

July 2017

AIA Course Number:
LEED17A

What's New in LEED v4

A focus on Material & Resources (MR) and
Indoor Environmental Quality (IEQ)

Inspiring Great Spaces®

Armstrong
CEILING SOLUTIONS

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As a USGBC Education Provider, we have agreed to abide by USGBC-established operational and educational criteria, and are subject to course reviews and audits for quality assurance.



Sustainable Ceiling Systems

Approved for **1** GBCI CE Hours for LEED Professionals.

Objectives

- Understand the overall objectives of LEEDv4 for BD&C and ID&C and how it is driving innovation and market transformation.
- Describe the differences between LEEDv3 and LEEDv4 related to the Material and Resources (MR) and Indoor Environmental Quality (IEQ) credits.
- Learn how Life Cycle Assessment (LCA) is introduced in LEEDv4 BD&C with the Whole Building Impact Reduction credit, Option 4; and in the MR credit Building Product Disclosure and Optimization - Environmental Product Declarations (EPDs).
- Understand the strategies behind the Interior Life Cycle Impact Reduction-Option 3:Design for Flexibility credit in ID&C and Healthcare.
- Understand the new transparency credits for Materials Ingredients in LEED v4, BD+C & ID&C.
- Understand the new IEQ credits in LEED v4 for BD&C & ID&C, Schools and Healthcare.





LEED
v4

BD+C

BUILDING DESIGN AND CONSTRUCTION RATING SYSTEMS

- New Construction
- Core & Shell
- Schools
- Retail
- Hospitality
- Data Centers
- Warehouses & Distribution Centers
- Healthcare
- Homes
- Mid-Rise

ID+C

INTERIOR DESIGN AND CONSTRUCTION RATING SYSTEMS

- Commercial Interiors
- Retail
- Hospitality

EB:O+M

EXISTING BUILDINGS: OPERATIONS AND MAINTENANCE RATING SYSTEMS

- Existing Buildings: Operations & Maintenance
- Schools
- Retail
- Hospitality
- Data Centers
- Warehouses & Distribution Centers

ND

NEIGHBORHOOD DEVELOPMENT RATING SYSTEMS

- Neighborhood Development Plan
- Neighborhood Development

LEED v4 SYSTEM GOALS

7



Reduce contribution to **global climate change**



Enhance individual **human health**



Protect and restore **water resources**



Protect and enhance **biodiversity and ecosystem services**



Promote **sustainable and regenerative** material cycles



Build a **green economy**



Enhance **community quality of life**



LEED v4 is bolder and more specialized for building projects worldwide.

The newest version of LEED is designed to be more flexible and improve the overall user experience. Here's why LEED v4 is better:

LEED v4 RATING SYSTEM REVIEW

LOCATION & TRANSPORTATION

SUSTAINABLE SITES

WATER EFFICIENCY

ENERGY & ATMOSPHERE

MATERIALS & RESOURCES

INDOOR ENVIRONMENTAL QUALITY



PRESENTED BY USGBC

LEEDv4 Scorecard



LEED v4 for ID+C: Commercial Interiors Project Checklist

Y ? N

Credit Integrative Process 2

0	0	0	Location and Transportation		18
Y			Credit	LEED for Neighborhood Development Location	18
Y			Credit	Surrounding Density and Diverse Uses	8
Y			Credit	Access to Quality Transit	7
Y			Credit	Bicycle Facilities	1
Y			Credit	Reduced Parking Footprint	2

0	0	0	Water Efficiency		12
Y			Prereq	Indoor Water Use Reduction	Required
Y			Credit	Indoor Water Use Reduction	12

0	0	0	Energy and Atmosphere		38
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Fundamental Refrigerant Management	Required
Y			Credit	Enhanced Commissioning	5
Y			Credit	Optimize Energy Performance	25
Y			Credit	Advanced Energy Metering	2
Y			Credit	Renewable Energy Production	3
Y			Credit	Enhanced Refrigerant Management	1
Y			Credit	Green Power and Carbon Offsets	2

0	0	0	Materials and Resources		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
Y			Credit	Long-Term Commitment	1
Y			Credit	Interiors Life-Cycle Impact Reduction	4
Y			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
Y			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
Y			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
Y			Credit	Construction and Demolition Waste Management	2

Project Name:
Date:

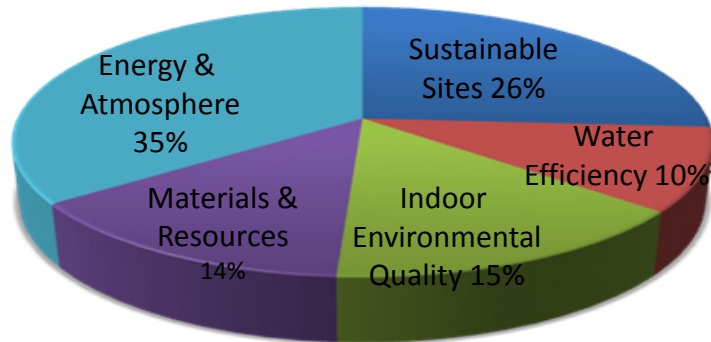
0	0	0	Indoor Environmental Quality		17
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
Y			Credit	Enhanced Indoor Air Quality Strategies	2
Y			Credit	Low-Emitting Materials	3
Y			Credit	Construction Indoor Air Quality Management Plan	1
Y			Credit	Indoor Air Quality Assessment	2
Y			Credit	Thermal Comfort	1
Y			Credit	Interior Lighting	2
Y			Credit	Daylight	3
Y			Credit	Quality Views	1
Y			Credit	Acoustic Performance	2

0	0	0	Innovation		6
Y			Credit	Innovation	5
Y			Credit	LEED Accredited Professional	1

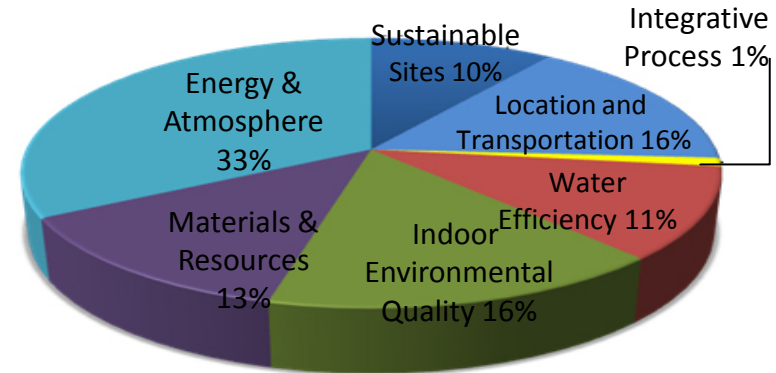
0	0	0	Regional Priority		4
Y			Credit	Regional Priority: Specific Credit	1
Y			Credit	Regional Priority: Specific Credit	1
Y			Credit	Regional Priority: Specific Credit	1
Y			Credit	Regional Priority: Specific Credit	1

0	0	0	TOTALS		Possible Points: 110
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80+					

LEED v3 (2009)



LEED v4



What's changed?

