

SECTION 01 81 13.15**SUSTAINABILITY CERTIFICATION REQUIREMENTS - LEED V4.1 BD+C: WAREHOUSES AND DISTRIBUTION CENTERS**

SPEC WRITER NOTE: Delete between //-----// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section describes requirements and procedures which are additive to and compatible with 01 81 13 SUSTAINABLE CONSTRUCTION REQUIREMENTS, and necessary to contribute to sustainability certification under the LEED v4.1 BD+C: Warehouses and Distribution Centers rating system (LEED v4.1 BD+C: WDC).

SPEC WRITER NOTE:

1. Ensure that the project specific checklist is provided as attachment to this section.

- B. A copy of the LEED v4.1 BD+C: WDC Project Checklist is attached at the end of this section.

1.2 RELATED WORK

- A. Section 01 81 13 SUSTAINABLE CONSTRUCTION REQUIREMENTS.

1.3 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-40-004 v3.0, "FSC Principles and Criteria for Forest Stewardship." Certificates must include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
- B. Regional Materials: Materials that have been extracted, harvested, or recovered, manufactured, and purchased, within 100 miles (160 km) of project site. If only a fraction of a product or material is extracted or harvested or recovered and manufactured locally, then only that percentage (by weight) must contribute to regional value. The purchase location, distribution and all points of manufacture are now included in the definition of regional materials.
- C. 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 value.

1. Postconsumer Recycled Content: Material generated by end users (households, or commercial, industrial, and institutional facilities) of a product, which can no longer be used for its intended purpose that is recycled into raw material for a new product.
 2. Preconsumer Recycled Content: 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.
- D. Biobased Material: Biobased materials other than wood must be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country. Exclude hide products, such as leather and other animal skin material. Products which meet the Sustainable Agriculture Network's Sustainable Agriculture Standard are valued at 100% of their cost multiplied by the biobased content of the product for the purposes of credit achievement calculation.
- E. Salvaged or Reused Materials: Construction materials recovered from existing buildings or construction sites and reused. Common salvaged materials include structural beams and post, flooring, doors, cabinetry, brick, and decorative items.
- F. Refurbished Materials: Products that could have been disposed of as solid waste. These products have completed their life cycle as consumer items and are then refurbished for reuse without substantial alteration of their form. Refurbishing includes renovating, repairing, restoring or generally improving appearance, performance, quality, functionality, or value of a product.
- G. Environmental Product Declaration (EPD): A standardized document communicating the environmental effects associated with a product or system's raw material extraction, energy use, chemical makeup, waste generation, and emissions to air, soil, and water.
1. Product-specific Type III EPD - Internally Reviewed: A product-specific internal EPD which conforms to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
 2. Industry Wide (generic) EPD: Products with third-party certification (Type III), including external verification, in which the

- manufacturer is explicitly recognized as a participant by the program operator. Must conform to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
3. Product-specific Type III EPD: Products with a third-party certification (Type III), including external verification and external critical review. Must conform to ISO 14025 and EN 15804 or ISO 21930.
- H. Health Product Declaration (HPD): A compliant HPD provides full disclosure of known hazards and demonstrates chemical inventory of the product to at least 0.1% (1000 ppm). Must comply with the Health Product Declaration Open Standard.
- I. Extended Producer Responsibility: An environmental policy approach in which a producer's responsibility for a product is extended to the postconsumer stage of the product's lifecycle. An extended producer responsibility policy shifts responsibility (physically and/or economically, fully or partially) upstream toward the producer and away from municipalities; and creates incentives for producers to take into account environmental considerations when designing their products.
- J. Low-Emitting Products: Building products, both solid and liquid, that are within the waterproofing membrane, that meet specific criteria for Low-Emitting.
1. Inherently Non-Emitting sources: Products that are inherently non-emitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay, brick, and unfinished or untreated solid wood) are considered fully compliant without any VOC emissions testing if they do not include integral organic-based surface coatings, binders, or sealants.
 2. Salvaged and Reused Materials: Products and materials that are more than one year old at the time of use. If finishes are applied to the product on-site, the finishes must meet the VOC emissions evaluation AND VOC content evaluation requirements.
 3. VOC Emissions Evaluation: Products must be tested according to California Department of Public Health (CDPH) Standard Method v1.2-2017, and comply with the VOC limits in Table 4-1 of the method. Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use. Products used in spaces other than school classrooms must be evaluated using the default private office scenario. The manufacturer's or third-party certification

- must state the exposure scenario used, the amount of wet-applied product applied in mass per surface area (if applicable), and the range of total VOCs. Third-party organizations that certify manufacturers' claims must be accredited under ISO Guide 17065.
4. VOC Content Evaluation: Products meet the VOC content limits outlined in one of the applicable standards and for projects in North America, methylene chloride and perchloroethylene may not be intentionally added. Statement of product compliance must be made by the manufacturer.
- K. Single Product: A "product" includes the physical components and services needed to serve the intended function. If there are similar products within a specification, each contributes as a separate product. For example, wallboard, gypsum, and binder are all required for a single installed assembly and cannot count individually. However, metal studs, wallboard, and concrete masonry units are examples of separate products. Different gloss levels of paints are considered separate products, but different colors of the same paint from the same manufacturer can only be counted once as a single product.
- L. Total Materials Cost: This includes costs for all permanently installed material on the project. This typically includes products from Divisions 3-10, 31 and 32. The materials cost excludes labor but include all taxes and expenses to deliver the material to the project site. The following items are excluded from the Total Materials Cost: All MEP items, special equipment (elevators, escalators, process equipment, and fire suppression systems), and temporary materials.
- M. WaterSense Label: WaterSense Labeled products meet EPA's specifications for water efficiency and performance, and are backed by independent, third-party certification. Flush-/Flow-fixtures that are required to have a WaterSense Label include all newly installed water-closets, urinals, private lavatory faucets, and showerheads

