LEED V4 TRAINING PROGRAM

MATERIALS AND RESOURCES

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MATERIALS AND RESOURCES

TITLE				D	PREREQUISITE
MR	PREREQUISITE	1	CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLANNING	C	PREREQUISITE
MR	PREREQUISITE	2	PBT SOURCE REDUCTION - MERCURY	D	PREREQUISITE
MR	CREDIT	3	BUILDING LIFE CYCLE IMPACT REDUCTION	C	ÖNKOŞUL
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MR	CREDIT	5	PBT SOURCE REDUCTION - LEAD, CADMIUM, AND COPPER - HOSPITALS	C	1
MR	CREDIT	6	FURNITURE AND MEDICAL UPHOLSTERY - HOSPITALS	C	2
MR	CREDIT	7	DESIGN FOR FLEXIBILITY - HOSPITALS	D	2
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MR PREREQUISITE 1: COLLECTION OF RECYCLABLE WASTE

PURPOSE

- The main aim is to reduce the amount of waste produced by building users that is sent to garbage collection areas and to ensure regular disposal.
- An easily accessible area should be allocated for the collection of recyclable waste and garbage in the building.
- There should also be a waste collection area or recycling room on each floor. A minimum of 5 different types of waste should be collected separately. These are listed below:
- Paper
- Cardboard
- Glass
- Plastic
- Metal

Video Source: Great Forest Australia

- Additionally;
- It is necessary to take appropriate precautions for the safe collection, storage, and disposal of at least 2 of the following:
- Batteries
- Mercury-containing Lamps
- Electronic Waste

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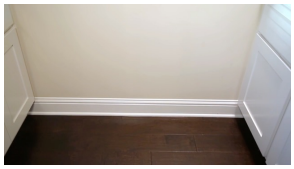
MR PREREQUISITE 1: COLLECTION OF RECYCLABLE WASTE

REQUIREMENTS

- Building owners and designers must designate a specific area for recycling, and these areas must be within the boundaries of the building or project.
- Additionally, it must be located in an area accessible to garbage trucks.
- The requirements of this prerequisite do not mandate the dimensions of the recycling area, but provide recommendations for the size of the "recycling room" that we will discuss in the following pages for project teams.
- The requirement in this prerequisite is that recycling room spaces must be included in the building, and room size information should be considered in the projects.



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MR PREREQUISITE 1: COLLECTION OF RECYCLEABLE WASTES

REQUIRED DOCUMENTS

Documentation	All Projects	Retail Projects
Verification of recycled material types	✓	
Description of recycling storage and collection strategies	✓	
Floor plans showing recycling storage and collection areas	✓	
Methodology and results of waste flow research		✓

RECYCLING ROOM SIZE

Commercial Buildings		Minimum Recycling Room Area	
ft2	m2	ft2	m2
0-5,000	0-465	82	8
5,001-15,000	465-1,394	125	12
15,001-50,000	1,394-4,645	175	16
50,001-100,000	4,645-9,290	225	21
100,001-200,000	9,290-18,580	275	26
200,001+	18,580	500	47

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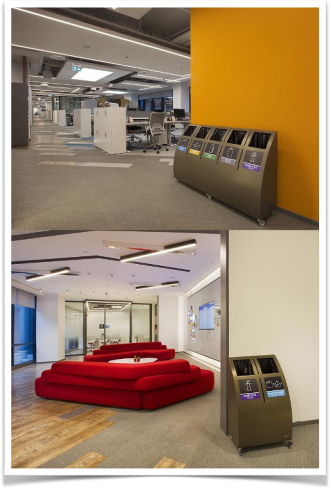
MR PRE-REQUISITE 1: COLLECTION OF RECYCLABLE WASTE

REFERENCE STANDARDS

- LEED v4 Guide



In buildings targeting LEED Certification, a waste collection area or recycling room should be allocated in the floors.

CALCULATIONS

- A recycling plan should be prepared, and recycling areas sized according to estimated capacity should be planned for user access.
- Floor and project area plans indicating recycling areas should be prepared.
- A narrative should be prepared that includes storage and collection strategies for recyclable materials.
- Waste management studies and methodologies are required for retail projects.
- The number of stored waste used in the waste management workflow must be at least 4.

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MR PREREQUISITE 2: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

OBJECTIVE

The primary aim is to reduce construction and demolition waste, prevent the disposal of recyclable materials at regular storage and incineration facilities, and ensure the reuse and recycling of construction waste and debris that do not contain hazardous substances.

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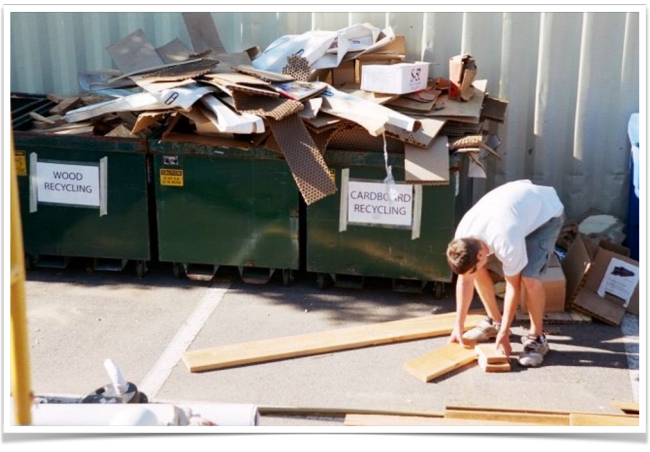
MR PREREQUISITE 2: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

REQUIREMENTS

- A Waste Management Plan describing the types of waste to be recycled and the recycling method will be prepared and implemented by the contractor.
- At least 5 structural and non-structural materials must be identified.
- The plan should indicate the project approaches necessary for the separation of these materials.
- Calculations are made based on either weight or volume.
- Excavation waste cannot be evaluated within this credit.



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MR PREREQUISITE 2: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

REQUIREMENTS

- A Waste Management Plan will be prepared that describes the types of waste to be recycled and the recycling methods, and it will be implemented by the contractor.
- At least 5 structural and non-structural materials must be identified. The plan demonstrates the project approaches necessary for the separation of these materials.
- Calculations are made based on one of weight or volume.
- Excavation waste is not considered within the scope of this credit.

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MR PREREQUISITE 2: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

REQUIREMENTS

- Types of waste that will go to recycling or landfill should be identified.
- Agreements can be made with waste collection institutions and organizations.
- Construction contractors involved in the project should provide necessary training to all subcontractor teams.
- Construction waste should be sorted on-site or off-site.
- Donations made to aid organizations are also considered within this credit.

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MR PREREQUISITE 2: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

REQUIRED DOCUMENTS

Documents	All Projects
Construction Waste Management Plan	✓
Total Construction Waste	✓

REFERENCE STANDARDS

- European Commission Waste Framework Directive 2008/98/EC
- European Commission Waste Incineration Directive 2000/76/EC
- EN 303-1—1999/A1—2003, Heating boilers with forced draught burners, Terminology, general requirements, testing and marking
- EN 303-2—1998/A1—2003, Heating boilers with forced draught burners, Special requirements for boilers with atomizing oil burners
- EN 303-3—1998/AC—2006, Gas-fired central heating boilers, Assembly comprising a boiler body and a forced draught burner
- EN 303-4—1999, Heating boilers with forced draught burners, Special requirements for boilers with forced draught oil burners with outputs up to 70 kW and a maximum operating pressure of 3 bar, Terminology, special requirements, testing and marking
- EN 303-5—2012, Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW
- EN 303-6—2000, Heating boilers with forced draught burners, Specific requirements for the domestic hot water operation of combination boilers with atomizing oil burners of nominal heat input not exceeding 70 kW
- EN 303-7—2006, Gas-fired central heating boilers equipped with a forced draught burner of nominal heat output not exceeding 1000 kW

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MR PRE-REQUISITE 2: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

v4.1 CHANGES

- The LEED v4 guide recommends the implementation of the notes provided on the right side regarding this matter.

NOTES:

- A narrative including recycling storage and collection strategies should be prepared.
- This narrative should specify the rate and location of recovery for all types of products to be recycled.
- All recyclable products generated during construction should be documented.
- As the scale of constructions increases, a more valuable amount of recyclable products is obtained. Therefore, recycling can be an important source of revenue in constructions.

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MR PREREQUISITE 3: PBT SOURCE REDUCTION - MERCURY - HOSPITALS

PURPOSE

- The aim is to prevent the release of mercury during the recycling and use of mercury and mercury-containing products and equipment.
- As part of the recycling collection system developed in accordance with MR Prerequisite 1, the following should be determined:
- Types of mercury-containing products and devices to be collected
- Criteria for the storage and disposal of these wastes included in the recycling plan
- Methods for the disposal of captured mercury leaks

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MR PREREQUISITE 3: PBT SOURCE REDUCTION - MERCURY

REQUIREMENTS

- In facilities providing dental care, amalgam separation devices that meet or exceed the ISO – 11143 standard must be installed.
- Work should be carried out in accordance with the requirements of the 2010 FGI Guidelines for Design and Construction of Health Care Facilities (Section A1.3- 4b: Mercury Elimination).
- 4.2.1.1 New construction: Newly constructed health facilities cannot use devices containing mercury, including thermostats, switching devices, and other building system devices. (Except for lamps)
- 4.2.1.2 Renovation: Renovated health facilities must gradually phase out products containing mercury and develop a plan to replace existing mercury-containing lamps with high-efficiency, low-mercury, or mercury-free lamps.