- Split Location and Transportation from Sustainable Sites
- Integrated Process - encourage early analysis of the interrelationship of systems
- Materials and Resources - more holistic & integration of human health
- Indoor Environmental Quality- more low VOC requirements, added Acoustics.

Using practices that significantly reduce or eliminate the negative impacts of a building on its occupants and the environment.



Materials impact both architecture and human experience

Credit	Title	Points
Prereq 1	Storage & Collection of Recyclables	R
Credit 1	Building Reuse	4
Credit 2	Construction Waste Management	2
Credit 3	Material Reuse	2
Credit 4	Recycled Content	2
Credit 5	Regional Materials	2
Credit 6	Rapidly Renewable Materials	1
Credit 7	Certified Wood	1
Total Points:		14

Emphasizes the “Single Attribute”

Materials & Resources: LEEDv4

14

Credit	Title	Points
Prereq 1	Storage & Collection of Recyclables	R
Prereq 2	Construction and Demolition Waste Management Planning	R
Credit 1	Building Life-Cycle Impact Reduction	5
Credit 2	Building Product Disclosure and Optimization Environmental Product Declarations	2
Credit 3	Building Product Disclosure and Optimization Sourcing of Raw Materials	2
Credit 4	Building Product Disclosure and Optimization Material Ingredients	2
Credit 5	Construction and Demolition Waste Management	2
Total Points:		13

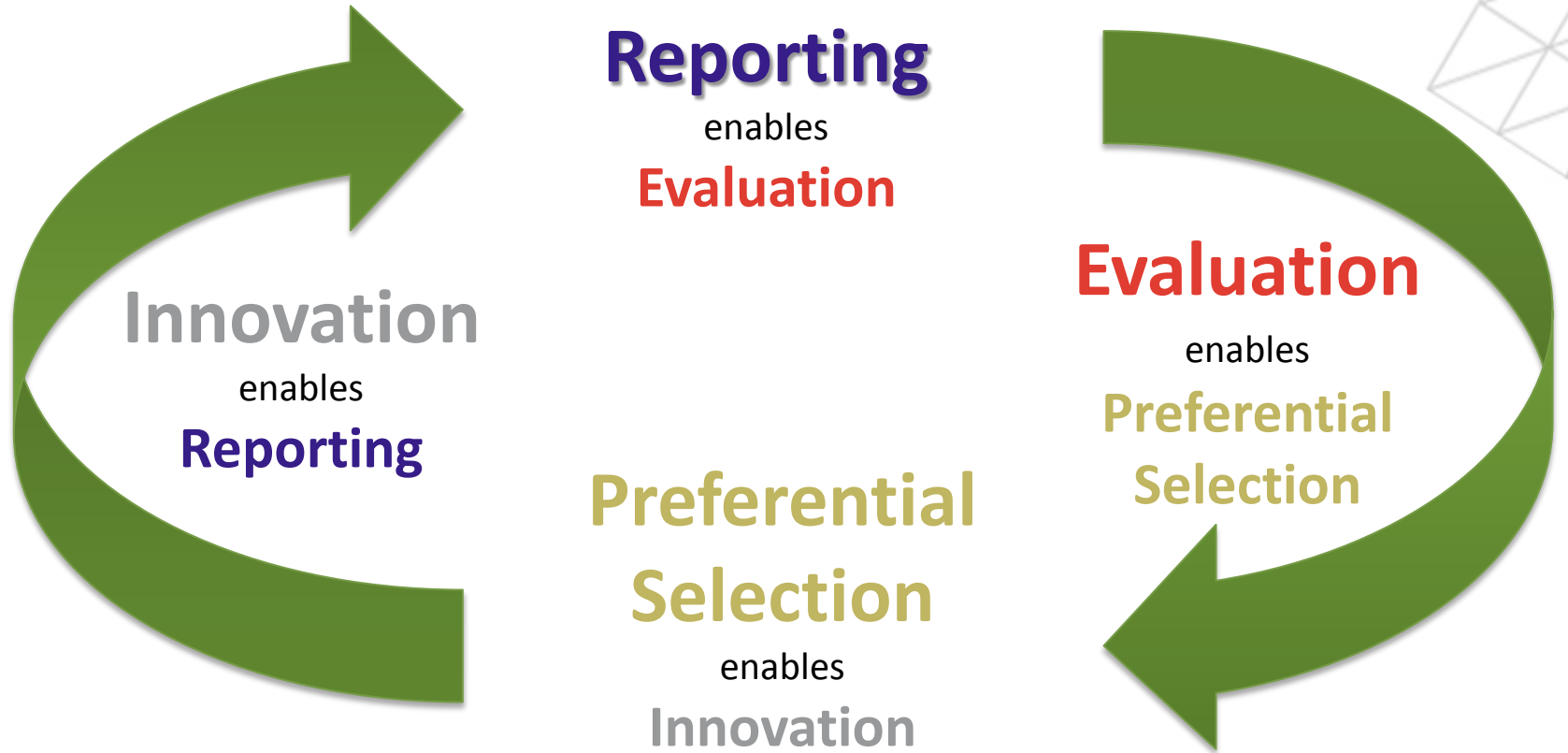
- Includes: Recycled Content, BioBased Materials and FSC Certified Wood

Emphasizes Life Cycle Thinking and Transparency

LEED® Update - Comparison - New Construction

Materials and Resources	v3	v4
Prerequisite: Storage and Collection of Recyclables	X	X
Prerequisite: Construction and Demolition Waste Management Planning		X
Building Impact and Life Cycle Reduction	X	X
Construction and Demolition Waste Management	X	X
Materials Reuse	X	
Recycled Content	X	
Regional Materials	X	
Rapidly Renewable Materials	X	
Certified Wood	X	
Building Product Disclosure and Optimization - Environmental Product Declarations		X
Building Product Disclosure and Optimization - Sourcing of Raw Materials		X
Building Product Disclosure and Optimization - Material Ingredients		X
Possible Points	14	13

- Includes: Recycled content, biobased materials, and FSC wood



Transform the market by driving product improvement

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



Prerequisite

- Establish waste diversion goals and ID at least 5 materials for diversion.
 - Specify whether materials will be separated or commingled and describe diversion strategies. Describe where the material will be taken and how it will be processed.

Credit

- Meet Diversion Goals for Identified Material Streams (50% and 75%)

All Projects

Unit of measurement

Total waste diverted from landfill

Total construction waste

Percentage of construction waste diverted from landfill (%)



Upload: Construction and demolition waste management plan

Provide the construction and demolition waste management plan. The plan must outline at least five materials targeted for diversion, provide the anticipated percentage of total waste that these materials represent, and include on-site diversion strategies. If on-site diversion strategies are not available, explain why.



MR Prerequisite Construction and Demolition Waste Management Planning



Excavated soil and land-clearing debris must be excluded from calculations. Alternative daily cover (ADC) must be excluded from diverted waste calculations but included in total construction waste calculations.

LCA is a method to systematically measure the environmental impacts associated with each stage of a product's life cycle.



