

SECTION 018114

SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general requirements and procedures for compliance with USGBC LEED prerequisites and credits needed for Project to obtain LEED certification based on LEED **[Level]** certification based on **[LEED Version]**. 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.
 - 1. Additional LEED prerequisites and credits needed to obtain the indicated LEED certification depend on Design Professional's design and other aspects of Project that are not part of the Work of the Contract.
 - 2. A copy of the LEED Project checklist is attached at the end of this Section for information only.
- B. Related Sections:
 - 1. Divisions 01 through 33 Sections for requirements specific to the work of each of these Sections.

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-01-001, "FSC Principles and Criteria for Forest Stewardship". Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
- B. LEED: Leadership in Energy & Environmental Design.
- C. Rapidly Renewable Materials: Materials made from plants that are typically harvested within a 10-year or shorter cycle. Rapidly renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.
- D. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles 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.
- E. Regionally-Manufactured Materials: Materials that are manufactured within a radius of 500 miles from Project site. Manufacturing refers to the final assembly of components into the building product that is installed at Project site.
- F. Regionally-Extracted and Manufactured Materials: Regionally-manufactured materials made from raw materials that are extracted, harvested, or recovered within a radius of 500 miles from Project site.
- G. 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.
- H. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).
 - 1. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.
 - 2. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.

1.4 SUBMITTALS

- A. General: Submit sustainable submittals required by other Specification Sections.

- B. Sustainable submittals are to be submitted with other submittals required by each section. 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 sustainable requirements.
- C. Project Materials Cost Data: Provide statement indicating total cost for building materials used for Project, excluding mechanical, electrical, and plumbing components, and specialty items such as elevators and equipment. Include statement indicating total cost for wood-based materials used for Project.
- D. Sustainable Action Plans: Provide preliminary submittals within fourteen (14) days of date established for commencement of the Work indicating how the following requirements will be met:
 - 1. Waste management plan complying with Division 01 Section 017419, "Construction Waste Management and Disposal".
 - 2. Recycled Content: List of proposed materials with recycled content. Indicate cost, post-consumer recycled content, and pre-consumer recycled content for each product having recycled content.
 - 3. Regional Materials: List of proposed regional materials. Identify each regional material, including its source, cost, and the fraction by weight that is considered regional.
 - 4. Certified Wood: List of proposed certified wood products. Indicate each product containing certified wood, including its source and cost of certified wood products.
 - 5. Indoor Air Quality: Construction indoor-air-quality management plan.
- E. Sustainable Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with action plans for the following:
 - 1. Waste reduction progress reports complying with Division 01 Section 017419, "Construction Waste Management and Disposal".
 - 2. Recycled content
 - 3. Regional materials
 - 4. Certified wood products
- F. Sustainable Documentation Submittals:
 - 1. Product data and wiring diagrams for sensors and data collection system used to provide continuous metering of building energy consumption performance over time.
 - 2. Recycled Content: Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 - 3. Regional Material: Product data for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.
 - 4. Certified Wood: Product data and chain-of-custody certificates for products containing certified wood. Include statement indicating cost for each certified wood product.
 - 5. Indoor Air Quality During Construction:
 - a. Construction indoor air quality management plan
 - b. Product data for temporary filtration media
 - c. Product data for filtration media used during occupancy
 - d. Construction Documentation: Six (6) photographs at three (3) different times during the construction period, along with a brief description of the SMACNA approach employed, documenting implementation of the indoor air quality management measures, such as protection of ducts and on-site stored or installed absorptive materials.
 - 6. Indoor Air Quality Prior to Occupancy:
 - a. Signed statement describing the building air flush-out procedures, including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
 - b. Product data for filtration media used during flush-out and during occupancy.
 - c. Report from testing and inspecting agency, indicating results of indoor air quality testing and documentation shows compliance with indoor air quality testing procedures and requirements.
 - 7. Adhesives and Sealants: Product data for adhesives and sealants used inside the weatherproofing system indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 8. Paints and Coatings: Product data for paints and coatings used inside the weatherproofing system indicating chemical composition and VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 9. Urea Formaldehyde Prohibition: Product data for products containing composite wood or agrifiber products or wood glues indicating that they do not contain urea-formaldehyde resin.