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MR PREREQUISITE 3: PBT SOURCE REDUCTION - MERCURY

REQUIREMENTS

- Pre-heated T-9, T-10 or T-12 fluorescent or mercury vapor type high intensity discharge (HID) lamps should not be used in the project. Probe start metal halide lamps should not be used in the project's internal volumes.
- Illuminated "EXIT" signs must use Light Emitting Diode (LED) or Light Emitting Capacitor (LEC) lamps and should consume less than 5 watts of electricity.
- It is necessary to identify products containing mercury and to check their compliance with PREREQUISITE requirements.
- In existing buildings, products containing mercury should be gradually phased out and replaced with non-mercury alternatives.

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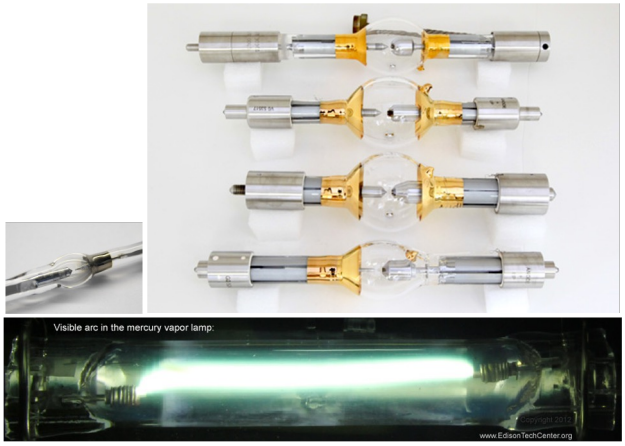
MR PREREQUISITE 3: PBT SOURCE REDUCTION - MERCURY

LAMP AND ARMATURE REQUIREMENTS

Lamp Type	Maximum Content
T-8 fluorescent, eight-foot	10 mg mercury
T-8 fluorescent, four-foot	3.5 mg mercury
T-8 fluorescent, U-bent	6 mg mercury
T-5 fluorescent, linear	2.5 mg mercury
T-5 fluorescent, circular	9 mg mercury
Compact fluorescent, non-integral ballast	3.5 mg mercury
Compact fluorescent, integral ballast	3.5 mg mercury, ENERGY STAR certified
High Pressure Sodium, up to 400 watts	10 mg mercury
High Pressure Sodium, over 400 watts	32 mg mercury



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MR PRE-REQUISITE 3: PBT SOURCE REDUCTION - MERCURY

REQUIRED DOCUMENTS

Documentation	All Projects
Existing Inventory and Phased Closure Plan (For LEED Certification Targeted Renovation Projects)	✓
Recycling Plan for Mercury-containing Lamps	✓
Lighting Program Including Lamp Type and Mercury Content	✓
Usgbc's Pbt Source Reduction Calculator File or Equivalent Documents	✓

REFERENCE STANDARDS

- LEED V4 BD+C Guide
- ISO-11143

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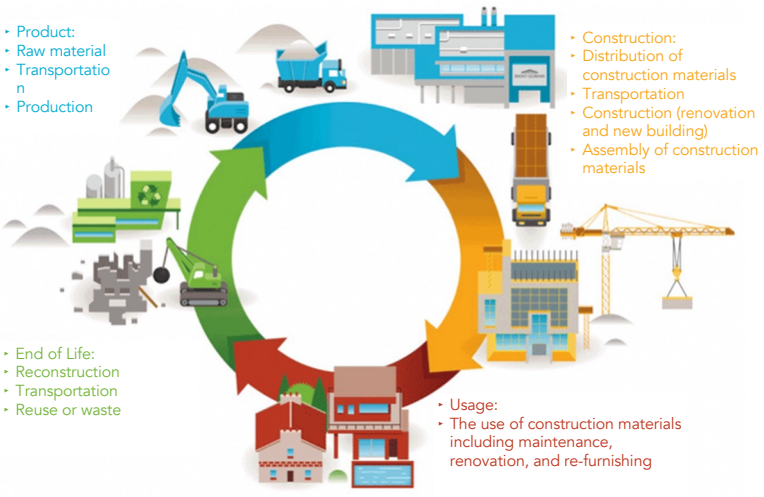
MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

OBJECTIVE

The main objective is to adapt and reuse products and materials, and to optimize the environmental performance of construction materials.

For existing buildings, it is necessary to demonstrate how building resources are reused, while for newly constructed buildings, it must be shown through life cycle assessment (LCA) that the environmental impacts of the materials used have been reduced.

One of the options presented in the next image must be obtained:



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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

REQUIREMENTS

Option 1: Historical Building Reuse (5 points)

It is necessary to preserve the existing building structure, its outer shell, and the non-structural elements of the building in a historical district or a historical building.

The name of the building or historical district must be included in official records showing local or national historical sites.

No part of the historical structure should be demolished except for the sections deemed unhealthy and dangerous.

For registered buildings, any demolition approval must be granted by the local historical preservation board.

For projects outside the USA, a decision from the Cultural and Natural Heritage Conservation Board or a local equivalent institution is required for the reuse of historical buildings.

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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

REQUIREMENTS

Option 1: Historical Building Reuse (5 points)

Any protection, restoration, or rehabilitation changes made to the project site or building must comply with local or national standards.

Even if the building is not registered or under protection, the project team must include a historic architect (or a local equivalent for projects outside the U.S.) who is a qualified professional in historic preservation architecture.

In the U.S., this specialist must be approved under the Secretary of the Interior's Standards for Rehabilitation. A local equivalent should be used for projects outside the U.S.

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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

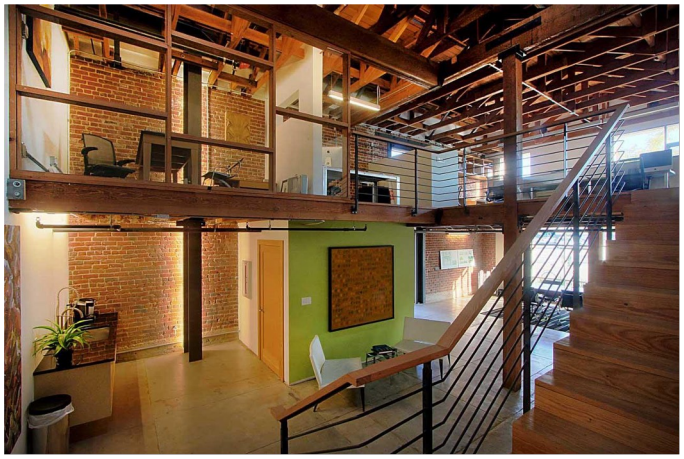
REQUIREMENTS

Option 2: Renovation of Abandoned or Vacant Building (5 points)

As a surface area, it is necessary to preserve 50% of the external shell or internal structural elements of the existing building in accordance with local regulations.

Additionally, they must necessarily be the permanent users of the building.

Up to 25% of the building's surface area may be excluded from credit calculations due to deterioration or existing damages.



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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

REQUIREMENTS

Option 3: Building and Material Reuse (2-4 points)

It is necessary to calculate the surface area of building materials as a percentage of the building's surface area, as shown in Table 1. Examples include flooring, roofing, or ground coatings.

Similarly, the outer shell, frame structures, or permanent structural interior elements (e.g., walls, doors, flooring, ceiling systems) can be used. Window systems and hazardous materials are excluded from the calculations.

Materials taken into account here cannot be counted under MR Credit Building Product Optimization.

POINTS

Percentage (%) of Project Surface Area Reused and Completed	BD & C Points	BD & C (Core and Shell) Points
25%	2	2
50%	3	3
75%	4	5

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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

REQUIREMENTS

Option 4. Whole Building Life Cycle Assessment (3 Points)

For new building construction or newly built parts of buildings, a life cycle assessment (LCA) is required to demonstrate a reduction of at least 10% in three of the six impact categories listed below when compared to the baseline building.

One of these impact categories must be Global Warming Potential (GWP).

In the Life Cycle Analysis, any assessed impact category can show a maximum increase of 5% compared to the baseline building.

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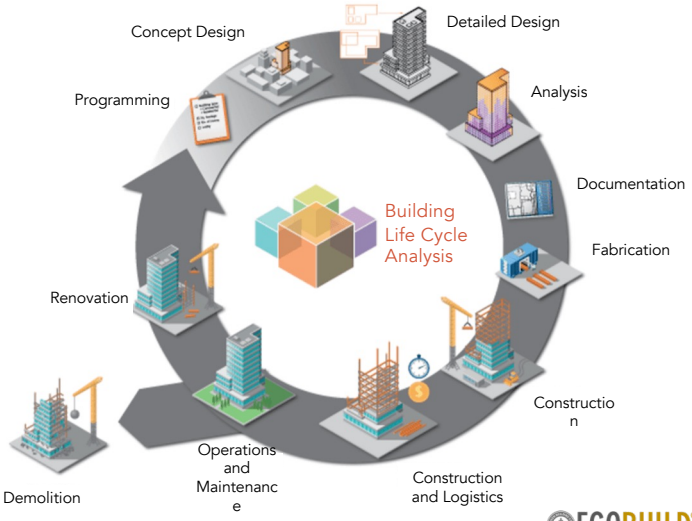
MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

REQUIREMENTS

Option 4. Whole Building Life Cycle Assessment (3 Points)

The defined baseline (ASHRAE 90.1 baseline building) and proposed buildings must be comparable in size, function, orientation, and operational energy performance as specified in the EA prerequisite Minimum Energy Performance credit. The lifespan of the base and proposed buildings must be the same, and a lifespan of at least 60 years should be calculated for full maintenance and refurbishment. Using the same life cycle assessment software tools, both the baseline building and the proposed building should be evaluated and all listed impact categories should be reported. The datasets must comply with ISO 14044 standards.



