level of 70 dBA and must***
- ***Maintain sound-level coverage within +/–3 dB at the 2000 Hz octave band throughout the space.***

Masking Systems
For projects that use masking systems, the design levels must not exceed 48 dBA. Ensure that loudspeaker coverage provides uniformity of +/–2 dBA and that speech spectra are effectively masked.

[1] ***Adapted from ASHRAE (2007d), ASA (2008), ANSI (2002), and CEN (2007)***

If a McElroy Metal insulated wall panel system and/or an insulated metal roof system can help the building project meet the LEED criteria for composite sound transmission class (STC) ratings, these products and systems can help the LEED registered project qualify for the points in this credit.

This credit applies to any of the McElroy Metal IMP products, wall or roof applications.

Low-emitting Materials Credit (possible 3 points)

Intent

To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.

Requirements

This credit includes requirements for product manufacturing as well as project teams. It covers volatile organic compound (VOC) emissions into indoor air and the VOC content of materials, as well as the testing methods by which indoor VOC emissions are determined. Different materials must meet different requirements to be considered compliant for this credit. The building interior and exterior are organized in seven categories, each with different thresholds of compliance. The building interior is defined as everything within the waterproofing membrane. The building exterior is defined as everything outside and inclusive of the primary and secondary weatherproofing system, such as waterproofing membranes and air- and water-resistive barrier materials.

Option 1. Product Category Calculations

Achieve the threshold level of compliance with emissions and content standards for the number of product categories listed in Table 2.

Table 1. Thresholds of compliance with emissions and content standards for 7 categories of materials

Category	*Threshold*	*Emissions and content requirements*
Interior paints and coatings applied on site	*At least 90%, by volume, for emissions; 100% for VOC content*	• *General Emissions Evaluation for paints and coatings applied to walls, floors, and ceilings* • *VOC content requirements for wet applied products*
Interior adhesives and sealants applied on site (including flooring adhesive)	*At least 90%, by volume, for emissions; 100% for VOC content*	• *General Emissions Evaluation* • *VOC content requirements for wet applied products*
Flooring	*100%*	*General Emissions Evaluation*
Composite wood	*100% not covered by other categories*	*Composite Wood Evaluation*
Ceilings, walls, thermal, and acoustic insulation	*100%*	• *General Emissions Evaluation* • *Healthcare, Schools only Additional insulation requirements*
Furniture (include in calculations if part of scope of work)	*At least 90%, by cost*	*Furniture Evaluation*
Healthcare and Schools Projects only: Exterior applied products	*At least 90%, by volume*	*Exterior Applied Products*

Table 2. Points for number of compliant categories of products

Compliant categories	*Points*
NC, CS, NC Retail, DC, WDC, NC Hos projects without furniture	
2	*1*
4	*2*
5	*3*
NC, CS, NC Retail, DC, WDC, NC Hos projects with furniture, CI, CI Retail, CI Hos	
3	*1*
5	*2*
6	*3*
Schools, HC without furniture	
3	*1*
5	*2*
6	*3*
Schools, HC with furniture	
4	*1*
6	*2*
7	*3*

Option 2. Budget Calculation Method

If some products in a category do not meet the criteria, project teams may use the budget calculation method (Table 3).

Table 3. Points for percentage compliance, under budget calculation method

Percentage of total	*Points*
≥ 50% and < 70%	*1*
≥ 70% and < 90%	*2*
≥ 90%	*3*

The budget method organizes the building interior into six assemblies:

- *flooring;*
- *ceilings;*
- *walls;*
- *thermal and acoustic insulation;*
- *furniture*

Include furniture in the calc

Schools, HC without furniture	
3	*1*
5	*2*
6	*3*
Schools, HC with furniture	
4	*1*
6	*2*
7	*3*

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- *flooring;*
- *ceilings;*
- *walls;*
- *thermal and acoustic insulation;*
- *furniture*

calculations if it is part of the scope of work. Walls, ceilings, and flooring are defined as building interior products; each layer of the assembly, including paints, coatings, adhesives, and sealants, must be evaluated for compliance. Insulation is tracked separately.