1.5 QUALITY ASSURANCE

- A. Sustainability Coordinator: Engage an experienced LEED-Accredited Professional to coordinate sustainable requirements. Sustainability Coordinator may also serve as waste management coordinator.

PART 2 - PRODUCTS

2.1 RECYCLED CONTENT OF MATERIALS

- A. Cost of 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 and multiplying by cost of the item.
- B. Do not include mechanical and electrical components in the calculation.

2.2 REGIONAL MATERIALS

- A. Provide 20 percent of building materials (by cost) that are regional materials.
- B. Provide 20 percent of building materials (by cost) that are regionally manufactured materials.
- C. Provide 10 percent of building materials (by cost) that are regionally extracted and manufactured materials.

2.3 CERTIFIED WOOD

- A. Provide a minimum of 50 percent (by cost) of wood-based materials that are produced 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

2.4 LOW-EMITTING MATERIALS

- A. 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):
1. Wood Glues: 30 g/L
 2. Metal-to-Metal Adhesives: 30 g/L
 3. Adhesives for Porous Materials (Except Wood): 50 g/L
 4. Subfloor Adhesives: 50 g/L
 5. Plastic Foam Adhesives: 50 g/L
 6. Carpet Adhesives: 50 g/L
 7. Carpet Pad Adhesives: 50 g/L
 8. VCT and Asphalt Tile Adhesives: 50 g/L
 9. Cove Base Adhesives: 50 g/L
 10. Gypsum Board and Panel Adhesives: 50 g/L
 11. Rubber Floor Adhesives: 60 g/L
 12. Ceramic Tile Adhesives: 65 g/L
 13. Multipurpose Construction Adhesives: 70 g/L
 14. Fiberglass Adhesives: 80 g/L
 15. Contact Adhesive: 80 g/L
 16. Structural Glazing Adhesives: 100 g/L
 17. Wood Flooring Adhesive: 100 g/L
 18. Structural Wood Member Adhesive: 140 g/L

19. Special Purpose Contact Adhesive (contact adhesive that is used to bond melamine covered board, metal, unsupported vinyl, Teflon, ultra-high molecular weight polyethylene, rubber or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.
 20. Top and Trim Adhesive: 250 g/L
 21. Plastic Cement Welding Compounds: 350 g/L
 22. ABS Welding Compounds: 400 g/L
 23. CPVC Welding Compounds: 490 g/L
 24. PVC Welding Compounds: 510 g/L
 25. Adhesive Primer for Plastic: 650 g/L
 26. Sheet Applied Rubber Lining Adhesive: 850 g/L
 27. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent by weight
 28. Aerosol Adhesive, General-Purpose Web Spray: 55 percent by weight
 29. Special-Purpose Aerosol Adhesive (All Types): 70 percent by weight
 30. Other Adhesives: 250 g/L
 31. Architectural Sealants: 250 g/L
 32. Non-Membrane Roof Sealants: 300 g/L
 33. Single-Ply Roof Membrane Sealants: 450 g/L
 34. Other Sealants: 420 g/L
 35. Sealant Primers for Nonporous Substrates: 250 g/L
 36. Sealant Primers for Porous Substrates: 775 g/L
 37. Modified Bituminous Sealant Primers: 500 g/L
 38. Other Sealant Primers: 750 g/L
- B. 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) and the following chemical restrictions:
1. Flat Paints, Coatings, and Primers: VOC not more than 50 g/L
 2. Non-Flat Paints, Coatings, and Primers: VOC not more than 150 g/L
 3. Anticorrosive and Antirust Paints Applied to Ferrous Metals: VOC not more than 250 g/L
 4. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L
 5. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L
 6. Floor Coatings: VOC not more than 100 g/L
 7. Shellacs, Clear: VOC not more than 730 g/L.
 8. Shellacs, Pigmented: VOC not more than 550 g/L
 9. Stains: VOC not more than 250 g/L
 10. Flat Interior Topcoat Paints: VOC not more than 50 g/L
 11. Non-Flat Interior Topcoat Paints: VOC not more than 150 g/L
 12. Anticorrosive and Antirust Paints Applied to Ferrous Metals: VOC not more than 250 g/L
 13. Clear Wood Finishes, Varnishes and Sanding Sealers: VOC not more than 350 g/L
 14. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L
 15. Floor Coatings: VOC not more than 100 g/L
 16. Shellacs, Clear: VOC not more than 730 g/L
 17. Shellacs, Pigmented: VOC not more than 550 g/L
 18. Stains: VOC not more than 250 g/L
 19. Primers, Sealers, and Undercoats: VOC not more than 200 g/L
 20. Dry-Fog Coatings: VOC not more than 400 g/L
 21. Zinc-Rich Industrial Maintenance Primers: VOC not more than 340 g/L
 22. Pretreatment Wash Primers: VOC not more than 420 g/L
 23. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
- C. Urea Formaldehyde Prohibition: Do not use composite wood or agrifiber products or adhesives that contain urea-formaldehyde resin.