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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

REQUIREMENTS

1. Option 4. Whole Building Life Cycle Assessment (3 Points)
2. It is necessary to choose at least three of the following impact categories for impact reduction:
3. GWP: Global Warming Potential in CO2 (greenhouse gases)
4. ODP: Stratospheric Ozone Layer Depletion (kg CFC -11)
5. Soil and Water Resources Acidification (H + or kg SO2 molecules)
6. Eutrophication (kg nitrogen or kg phosphate)
7. Tropospheric Ozone Formation (kg NOx or kg ethene)
8. Depletion of Non-Renewable Energy Resources (MJ)

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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

REQUIRED DOCUMENTS

Documentation	Option 1	Option 2	Option 3	Option 4
Documentation of historical building condition	✓			
Description of the demolition, if available	✓			
Documentation showing attachments or guidance, if available. Documents showing local regulations	✓			
Description showing demolition or partial impacts		✓		
Table and calculations for reused elements		✓	✓	
Assumptions for LCA calculations for the base building and project building, and analysis processes				✓
Summary of life cycle impact analysis indicators showing percentage impact reduction between the base building and project building				✓

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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

REFERENCE STANDARDS

- ISO 14044–2006, Environmental management, Life cycle assessment requirements, and guidelines
- National Register of Historic Places
- Secretary of Interior's Standards for the Treatment of Historic Properties

CALCULATIONS

- A building LCA analysis should be conducted.
- Calculations should be made using software approved by LEED guidelines for LCA analysis.
- These calculations should demonstrate how environmental impact has been reduced in the relevant sections.

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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

v4.1 CHANGES

- Option 3: Building and Material Reuse (1-4 points)
- Materials contributing to this credit cannot contribute to the MR Credit Material Description and Optimization - Raw Material Supply credit.
- Pathway 1 or Pathway 2 (a / b) can be attempted, but the combination of Pathway 1 and Pathway 2 to achieve a Pathway is not allowed.

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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

v4.1 CHANGES

Option 3: Building and Material Reuse

(2-4 points)

It is necessary to calculate and use the surface area of building materials as a percentage of the building surface area, as shown in Table 1. Examples include floor, roof, or flooring.

For instance, exterior shell materials (exterior shell or frame structure) and permanent structural interior elements (e.g., walls, doors, floor finishes, ceiling systems) are included. Window systems and hazardous materials are excluded from the calculations.

Materials considered here cannot be accounted for under the MR Credit Building Products Optimization title.

NOTES: POINTS HAVE CHANGED

Percentage of Surface Area Reused and Completed in the Project (%)	BD & C Points	BD & C (Core and Shell) Points
25%	1	2
50%	2	3
75%	3	5

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MR CREDIT 1: BUILDING LIFE CYCLE IMPACT REDUCTION

V4.1 CHANGES

Option 4. Complete Building Life Cycle Assessment (3 Points)

Path 1: Conduct a life cycle assessment of the project's structure and enclosure. (1 point)

Path 2: Conduct an LCA showing a minimum 5% reduction compared to the baseline building in at least three of the six impact categories listed, one of which must be global warming potential. (2 points)

Path 3: Conduct an LCA showing a minimum 10% reduction compared to the baseline building in at least three of the six impact categories listed, one of which must be global warming potential. (3 points)

Path 4: Meet the requirements of Path 3. Include building reuse and/or salvage materials in the design of the project. Show at least a 20% reduction compared to a baseline building for global warming potential and at least a 10% reduction in two additional impact categories. (4 points)

For Paths 2, 3, and 4 listed above, no impact category evaluated as part of the life cycle assessment should increase by more than 5% compared to the baseline building.

Please include a report explaining how the life cycle assessment was conducted and what changes were made in the design of the building to achieve the relevant impact reductions.

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MR CREDIT 2: BUILDING PRODUCT DECLARATIONS AND OPTIMIZATION - EPD

PURPOSE

The aim is to promote the use of materials that have life cycle information in order to reduce the environmental, economic, and social life cycle impacts of building materials.

Under the credit header, project teams are directed to select products from manufacturers whose environmental life cycle impacts are LCA verified.

To be able to obtain a maximum of 2 points, it is necessary to achieve one or more of the following options:

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MR CREDIT 2: BUILDING PRODUCT DECLARATIONS AND OPTIMIZATION - EPD

REQUIREMENTS

Option 1: Environmental Product Declaration (EPD) (1 point)

At least 20 different products from at least 5 different manufacturers must be installed in the building.

Product Specific Declaration: A product for which a life cycle assessment (LCA) has been conducted in accordance with ISO 14044 is valued at one quarter (1/4) of its price.

EPDs must comply with ISO 14025, 14040, 14044, and EN 15804 or ISO 21930.

Environmental Product Declarations: Industry-wide (generic) EPDs - third-party certified, products with external verification documents (Type III) that the manufacturer is explicitly recognized as a participant by the program operator are valued at half (1/2) of their price for credit title calculations.

Product-specific Type III EPDs - including external verification (Type III) where the manufacturer is explicitly recognized as a participant by the program operator, are considered as a whole product for credit success

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MR CREDIT 2: BUILDING PRODUCT DECLARATIONS AND OPTIMIZATION - EPD

REQUIREMENTS

Option 2: Multiple Attribute Optimization (1 point)

The products representing 50% of the total project cost must have features according to the following criteria. Products will be calculated as follows:

The impact reduction of third-party certified products must be below the industry average according to 3 of the following criteria. For credit success calculations, 100% of its own cost is valued.

GWP - Global Warming Potential as CO2 equivalent for greenhouse gases

Stratospheric Ozone Layer Depletion in kg CFC-11

Acidification of Soil and Water Resources in H + or kg SO2

Eutrophication in kg nitrogen or kg phosphate

Tropospheric Ozone Formation in kg NOx or kg ethylene

Exhaustion of Non-Renewable Energy Sources in MJ

USGBC-approved programs - USGBC-approved multiple attribute framework programs.

For credit calculation, if the products used in the building are within 100 miles (160 km) of the project site (extracted, manufactured, and used), the base contribution cost is valued at 200%.

Structural and facade-wall materials cannot constitute more than 30% of the value of building products.

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MR CREDIT 2: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION - EPD

REQUIRED DOCUMENTS

Documentation	Option 1	Option 2
Material and Resources building product disclosure and optimization calculator or equivalent tool.	✓	✓
EPD and LCA reports or summary documents where all products in this scope (100%) are declared.	✓	
Documents for USGBC-approved programs		✓

REFERENCE STANDARDS

- ISO 14021–1999, Environmental labels and declarations—Self Declared Claims (Type II Environmental Labeling)
- ISO 14025–2006, Environmental labels and declarations (Type III Environmental Declarations—Principles and Procedures)
- ISO 14040–2006, Environmental management, Life cycle assessment principles, and frameworks
- ISO 14044–2006, Environmental management, Life cycle assessment requirements, and guidelines
- EN 15804—2012 Sustainability of construction works, Environmental product declarations, Core rules for the product category of construction products
- ISO 21930–2007 Sustainability in building construction—Environmental declaration of building products
- Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7 (e)

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MR CREDIT 2: BUILDING PRODUCT DECLARATIONS And OPTIMIZATION - EPD

v4.1 CHANGES

- Option 1: Environmental Product Declaration (EPD) (1 point)
- The price of a product that has undergone a cradle-to-gate LCA, conducted under ISO 14044 conditions, is considered as a whole. The EPD requirement has been established.
- Product-specific Type III EPD - Internally Reviewed. Products with internally reviewed LCA according to ISO 14071. Products with product-specific internally reviewed EPDs compliant with ISO 14025 and EN 15804 or ISO 21930, covering at least cradle-to-gate, are valued for credit calculations at their full price.
- Industry-wide (generic) EPD - products that have undergone third-party certification, where the manufacturer is explicitly recognized as a participant by the program operator, are valued at their full price for credit calculations based on externally verified (Type III) documents.
- Product-specific Type III EPD - products are evaluated at 1.5 times their price in credit success calculations with external verification, including third-party certification recognized by the program operator as a participant (Type III).

MR CREDIT 2: BUILDING PRODUCT DECLARATIONS And OPTIMIZATION - EPD

v4.1 CHANGES

- Option 2: Highly Qualified Optimization (1 point)
- Use products that meet one of the criteria below based on 10% of the total value of permanently installed products in the project, or utilize at least 10 permanently installed products from at least three different manufacturers. The products will be evaluated as follows.
- Life Cycle Impact Reduction Action Plan (50% of the product cost or 1⁄2 product)
- The manufacturer has produced a product-specific LCA using EN 15804 or ISO 21930 for the product and has provided a publicly available action plan to reduce or mitigate life cycle impacts. The action plan must be specific to the product using the specified PCR functional unit, critical points must be reviewed, and it should include the following information:
- Description of the LCA conducted, including the dataset, software, or platform used by the manufacturer to complete the analysis.
- Identification of the largest life cycle impact areas defined in the analysis, along with an explanatory note of the targeted impact areas for reduction in the action plan.
- Description of specific steps anticipated in the implementation of the action plan. Description of proposed changes in formulation or production processes that are part of the impact reduction strategy.
- A timeline showing the dates set for the completion of all steps described in the action plan.