Determine the total percentage of compliant materials according to Equation 1.

Equation 1. Total percentage compliance

$$\text{Total \% compliant for projects without furniture} = \frac{\text{(\% compliant walls + \% compliant ceilings + \% compliant flooring + \% compliant insulation)}}{4}$$

$$\text{Total \% compliant for projects with furniture} = \frac{\text{(\% compliant walls + \% compliant ceilings + \% compliant flooring + \% compliant insulation) + (\% compliant furniture)}}{5}$$

Equation 2. System percentage compliant

$$\text{Flooring, walls, ceilings, insulation \% compliant} = \frac{\text{(compliant surface area of layer 1 + compliant surface area of layer 2 + compliant surface area of layer 3 + ...)}}{\text{total surface area of layer 1 + total surface area of layer 2 + total surface area of layer 3 + ...)}} \text{ X 100}$$

Equation 3. Furniture systems compliant, using ANSI/BIFMA evaluation

$$\text{\% compliant for furniture} = \frac{\text{0.5 x cost compliant with §7.6.1 of ANSI/BIFMA e3-2011 + cost compliant with §7.6.2 of ANSI/BIFMA e3-2011}}{\text{total furniture cost}} \text{ X 100}$$

Calculate surface area of assembly layers based on the manufacturer's documentation for application.

If 90% of an assembly meets the criteria, the system counts as 100% compliant. If less than 50% of an assembly meets the criteria, the assembly counts as 0% compliant.

Manufacturers' claims. Both first-party and third-party statements of product compliance must follow the guidelines in CDPH SM V1.1–2010, Section 8. Organizations that certify manufacturers' claims must be accredited under ISO Guide 65.

Laboratory requirements. Laboratories that conduct the tests specified in this credit must be accredited under ISO/IEC 17025 for the test methods they use.

Emissions and Content Requirements: To demonstrate compliance, a product or layer must meet all of the following requirements, as applicable.

Inherently nonemitting sources. Products that are inherently nonemitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring) are considered fully compliant without any VOC emissions testing if they do not include integral organic-based surface coatings, binders, or sealants.

General emissions evaluation. Building products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010, using the applicable exposure scenario. The default scenario is the private office scenario. The manufacturer's or third-party certification must state the exposure scenario used to determine compliance. Claims of compliance for wet-applied products must state the amount applied in mass per surface area.

Manufacturers' claims of compliance with the above requirements must also state the range of total VOCs after 14 days (336 hours), measured as specified in the CDPH Standard Method v1.1

- *0.5 mg/m3 or less;*
- *between 0.5 and 5.0 mg/m3; or*
- *5.0 mg/m3 or more.*

Projects outside the U.S. may use products tested and deemed compliant in accordance with either (1) the CDPH standard method (2010) or (2) the German AgBB Testing and Evaluation Scheme (2010). Test products either with (1) the CDPH Standard Method (2010), (2) the German AgBB Testing and Evaluation Scheme (2010), (3) ISO 16000-3: 2010, ISO 16000-6: 2011, ISO 16000-9: 2006, ISO 16000-11:2006 either in conjunction with AgBB, or with French legislation on VOC emission class labeling, or (4) the DIBt testing method (2010). If the applied testing method does not specify testing details for a product group for which the CDPH standard method does provide details, use the specifications in the CDPH standard method. U.S. projects must follow the CDPH standard method.

Additional VOC content requirements for wet-applied products. In addition to meeting the general requirements for VOC emissions (above), on-site wet-applied products must not contain excessive levels of VOCs, for the health of the installers and other tradesworkers who are exposed to these products. To demonstrate compliance, a product or layer must meet the following requirements, as applicable. Disclosure of VOC content must be made by the manufacturer. Any testing must follow the test method specified in the applicable regulation.