1.4 SUBMITTALS

- A. Additional Sustainability Action Plan requirements.

SPEC WRITER NOTE:

1. If the Erosion and Sedimentation Control Plan is provided by the design team omit // //
1. //Erosion and Sedimentation Control Plan which conforms to erosion and sedimentation requirements of the 2017 EPA Construction General Permit or local standards and codes, whichever is more stringent.

The plan must describe measures implemented to accomplish the following objectives:

- a. To prevent loss of soil during construction by stormwater runoff and wind erosion, including protecting topsoil by stockpiling for reuse.
 - b. To prevent sedimentation of storm sewers or receiving streams.
 - c. To prevent pollution of air with dust and particulate matter.//
2. Additional inclusions in Sustainable Construction Progress Reports:
- a. Inspection report or date-stamped photos confirming compliance with the Erosion and Sedimentation Control Plan;
 - b. Provide updated information submittal using LEED Online forms and USGBC-provided spreadsheets for the following LEED Credits sought for Project.

SPEC WRITER NOTE:

1. Delete between //-----// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
3. //Receipts for salvaged and refurbished materials used for Project, indicating sources and costs for salvaged and refurbished materials.//
4. //Additional Product Submittals to be provided with manufacturer documentation:
- a. USGBC BPDO Calculator for Environmental Product Declarations, Sourcing of Raw Materials, and Material Ingredients.
 - b. Life-cycle assessment conforming to ISO 14044 with cradle to gate scope.
 - c. Environmental Product Declaration.
 - d. Corporate Sustainability Report.
 - e. Evidence of manufacturer participation in an extended producer responsibility program.
 - 1) Verification from manufacturer that specified products are eligible for program.
 - f. Health Product Declaration.
 - g. Regional Materials: Indicate location and distance from project site of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and fraction by weight that is

- considered regional. Show the purchase location, distribution, and all points of manufacture.//
- h. //Biobased Materials: Indicate percent of biobased content. Include statement indicating cost of each relevant product and fraction by weight that is considered biobased material.//
 - i. //Provide Chain-of-Custody (CoC) certificates for products containing certified wood. An invoice must be included from the CoC certificate holder that lists the vendor's CoC certificate code and an itemized list of the FSC-certified products and specific FSC claims. The invoice must show the entity being invoiced and indicate the delivery is intended for the LEED project.//
 - j. //USGBC Construction and Demolition Waste Calculator tracking construction recycling for the project. Provide documentation for all activities.//
 - k. //IAQ Management plan, including checklists, protection measures description, photographs of IAQ measures and records for filtration media.//
 - l. //USGBC Low-Emitting Materials Calculator, product information showing MSDS, third party certifications, and testing reports for low emitting materials.//
 - 1) For paints and coatings applied on site within the weatherproofing membrane provide documentation of compliance with low-emitting materials requirements:
 - a) The manufacturer or third-party certification must state the exposure scenario used to determine compliance. Claims of compliance for wet-applied products must state the amount applied in mass per surface area.
 - b) For at least 75%, by volume or surface area, provide manufacturers' claims that the product has been tested in accordance with the California Department of Public Health (CDPH) Standard Method v1.2-2017, and complies with the VOC limits in Table 4-1 of the method. State range of total VOCs after 14 days (336 hours), measured as specified in the CDPH Standard Manual v1.1: 0.5 mg/cubic meter or less; between 0.5 and 5.0 mg/cubic meter; or 5.0 mg/cubic meter or more.

- c) For 100% of products, provide manufacturer or third-party claims that the product complies with the VOC content limits outlined in the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.
 - d) VOC content for each product.
 - e) Exclude foamed-in place and sprayed insulation.
- 2) For adhesives and sealants applied on site within the weatherproofing membrane provide documentation of compliance with low-emitting material requirements:
- a) The manufacturer or third-party certification must state the exposure scenario used to determine compliance. Claims of compliance for wet-applied products must state the amount applied in mass per surface area.
 - b) For at least 75%, by volume or surface area, provide manufacturers' claims that the product has been tested in accordance with the California Department of Public Health (CDPH) Standard Method v1.2-2017, and complies with the VOC limits in Table 4-1 of the method. State the range of total VOCs after 14 days (336 hours), measured as specified in the CDPH Standard Manual v1.1: 0.5 mg/cubic meter or less; between 0.5 and 5.0 mg/cubic meter; or 5.0 mg/cubic meter or more.
 - c) For 100% of products, provide manufacturer or third-party claims that the product complies with the VOC content limits outlined in the South Coast Air Quality Management District (SCAQMD) Rule 1168, effective October 6, 2017.
 - d) VOC content for each product.
- 3) For flooring installed on site within the weatherproofing membrane provide documentation of compliance with low-emitting material requirements:
- a) For at least 90%, by cost or surface area, provide manufacturers' claims or third-party certification that the product has been tested in accordance with the California Department of Public Health (CDPH) Standard Method v1.2-2017, stating the exposure scenario used to determine compliance, and complies with the VOC limits in Table 4-1 of the method. Alternatively, provide documentation that

