

SECTION 018113 - SUSTAINABLE DESIGN AND LEED REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes general requirements and procedures for compliance with certain USGBC LEED prerequisites and credits needed for Project to obtain LEED Platinum certification based on LEED for HOMES Mid-Rise version 2010 and meet or exceed the 2010 requirements of Architecture 2030's "2030 Challenge."
 - 1. Other LEED prerequisites and credits needed to obtain LEED certification depend on material selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
 - 2. Additional LEED prerequisites and credits needed to obtain the indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.
 - 3. A draft copy of the LEED Project Checklist is attached at the end of this Section for information only.
 - 4. Sustainable design Project goals.
 - 5. Sustainable design product requirements.

- B. Related Sections:
 - 1. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 01 specification sections.
 - 2. Section 014400, Construction Indoor Air Quality
 - 3. Provision of waste management: Section 017419, Construction Waste Management and Disposal.
 - 4. Section 018100, Commissioning
 - 5. Section 019100 - Commissioning: General commissioning requirements.
 - 6. Division 23 – Heating, Ventilation and Air Conditioning
 - 7. Divisions 01 through 33 Sections for LEED requirements specific to the work of each of these Sections. Requirements may or may not include reference to LEED.

1.2 DEFINITIONS

- A. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer and supplier is certified for chain of custody by an FSC-accredited certification body.

- B. LEED: Leadership in Energy & Environmental Design.

- C. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

- D. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
1. "Post-consumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
 2. "Pre-consumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

1.3 REFERENCES

- A. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
1. ASHRAE 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
 2. ASHRAE 62 - Ventilation for Acceptable Indoor Air Quality.
 3. ASHRAE 90.1 - Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings.
- B. ASTM International:
1. ASTM C1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
 2. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
 3. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
 4. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
 5. ASTM E1918 - Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
 6. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
- C. Carpet and Rug Institute:
1. CRI Green Label Plus Testing Program.
 2. CRI Green Label Testing Program.
- D. Forest Stewardship Council:
1. FSC Guidelines- Forest Stewardship Council Guidelines.
- E. Green Seal:
1. GC-03 - Anti-Corrosive Paints.
 2. GS-11 - Product Specific Environmental Requirements.
 3. GS-36 - Aerosol Adhesives.

F. International Standards Organization:

1. ISO 14021 - Environmental Labels and Declarations - Self-Declared Environmental Claims (Type II Environmental Labeling).

G. Sheet Metal and Air Conditioning Contractors:

1. SMACNA IAQ - IAQ Guidelines for Occupied Buildings Under Construction.

H. South Coast Air Quality Management District:

1. SCAQMD Rule 1113 - Architectural Coatings.
2. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

I. U.S. Environmental Protection Agency:

1. ENERGY STAR - ENERGY STAR Voluntary Labeling Program.
2. EPA 832-R-92-005 - Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
3. EPA Baseline IAQ - Testing for Indoor Air Quality, Baseline IAQ, and Materials Section 01445.
4. EPA Construction General Permit, 2003.

J. U.S. Green Building Council:

1. LEED for Homes Mid-Rise 2010 Rating System issued in October 2010
2. LEED Reference Guide - LEED for New Construction Reference Guide, Version.

1.4 SUSTAINABLE PROJECT GOALS

A. Target: Minimum LEED Silver – LEED for HOMES Mid-Rise 2011.

1. Work with project team and LEED for Homes Provider and Green Rater to meet all targeted credit requirements and documentation submissions, as required.
2. Find attached to this section a copy of the latest targeted LEED for HOMES Mid-Rise 2011 Checklist.

B. Comply with the following general sustainable Project goals. Refer to specific specification sections for more detailed requirements.

C. Notify Owner and Architect/Engineer when conflicts arise between Work performance and sustainable Project goals.

D. Sustainable Project Goals: Refer to LEED for HOMES Mid-Rise 2011 Rating System Project Checklist attached to this section.

1.5 LEED DOCUMENTATION

A. All LEED documentation shall be made in accordance with the requirements specified in Section 01 33 00 – SUBMITTAL PROCEDURES.