LEED v4 introduces LCA into 2 credits: Whole Building & Products

Impact Categories: (Based on Emission factors)

- Global warming potential (climate change or carbon footprint)
- Smog potential (air pollution - ground level ozone)
- Ozone depletion potential (damage to stratospheric ozone)
- Acidification potential (“acid rain”)
- Eutrophication potential (releases in water or soil)

Resource Categories: (Computed based on actual usage)

- Energy demand (all of the energy use to make the product)
- Water consumption (total water used)
- Waste generated

Building Impact and Life Cycle Reduction: For new buildings or portions of buildings

- **OPTION 4. Whole Building Life Cycle Assessment (3 points)**
 - Demonstrate a minimum of 10% reduction compared to a baseline building
 - Choose 3 of the 6 LCA impact categories; 1 must be global warming potential
 - No impact category may increase by more than 5% compared with the baseline building

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

- global warming potential (greenhouse gases), in kg 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 NO_x, kg O₃ eq, or kg ethene; and
- depletion of nonrenewable energy resources, in MJ.

A photograph of a modern building with a green overlay containing text. The building is a single-story structure with a light-colored facade and a dark roof. It is surrounded by trees and a paved area. The green overlay is a semi-transparent rectangle with a white border, containing the text in white, bold, uppercase letters.

**REDUCE WASTE THROUGH
PRE-FABRICATION,
MODULAR CONSTRUCTION,
OR USING INDUSTRY
STANDARD SIZES**

Interior Life Cycle Impact Reduction: (ID&C; Healthcare)

- Intent: Increase project space flexibility, ease of adaptive use, and recycling of building materials:
- OPTION 3. Design for Flexibility – use at least 3 of the following strategies
 - Install accessible systems (floor or ceiling) for at least 50% of the project floor area
 - Design at least 50% of interior nonstructural walls, ceilings and floors to be movable or demountable
 - Implement flexible power distribution (i.e. plug and play) systems for at least 50% of the project floor area
 - Ensure that at least 50% of nonstructural materials are reusable or recyclable
 - Use materials with integral labels (radio frequency ID)

Disclosure

Environmental impacts using EPDs

Materials ingredients

Sustainability Reporting



Optimization

EPDs better than industry average










Selecting products without certain chemicals

Optimized sourcing

First disclose, then optimize

BPDO CHEAT SHEET

The three Building Product Disclosure and Optimization (BPDO) credits in LEED v4 are pushing the industry into new territory. USGBC has done a great job defining and spurring manufacturers to support some options, but others are not yet (as of mid-2017) achievable, for a range of reasons. So go after the easy ones, and don't waste time on others until they're within reach.

	 ENVIRONMENTAL PRODUCT DECLARATIONS (EPDS)	 RAW MATERIAL EXTRACTION	 MATERIAL INGREDIENTS
OPTION 1 DISCLOSURE (1 POINT)	<p>EASY (AND GETTING EASIER ALL THE TIME)</p> <ul style="list-style-type: none"> ▶ 20 product-specific EPDs from at least 5 suppliers ▶ Industry-average EPDs count at ½ value <p>GOOD TARGET FOR EXEMPLARY PERFORMANCE (40 EPDs)</p> 	<p>NOT ACHIEVABLE AT THIS TIME</p>  <ul style="list-style-type: none"> ▶ Corporate sustainability reports have to include specifics on raw material extraction. Almost none of them do (yet). <p>IN THE FUTURE: Will become viable after we see results from USGBC work with suppliers to define and develop examples of compliant CSRs. Even after that happens, however, it may a while before a critical mass of companies publish them.</p>	<p>EASY (AND GETTING EASIER ALL THE TIME)</p> <ul style="list-style-type: none"> ▶ 20 disclosure statements from at least 5 suppliers ▶ Lots of disclosure statement options <p>GOOD TARGET FOR EXEMPLARY PERFORMANCE (40 disclosure statements)</p> 
OPTION 2 (& 3) OPTIMIZATION (1 POINT)	<p>NOT ACHIEVABLE AT THIS TIME</p>  <ul style="list-style-type: none"> ▶ 50% (by cost) of products have to show better-than-baseline performance in several environmental impact categories. ▶ No more than 30% can be from structure & enclosure, which is challenging even with new flexibility on that requirement from USGBC. <p>IN THE FUTURE: Will become viable for more projects if/when USGBC approves more certifications as indicative of across-the-board improvements.</p>	<p>DOABLE (ESPECIALLY WITH THE SWITCH FROM FSC-ONLY TO LEGAL WOOD)</p>  <ul style="list-style-type: none"> ▶ 25% (by cost) of products have to meet one of the options: take-back program, bio-based, salvaged, recycled content, or "legal wood." ▶ No more than 30% can be from structure & enclosure <p>IN THE FUTURE: Watch out for potential changes to the legal wood pilot credit that could make it more restrictive.</p>	<p>NOT ACHIEVABLE FOR MOST PROJECTS</p>  <ul style="list-style-type: none"> ▶ 25% (by cost) of products have to show: <ul style="list-style-type: none"> Hazard avoidance OR Supply chain optimization ▶ No more than 30% can be from structure & enclosure, which is challenging even with new flexibility on that requirement from USGBC <p>IN THE FUTURE: Once suppliers get on board with documenting supply chain optimization it should become within reach.</p>

LOCAL MATERIALS COUNT DOUBLE!
(EXTRACTED, MANUFACTURED, & PURCHASED WITHIN 100 MILES)
This could make a difference for wood, aggregate, salvage items in the Raw Material Extraction credit.



MR Credits

Building Product Disclosure and Optimization

ENVIRONMENTAL
PRODUCT
DECLARATIONS

SOURCING OF
RAW MATERIALS

MATERIAL
INGREDIENTS



MR Credit

Building Product Disclosure and Optimization
Environmental product declarations

OPTION

1

Environmental product
declaration (EPD)

1 POINT

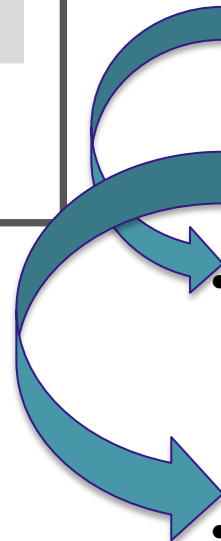
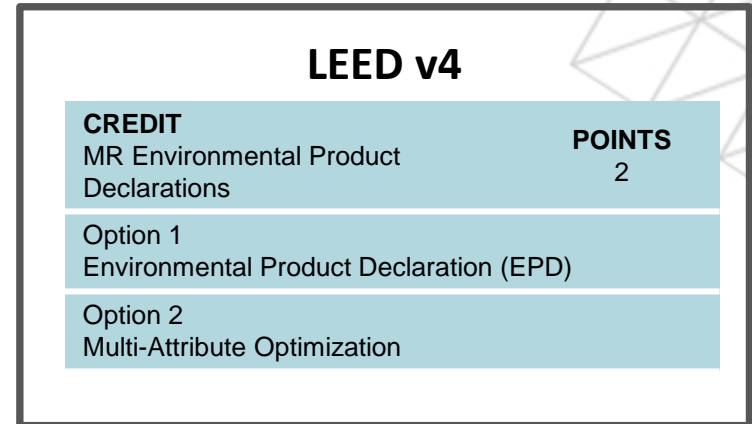
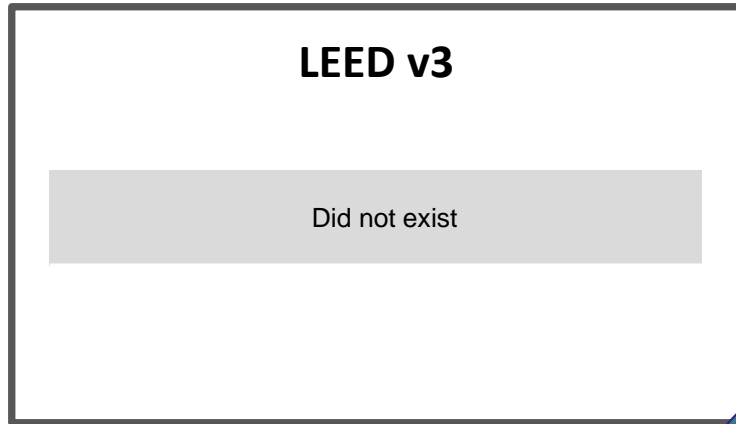
and
/or