- confirms the product is either an inherently non-emitting source or is a salvaged or reused material, if applicable.
- b) This category includes all types of hard and soft surface flooring (carpet, ceramic, vinyl, rubber, engineered, solid wood, laminates), raised flooring, wall base, underlayments, and other floor coverings.
 - c) Exclude subflooring (include subflooring in the composite wood category, if applicable). Exclude wet-applied products applied on the floor (include in paints and coatings category).
- 4) Composite Wood Products: For at least 75%, by cost or surface area, provide manufacturer documentation which confirms low formaldehyde emissions that meet the California Air Resources Board Composite Wood Products Airborne Toxic Control Measures (ATCM) for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins (NAUF).
- a) This category includes all particleboard, medium density fiberboard (both medium density and thin), hardwood plywood with veneer, composite or combination core, and wood structural panels or structural woos products.
 - b) Exclude products covered in the flooring, ceiling, wall panels, or furniture material categories.
- 5) Ceilings:
- a) For at least 90%, by cost or surface area, provide manufacturers' claims or third-party certification of compliance with the California Department of Public Health (CDPH) Standard Method v1.2-2017 which states the exposure scenario used to determine compliance.
 - b) Category includes all ceiling panels, ceiling tile, surface ceiling structures such as gypsum or plaster, suspended systems (including canopies and clouds), and glazed skylights.
- 6) Wall Panels: For at least 75%, by cost or surface area, provide manufacturers' claims or third-party certification of compliance with the California Department of Public Health (CDPH) Standard Method v1.2-2017 which states the exposure scenario used to determine compliance.

- a) This category includes all finish wall treatments (wall coverings, wall paneling, wall tile), surface wall structures such as gypsum or plaster, cubicle/curtain/partition walls, trim, interior and exterior doors, wall frames, interior and exterior windows, and window treatments.
 - b) Exclude cabinetry and vertical structural elements.
- 7) Insulation: For at least 75%, by cost or surface area, provide manufacturers' claims or third-party certification of compliance with the California Department of Public Health (CDPH) Standard Method v1.2-2017 which states the exposure scenario used to determine compliance.
- a) This category includes all thermal and acoustic boards, batts, rolls, sound attention fire blankets, foamed-in place, loose-fill, blown and sprayed insulation.
 - b) Exclude insulation for HVAC ducts and plumbing piping from the credit. Insulation for HVAC ducts may be included at the project team's discretion.
- 8) Furniture: For at least 75%, by cost, provide manufacturers' claims or third-party certification of compliance with the ANSI/BIFMA Standard Method M7.1-2011. Comply with ANSI/BIFMA e3-2014e or e3-2019e Furniture Sustainability Standard, Sections 7.6.1, or 7.6.2, or 7.6.2 AND 7.6.3. Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use.
- a) This category includes all seating, desks and tables, filling/storage, free-standing cabinetry, workspaces, and furnishing items purchased for the project.
 - b) Exclude office accessories from the credit.

SPEC WRITER NOTE:

- 1. Any of the optional construction credits that the project is not attempting, the design team may omit //...//.

B. Additional Closeout Submittals

- 1. LEED Online: Final completed LEED Online forms and associated required documentation uploaded to LEED Online for the following prerequisites and credits:
 - a. Construction activity pollution prevention.
 - b. Construction and demolition waste management planning.

- c. //Building product disclosure and optimization - environmental product declaration.//
- d. //Building product disclosure and optimization - sourcing of raw materials.//
- e. //Building product disclosure and optimization - material ingredients.//
- f. //Construction and demolition waste management.//
- g. //Low-emitting materials.//
- h. //Construction indoor air quality management plan.//
- i. //Indoor air quality assessment.//

SPEC WRITER NOTE:

- 1. Omit the following if indoor air testing is not planned for the project //...//.
- 2. //Report from testing and inspecting agency indicating results of indoor-air-quality testing and documentation showing compliance with indoor-air-quality testing procedures and requirements.//

1.5 APPLICABLE PUBLICATIONS

- A. LEED v4.1 BD+C: Warehouses and Distribution Centers Rating System.
- B. LEED Reference Guide for Building Design and Construction, July 2022, including all addenda current at date of project registration.
- C. Forest Stewardship Council Principles and Criteria for Forest Stewardship (FSC STD-40-004 v3.0).
- D. Sustainable Agriculture Network's Sustainable Agriculture Standard.
- E. 2017 EPA Construction General Permit.
- F. California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.2, Emission Testing method for California Specification 01350 (CDPH Standard Method V1.2-2017).
- G. California Air Resources Board Composite Wood Products Airborne Toxic Control Measures (ATCM).
- H. California Air Resources Board (CARB) 2007 Suggested Control Measure (SCM) for Architectural Coatings.
- I. ANSI/BIFMA Standard Method M7.1-2011.
- J. ANSI/BIFMA e3-2014e or e3-2019 Furniture Sustainability Standard, Sections 7.6.1, 7.6.2, and 7.6.3.
- K. South Coast Air Quality Management District (SCAQMD) Rule 1168, October 6, 2017.