MR CREDIT 2: BUILDING PRODUCT DECLARATIONS And OPTIMIZATION - EPD

v4.1 CHANGES

- Option 2: Highly Qualified Optimization (1 point)
- Embedded Carbon Life Cycle Impact Reduction
- Products demonstrating environmental impact reductions based on a valid third-party EPD or a verified LCA that meets the comparability requirements of ISO 14025 and ISO 21930.
- The comparative analysis must show a reduction in impact in the global warming potential GWP impact category and must provide a narrative explaining how the impacts were reduced. Published comparisons must be verified by third parties. (evaluated at 100% or 1 product value based on cost)
- The comparative analysis must show at least a 10% reduction in impact in the global warming potential GWP impact category and must provide a narrative explaining how the impact reductions were achieved. Published comparisons must be verified by third parties. (evaluated at 150% or 1.5 product value based on cost)
- The comparative analysis must show at least a 20% reduction in impact in the global warming potential GWP impact category and at least a 5% reduction in two additional impact categories. A narrative explaining how the impact reductions were achieved is required. Published comparisons must be verified by third parties. (evaluated at 200% or 2 product value based on cost)

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MR CREDIT 2: BUILDING PRODUCT DECLARATIONS And OPTIMIZATION - EPD

v4.1 CHANGES

Option 2: Highly Qualified Optimization (1 point)
Inclusion of Local Materials:

For the calculation of credit points, products extracted, produced, or purchased within a radius of 100 miles (160 km) from the project site are valued up to a maximum of 200% of their price, as two times the basic contribution cost (or number of products).

The contributing cost is used for 2 products.

By using local materials, local economies, crafts, and culture are being developed, and transportation emissions of building materials are reduced. A more environmentally friendly structure is achieved.

The use of local materials is significant in the LEED Green Building Rating System. The image shows the use of local natural stone in the building.

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MR CREDIT 3: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION SOURCE OF RAW MATERIALS

PURPOSE

The aim is to promote the use of materials that have existing life cycle information and the environmental, economic, and social life cycle impacts associated with them.

Especially, the environmental impacts arising during the raw material extraction process are intended to be reduced under this credit heading. Even if a product has a low environmental impact, it should not be preferred in green buildings if it causes harm to the environment during the raw material extraction phase.

To achieve a maximum of 2 points, it is necessary to obtain one or more of the following options:

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MR CREDIT 3: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION SOURCE OF RAW MATERIALS

PURPOSE

The aim is to promote the use of materials that have lifecycle knowledge and their associated environmental, economic, and social lifecycle impacts.

In particular, the environmental impacts that arise during the extraction process of the raw materials of products are intended to be reduced under this credit title. Even if a product has low environmental impact, it should not be preferred in green buildings if it harms the environment during the raw material extraction phase.

To earn a maximum of 2 points, it is necessary to obtain one or more of the following options:

The video provides examples of the environmental impacts of mining. The environmental impact begins from the extraction of construction materials as raw materials. Video Source: netgeotv.com

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MR CREDIT 3: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION SOURCE OF RAW MATERIALS

REQUIREMENTS

- Option 1: Raw Material Source and Raw Material Extraction Reporting (1 point)
- Products permanently installed in buildings obtained from at least 5 different manufacturers, with at least 20 different products, are provided by raw material suppliers that have made commitments to publicly available points of raw material sourcing, long-term ecologically responsible land use, reduced environmental harm during raw material extraction and production, and commitments to meet responsible sourcing criteria within the framework of valid standards or voluntary programs.
- The products of manufacturers reporting their own declarations are valued at ½ (50%) in credit calculations.
- In declarations that determine the environmental impacts during the raw material extraction phase made with Corporate Sustainability Reports (CSR) announced by independent third parties and which identify environmental impacts throughout the entire product supply chain, the product value is considered to be 100%. The accepted CSR framework programs are as follows:
- Global Reporting Initiative (GRI) Sustainability Report
- Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises
- UN Global Compact: Progress Communication Section
- ISO 26000: Guidance on Social Responsibility 2010
- USGBC Approved Programs: Programs that meet other USGBC approved CSR criteria

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MR CREDIT 3: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION SOURCE OF RAW MATERIALS

REQUIREMENTS

Option 2: Leadership in Raw Material Extraction Application (1 point)

In the project, products that meet at least one of the following responsible raw material extraction criteria, valued at least 25% of the total cost of the permanently assembled building products, must be used:

Extended Producer Responsibility: Products purchased from a producer participating in an extended producer responsibility program or directly responsible as an extended producer. If the products meet these conditions, they are evaluated at 50% of their cost in credit calculations.

Bio-based Materials: Biological-based products must meet the Sustainable Agriculture Network Sustainable Agriculture Standard. Biological-based raw materials must be tested using ASTM Test Method D6866. They must be legally harvested and obtained by the receiving country. These products are valued as 100% of their cost in credit calculations. Products containing leather and other animal-based materials are excluded from this credit scope. Rapidly renewable products are those obtained from plants that renew themselves in less than 10 years.

Wood Products: Wood products must be certified by an FSC or USGBC approved equivalent program. The criteria for wood products are evaluated at 100% of their cost in credit calculations.

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MR CREDIT 3: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION SOURCE OF RAW MATERIALS

REQUIREMENTS

Option 2: Leadership in Raw Material Extraction Application (1 point)

Reused Materials: Includes reused, recoverable refurbished products. Reused products are evaluated in credit calculations at 100% of their own cost.

Recyclable Content: The amount of recyclable content is calculated as half of the post-consumer + pre-consumer recyclable content. Products are evaluated in calculations at 100% of their own cost based on total recycled content criteria.

Regional Content: For credit calculations, product base contribution costs that are (extracted, manufactured, and used in building construction) within 100 miles (160 km) of the project site are valued at 200%. In credit calculations, multiple responsible extraction criteria compliant products are not allowed to contribute to the scoring. The product's total actual cost before regional multipliers is not allowed to exceed 100%, and double counting of single product components compliant with multiple extraction criteria is not permitted, and in no case can the total actual cost contribute to a product that is allowed to be 200%. Structural and exterior shell materials must not constitute more than 30% of the value of building products in calculations.

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RECYCLED CONTENT DEFINITIONS

PRE-CONSUMER RECYCLED CONTENT	POST-CONSUMER RECYCLED CONTENT
This term refers to materials that entered the recycling loop before reaching the consumer, according to ISO 14021.	This term refers to materials that entered the recycling loop after reaching and being used by the consumer, according to ISO 14021.
All calculations are made by weight.	
It is accounted for as 50% in calculations.	It is accounted for as 100% in calculations.
By-products, trimmings, scraps, etc. that occur during the production of products in factories can be examples. If fly ash emitted from a thermal power plant is used as a building material, it is considered pre-consumer recycled content.	These are materials that are evaluated by being recycled and re-entering the production chain after they have reached the consumer. An example of this could be a soda bottle. A thermal insulation material made from old used fabrics is also an example of post-consumer recycled content.

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RECYCLED CONTENT CALCULATION EXAMPLE

Let's calculate the recycled content of a concrete element with a total weight of 21 kg. The product content of this concrete element has been exemplified as follows.

Content	kg	PRE-CONSUMER RECYCLED CONTENT (%50)	POST-CONSUMER RECYCLED CONTENT (%100)
Aggregate extracted from the mine	9		
Tap water	1		
Water from pressed concrete	2	1	
Water from rainwater harvesting	1		1
Recycled aggregate from construction sites	4		4
Cement	2		
Fly ash	2	1	
Total	21	2	5
Total Recycled Content		2 + 5 = 7 kg	
Recycled Content of the Product %		(7 / 21) x 100 = %33.3	

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MR CREDIT 3: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION SOURCE OF RAW MATERIALS

NECESSARY DOCUMENTS

Documentation	Option 1	Option 2
MR construction product declaration and optimization calculator or equivalent monitoring tool	✓	✓
Corporate sustainability reports for 100% of contributing products	✓	
USGBC approved programs or product verifier reports		✓

REFERENCE STANDARDS

- 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
- Forest Stewardship Council
- Sustainable Agriculture Network
- The Rainforest Alliance
- ASTM Test Method D6866
- ISO 14021-1999, Environmental labels and declarations—Self Declared Claims (Type II Environmental Labeling)

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MR CREDIT 3: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION SOURCE OF RAW MATERIALS

v4.1 CHANGES

- Responsible Raw Material Supply: (1-2 Points)
- Use products obtained from at least three different manufacturers that meet at least one of the "Responsible Sourcing and Extraction Criteria" described below for at least 20% of the total value of permanently installed building products in the project as a cost. (1 point)
- Use products obtained from at least five different manufacturers that meet at least one of the "Responsible Sourcing and Extraction Criteria" below for at least 40% of the total value of permanently installed building products in the project as a cost. (2 points)
- Extended Producer Responsibility: Products purchased from a manufacturer participating in the EPR program or directly responsible for extended producer responsibility. Products that meet extended producer responsibility criteria are valued at 50% of their cost for credit calculation.
- Biobased Products: Biobased raw materials other than wood must be tested using ASTM Test Method D6866 and must be legally harvested. Exclude products such as leather and other animal skin materials.
- The value for biobased products for credit success calculation is 50% of the cost multiplied by the product's biobased content.
- Biobased products that meet the "Sustainable Agriculture Standard" of the Sustainable Agriculture Network are included in credit calculations at 100% of the cost multiplied by the product's biobased content.