OPTION

2

Multi-attribute
optimization

1 POINT



- Disclose (20 products)
 - Product LCA (1/4)
 - Industry Average EPD (1/2)
 - Product Specific EPD (1)
- Optimize
 - Better than industry average

OPTION 1. EPDS

20

minimum number
of products

5

maximum number
of different manufacturers


WHAT

WHY

WHEN

WHO

HOW

TYPE OF DISCLOSURE	VALUE
product-specific declarations	1/4 of a product
industry-wide (generic) EPDs	1/2 of a product
 product-specific Type III EPDs	1 product

ENVIRONMENTAL PRODUCT DECLARATION

STEEL SPECIALTY PRODUCTS

AN INDUSTRY-WEIGHTED ENVIRONMENTAL PROFILE



Steel specialty products include ceiling and wall systems, trims, column covers and associated suspension elements.

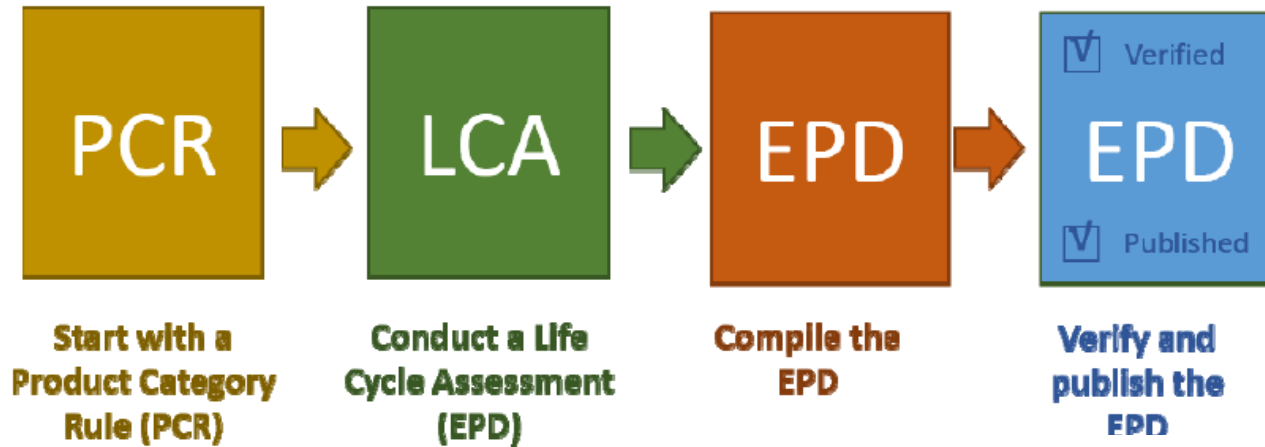


Increasing attention is paid to the environmental impact and sustainability of raw material sourcing, production, usage, and disposal of building products.

The Ceilings & Interior Construction Association (CISCA) is the industry leading organization for metal specialty companies in the manufacture of aluminum and steel ceilings, walls, and associated specialty products in the building products segment.

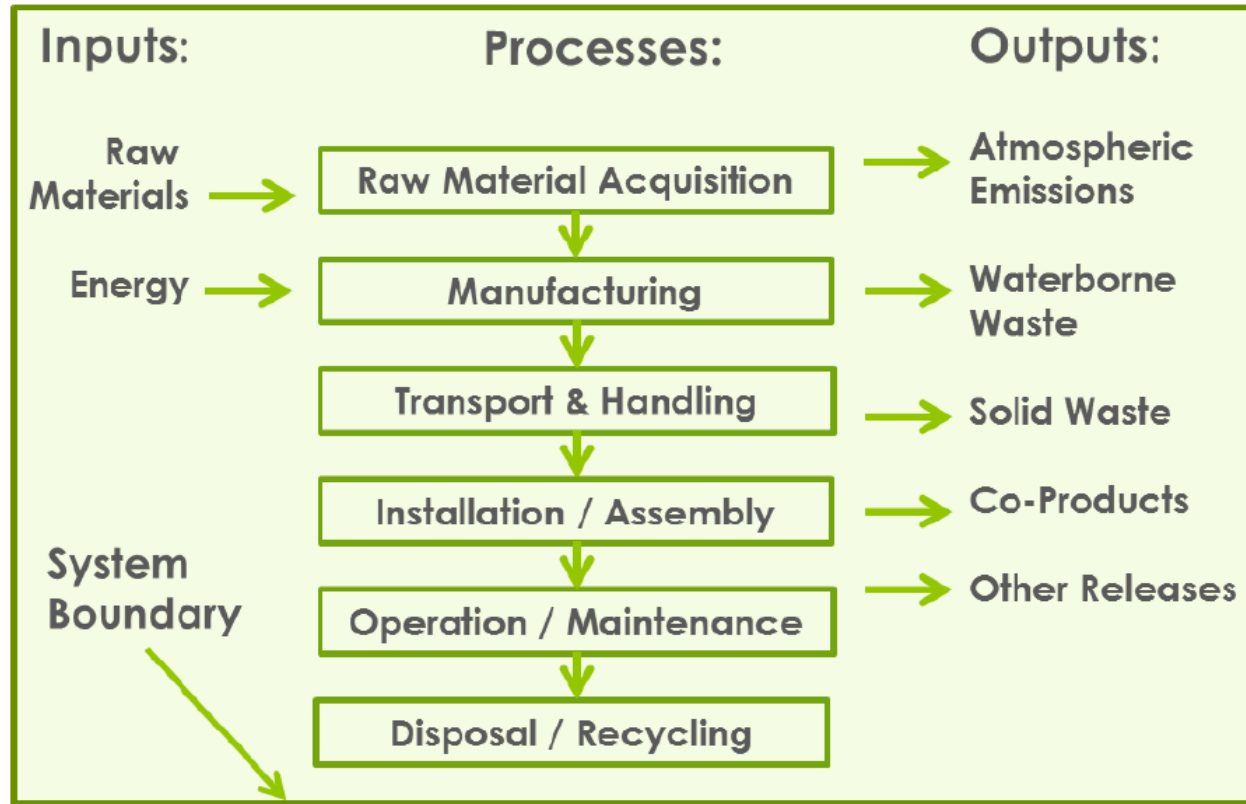
In an effort to support and inform the market, CISCA pulled together its leading metal specialty building product member companies to provide the first industry-weighted average EPDs covering metal specialty materials sold and installed in North America.