- L. South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.
- M. Global Reporting Initiative (GRI) Sustainability Report.
- N. Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises.
- O. U.N. Global Compact: Communication of Progress.
- P. Chemical Abstract Service Registration Number (CASRN).
- Q. Health Product Declaration Open Standard.
- R. Cradle to Cradle Certified.
- S. GreenScreen v1.2 Benchmark.
- T. GreenScreen List Translator.
- U. REACH Optimization.
- V. EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air".

PART 2 - PRODUCTS

PART 2 -

2.1 PERFORMANCE CRITERIA

SPEC WRITER NOTE:

1. The following are options for the LEED v4.1 credit 'Environmental Product Declarations.' Coordinate with project team to determine which option is being pursued. When this credit is not being pursued omit //...//.
- A. //Environmental Product Declarations: Achieve one or more of the options below, for a maximum of 2 points.
1. Option 1. Environmental Product Declaration (EPD) (1 point): At least 10 permanently installed products from at least 5 different manufacturers must have one of the following:
 - a. Life-cycle Assessment and environmental product declarations:
 - 1) Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope are valued as one whole product for the purpose of credit achievement calculation.
 - 2) Products with an internally critically reviewed LCA in accordance with ISO 14071, which conform to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope are valued at one whole product for the purpose of credit achievement calculation.

- 3) Industry-wide (generic) EPD - Products with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as a participant by the program operator and conform with ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope are valued as one whole product for the purposes of credit achievement calculation.
- b. Environmental Product Declarations:
 - 1) Product-specific Type III EPD - Products with third-party certification (Type III), including external verification and external critical review, and conform to ISO 14025, and EN 15804 or ISO 21930 and have at least cradle to gate scope are valued as 1.5 products for the purposes of credit achievement calculation.
2. Option 2. Embodied Carbon/LCA Optimization (1 point): Use products that have a compliant embodied carbon optimization report or action plan separate from the LCA or EPD. Use at least 5 permanently installed products sourced from at least three different manufacturers:
 - a. Embodied Carbon/LCA Action Plan:
 - 1) Product Specific LCA or product-specific Type III EPD;
 - 2) Prepared by the manufacturer and signed by company executive;
 - 3) Valued at half of a product.
 - b. Reductions in Embodied Carbon: Less than 10% reduction in GWP relative to baseline:
 - 1) Baseline: Product-specific LCA, Product-specific Type III EPD, or Industry-wide Type III EPD;
 - 2) Optimized: Product-specific LCA or Product-specific Type III EPD;
 - 3) Comparative Analysis is verified by an independent party;
 - 4) Valued at one whole product.
 - c. Reductions in Embodied Carbon: 10%+ reduction in GWP relative to baseline:
 - 1) Baseline: Product-specific LCA, Product-specific Type III EPD, or Industry-wide Type III EPD;
 - 2) Optimized: Product-specific LCA or Product-specific Type III EPD;
 - 3) Comparative Analysis is verified by an independent party;

- 4) Valued at 1.5 products.
- d. Reductions in Embodied Carbon: 20%+ reduction in GWP and 5%+ reduction in two additional impact categories, relative to baseline:
- 1) Baseline: Product-specific LCA, Product-specific Type III EPD, or Industry-wide Type III EPD;
 - 2) Optimized: Product-specific LCA or Product-specific Type III EPD;
 - 3) Comparative Analysis is verified by an independent party;
 - 4) Valued at 1.5 products;
 - 5) Impact Categories:
 - a) Global warming potential (greenhouse gases), in CO₂e.
 - b) Depletion of stratospheric ozone layer, in kg CFC-11e.
 - c) Acidification of land and water sources, in moles H⁺ or kg SO₂e.
 - d) Eutrophication, in kg nitrogen or kg phosphate equivalent.
 - e) Formation of tropospheric ozone, in kg NO_x, kg O₃ eq, or kg ethene.
 - f) Depletion of nonrenewable energy resources, in MJ using CML / depletion of fossil fuels in TRACI.
- e. For Credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of project site are valued at twice their base contributing number of products, up to a maximum of 2 products.//

SPEC WRITER NOTE:

1. The following are options for the LEED v4.1 credit 'Sourcing of Raw Materials.' Coordinate with project team to determine which option is being pursued and edit accordingly. When this credit is not being pursued omit // //.
- B. //Sourcing of Raw Materials (1-2 points): Based on the total value of permanently installed building products in the project, use products sourced from at least three different manufacturers that meet at least one of the responsible sourcing and extraction criteria below for at least 15%, by cost (1 Point) - OR - Use products sourced from at least five different manufacturers that meet at least one of the responsible sourcing and extraction criteria below for at least 30%, by cost (2 Points).