- B. LEED documentation should be submitted concurrently with construction submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.
- C. LEED Action Plans: Provide preliminary LEED information within seven days of date established for the Notice to Proceed indicating how the following requirements will be met:
 - 1. Innovation and Design IDc2: Durability Planning and Management. Complete the Durability Risk Evaluation Form and Durability Plan and Durability Inspection Checklist. Coordinate completion of Durability Inspection Checklist with Green Rater upon installation of all inspection items.
 - 2. Credit MR 3.1 and Credit MR 3.2: Construction waste management plan complying with Division 01 Section "Construction Waste Management and Disposal."
 - 3. Credit MR 2: List of environmentally preferable products with recycled content. Indicate post-consumer recycled content, and pre-consumer recycled content for each building component or system listed in LEED for Homes Mid-Rise Credit 2.2 – Table 24 having recycled content.
 - 4. Credit MR 2: List of proposed environmentally preferable products with Regional Materials for each building component or system listed in LEED for Homes Mid-Rise Credit 2.2 – Table 24. Identify each regional material, including its source, and the fraction by weight that is considered regional.
 - 5. Credit MR 2: List of proposed certified wood products. Indicate each product containing certified wood, including its source of certified wood products for each building component or system listed in LEED for Homes Mid-Rise Credit 2.2 – Table 24.
- D. LEED Progress Reports: Concurrent with each Construction Progress Meeting Minutes, include LEED status comparing actual construction and purchasing activities with LEED action plans for the following:
 - 1. Credit MR 3.2: Waste reduction progress reports complying with Division 01 Section "Construction Waste Management and Disposal."
 - 2. Credit EQc8.1: Indoor Contaminant Control During Construction
 - 3. Credit MR 2: Recycled content.
 - 4. Credit MR 2: Regional materials.
 - 5. Credit MR 2: Certified wood products.
 - 6. Credit MR 2: Low- or No-VOC content materials.

1.6 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
 - 1. Submit data for filter media and filter efficiency.
- C. Manufacturer's Certificate: Where targeted for LEED Credit, certify products meet or exceed specified requirements that pertain to the targeted Credit.
 - 1. Certify roofing materials solar reflectance index.

- a. Indicate roof slope, solar reflectance index, and percent of total roof surface for each roofing material.
2. Certify recycled material content for recycled content products permanently installed as part of Project.
 - a. Indicate post-consumer recycled content percent by weight as defined by LEED Rating System.
 - b. Indicate pre-consumer recycled content percent by weight as defined by LEED Rating System.
 - c. Indicate recycled content materials in accordance with ISO 14021.
3. Certify source for local and regional materials for products permanently installed as part of Project.
 - a. Indicate extraction, manufacturing or fabrication location and distance to site in miles.
 - b. Indicate percent by weight of each product qualifying as local and regional material.
4. Certify lumber is harvested from Forest Stewardship Council Certified well managed forest.
 - a. Indicate certifying agency and agency accreditation by Forest Stewardship Council.
 - b. Include chain-of-custody documentation tracking wood product from forest to installed Product.
 - c. Include description and location of each certified wood-based Product in completed construction.
5. Certify volatile organic compound content for each interior adhesive and sealant and related primer.
 - a. Include data sheet indicating volatile organic compound content, in g/L, for each Product.
6. Certify volatile organic compound content for each interior paint and coating.
 - a. Include data sheet indicating volatile organic compound, in g/L, and chemical component content for each Product.
7. Certify volatile organic compound content for each carpet and carpet cushion.
 - a. Include independent test results indicating each carpet complies with CRI Green Label Plus Testing Program.
 - b. Include independent test results indicating each carpet cushion complies with CRI Green Label Testing Program.
8. Certify each composite wood and agrifiber product contains no added urea-formaldehyde resins.