International
Organization for
Standardization

Image: International Organization for Standardization via Wikimedia Commons.



EPDs report on the entire life cycle of a product.



MR Credit

Building Product Disclosure and Optimization
Environmental product declarations

OPTION 2.

MULTI-ATTRIBUTE OPTIMIZATION

Demonstrate impact reduction below
industry average in 3 LCA categories.



of total materials

OPTION

2

Multi-attribute
optimization

1 POINT

Comparison: Material Ingredients

LEED v3

Did not exist



LEED v4

CREDIT	POINTS
MR Material Ingredients	2
Option 1 Materials Ingredients Reporting	
Option 2 Materials Ingredients Optimization	
Option 3 Product Manufacturer Supply Chain Organization	

Reward local materials
(100 miles / 160 km)

- Disclose ingredients to 1000 ppm
- Inventoried ingredients to 100 ppm and have no Benchmark 1 hazards
- C2C V3 Silver or higher
- REACH criteria for substances of very high concern (international)
- Sourced from manufacturer with a robust safety, health, hazard, and risk programs & certified supply chain

Three “and/or” options, but only 2 points available



MR Credit

Building Product Disclosure and Optimization
Material ingredients

OPTION

1

Material
ingredient
reporting
@1000ppm

- 1. Manufacturer Inventory
- 2. HPD + Declare
- 3. Cradle to Cradle

and
/or

OPTION

2

Material
ingredient
optimization

- 1. GreenScreen 100 ppm
- 2. Cradle to Cradle
- 3. REACH

and
/or

OPTION

3

Product
manufacturer
supply chain
optimization

- 3rd party supply chain
verification



PRODUCTS WITH FULL
DISCLOSURE CAN
CONTRIBUTE TO ALL
BPDO AND LCA CREDITS

photo credit: Ana Ka'ahanui



Material Ingredients

- Material Transparency
 - Health Product Declarations are an option to achieve this credit.
 - Must be at 1000 ppm disclosure.



Once we can know what is in the products we build with, we begin to have the opportunity to select those that will result in healthier buildings. This Guide explains how to take these steps today.

Robin Guenther, Principal,
Perkins+Will
September 2016

Health Product Declarations are an option for achieving this credit.

Material Ingredients

Using Declare Labels for USGBC's LEED v4 Material Ingredients Credit, Option 1

LBC Red List Free

"LBC Red List Free" Declare products are 100% disclosed down to 100ppm. These labels comply with the LEED v4 Material Ingredients Credit, Option 1

Declare.

Your Product
Your Company

Final Assembly: City, State, Country
Life Expectancy: 000 Years
End of Life Options: Recyclable (42%), Landfill (58%)

Ingredients:
Your First Component: Sustainably Sourced Ingredient (Location, ST), Non-Toxic Ingredient;
Your Second Component: Ingredient

Living Building Challenge Criteria:

XXX-0000	EXP: 01 JAN 2018
VOC Content: 0 g/L	VOC Emissions: CDPH Compliant
Declaration State →	<input checked="" type="checkbox"/> LBC Red List Free
	<input type="checkbox"/> LBC Compliant
	<input type="checkbox"/> Declared

MANUFACTURER RESPONSIBLE FOR LABEL ACCURACY
INTERNATIONAL LIVING FUTURE INSTITUTE™ declareproducts.com

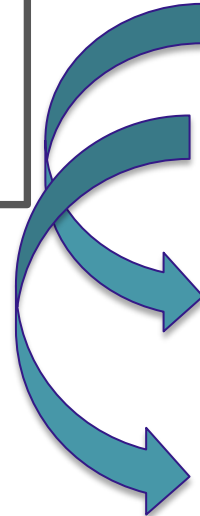
Declare Labels are an option for achieving this credit.

Comparison: Raw Material Sourcing

LEED v3	
CREDIT	POINTS
Sustainably sourced materials and products	4
- Reused materials	
- Recycled content	
- Regionally sourced	
- Rapidly renewable materials	
- Certified wood	



LEED v4	
CREDIT	POINTS
MR Raw Material Sourcing	2
Option 1 Raw Material Source & Extraction Reporting	
Option 2 Leadership Extraction Practices	



Reward local materials
(100 miles / 160 km)

Disclose

- Sustainability Reports from raw materials suppliers.

Optimize

- Extended Producer Responsibility
- Recycled Content
- FSC certified wood
- Biobased materials

Local Materials Count Double – Extracted, Purchased, Mfr

40

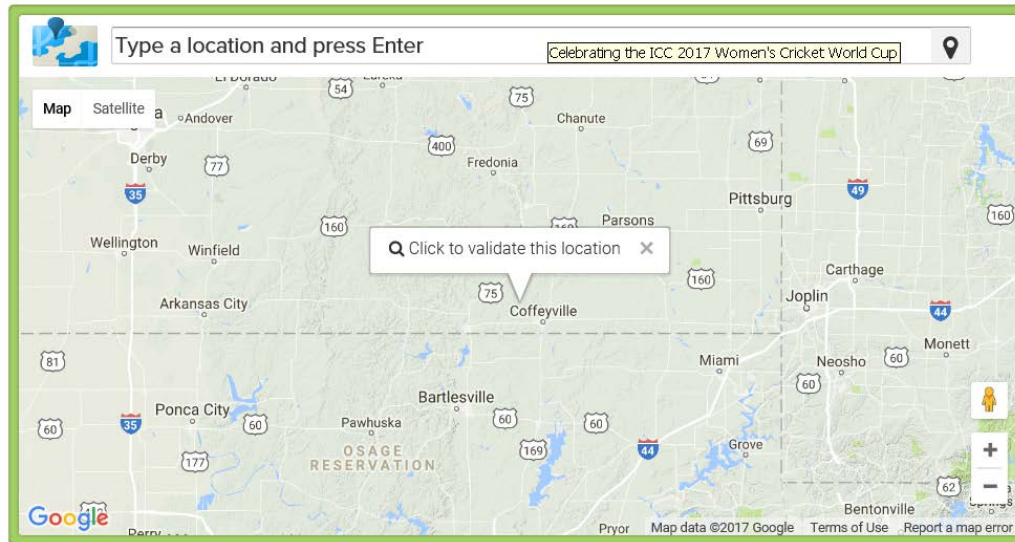
Regional priority credit lookup

FILTER

LEED ID+C: Commercial Interiors ▾

v4 ▾

Projects registered prior to **May 8th 2016**, regional priority selections are based on zip code. [Click here](#) to view zip code lookup



Reward local materials sourced w/in 100 miles of project location.