1. Extended Producer Responsibility. Products purchased from a manufacturer (producer) that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility. Products meeting extended producer responsibility criteria are valued at 50% of their cost for the purposes of credit achievement calculation.
2. Biobased Materials. Biobased products and materials other than wood must be tested using ASTM Test Method D6866 or equivalent method ISO 16620-2, or be certified to the USDA BioPreferred Voluntary Labeling Initiative that includes verification via ASTM 6866 testing. Exclude hide products, such as leather and other animal skin material.
 - a. Biobased products that meet the criteria above are valued at 50% of the cost multiplied by the biobased content of the product for the purposed of credit achievement calculation.
 - b. Biobased products that meet the Sustainable Agriculture Network's Sustainable Agriculture Standard in addition to the testing requirements above are valued at 100% of the cost multiplied by the biobased content of the product for the purposes of credit achievement calculation.
3. Wood Products. Wood products must be certified by the Forest Stewardship Council or USGBC-approved equivalent. Products meeting wood products criteria are valued at 100% of their cost for the purposes of credit achievement calculation.
4. Materials Reuse. Reuse includes salvaged, refurbished, or reused products. Products meeting materials reuse criteria are valued at 200% of their cost for the purposes of credit achievement calculation.
5. Recycled Content. Recycled content is the sum of postconsumer recycled content plus one-half the pre-consumer recycled content, based on weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value. Products meeting recycled content criteria are valued at 100 % of their cost for the purposes of credit achievement calculation.
6. For credit achievement calculation, products sourced (extracted, manufactured, and purchased) within 100 miles (160 km) of project site are valued at twice their base contributing cost, up to 200% of cost.//

SPEC WRITER NOTE:

1. The following are options for the LEED v4.1 credit 'Material Ingredients.' Coordinate with project team to determine which option(s) is being pursued and edit accordingly. When this credit is not being pursued omit //...//.

C. //Material Ingredients: Achieve one or more of the options below, for a maximum of 2 points.

1. Option 1. Material Ingredient Reporting (1 point): Use at least 10 permanently installed products from at least 5 different manufacturers that use any of the following programs to demonstrate chemical inventory of the product to at least 0.1% (1000 ppm). Any compliant reports from below with third-party verification that includes the verification of content inventory are worth 1.5 products for credit achievement calculations.
 - a. ANSI/BIFMA e3 Furniture Sustainability Standard. The documentation from the assessor or scorecard from BIFMA must demonstrate the product earned at least 3 points under 7.5.1.3 Advanced Level in e3-2014 or 3 points under 7.4.1.3 Advanced Level in e3-2012.
 - b. Cradle to Cradle. The end use product has Material Health Certificate or is Cradle to Cradle Certified under standard version 3 or later with a Material Health achievement level at the Bronze level or higher.
 - c. Declare. The Declare product label must meet the following requirements:
 - 1) Declare labels designed as Red List Free, LBC Red List Free, or Declared.
 - 2) Declare labels designated as LBC Red List Approved or LBC Compliant that demonstrate content inventory to 0.1% (1000ppm).
 - d. Facts - NSF/ANSI 336: Sustainability Assessment for Commercial Furnishings Fabric at any certification level
 - e. Global Green TAG PHD labels issued after January 1, 2020.
 - f. Health Product Declaration. The end use product has a published, complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard.

- g. Living Product Challenge. The included Declare product label must demonstrate content inventory to 0.1% (1000ppm).
 - h. Manufacturer Inventory. The manufacturer has published complete content inventory for the product following these guidelines:
 - 1) A publicly available inventory of ingredients identified by name and Chemical Abstract Service Registration Number (CASRN).
 - 2) Materials defined as trade secret or intellectual property may withhold the name and/or CASRN/EC Number but must disclose ingredient/chemical role, amount and hazard score/class using either:
 - a) Greenscreen List Translator (LT) score and/or Full GreenScreen Benchmark (BM)
 - b) The Globally Harmonized System of Classification and Labeling of Chemicals rev.6 (2015) (GHS)
 - 1) The hazard screen must be applied to each trade secret ingredient and the inventory lists the hazard category for each of the health hazards included in Part 3 of GHS (e.g. "GHS Category 2 Carcinogen").
 - i. Product Lens Certification.
2. Option 2. Material Ingredient Optimization (1 point): Use products that have a compliant material ingredient optimization report or action plan. Use at least 5 permanently installed products sourced from at least three different manufacturers. Products are valued as noted below:
- a. Material Ingredient Screening and Optimization Action Plan (value at $\frac{1}{2}$ product).
 - 1) Manufacturer self-reported.
 - b. Advanced Inventory & Assessment (value at 1 product):
 - 1) Inventory to 0.01% by weight (100 ppm) and at least 75% by weight of product assessed using GreenScreen Translator (www.greenscreenchemicals.org):
 - a) Cradle-to-Cradle (bronze level);
 - b) Declare (third-party verified "Red List Free");
 - c) Health Product Declaration (HPD):
 - 1) Must meet optimization and verification criteria,
 - 2) Must be third-party verified.