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MR CREDIT 3: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION SOURCE OF RAW MATERIALS

v4.1 CHANGES

Responsible Raw Material Sourcing: (1-2 Points)

Wood Products: Wood products must be approved by the Forest Stewardship Council (FSC) or an equivalent program certified by USGBC. Products meeting the wood product criteria are valued at 100% of their cost for credit calculations.

Material Reuse: Reuse includes salvaged, refurbished, or reused products. Products meeting the material reuse criteria are valued at 200% of their cost for credit success calculations.

Recycled Content: Products meeting the recycled content criteria are valued at 100% of their cost for credit calculations.

Recycled Content = By weight as (Post-Consumer Recycled Content) + (Pre-Consumer Recycled Content x 1/2)

The recycled portion of the product is multiplied by the installation cost to determine the recycled content value.

Regional Content: For credit calculations, products (extracted, manufactured, used) within 100 miles (160 km) of the project site are valued at a base contribution cost of 200% for 2 products.

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REGIONAL CONTENT MAP

The diagram seen on the side shows the answers to the question of what stages the product underwent before being installed in the building and how much of it was sourced regionally from raw material to production.

The regional content of the product used in construction is determined by calculating the recyclable content within a circle with a diameter of 160 km drawn from the construction site in kg.

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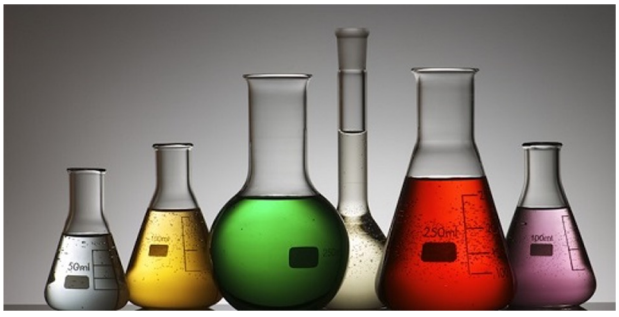
MR CREDIT 4: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION CONTENT OF MATERIALS

PURPOSE

The aim is to promote the use of materials that have knowledge of the life cycle, do not contain harmful chemicals for human health, and the environmental, economic, and social life cycle impacts associated with them.

The aim is to promote projects that select products from manufacturers whose product contents do not contain harmful chemicals for human health and whose effects have been verified.

It is a necessity for healthy buildings that construction chemicals are present in the product content and ultimately in the buildings, complying with human health criteria.



With the LEED v4 Certification system, the chemical content of building materials has gained importance during the certification process.

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MR CREDIT 4: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION CONTENT OF MATERIALS

REQUIREMENTS

Option 1: Material Content Reporting (1 point)

A demonstration of the chemical inventory of the product at a minimum concentration of 0.1% (1000 ppm) using any of the programs below for at least 20 different construction materials that have been permanently assembled from five different manufacturers.

Manufacturer Inventory: A complete content inventory must be published for the product following the Manufacturer Inventory guidelines:

There must be an open inventory of all substances defined by CASRN (Chemical Abstract Service Registration Number) that are publicly accessible.

For materials defined as trade secrets or intellectual property, the role, amount, and Greenscreen criteria of the chemical must be disclosed without the name and/or CASRN, as defined by Greenscreen v1.2.

Healthy Product Declaration: The product must have a Healthy Product Declaration with published data on all known hazardous chemicals as specified in the Healthy Product Declaration Standard.

Cradle to Cradle Certification: The product must be Cradle v3 Bronze, v2 Basic, or Cradle to Cradle certified.

USGBC Approved Program: Approved programs that meet other USGBC material reporting criteria.

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MR CREDIT 4: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION CONTENT OF MATERIALS

REQUIREMENTS

Option 2: Material Content Optimization (1 point)

Documenting content optimization for the total value of products that have been permanently installed, using the options below for at least 25% of their cost.

Greenscreen v1.2 Benchmark: Fully documented chemical substances that do not exceed the hazards of Benchmark 1 with 100 ppm:

If the product has been evaluated in the Greenscreen Translator, these products will be considered at 100% of their cost for evaluation.

If all contents fully pass the Greenscreen Evaluation, they will be considered at 150% of their cost for evaluation.

For projects outside the US, if they can document that there is no chemical according to REACH criteria, they will be considered to have fulfilled this requirement.

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MR CREDIT 4: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION CONTENT OF MATERIALS

REQUIREMENTS

Option 2: Material Content Optimization (1 point)

Cradle to Cradle Certified Product: End-use products must be certified as Cradle to Cradle.

Products will be evaluated as follows:

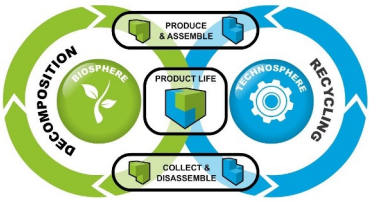
100% of the cost: Cradle v2 Gold

150% of the cost: Cradle v2 Platinum

100% of the cost: Cradle v3 Silver

150% of the cost: Cradle v3 Gold or Platinum

As an international alternative route - REACH Optimization can be used. End-use products and materials that do not contain substances meeting REACH criteria for very high-risk substances. Substances on the REACH authorization or candidate list will be assessed at 100% of their value cost.



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MR CREDIT 4: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION CONTENT OF MATERIALS

REQUIREMENTS

Option 3: Product Manufacturer Supply Chain Optimization (1 point) The total value of the permanently installed building products of the project, the cost, must be at least 25%:

It must be documented that at least 99% of the product by weight consists of materials compliant with health, hazard, and risk programs, verified from the manufacturer.

The product's supply chain must meet at least the following as verified by independent 3rd party validators: The values of the documented products are used in the calculations at 100%.

For the calculation of credits for Options 2 and 3, the contributions within 100 miles (160 km) are valued at 200% of the contribution cost. For the credit calculation, the value of each product compliant with either Option 2 or 3 can be combined to reach the 25% threshold. However, products compliant with both Options 2 and 3 are counted only once. The materials do not constitute more than 30% of the value of compliant building products.

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MR CREDIT 4: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION CONTENT OF MATERIALS

REQUIRED DOCUMENTS

Documentation	Option 1	Option 2	Option 3
MR building product disclosure and optimization calculator or equivalent tool	✓	✓	
Health Product Declaration, Cradle to Cradle certification labels, content producer lists, GreenScreen assessment reports for confidential contents, or USGBC-approved programs	✓		
Cradle to Cradle certification labels, lists of producers exceeding GreenScreen thresholds for all components, or producer declarations (for REACH), or USGBC-approved programs		✓	
Supply chain optimization documentation			✓

REFERENCE STANDARDS

- Chemical Abstracts Service
- Health Product Declaration
- Cradle-to-Cradle® Certified Products Program
- Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- GreenScreen Program

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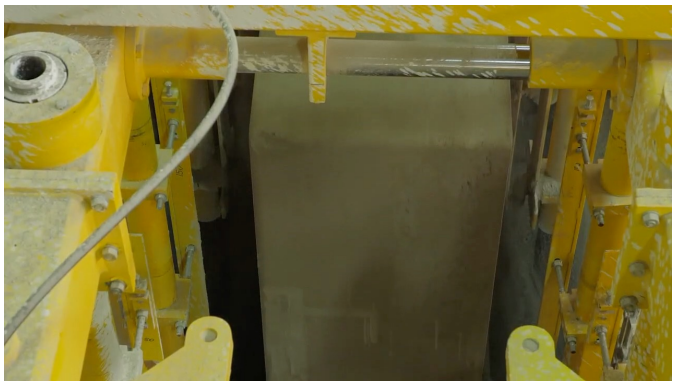
MR CREDIT 4: BUILDING PRODUCT DISCLOSURES AND OPTIMIZATION CONTENT OF MATERIALS

v4.1 CHANGES

- Reporting of Material Content
- Use of Greenscreen List Translator
- REACH Optimization Must Be Done. 100% utilization of material value
- Global Green Tag International: Use of products certified with Product Health Declaration (PhD).
- Regional Content: For credit calculations, products (extracted, manufactured, used) within 100 miles (160 km) of the project site are valued at 200% of basic contribution cost for 2 products.



Video Source: MASA Concrete Block Machines

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MR CREDIT 9: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

OBJECTIVE

The main objective is to reduce construction and demolition waste, prevent the disposal of recyclable materials in regular storage and incineration facilities, and ensure the reuse and recycling of non-hazardous construction waste and debris. This significantly reduces the environmental impact of construction.

Construction waste management in green buildings targeting LEED certification begins from the demolition of an existing building when it is to be rebuilt.