MR Credit

Building Product Disclosure and Optimization
Sourcing of raw materials

OPTION

1

Raw material source and
extraction reporting

OPTION 1. RAW MATERIAL SOURCE AND EXTRACTION



permanently installed products
with reported sustainable sourcing
and extraction requirements

TYPE OF DISCLOSURE	VALUE
self-declared reports	1/2 of a product
third-party verified corporate sustainability reports (or CSRs)	1 product



MR Credit

Building Product Disclosure and Optimization
Sourcing of raw materials

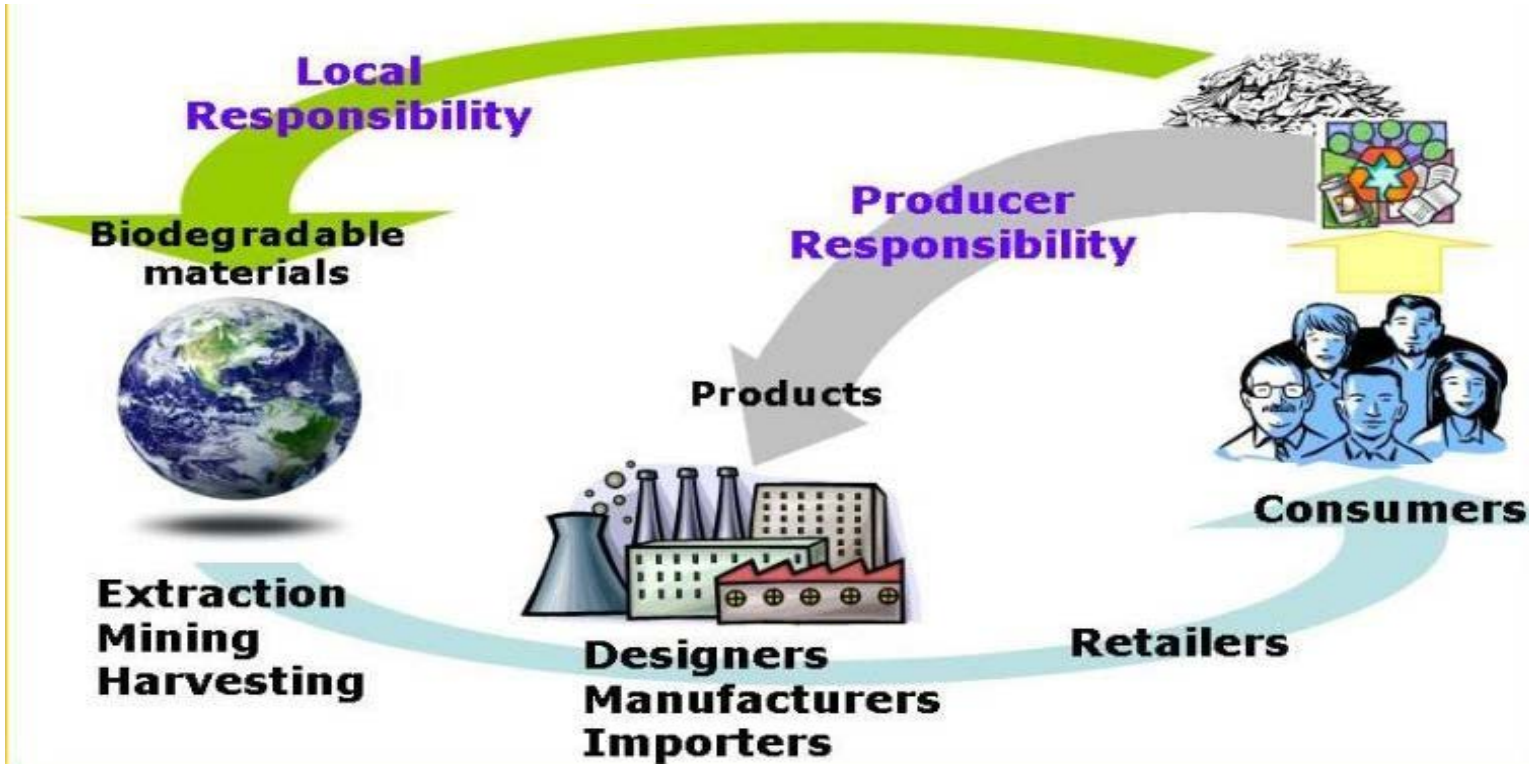
OPTION 2. LEADERSHIP EXTRACTION PRACTICES



of products
by cost meet at least one criteria

RESPONSIBLE EXTRACTION CRITERIA	VALUE OF THE PRODUCT COST
extended producer responsibility	50%
bio-based materials	100%
wood products	100%
materials re-use	100%
recycled content (post consumer/pre consumer)	100%/50%

Extended Producer Responsibility (EPR)



Product take-back programs are an example of EPR

Extended Producer Responsibility (EPR)

31 States have Extended Producer Responsibility Laws

- Product Categories**
- Auto Switches
 - Batteries
 - Carpets
 - Cell Phones
 - Electronics
 - Fluorescent Lighting
 - Mercury Thermostats
 - Paint
 - Pesticide Containers
 - Mattresses



Source: Product Stewardship Institute, Inc. (2013)



Number of Product Categories Covered by EPR Law

Grey	One	Two	Three
Red	Four	Five	Six
Blue	Seven		

* Other laws authorizing agencies to require EPR, including Framework laws

Source: PSI, 2013

In US, EPR applies mainly to materials that pose a toxicity hazard

LEED v3	
CREDIT	POINTS
MR Construction Waste Management	2



LEED v4	
Prerequisite MR Construction and Demolition Waste Management Planning	
CREDIT	POINTS
MR Construction and Demolition Waste Management	2

- Added prerequisite for construction waste management plan - must identify 5 materials for diversion
- Alternative daily cover no longer counts towards diversion
- 1 point - 50% diversion & 3 materials
- 2 points - 75% diversion & 4 materials or generate <2.5 pounds of construction waste per square foot