PART 3 - EXECUTION

- 3.1 REFRIGERANT AND CLEAN-AGENT FIRE-EXTINGUISHING-AGENT REMOVAL
- A. Remove CFC-based refrigerants from existing HVAC&R equipment indicated to remain and replace with refrigerants that are not CFC-based. Replace or adjust existing equipment to accommodate new refrigerant as described in Division 23 Section **[Number]** **[Title]**.
 - B. Remove clean-agent fire-extinguishing agents that contain HCFCs or halons and replace with agent that does not contain HCFCs or halons. See Division 21 Section **[Number]**, "Clean-Agent Fire Extinguishing Systems" for additional requirements.

3.2 MEASUREMENT AND VERIFICATION

- A. Implement measurement and verification plan consistent with [Option B: Energy Conservation Measure Isolation] [Option D: Calibrated Simulation, Savings Estimation Method 2] in the EVO's "International Performance Measurement and Verification Protocol (IPMVP) Volume III: Concepts and Options for Determining Energy Savings in New Construction".
- B. If not already in place, install metering equipment to measure energy usage. Monitor, record, and trend log measurements.
- C. Evaluate energy performance and efficiency by comparing actual to predicted performance.
- D. Measurement and verification period shall cover at least one year of post-construction occupancy.

3.3 CONSTRUCTION WASTE MANAGEMENT

- A. Comply with Division 01 Section 015639, "Construction Waste Management and Disposal".

3.4 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

- A. Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction".
 - 1. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Division 01 Section "Temporary Facilities and Controls", install filter media having a MERV 8 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.
 - 2. Replace all air filters immediately prior to occupancy.
- B. Comply with the following requirements:
 - 1. Air-Quality Testing:
 - a. Conduct baseline indoor-air-quality testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air" and as additionally detailed in the USGBC's **[LEED Version]**: Reference Guide".
 - b. Demonstrate that the contaminant maximum concentrations listed below are not exceeded:
 - 1) Formaldehyde: 50 ppb
 - 2) Particulates (PM10): 50 micrograms/cu. m
 - 3) Total Volatile Organic Compounds (TVOC): 500 micrograms/cu. m
 - 4) 4-Phenylcyclohexene (4-PH): 6.5 micrograms/cu. m
 - 5) Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels
 - c. For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met. When retesting non-complying building areas, take samples from same locations as in the first test.
 - d. Air-sample testing shall be conducted as follows:
 - 1) All measurements shall be conducted prior to occupancy but during normal occupied hours and with building ventilation system starting at the normal daily start time and operated at the minimum outside air flow rate for the occupied mode throughout the duration of the air testing.
 - 2) Building shall have all interior finishes installed including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Non-fixed furnishings such as workstations and partitions are encouraged, but not required, to be in place for the testing.
 - 3) Number of sampling locations will vary depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 25,000 sq. ft. or for each contiguous floor area, whichever is larger, and shall include areas with the least ventilation and greatest presumed source strength.
 - 4) Air samples shall be collected between 3-feet and 6-feet from the floor to represent the breathing zone of occupants, and over a minimum four (4) hour period.

END OF SECTION