- a. Include data sheet indicating urea-formaldehyde resin content for each Product.
- D. Construction Photographs: Submit photographs indicating measures protecting materials from moisture for the following:
- 1. Radon system installed sub-slab.
 - 2. Absorptive materials, including but not limited to masonry units, lumber, finished architectural woodwork, flush wood doors, gypsum board, acoustical ceiling tiles, and insulation.
 - 3. Ducts and other HVAC equipment.
 - 4. Any item that is concealed or covered during the normal construction process that the Green Rater must see as part of the Durability Inspection Checklist noted in Section 1.5.C.1. above.
- E. Construction Plans:
- 1. Construction Waste Management Plan: Indicate analysis of estimated job site waste to be generated, including types and quantities; and proposed alternatives to use of landfill.
 - a. Submit monthly reports of actual recycling rates, salvage rates, and landfill rates.
 - 2. Construction Indoor Air Quality (IAQ) Plan: Indicate absorptive material and HVAC system protection; source control; pathway interruption; housekeeping and construction sequencing.

1.7 QUALITY ASSURANCE

- A. LEED Coordinator: Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.
- B. Perform Work in accordance with LEED for HOMES Mid Rise 2011 Rating System to permit application and certification to achieve Platinum Rating.
 - 1. Owner and Architect identified sustainable Project goals that are believed to be attainable.
 - 2. Furnish products with materials and properties for entire Project to meet or exceed specified sustainable Project goals.
 - 3. Perform Work using means and methods for entire Project to meet or exceed specified sustainable Project goals.
- C. Perform storm water management and erosion control Work in accordance with EPA Construction General Permit EPA 832-R-92-005 or local erosion and sedimentation control standards whichever is more stringent.
- D. Perform commissioning Work as specified in Section 01 91 00 - Commissioning, for the following:
 - 1. Fundamental building systems.
- E. Perform Work to meet or exceed minimum energy efficiency and performance in accordance with ASHRAE 90.1 2007 or local energy code whichever is more stringent.

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- F. Perform Work without use of CFC based refrigerants in HVAC building systems.
- G. Perform ventilation Work in accordance with ASHRAE 62.2 and ASHRAE 62.1 in accordance with LEED for Homes Mid-Rise 2011 requirements.
- H. Develop and implement construction indoor air quality management plan including the following:
 - 1. Comply with minimum requirements of SMACNA IAQ.
 - 2. Protect stored and installed absorptive materials from moisture damage.
 - a. Store materials on elevated platforms under cover, and in dry location.
 - b. When materials are not stored in enclosed location, cover tops and sides of material with secured waterproof sheeting.
 - 3. Protect HVAC equipment during construction.
 - a. Shut down return side of HVAC system whenever possible during heavy construction or demolition.
 - b. When HVAC system are operated during heavy construction, furnish disposable temporary filters.
 - 4. Replace filtration media immediately before occupancy.
- I. Perform Work in accordance with State and Municipality of project location standard.
- J. Framing Order Waste Factor Limit. Limit the overall estimated waste factor to 10% or less. If the waste factor for any portion of the framing order exceeds 10%, calculate the overall waste factor as shown in the LEED for HOMES Mid-rise 2011 Rating System under Credit MR 1.

1.8 QUALIFICATIONS

- A. Monitor and manage compliance with this section under direct supervision of LEED Accredited Professional.

1.9 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.
 - 1. Review submittal and documentation requirements for LEED Rating System certificate.
 - 2. Review construction procedures and temporary facilities required for LEED Rating System compliance.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

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- B. Accept absorptive materials on site in manufacturer's sealed, protective packaging. Inspect for damage.
- C. Store absorptive materials in enclosed, environmentally conditioned space to prevent moisture absorption.
- D. Do not store or install absorptive materials within building until building is enclosed and materials are protected from exposure to elements.
- E. Protect installed absorptive materials from damage with temporary exterior enclosure to prevent moisture absorption.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Prior to construction, design and plan appropriate erosion control measures. During construction, implement these measures. Erosion control measures must include all of the following:
 - 1. Stockpile and protect disturbed topsoil from erosion (for reuse).
 - 2. Control the path and velocity of runoff with silt fencing or comparable measures.
 - 3. Protect on-site storm sewer inlets, streams, and lakes with straw bales, silt fencing, silt sacks, rock filters, or comparable measures.
 - 4. Provide swales to divert surface water from hillsides.
 - 5. If soils in a sloped area (i.e., 25%, or 4:1 slope) are disturbed during construction, use tiers, erosion blankets, compost blankets, filter socks and berms, or some comparable approach to keep soil stabilized.