PBT source reduction - mercury

Material & resources

Credit | 1 point

PBT source reduction - lead, cadmium and copper

Material & resources

Credit | 2 points

Furniture and medical furnishings

Material & resources

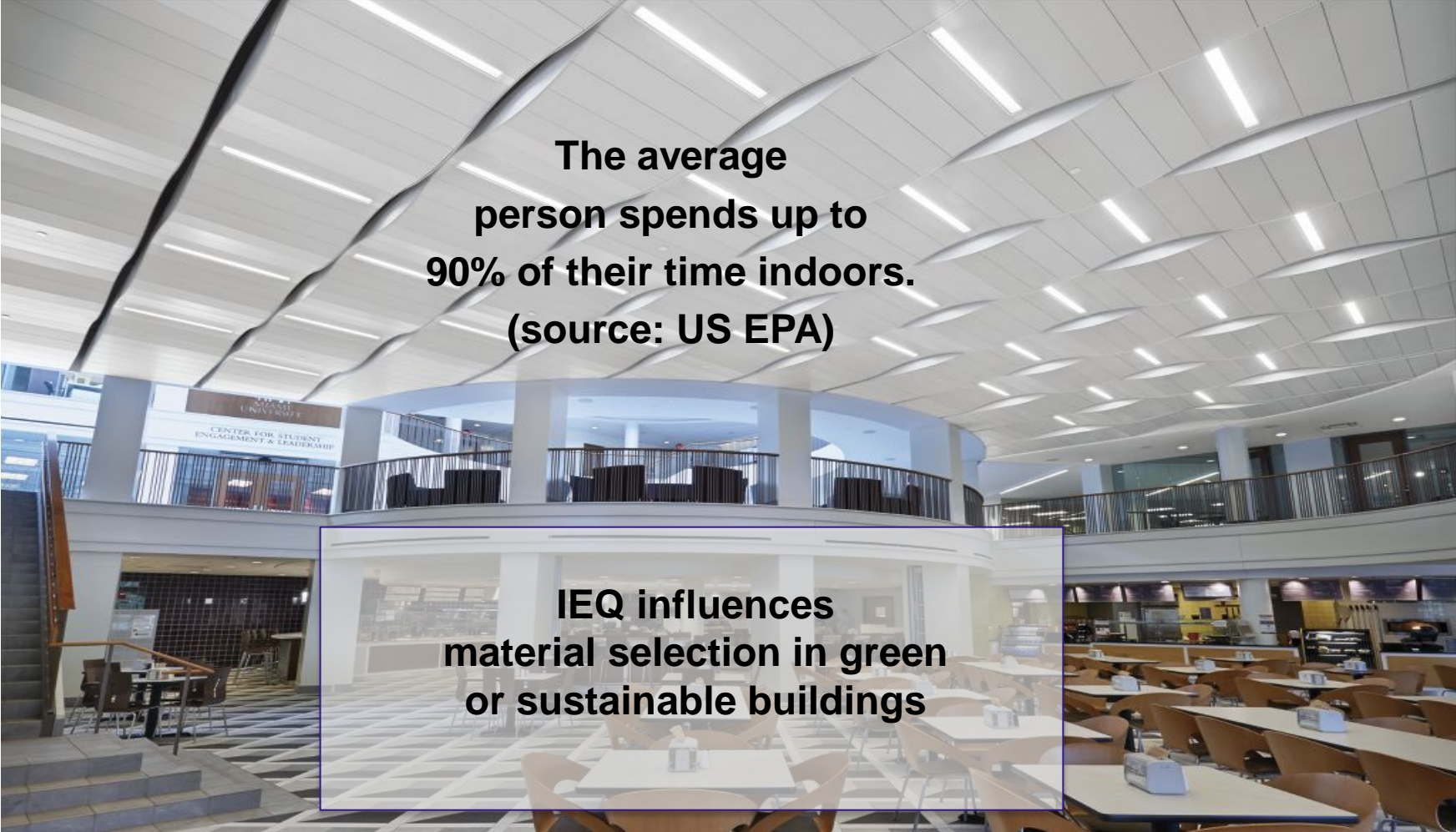
Credit | Up to 2 points



Option 1: Minimal chemical content

Option 2: Testing and modeling of chemical content

Option 3: Multi-Attribute Assessment of Products



**The average
person spends up to
90% of their time indoors.
(source: US EPA)**

**IEQ influences
material selection in green
or sustainable buildings**

Low Emitting Materials (1-3 points based on % compliance)

- Mineral Fiber Ceilings:
 - Compliant with CDPH standard
 - State range total VOCs
- Composite Wood – CARB:
 - With ULEF resins or no added formaldehyde resins

Acoustic Performance (2 points)

- Acoustical Ceilings:
 - Contribute to meeting reverberation time requirements <0.6-0.8
 - STC requirements 45-50

Interior Lighting

Option 2: Lighting Quality (1 point)

- Ceilings:
 - Average surface reflectance of 85%
 - Walls – 60%

INDOOR
ENVIRONMENTAL
QUALITY



LEED v3

CREDIT	POINTS
Adhesives & Sealants	1
Paints & Coatings	1
Flooring Systems	1
Composite Wood	1



LEED v4

CREDIT	POINTS
Low Emitting Materials	1-3
Option 1 Product Category Calculation	
Option 2 Budget Calculation Method	

- 4 to 3 total points
- 4 to 7 categories - More materials included
- Requires CARB ACM for all including wood and adhesives
- Must report Total Volatile Organic Compounds (TVOC)

LEED v4	
CREDIT	POINTS
Low Emitting Materials	1-3
Option 1 Product Category Calculation	
Option 2 Budget Calculation Method	



Product Categories:

- Paints & coatings (>90%)
- Adhesives & sealants (>90%)
- Flooring (100%)
- Composite wood (100%)
- Ceilings, walls & insulation (100%)
- Furniture
- Exterior applied products - schools, healthcare (>90%)

Option 1:

Schools, HC. w/o furniture	
Compliant Categories	Points
3	1
5	2
6	3

Option 2:

Total % compliant for projects w/o furniture =

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

= (% compliant walls + % compliant ceilings + % compliant flooring + % compliant insulation) / 4



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

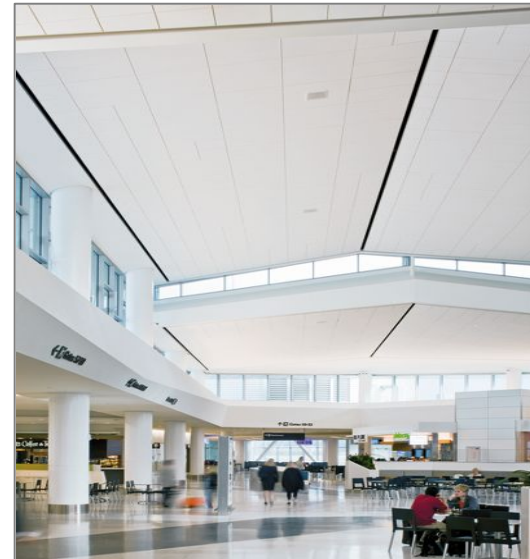
Category	Threshold	Emissions and content requirements
Interior paints and coatings applied on site	At least 90%, by volume, for emissions; 100% for VOC content	<ul style="list-style-type: none"> • General Emissions Evaluation for paints and coatings applied to walls, floors, and ceilings • VOC content 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	<ul style="list-style-type: none"> • 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%	<ul style="list-style-type: none"> • General Emissions Evaluation
Furniture (include in calculations if part of scope of work)	At least 90%, by cost	Furniture Evaluation

LEED v4

CREDIT	POINTS
Provide high quality lighting	1-2
Option 1: Lighting Control – provide individual lighting controls to occupants	
Option 2: Lighting Quality – several strategies Use high LR (85%) ceilings; 60% walls; 25% floors	



- Application:
 - Install ceilings that have a light reflectance rating of at least 85%.
 - Install walls that have at least area-weighted surface reflectance of at least 60%.
 - Floors with 25% LR



- Daylight Credit:

- Use high light reflectance surfaces as part of your daylight model to bring more daylight into the space.

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

LEED v3	
CREDIT	POINTS
Minimum Acoustic Performance EQp3	Required
Max Background noise 45 dBA; Reverb time	
Enhanced Acoustical Performance	1



LEED v4	
CREDIT	POINTS
Minimum Acoustic Performance Option 1: Use materials with NRC.70 + Option 2: Conform to meet ANSI S1260	1
Acoustic Performance:, STC ratings, background noise 35dBA	1

- Go to usgbc.org [Acoustical Performance Calculator](#)
- Learn more about the ANSI Standard - <https://www.ansi.org/>

Classrooms and core learning spaces < 20,000 cubic feet:

- 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
- 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.