The video showcases the implementation of construction waste management.
Video Source: netregs

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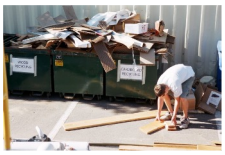
MR CREDIT 9: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

REQUIREMENTS



- A Waste Management Plan will be prepared that describes the types of waste to be recycled and the conversion method, to be implemented by the contractor.
- At least 5 structural and non-structural materials must be identified. The plan outlines the project approaches necessary for the separation of these materials.
- Calculations are made based on either weight or volume.
- Excavation waste is not considered under this credit.
- Alternative daily cover (ADC) is not accepted as separated material. Construction, demolition, or renovation waste is not accepted as such.
- If the European Commission Waste Framework Directive 2008/98/EC and Waste Incineration Directive 2000/76/EC rules are followed, waste separation for projects unable to meet credit requirements using recycling and recovery methods may be accepted as waste recovery system classification, and Waste-to-Energy facilities must comply with the European Committee for Standardization (CEN) EN 303 standards.
- 1 point is earned if 50% recycling is achieved, 2 points if 75% is achieved. Recycling success of 95% or above earns exemplary performance points.

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MR CREDIT 9: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

REQUIREMENTS

Option 1: Waste separation (1-2 Points)

Path 1: Separate 50% and three materials (1 point)

Separate at least 50% of total construction and demolition materials. The separated materials must include at least three types of materials.

or

Path 2: Separate 75% and four types of materials (2 points)

Separate at least 75% of total construction and demolition materials. The separated materials must include at least four types of materials.

or

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MR CREDIT 9: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

REQUIREMENTS

- Option 2: Reduction of total waste material (2 points)
- Construction waste should not exceed 2.5 pounds per square foot (12.2 kilograms per square meter) of the building's footprint.

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MR CREDIT 9: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

STRATEGIES AND APPLICATIONS

Waste types that will be sent for recycling or to the trash should be identified.

Agreements can be made with institutions and organizations that collect waste.

Construction contractors involved in the project should provide necessary training to all subcontractor teams.

Construction waste should be sorted on-site or off-site.

Donations made to aid organizations are also considered within this credit.

Sorting Rate = (Total Amount of Sorted Waste Prevented from Going to the Total Disposal Area / Total Construction Waste Generated in the Project) x 100

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MR CREDIT 9: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

STRATEGIES And APPLICATIONS

- A person assigned by the contractor will track the waste throughout the entire construction period and will report how much is sent for recycling and how much is sent to waste disposal areas (landfills).
- All waste materials that will arise on the construction site (whether recyclable or non-recyclable) should be tracked by weight or volume. The contractor is free to decide how to track it, but the tracking method should be specified at the beginning and all waste should be followed either by weight or by volume.
- Some of the recyclable wastes that can be collected by municipalities and/or private recycling companies include:
- Paper/Cardboard
- Packaging waste
- Glass
- Plastic
- Metal

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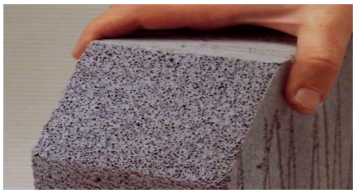
MR CREDIT 9: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

STRATEGIES AND APPLICATIONS

- Besides these, the materials that would normally be sent to the casting area can be considered recycled through methods such as returning to the producer companies, using it at another site, selling as scrap, or breaking it down to use as filler material for the following waste types:
- Concrete: Reused as filler material or aggregate through crushing method
- Gas Concrete: Returning to the producer or using as filler material by breaking it down
- Wooden Pallets: Returning to the producer
- Wood Formwork Material: Using discarded wood at another site
- Iron/Aluminum: Selling as scrap
- Gypsum Board/Betopan: Returning excess pieces to the producer for recycling
- Other: All other waste types that can be sent for recycling



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MR CREDIT 9: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

REQUIRED DOCUMENTS

Documents	Option 1	Option 2
MR construction and demolition waste management calculator or equivalent tool, monitoring total and separated waste quantities and material flows	✓	
Documents for recycling rates for commingled material	✓	
Justification explanation for waste-to-energy strategy usage	✓	
Documentation of waste-to-energy facilities related to applicable EN standards		
Calculations and tables of total waste quantities per area		✓

REFERENCE STANDARDS

- European Commission Waste Framework Directive 2008/98/EC
- European Commission Waste Incineration Directive 2000/76/EC
- EN 303-1—1999/A1—2003, Heating boilers with forced draught burners, Terminology, general requirements, testing and marking
- EN 303-2—1998/A1—2003, Heating boilers with forced draught burners, Special requirements for boilers with atomizing oil burners
- EN 303-3—1998/AC—2006, Gas-fired central heating boilers, Assembly comprising a boiler body and a forced draught burner
- EN 303-4—1999, Heating boilers with forced draught burners, Special requirements for boilers with forced draught oil burners with outputs up to 70 kW and a maximum operating pressure of 3 bar, Terminology, special requirements, testing and marking
- EN 303-5—2012, Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW
- EN 303-6—2000, Heating boilers with forced draught burners, Specific requirements for the domestic hot water operation of combination boilers with atomizing oil burners of nominal heat input not exceeding 70 kW
- EN 303-7—2006, Gas-fired central heating boilers equipped with a forced draught burner of nominal heat output not exceeding 1000 kW

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MR CREDIT 9: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

v4.1 CHANGES

- Option 1: Waste Separation (1-2 Points)
- Path 1: Separate 50% and 2 materials (1 point)
- At least 50% of the total construction and demolition materials must be separated. The separated materials must include at least 2 types of materials.
- or
- Path 2: Separate 50% using a Certified Mixed Recycling Facility. (1 point) At least 50% of the total construction and demolition materials must be separated. All separated products are sent to the Certified Mixed Recycling Facility.
- Path 3: Separate 75% using a Certified Mixed Recycling Facility. (2 points) At least 75% of the total construction and demolition materials must be separated. All separated products are sent to the Certified Mixed Recycling Facility.
- Option 2: Reduction of total waste material (2 points)
- Construction waste should not exceed 7.5 pounds per square foot (36.6 kilograms per square meter) of the building's footprint.

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LEED V4 FOR HOSPITALS

MATERIALS And RESOURCES

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MR CREDIT 5: PBT SOURCE REDUCTION - MERCURY - HOSPITALS

PURPOSE

The main goal is to reduce the release of harmful chemicals from building materials containing Persistent Bioaccumulative Toxic (PBT) substances throughout their life cycle.

PBT stands for Persistent Bioaccumulative Toxic.

According to MR Prerequisite 2, fluorescent lamps with low mercury values must meet the characteristics listed below.

Note: Circular fluorescent lamps and probe-start metal halide lamps should not be used in the project. Choosing longer-lasting lamps means fewer replacements and less mercury damage. Documents and brochures that show the product name, manufacturer information, product mercury content ratios, and lifespan must be collected.

REQUIRED DOCUMENTS

Documentation	All Projects
Lighting program (including lamp lifespan hours)	✓
Descriptive narrative explaining lamps outside the credit	✓
USGBC's MR PBT source reduction calculator (or equivalent documents)	✓

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MR CREDIT 5: REDUCING PBT SOURCE - MERCURY

Table 1: Criteria for the Lifespan of Low Mercury Lamps

Lamp	Maximum Mercury Content (mg)	Lamp Life (hours)
T-8 Fluorescent, 8 foot	10	Standard output - 24,000 hours in instant start ballasts or program start ballasts (3 hours per start) High output - 18,000 hours in instant start ballasts or program start ballasts (3 hours per start)
T-8 Fluorescent, 4 foot	3.5	30,000 hours in both standard and high output instant start ballasts or 36,000 hours in program start ballasts (3 hours per start)
T-8 Fluorescent, 2-3 foot	3.5	24,000 hours in instant start or program start ballasts (3 hours per start)
T-8 Fluorescent, U bent	6	18,000 rated hours in instant start ballasts or 24,000 rated hours in program start ballasts (3 hours per start)
T-5 Fluorescent, linear	2.5	25,000 hours in both standard and high output in program start ballasts
Compact Fluorescent, removable ballast	3.5	12,000 hours
Compact Fluorescent, integral ballast	3.5 and Energystar compliant	Bare bulb - 10,000 hours Framed models such as globes, reflectors, A-19s - 8,000 hours
Sodium-containing Lamps	Maximum Mercury Content (mg)	Lamp Life (hours)
High pressure sodium, up to 400 watts	10	Use a non-cycling type or replace with LED lamps or induction lamps
High pressure sodium, over 400 watts	32	Use a non-cycling type or replace with LED lamps or induction lamps

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MR CREDIT 6: REDUCING PBT SOURCES - LEAD, CADMIUM, and COPPER

PURPOSE

The aim is to reduce the release of harmful chemicals during the life cycle of construction materials containing Persistent Bioaccumulative Toxic (PBT) substances.

PBT stands for Persistent Bioaccumulative Toxic.

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MR CREDIT 6: PBT SOURCE REDUCTION - LEAD, CADMIUM, AND COPPER

REQUIREMENTS

- Materials containing lead and cadmium must meet the requirements specified below:
- For connections of water-carrying pipes intended for human use, 100% lead-free (as defined by EPA) solder and solder flux must be used. According to California AB1953 standard, solder may contain a maximum of 0.2% lead, and solder flux may contain a maximum of 0.25% lead.
- Water-carrying pipes intended for human use, pipe fittings, plumbing fixtures, and faucets may contain a maximum of 0.25% lead according to California AB1953 standard.
- Lead-free roofing materials must be used.
- The lead content of electrical wires must be less than 300 ppm.
- Interior and exterior paints should not contain cadmium or lead.
- For renovation projects, ensure the removal and proper disposal of non-lead stabilizer wires in accordance with the 2002 National Electric Code requirements.