- *All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.*
- *All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168. The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.*
- *For projects outside the U.S., all paints, coatings, adhesives, and sealants wet-applied on site must either meet the technical requirements of the above regulations, or comply with applicable national VOC control regulations, such as the European Decopaint Directive (2004/42/EC), the Canadian VOC Concentration Limits for Architectural Coatings, or the Hong Kong Air Pollution Control (VOC) Regulation.*
- *If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed.*
- *If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.*
- *For projects in North America, methylene chloride and perchloroethylene may not be intentionally added in paints, coatings, adhesives, or sealants.*

McElroy Metal wall panel systems can help a LEED-registered project comply with this credit if the wet-applied sealants and adhesives meet the LEED criteria for VOC levels and content for both exterior and interior applications. Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1-2010 using the applicable exposure scenario. In addition to meeting the general requirements for VOC emissions, on-site wet-applied products must not contain excessive levels of VOCs, for the health of the installers and other trades workers who are exposed to these products. All paints and coatings wet-applied on site must meet the applicable VOC limits of the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011. All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005 Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168. The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations. If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10, ISO 11890 part 1, ASTM D6886-03, or ISO 11890-2. This credit applies to any of the McElroy Metal IMP product, wall systems or roof applications.

Thermal Comfort Credit (possible 1 point)

Intent

To promote occupants' productivity, comfort, and well-being by providing quality thermal comfort.

Requirements

Meet the requirements for both thermal comfort design and thermal comfort control.

Thermal comfort design

Option 1. ASHRAE Standard 55-2010

Design heating, ventilating, and air-conditioning (HVAC) systems and the building envelope to meet the requirements of ASHRAE Standard 55–2010, Thermal Comfort Conditions for Human Occupancy, with errata or a local equivalent.

For natatoriums, demonstrate compliance with ASHRAE HVAC Applications Handbook, 2011 edition, Chapter 5, Places of Assembly, Typical Natatorium Design Conditions, with errata.

OR

Option 2. ISO and CEN Standards

Design HVAC systems and the building envelope to meet the requirements of the applicable standard:

- *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, Section A2.*

Thermal comfort control

Provide individual thermal comfort controls for at least 50% of individual occupant spaces. Provide group thermal comfort controls for all shared multioccupant spaces, and for any individual occupant spaces without individual controls.

Thermal comfort controls allow occupants, whether in individual spaces or shared multi-occupant spaces, to adjust at least one of the following in their local environment: air temperature, radiant temperature, air speed, and humidity.

Based on the excellent thermal performance of insulated metal panels, McElroy Metal wall and/or roof systems can be designed to meet any of the above-mentioned standards and would help a LEED-registered project to qualify for this credit.

Innovation Category

- **Innovation**

Innovation Credit (possible 5 points)

Intent

To encourage projects to achieve exceptional or innovative performance.

Requirements

Project teams can use any combination of innovation, pilot, and exemplary performance strategies.

Option 1. innovation (1 point)

Achieve significant, measurable environmental performance using a strategy not addressed in the LEED green building rating system.

Identify the following:

- *the intent of the proposed innovation credit;*
- *proposed requirements for compliance;*
- *proposed submittals to demonstrate compliance; and*
- *the design approach or strategies used to meet the requirements.*

AND/OR

Option 2. pilot (1 point)

Achieve one pilot credit from USGBC's LEED Pilot Credit Library

AND/OR

Option 3. additional strategies

- ***Innovation (1-3 points)***

  Defined in Option 1 above.

- ***Pilot (1-3 points)***

  Meet the requirements of Option 2.

- ***Exemplary performance (1–2 points)***

  Achieve exemplary performance in an existing LEED v4 prerequisite or credit that allows exemplary performance, as specified in the LEED Reference Guide, v4 edition. An exemplary performance point is typically earned for achieving double the credit requirements or the next incremental percentage threshold.

The design flexibility of metal components in a building project can help a design team to feature systems or performance of the building project in areas that go beyond the LEEDv4 requirements. McElroy Metal IMP, insulated metal wall panels, and metal roof panel systems integrated into a building's overall design can help a LEED registered project to qualify for points in this credit if the building's design team applies strategies or measures that demonstrate performance above the requirements in various categories and /or innovative performance not specifically addressed by LEED.