- d) Living Product Challenge certified products that include Red List Free or LBC Red List Free Declare label.
- e) Manufacturer Inventory:
 - 1) Must meet all optimization and verification criteria.
- c. Material Ingredient Optimization (value at 1.5 products):
 - 1) Inventory to 0.01% by weight (100 ppm) and at least 95% by weight of product assessed using GreenScreen Translator (www.greenscreenchemicals.org):
 - a) Cradle-to-Cradle (Silver or higher);
 - b) Health Product Declaration (HPD):
 - 1) Must meet optimization and verification criteria;
 - 2) Must be third-party verified;
 - 3) GreenScreen benchmark (No BM-1 hazards).
 - c) Living Product Challenge certified products that achieve Imperative 09: Transparent Material Health.
 - d) Manufacturer Inventory:
 - 1) Must meet all optimization and verification criteria.//

SPEC WRITER NOTE:

- 1. The following are options for the LEED v4.1 credit 'Low-Emitting Materials.' Coordinate with project team to determine which option(s) is being pursued and edit accordingly. When this credit is not being pursued omit //...//.

- D. // Low Pollutant-Emitting Materials (1-3 points): Use materials on the building interior (everything within the waterproofing membrane) that meet the low-emitting criteria below. Meet the requirements for two categories below for 1 point, three categories for 2 points, and four categories for 3 points. An exemplary performance point can be earned by achieving 5 categories or by reaching a 90% threshold in at least three categories.
 - 1. Paints and Coatings: For field applications that are inside the weatherproofing system, 75% (by volume or area) of paints and coatings meet the emissions evaluation and 100% meet the VOC content evaluation. To meet the 100% requirement for VOC content evaluation, a VOC budget may be used. See part 2.1, section F.9 Low-Emitting Criteria for further information regarding the evaluations.
 - a. Anti-Corrosive/Antirust Paints: 100 g/L.
 - b. Clear Wood Finish, Lacquer: 275 g/L.

- c. Clear Wood Finish, Sanding Sealer: 275 g/L.
 - d. Clear Wood Finish, Varnish: 275 g/L.
 - e. Floor Coating: 50 g/L.
 - f. Interior Flat Paint, Coating or Primer: 50 g/L.
 - g. Interior Non-Flat Paint, Coating or Primer: 50 g/L.
 - h. Shellac, Clear: 730 g/L.
 - i. Shellac, Pigmented: 550 g/L.
 - j. Stain: 250 g/L.
 - k. Concrete Curing Compounds: 100 g/L.
 - l. Faux Finishing Coatings (Decorative, Glazes, Japan): 350 g/L.
 - m. Magnesite Cement Coatings: 450 g/L.
 - n. Waterproofing Sealers: 100 g/L.
 - o. Wood Preservatives: 350 g/L.
 - p. Low-Solids Coatings: 120 g/L.
 - q. Dry-Fog Coatings: 50 g/L.
 - r. Primers, Sealers, and Undercoaters: 100 g/L.
 - s. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
 - t. Pretreatment Wash Primers: 420 g/L.
2. Adhesives and Sealants: For field applications that are inside the weatherproofing system, 75% of adhesives and sealants meet the emissions evaluation and 100% meet the VOC content evaluations. The adhesives and sealants product category includes all interior adhesives and sealants wet-applied on site. See part 2.1, section F.9 Low-Emitting Criteria for further information regarding the evaluations.
- a) Wood Glues: 30 g/L.
 - b) Metal-to-Metal Adhesives: 30 g/L.
 - c) Adhesives for Porous Materials (Except Wood): 50 g/L.
 - d) Subfloor Adhesives: 50 g/L.
 - e) Plastic Foam Adhesives: 50 g/L.
 - f) Carpet Adhesives: 50 g/L.
 - g) Cove Base Adhesives: 50 g/L.
 - h) Gypsum Board and Panel Adhesives: 50 g/L.
 - i) Rubber Floor Adhesives: 60 g/L.
 - j) Ceramic Tile Adhesives: 65 g/L.
 - k) Multipurpose Construction Adhesives: 70 g/L.
 - l) Fiberglass Adhesives: 80 g/L.
 - m) Contact Adhesives: 80 g/L.

- n) Structural Glazing Adhesives: 100 g/L.
 - o) Wood Flooring Adhesives: 100 g/L.
 - p) Single-Ply Roof Membrane Adhesives: 250 g/L.
 - q) Top and Trim Adhesives: 250 g/L.
 - r) Plastic Cement Welding Compounds: 250 g/L.
 - s) CPVC Welding Compounds: 490 g/L.
 - t) PVC Welding Compounds: 510 g/L.
 - u) Adhesive Primer for Plastic: 550 g/L.
 - v) Sheet-Applied Rubber Lining Adhesives: 850 g/L.
 - w) Other Adhesives: 250 g/L.
 - x) Architectural Sealants: 250 g/L.
3. Flooring: A minimum of 90% of flooring products (by cost or surface area) meet the emissions evaluation or inherently non-emitting sources criteria or salvaged and reused materials criteria. See part 2.1, section F.9 Low-Emitting Criteria for further information regarding the evaluations and criteria. Subflooring is excluded. All flooring adhesives must comply with Adhesives and Sealants low-emitting materials criteria.
4. Wall Panels: A minimum of 75% of wall panel products meet the emissions evaluation or inherently non-emitting sources criteria or salvaged and reused materials criteria. See part 2.1, section F.9 Low-Emitting Criteria for further information regarding the evaluations and criteria. Wall panel products include wall paneling, wall coverings, wall tile, surface wall structures, cubicle/curtain/partition walls, trim, doors, frames, windows, and window treatments. Removable/interchangeable fabric panels, built-in cabinetry, and vertical structural elements are excluded.
5. Ceilings: A minimum of 90% of ceilings meet the emissions evaluation or inherently non-emitting sources criteria or salvaged and reused materials criteria. See part 2.1, section F.9 Low-Emitting Criteria for further information regarding the evaluations and criteria. Ceiling products include ceiling panels, ceiling tile, surface ceiling structures, suspended systems, and glazed skylights. Overhead structural elements are excluded.
6. Composite Wood: A minimum of 75% of all composite wood meet the formaldehyde emissions evaluation meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins (NAF) or