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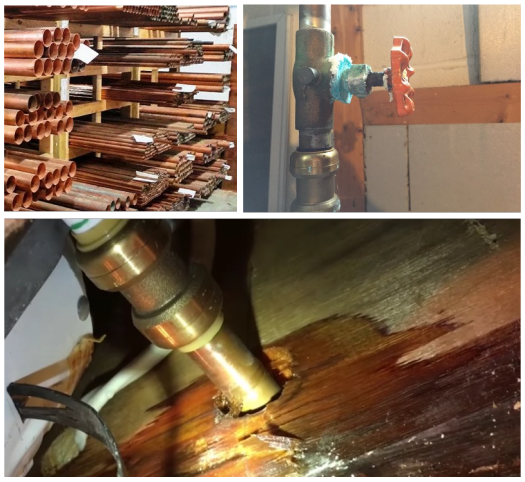
MR CREDIT 6: PBT SOURCE REDUCTION - LEAD, CADMIUM, and COPPER

REQUIREMENTS

- In copper pipe applications, copper corrosion that may arise from connection points should be reduced or prevented:
- Mechanically bent copper connections can be used, or
- All soldered connections must comply with ASTM B828-2002 and solder flux must be used in accordance with ASTM B813-2010.
- Use of Cadmium:
- Inform project teams not to use paints with cadmium in interior or exterior applications.
- Lead used for radiation shielding and copper used for MRI shielding are exempt from the requirements. This is a situation encountered in hospital buildings.



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MR CREDIT 6: REDUCE PBT SOURCE - LEAD, CADMIUM, AND COPPER

STRATEGIES AND APPLICATIONS

- Add the requirement for 100% lead-free solder and soldering flux to the project documents.
- Research alternative products that do not contain lead and cadmium.
- Silver or other lead-free solders can be used as solder.
- Lead-free copper connectors and polyethylene pipes can be used.
- Green Seal certified paints can be used.
- The following practices can be implemented to reduce copper corrosion:
- Using larger diameter pipes to reduce the flow rate of fluids within the pipes
- In hot water circulation systems, the diameters of return lines should be equal to the pipe diameter of the supply lines
- Minimizing changes in direction and size to reduce stagnant sections

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MR CREDIT 6: PBT SOURCE REDUCTION - LEAD, CADMIUM, and COPPER

REQUIRED DOCUMENTS

Documentation	All Projects
Product documents demonstrating credit criteria (manufacturer's data or certification document)	✓
Narrative explaining excluded materials	✓
Definition of pipe joining procedures (for copper pipes only)	✓
Verification of proper disposal of wires and lead stabilizers (for renovation projects only)	✓

REFERENCE STANDARDS

- ASTM B813 For Copper Flux
- ASTM B828, Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings
- California AB1953 Standard For Lead Water Pipes Used To Convey Water For Human Consumption
- GreenSeal
- 2002 National Electric Code requirements for removal and disposal of disconnected wires with lead stabilizers

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MR CREDIT 7: FURNITURE AND MEDICAL FURNISHINGS

PURPOSE

The improvement of environmental and human health performance characteristics related to independent furniture and medical furnishings aims to enhance the health conditions of building users.

The total value of all independent furniture and medical furnishings used in the project, including mattresses, foam, fabric panels, cell curtains, window coverings, and other textiles, must meet one of the following three options as a certain percentage (based on cost).

The minimum percentage rate is provided for each point on the side.

Percentage of Total Material (based on cost)	Points
%30	1
%40	2

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MR CREDIT 7: FURNITURE AND MEDICAL FURNISHINGS

REQUIREMENTS

- Built-in furniture within the building must be included in the base building calculations. If a product meets the criteria of any one of the three options, the dollar value of the product can be included in the total provided value.
- Option 1: Minimum chemical content
- All components that constitute at least 5% by weight of a piece of furniture or medical furniture assembly, including textiles, paints, and coatings, must contain less than 100 ppm of at least four out of the following five chemical groups:
- Urea formaldehyde
- Heavy metals including mercury, cadmium, lead, and antimony
- Compliance with coatings that adhere to the EU Directive on the Restriction of the Use of Certain Hazardous Substances (EU RoHS) regarding hexavalent chromium
- Chemicals derived from Perfluorinated Compounds (PFC), including Perfluorooctanoic Acid (PFOA), that are stain and grease-resistant
- Anti-microbial chemicals
- Furniture components must be included if they exceed 5% of the weight of the furniture.

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MR CREDIT 7: FURNITURE and MEDICAL UPHOLSTERY

REQUIREMENTS

- Option 2: Testing and modeling of chemical content
- In all components of a furniture or medical upholstery product, including textiles, coatings, and paints, at least 2 of the 5 chemical groups from Option 1 must be less than 100 ppm. New furniture or medical furniture arrangements must comply with ANSI / BIFMA Standard Method M7.1-2011. Use concentration modeling approach or emission factor approach to comply with ANSI / BIFMA e3-2010 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2. Properly model test results using the open plan, private office, or seating scenarios provided in ANSI / BIFMA M7.1. USGBC-approved equivalent test methods and contaminant thresholds are also acceptable. Documentation provided for the furniture must specify the modeling of the scenario to determine compliance.
- Provided that the paints, coatings, adhesives, and sealants applied in the field meet the requirements, furniture that is salvaged and reused that is older than one year is considered compliant during use.

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MR CREDIT 7: FURNITURE AND MEDICAL UPHOLSTERY

REQUIREMENTS

- Option 3: Multi-Purpose Evaluation of Products
- Use products that meet at least one of the criteria below. Each product can earn credit for each criterion met. Any Environmental Product Declaration (EPD) must be at least at the threshold level.
- Product-Specific Notification: Products that are publicly available, critically reviewed, and compliant with ISO 14044 life cycle assessment, covering at least cradle-to-gate, are considered a quarter (1/4) of a product for credit success calculation purposes.
- Environmental Product Declarations in accordance with ISO 14025, 14040, 14044, and EN 15804 or ISO 21930, and covering at least cradle-to-gate:
- Industry-wide (generic) EPD - Products with a Type III third-party certification, clearly defined as participating by the manufacturer's program operator, including external verification, can be used to calculate product credit acquisition.
- Product-Specific Type III EPD - Products with a Type III third-party certification, clearly defined as participating by the manufacturer's program operator, including external verification, are evaluated as a whole for credit acquisition calculation purposes.



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MR CREDIT 7: FURNITURE AND MEDICAL FABRICS

REQUIREMENTS

- Option 3: Multi-Purpose Evaluation of Products
- Materials are reusable. Products that have been salvaged, refurbished, or reused are acceptable.
- Recycled content. Use products with recycled content. Recycled content is defined as half of pre-consumer recycled content in addition to post-consumer recycled content.
- Extended producer responsibility. Products purchased from a manufacturer that is part of a broad producer responsibility program or that is directly responsible for extended producer responsibility (from the manufacturer).
- Bio-based materials. Bio-based products must meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials should be tested using ASTM Test Method D6866 and must be legally harvested as defined by the exporting and receiving country. Exclude hide products such as leather and other animal-derived materials.
- Wood products must be certified by the Forest Stewardship Council (FSC) or an equivalent approved by USGBC.



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MR CREDIT 7: FURNITURE AND MEDICAL FURNISHINGS

REQUIREMENTS

- Option 3: Multi-Purpose Evaluation of Products
- Products meeting the above criteria are evaluated according to their source locations (the points of extraction, production, and purchase must be within the distances specified below):
- For the calculation of credit acquisition, products supplied (extracted, manufactured, purchased) within 100 miles (160 km) of the project area are valued at 200% of the basic contribution cost.

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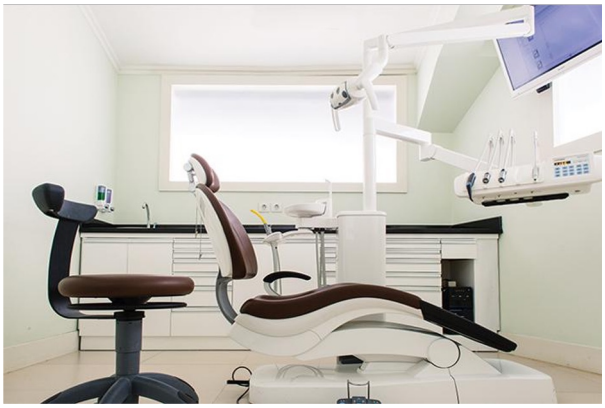
MR CREDIT 7: FURNITURE AND MEDICAL UPHOLSTERY

STRATEGIES AND APPLICATIONS

- Recyclable content should be researched, with previously used, local, FSC certified, and rapidly renewable product alternatives.
- The chemical contents of product alternatives should be investigated as specified in Option 1.
- Products containing low volatile organic compounds and formaldehyde (meeting CDPH/EHBL Standard Method v1.1 requirements) should be researched.
- A table should be prepared showing all furniture and medical upholstery products, indicating which option is followed for each product and the product cost.
- Technical data sheets of the products reported under the credit should be obtained from manufacturers.