PART 2 PRODUCTS

2.1 PROHIBITED MATERIALS

- A. Do not use materials containing asbestos, polychlorinated biphenyls (PCB) or other hazardous materials.
- B. Do not use HCFC based refrigerants or Halon extinguishing agents.
- C. Do not use materials containing butyl for interior locations.

2.2 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

- A. Credit MR 3. Comply with the requirements of Section 01 74 19 Construction Waste Management and Disposal.
- B. LEED Submittals:
 - 1. Provide completed forms in accordance with 01 74 19 and as follows:

- a. "Contractor's Plan for Solid Waste Management & Recycling".
- b. "Contractor's Report of Solid Waste Management and Recycling".

2.3 RECYCLED CONTENT OF MATERIALS

- A. Credit MR 2.1 and Credit MR 2.2: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 25 percent of cost of materials used for Project.
 1. Post-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content in the item by total weight of the item.
 2. Post-consumer recycled content plus one-half of pre-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by total weight of the item.
 3. Do not include mechanical and electrical components in the calculation.
 4. Product material must make up 90% of the component, by weight or volume.
- B. LEED Submittals:
 1. Provide LEED Submittals of product data indicating percentage by weight of post-consumer and pre-consumer recycled content for products having recycled content.
- C. LEED Products Requirements:
 1. Provide products with the minimum post-consumer and pre-consumer recycled content as per Section 01 81 13, Sustainable Design and LEED Requirements.

2.4 LOCAL AND REGIONAL MATERIALS

- A. Credit MR 2.2: Provide products that are locally sourced.
 1. Product material must make up 90% of the component, by weight or volume.
- B. LEED Submittals:
 1. Product data indicating location of material manufacturer and extraction. Include statement indicating cost and distance from place of manufacturer and extraction to Project Site for each regionally manufactured material.
- C. LEED Products Requirements:
 1. Provide product extracted and manufactured within 500 miles of the project site.

2.5 FSC CERTIFIED WOOD

- A. Credit MR 2.1: If tropical woods are used, provide products from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
 1. Wood-based materials include, but are not limited to, the following materials when made from wood, engineered wood products, or wood-based panel products:

- a. Rough carpentry.
- b. Miscellaneous carpentry.
- c. Heavy timber construction.
- d. Wood decking.
- e. Metal-plate-connected wood trusses.
- f. Structural glued-laminated timber.
- g. Finish carpentry.
- h. Architectural woodwork.
- i. Wood paneling.
- j. Wood veneer wall covering.
- k. Wood flooring.
- l. Wood lockers.
- m. Wood cabinets.
- n. Furniture.

B. LEED Submittals:

- 1. Provide certificates of chain-of-custody (COC) signed by manufacturers certifying materials and products specified are made from certified wood obtained from forests certified by a Forest Stewardship Council accredited certification body. Provide invoices with the following information: each wood product identified on a line items basis; FSC products identified on a line item basis; all line items must have dollar values and; vendor COC certificate number must be shown for any item with FSC content. Include evidence mill is certified for chain-of-custody by an FSC-accredited certification body.
- 2. Meet notification to suppliers requirements of LEED for Homes Mid-rise 2011 Rating System Credit MR 2.1. This letter to all suppliers is a prerequisite for certification.

C. LEED Products Requirements:

- 1. Provide all tropical wood-based materials and products produced from wood obtained from forests certified in accordance with Forest Stewardship Council's Principles and Criteria.