salvaged and reused materials criteria. Composite wood materials include particleboard, MDF, hardwood veneer plywood, and structural composite wood.

7. Insulation: A minimum of 75% of insulation products meet the emissions evaluation. See part 2.1, section F.9 Low-Emitting Criteria for further information regarding the evaluation. Insulation products include all thermal and acoustic boards, batts, rolls, blankets, sound attenuation fire blankets, and foamed-in-place, loose-fill, blown, and sprayed insulation. HVAC duct and plumbing piping insulation are excluded.
8. Furniture: At least 75% of all furniture in the project scope of work, by cost, meets the furniture emissions evaluation, OR inherently non-emitting sources criteria, OR salvaged and reused materials criteria. See part 2.1, section F.9 Low-Emitting Criteria for further information regarding the evaluations and criteria.
 - a. The furniture product category includes all seating, desks, and tables, filing/storage, free-standing cabinetry, workspaces, and furnishing items purchased for the project.
9. Low-Emitting Criteria:
 - a. Inherently Non-Emitting Sources:
 - 1) Product is an inherently non-emitting source of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood) and has no binders, surface coatings, or sealants that include organic chemicals.
 - b. Salvaged and Reused Materials :
 - 1) Product is more than one year old at the time of use. If finishes are applied to the product on-site, the finishes must meet the VOC emissions evaluation AND VOC content evaluation requirements.
 - c. VOC Emissions Evaluation:
 - 1) Product has been tested according to California Department of Public Health (CDPH) Standard Method v1.2-2017 and complies with the VOC limits of the method.
 - d. VOC Content Evaluation:
 - 1) Product meets the VOC content limits outlined in one of the applicable standards and for projects in North America,

methylene chloride and perchloroethylene may not be intentionally added.

- 2) Statement of product compliance must be made by the manufacturer or a USGBC-approved third-party.
 - 3) Any testing must follow the test method specified in the applicable regulation. If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed.
 - a) Paints and Coatings:
 - 1) California Air Resource Board (CARB) 2007 Suggested Control Measure (SCM) for Architectural Coatings;
 - 2) South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.
 - b) Adhesives and sealants:
 - 1) SCAQMD Rule 1168, October 6, 2017.
- e. Formaldehyde Emissions evaluation - Product meets one of the following:
- 1) Certified as ultra-low-emitting formaldehyde (ULEF) product under EPA Toxic Substances Control Act, Formaldehyde Emission Standards for Composite Wood Products or California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM).
 - 2) Certified as no added formaldehyde (NAF) product by EPA or CARB ATCM.
 - 3) Wood structural panel manufactured according to PS 1-09 or PS 2-10 (or one of the standards considered by CARB to be equivalent to PS 1 or PS 2) and labeled bond classification Exposure-1 or Exterior.
 - 4) Structural wood product manufactured according to ASTM D 5456 (for structural composite lumber), ANSI A190.1 (for glued laminated timber), ASTM D 5055 (for I-joists), ANSI PRG 320 (for cross-laminated), or PS 20-15 (for finger-jointed lumber).
- f. Furniture emissions evaluation:
- 1) Product has been tested in accordance with ANSI/BIFMA Standard Method M7.1-2011 (R2016) and complies with ANSI/BIFMA Furniture Sustainability Standard, Sections 7.6.1 (for half credit, by cost) OR 7.6.2 (for full credit, by cost), OR 7.6.2

AND 7.6.3 for one and a quarter credit, by cost. Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use.

- 2) Statements of product compliance must include the exposure scenario(s). Organizations that certify manufacturers' claims must be accredited under ISO/IEC 17065.//

PART 3 - EXECUTION

PART 3 -

3.1 CONSTRUCTION INDOOR AIR QUALITY TESTING REQUIREMENTS

SPEC WRITER NOTE:

1. For the LEED credit Indoor Air Quality Assessment, Option 1 Flush-Out is satisfied by the requirements included in 01 81 13. Retain below only when air testing is also to be included in the project. If not utilizing Option 2 Air Quality Testing, omit //...//

A. //Construction Indoor Air Quality Management additional requirement:

1. Perform air quality testing using Option 2: Path 1 (1 point) and/or Option 2: Path 2 (1 point).

- a. Option 2: Path 1: Particulate Matter and Inorganic Gases: Test for particulate matter (PM) and inorganic gases listed below - using an allowed test method and demonstrate the contaminants do not exceed the concentration limits listed.