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MR CREDIT 7: FURNITURE and MEDICAL FURNISHINGS

REQUIRED DOCUMENTS

Documentation	Option 1	Option 2	Option 3
MR furniture and medical furniture calculator provided by USGBC	✓	✓	✓
Documentation of product requirements for credit criteria	✓	✓	✓

REFERENCE STANDARDS

- Restriction of the Use of Certain Hazardous Substances of the European Union Directive (EU RoHS)
- ANSI/BIFMA M7.1–2011
- ANSI/BIFMA e3–2011
- ISO 14025–2006, Environmental labels and declarations (Type III Environmental Declarations—Principles and Procedures)
- ISO 14040–2006, Environmental management, Life cycle assessment principles, and frameworks
- ISO 14044–2006, Environmental management, Life cycle assessment requirements, and guidelines
- ISO 21930–2007 Sustainability in building construction—Environmental declaration of building products
- ISO 14021–1999, Environmental labels and declarations—Self Declared Claims (Type II Environmental Labeling)

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MR CREDIT 8: DESIGN FOR FLEXIBILITY

OBJECTIVE

The aim is to design with the purpose of reducing resource usage related to building construction and management by considering flexible use, future adaptations, and the lifespan of materials and products.

Using at least three of the following design and/or site planning strategies, enhance the building's flexible use and facilitate adaptability for reuse throughout the building's life:

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MR CREDIT 8: DESIGN FOR FLEXIBILITY

REQUIREMENTS

- The project definition includes the use of interim service spaces that serve at least 20% of the treatment and other clinical area gross floor area. (Calculations must be based on the Department's Gross Floor Area.) Design HVAC, Electrical, information technology, communications, medical gas, and sprinkler distribution systems with the capacity to control multiple areas in clinical spaces. (Inpatient units are included in the calculations.)
- Design 'soft space' equal to at least 5% of the total clinical space area. 'Soft space' refers to flexible areas that can be included in neighboring spaces when necessary, such as administrative or storage areas. Position soft spaces close to clinical departments that may need to grow in the future. Establish strategies for the future use of soft spaces. Calculations must be based on the Department's Gross Floor Area (DGA).
- Create reserve spaces equivalent to at least 5% of the total clinical space area. Reserve spaces are areas that are only enclosed by the building shell, are not constructed internally, and are designated for future use.

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MR CREDIT 8: DESIGN FOR FLEXIBILITY

REQUIREMENTS

- Determine the horizontal expansion capacity of the project to be at least 30% of the total construction area for diagnosis, treatment, and other clinical areas (excluding inpatient units). Horizontal expansion should not damage actively used areas (except for those at the expansion point). Reconstruction of the currently used area with partition walls is allowed.
- Or,
- Design allowing vertical expansion of at least 75% of the roof area. Ensure that existing services will operate at full or near full capacity during the expansion work.
- Reserve parking space for future use of at least 50% of the current open parking capacity. The reserved parking area must have direct access to the hospital main lobby/circulation/vertical transportation means (stairs, elevator).

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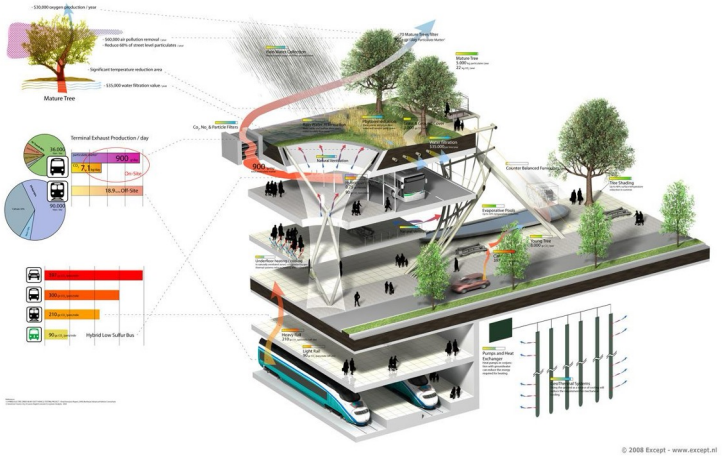
MR CREDIT 8: DESIGN FOR FLEXIBILITY

REQUIREMENTS

- At least 50% of the usable areas must have partition walls. Areas where partition walls cannot be used include: intensive care units, operating rooms, post-anesthesia care units, emergency service areas, and acute trauma.
- All furnishings (casework and millwork) must be at least 50% modular/portable (calculation is based on the total cost value of casework and millwork).



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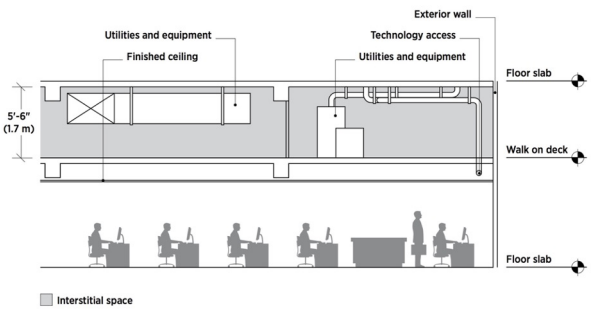
MR CREDIT 8: DESIGN FOR FLEXIBILITY

STRATEGIES AND APPLICATIONS

- Step 1. Develop flexibility goals: Identify which clinical programs will grow and position them to allow for expansion of the shell or soft space without significant disruption or reconfiguration.
- Step 2. Identify at least three strategies to meet credit requirements
- Step 3. Make Preliminary Calculations: If expansion is expected, determine potential size, location, and types of spaces. If project space is limited and vertical expansion is the only option, plan for additional structural, mechanical, and exit requirements. If flexibility is needed within the existing building envelope, choose strategies such as voids, soft spaces, and shell areas that allow for changes in room and building systems.
- Step 4. Ensure that the strategies meet credit requirements



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MR CREDIT 8: DESIGNING FOR FLEXIBILITY

STRATEGIES & PRACTICES

- Starting from the centerline of the walls, add the area of all clinical departments in the building program. Space for expansion. For both vertical and horizontal exterior walls, identify the potential of suitable areas as expansion areas – choose locations that allow for future additions without the need for floors to be demolished.
- Available space (ground and parking). This is the area of the existing project (whether it is a new building or a major renovation of the existing building), plus parking.
- Specify detachable partition area, i.e. Applicable Areas for Detachable Partitions.
- No calculations are required for the transition area strategy; Any use of void space that meets the gap definition meets the requirements of this strategy. Design large base-to-floor heights with raised floor distribution systems or systems with transitional space to simplify future changes. Project undifferentiated "technology floors" to fit surgery, cardiology, and radiology programs in identical, adaptable modules.

Figure 5. Example of linear surface locations applicable for demountable partition calculation

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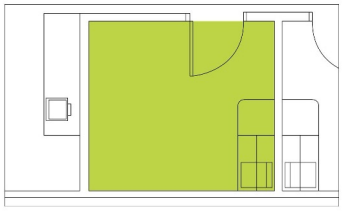
MR CREDIT 8: DESIGNING FOR FLEXIBILITY

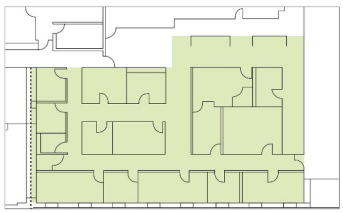
STRATEGIES & PRACTICES

- Step 5. Track the implementation of strategies throughout project completion: Shell space planning at the beginning of the design process can significantly help prevent costly changes if new programmatic requirements are defined late in the design process.
- The programmed soft space can be reduced to accommodate the space changes required during the design development phase.
- Review "at-risk" strategies at key project milestones and work with the project team to ensure optimal design flexibility is maintained.
- Clearly strategize in the floor plan and design documents to ensure open communication between all disciplines.



Net Area: The area within the walls of a room or the usable floor area assigned to a function in an open area e.g., cubicles or workstations. The space includes casework, fixtures and door swings but does not include wall thickness.

NA



Departmental Gross Area (DGA): The area inside the centerline of the walls separating a department from adjoining areas; include internal walls, corridors, etc.

DGA

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MR CREDIT 8: DESIGN FOR FLEXIBILITY

GENERAL STRATEGIES

- Modular, generic spaces and the use of repetitive design elements.
- Use of standard sizes and non-personalized, multi-user portable workstations in offices.
- Standard selection of material dimensions.
- Utilization of repetitive design elements.
- Future-oriented design. High ceiling heights, the use of raised flooring, and intermediate service floors provide flexibility for future usage modifications.
- Positioning of soft spaces or reserve areas close to main clinical spaces.
- Designing and positioning corridors and staircases to accommodate future modifications.
- Use of building elements that can be easily dismantled and reconfigured. Use of partition walls, movable or reusable construction elements.
- Utilizing systems that allow lighting and controls to be relocated within the space without needing rewiring.

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MR CREDIT 8: DESIGN FOR FLEXIBILITY

REQUIRED DOCUMENTS

Documentation	All Projects
General definition of the flexible design strategy	✓
Section calculations showing required areas for each chosen strategy in the gross area calculations	✓
Floor plans or other documents for areas using flexible design strategies	✓
Calculation of soft area, shell area, expansion capacity, and ground area for future parking (if any)	✓
Linear area calculations for removable sections and definitions of excluded areas (if any)	✓
Calculation of product costs for movable and modular units (if any)	✓

REQUIRED APPLICATIONS

- The project should be designed to allow for future expansion and changes in functionality.
- Standardization of spaces, materials, and building construction elements should be ensured as much as possible.
- Portable and modular building elements and furniture should be used in the spaces.
- Possibilities for vertical and horizontal expansion should be evaluated.
- Potential increases in parking capacity for future growth should be assessed.

REFERENCE STANDARDS

- None.

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