Provide workspaces and classrooms that promote occupants' wellbeing, productivity and communications through effective acoustic design.

LEED v3	
CREDIT	POINTS
LEED for Schools	1



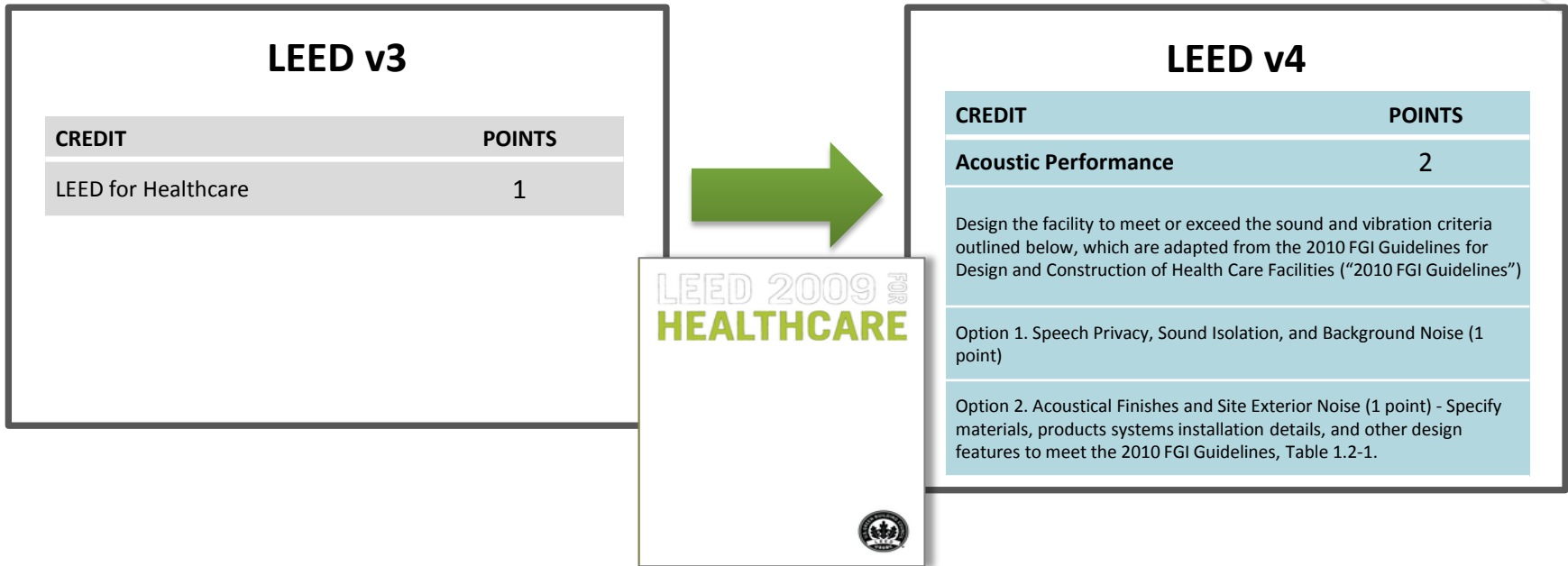
LEED v4	
CREDIT	POINTS
Acoustic Performance	2
Sound Transmission – Meet the composite sound transmission (STCc) ratings for adjacent spaces	
Reverberation Time – Meet the reverberation time requirements for room types	

- Go to usgbc.org [Acoustical Performance Calculator](#)

IEQ: Acoustic Performance 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

Provide healthcare spaces that promote occupants' privacy, enhanced healing and improved communications through effective acoustic design.



- Go to usgbc.org [Acoustical Performance Calculator](#)
- [FGI Guidelines - Read Only copy is available online](#)

Design the facility to meet or exceed the sound and vibration criteria outlined below, which are adapted from the 2010 FGI Guidelines for Design and Construction of Health Care Facilities .

- Option 1. Speech Privacy, Sound Isolation, and Background Noise (1 point) Speech Privacy and Sound Isolation
 - Design sound isolation to achieve speech privacy, acoustical comfort, and minimal annoyance from noise-producing sources.
 - Design the facility to meet the criteria outlined in the sections of Table 1.2-3, Design Criteria for Minimum Sound Isolation Performance between Enclosed Rooms, and Table 1.2-4 Speech Privacy for Enclosed Room and Open-Plan Spaces (in the 2010 FGI Guidelines and 2010 SV Guidelines).
 - Calculate or measure sound isolation and speech privacy descriptors achieved for representative adjacencies as necessary to confirm compliance with the criteria in the 2010 FGI Guidelines, Sections 1.2-6.1.5 and 1.2-6.1.6, and the 2010 SV Guidelines (including the appendix).

- **Background Noise**
 - Consider background noise levels generated by all building mechanical-electrical-plumbing systems, air distribution systems and other facility noise sources under the purview of the project building design-construction team.
 - Design the facility to meet the 2010 FGI Guidelines, Table 1.2-2 Minimum-Maximum Design Criteria for Noise in representative interior rooms and spaces.
 - Calculate or measure sound levels in representative rooms and spaces of each type to confirm compliance with criteria in the above-referenced table using a sound level meter.
- **Option 2. Acoustical Finishes and Site Exterior Noise (1 point)**
 - Meet the requirements for acoustical finishes and site exterior noise.
- **Acoustical Finishes**
 - Specify materials, products systems installation details, and other design features to meet the 2010 FGI Guidelines, Table 1.2-1, Design Room Sound Absorption Coefficients.
 - Calculate or measure the average sound absorption coefficients for representative unoccupied rooms of each type in the building to confirm conformance with the requirements.

Look for credits in the Innovation Catalog.

Innovation (IN) - Sustainable design strategies and measures are constantly evolving and improving. New technologies are continually introduced to the marketplace, and up-to-date scientific research influences building design strategies. The purpose of this LEED category is to recognize projects for innovative building features and sustainable building practices and strategies. [more...](#)



Innovation in design

IDc1 | Up to 5 points



LEED Accredited Professional

IDc2 | 1 point

The ultimate goal of RP credits is to enhance the ability of LEED project teams to address critical environmental issues across the country and around the world.

Regional Priority (RP) - Because some environmental issues are particular to a locale, volunteers from USGBC chapters and the LEED International Roundtable have identified distinct environmental priorities within their areas and the credits that address those issues. These Regional Priority credits encourage project teams to focus on their local environmental priorities. [more...](#)



Regional priority

Regional priority

Credit 1 | Up to 4 points

The Highlights!

- Green building is about architectural and human performance
- LEED® requirements are changing
- LEED® is emphasizing materials and health
- Moving from single attribute focus to life cycle thinking includes holistic, transparency approach
- Better interior environmental performance within spaces can lead to a better human environments.
- Acoustic Performance now part of LEED® v4
- LEED® v4 will drive market transformation

LEED® Credit Library – access all versions and credits



<http://www.usgbc.org/credits>

<https://www.usgbc.org/resources/lead-v4-glossary-terms-translations>