1) Carbon Monoxide (CO):

- a) Concentration Limit ($\mu\text{g}/\text{m}^3$): 9 ppm; no more than 2 ppm above outdoor levels.
- b) Allowed test methods:
 - 1) ISO 4224; EPA Compendium Method IP-3;
 - 2) Direct calibrated electrochemical instrument with accuracy of (+/- 2% ppm <50 ppm min. accuracy).

2) PM 10:

- a) Concentration Limit ($\mu\text{g}/\text{m}^3$): ISO 14644-1:2015, cleanroom class of 8 or lower; 50 $\mu\text{g}/\text{m}^3$.
- b) Allowed test methods:
 - 1) Particulate monitoring device with accuracy greater of 5 micrograms/m³ or 20% of reading and resolution (5 min average data) +/- 5 $\mu\text{g}/\text{m}^3$.

3) PM 2.5:

- a) Concentration Limit ($\mu\text{g}/\text{m}^3$): 12 $\mu\text{g}/\text{m}^3$ or 35 $\mu\text{g}/\text{m}^3$.
- b) Allowed test methods:

- 1) Particulate monitoring device with accuracy greater of 5 micrograms/m³ or 20% of reading and resolution (5 min average data) +/- 5 µg/m³.
- 4) Ozone:
 - a) Concentration Limit (µg/m³): 0.07 ppm.
 - b) Allowed test methods:
 - 1) Monitoring device with accuracy greater of 5 ppb or 20% of reading and resolution (5 min average data) +/- 5 ppb;
 - 2) ISO 13965; ASTM D5149-02; EPA designated methods for Ozone.
- b. Option 2: Path 2: Volatile Organic Compounds: Perform a screening test for Total Volatile Organic Compounds (TVOC). Use ISO 1600-6, EPA TO-17, or EPA TO-15 to collect and analyze the air sample. Calculate the TVOC value per EN 16516:2017, CDPH Standard Method v1.2 2017 section 3.9.4, or alternative calculation method as long as full method description is included in test report. If the TVOC levels exceed 500 µg/m³, investigate for potential issues by comparing the individual VOC levels from the GC/MS results to associated cognizant authority health-based limits. Correct any identified issues and re-test if necessary. Test for the individual VOCs listed below using the allowed test methods to demonstrate that the contaminants do not exceed the concentration limits listed.
 - 1) Formaldehyde 50-00-0:
 - a) Concentration limit: 20 µg/m³ (16 ppb).
 - b) Allowed test methods: ISO 1600-3, 4; EPA TO-11a; EPA comp. IP-6A; ASTM D5197-16.
 - 2) Acetaldehyde 75-07-0:
 - a) Concentration limit: 140 µg/m³.
 - b) Allowed test methods: ISO 1600-3, 4; EPA TO-11a; EPA comp. IP-6A; ASTM D5197-16.
 - 3) Benzene 71-43-2:
 - a) Concentration limit: 3 µg/m³.
 - b) Allowed test methods: ISO 1600-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15.
 - 4) Hexane (n-) 110-54-3:
 - a) Concentration limit: 7000 µg/m³.

- b) Allowed test methods: ISO 1600-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15.
- 5) Naphthalene 91-20-3:
 - a) Concentration limit: 9 $\mu\text{g}/\text{m}^3$.
 - b) Allowed test methods: ISO 1600-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15.
- 6) Phenol 108-95-2:
 - a) Concentration limit: 200 $\mu\text{g}/\text{m}^3$.
 - b) Allowed test methods: ISO 1600-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15.
- 7) Styrene 100-42-5:
 - a) Concentration limit: 900 $\mu\text{g}/\text{m}^3$.
 - b) Allowed test methods: ISO 1600-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15.
- 8) Tetrachloroethylene 127-18-4:
 - a) Concentration limit: 35 $\mu\text{g}/\text{m}^3$.
 - b) Allowed test methods: ISO 1600-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15.
- 9) Toluene 108-88-3:
 - a) Concentration limit: 300 $\mu\text{g}/\text{m}^3$.
 - b) Allowed test methods: ISO 1600-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15.
- 10) Vinyl Acetate 108-05-4:
 - a) Concentration limit: 200 $\mu\text{g}/\text{m}^3$.
 - b) Allowed test methods: ISO 1600-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15.
- 11) Dichlorobenzene (1,4-) 106-46-7:
 - a) Concentration limit: 800 $\mu\text{g}/\text{m}^3$.
 - b) Allowed test methods: ISO 1600-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15.
- 12) Xylenes-total 108-38-3, 95-47-6, and 106-42-3:
 - a) Concentration limit: 700 $\mu\text{g}/\text{m}^3$.
 - b) Allowed test methods: ISO 1600-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15.
- c. Exemplary performance is available for projects that test for the additional target volatile organic compounds specified in CDPH Standard Method v1.2 2017, table 4-1 and do not exceed the full

CREL levels for these compounds adopted by Cal/EPA OEHHA in effect in June 2016.//

3.2 ATTACHMENTS

A. LEED v4.1 BD+C: WDC Project Checklist

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