2.6 LOW-EMITTING MATERIALS – ADHESIVES AND SEALANTS

- A. Credit MR2.2: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

Table 26: Standards for Low-Emissions Adhesives and Sealants (meet South Coast Air Quality Management District Rule #1168)

	Applicable standard (VOC content, g/L less water)
Architectural applications	
Indoor carpet adhesives	50
Carpet pad adhesives	50
Wood flooring adhesives	100
Rubber floor adhesives	60
Subfloor adhesives	50
VCT and asphalt adhesives	50
Drywall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Specialty applications	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Contact adhesive	80
Special-purpose contact adhesive	250
Structural wood member adhesive	140
Sheet-applied rubber lining operations	850
Top and trim adhesive	250
Substrate-specific applications	
Metal to metal	30
Plastic foams	50
Porous materials (except wood)	50
Wood	30
Fiberglass	80
Sealants	
Architectural	250
Nonmembrane roof	300
Roadway	250
Single-ply roof membrane	450
Other	420
Sealant primers	
Architectural nonporous	250
Architectural porous	775
Other	750

B. LEED Submittals:

1. Provide manufacturers' product data for construction adhesives and sealants, including printed statement of VOC content and MSDS Sheets.

C. LEED Products Requirements:

1. See list above.

2.7 LOW-EMITTING MATERIALS – PAINTS AND COATINGS

- A. Credit MRc2.2: For field applications that are inside the weatherproofing system, use paints and coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

Table 25: Standards for Environmentally Preferable Paints and Coatings

Component	Applicable standard (VOC content)	Reference
Architectural paints, coatings and primers applied to interior walls and ceilings	Flats: 50 g/L Nonflats: 150 g/L	Green Seal Standard GS-11, Paints, 1st Edition, May 20, 1993 Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997 South Coast Air Quality Management District Rule 1113, Architectural Coatings
Anticorrosive and antirust paints applied to interior ferrous metal substrates	250 g/L	
Clear wood finishes	Varnish: 350 g/L Lacquer: 550 g/L	
Floor coatings	100 g/L	
Sealers	Waterproofing: 250 g/L Sanding: 275 g/L All others: 200 g/L	
Shellacs	Clear: 730 g/L Pigmented: 550 g/L	
Stains	250 g/L	

B. LEED Submittals:

1. Provide manufacturers' product data for interior paints, paint primers and coatings, including printed statement of VOC content and MSDS Sheets (Green Seal certification to GS-11).

C. LEED Products Requirements:

1. See list above.

2.8 LOW-EMITTING MATERIALS – CARPET AND FLOORING MATERIALS

- A. Credit MRc2.2: Purchase carpet and carpet pad that meet the testing and product requirements of Carpet and Rug Institute’s Green Label (Plus) Indoor Air Quality Test Program. All carpet adhesives shall meet the VOC requirements of MRc2.2.

B. LEED Submittals:

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1. Provide manufacturers' product data for carpet systems, including printed statement of VOC content complying with Carpet and Rug Institute's Green Label (Plus) Indoor Air Quality Test Program.

C. LEED Products Requirements:

1. CARPET - Meet or exceed requirements of the Carpet and Rug Institute Green Label Plus Indoor Air Quality Test Program.
2. CARPET CUSHION - Meet or exceed requirements of the Carpet and Rug Institute Green Label Program.
3. CARPET ADHESIVE - Must meet requirement of LEED Credit MRc2.2.
4. RESILIENT FLOORING - Meet or exceed requirements of the "Floor Score" certification process.
5. FLOORING ADHESIVE - Must meet requirement of LEED Credit MRc2.2.

2.9 LOW-EMITTING MATERIALS – COMPOSITE WOOD AND AGRIFIBER

- A. Credit MRc2.2: Provide composite wood or agrifiber products or adhesives that contain no urea-formaldehyde resin.

B. LEED Submittals:

1. Provide manufacturers' product data for composite wood products used in the building contain no added urea-formaldehyde resins.

C. LEED Products Requirements:

1. Do not use composite wood and agrifiber products containing urea-formaldehyde resins. Laminating adhesive used in fabrication of on-site and shop applied composite wood and agrifiber assemblies must contain no added urea formaldehyde resins.

- D. In addition to the above, adhere to the following standards:

2.10 EQUIPMENT AND APPLIANCES

- A. Equipment and Appliances: ENERGY STAR compliant for appliances, office equipment, electronics, and commercial food service equipment.

PART 3 EXECUTION

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END OF SECTION 018113