

SECTION 01 8114 - SUSTAINABLE DESIGN REQUIREMENTS - LEED V4 BD+C

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Review the applicable LEED Rating Systems before revising this Section.

Percentages included in this Section relate to quantities or weight of materials in lieu of cost. This approach will not track cost. There is no definitive documentation required for this requirement, other than basic product data and shop drawings. It is incumbent upon the Architect and designer to verify compliance with sustainable requirements.

Where practical, terminology used in this Section has been made identical to or at least consistent with terminology used in the LEED Rating Systems; if questions arise relating to terminology, review the applicable LEED reference guide and the standards referenced by the applicable LEED Rating System for possible explanations.

Delete hidden text after this Section has been edited for the Project.

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.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
  - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
  - 2. The University of Houston's *Supplemental General Conditions and Special Conditions for Construction*.

1.2 SUMMARY

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. Section includes but is not limited to general requirements and procedures for compliance with certain prerequisites and credits needed for Project to obtain "LEED Version 4 for Building Design and Construction" Silver certification based on USGBC's LEED v4 and v4.1 BD+C.

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1. Specific requirements for LEED are also included in other Sections.
2. Some LEED prerequisites and credits needed to obtain LEED certification depend on product 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.
3. A copy of the LEED Project checklist is attached at the end of this Section for information only.
  - a. Some 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.
4. Some LEEDv4 credits may be substituted for LEEDv4.1 credit criteria. These have been identified in the checklist, and language has been incorporated throughout the documents to reflect the revised criteria for those specific credit substitutions.

**1.3 DEFINITIONS**

[Retain terms that remain after this Section has been edited for a project.](#)

- A. LEED: USGBC's "LEED Version 4 for Building Design and Construction."
  1. Definitions that are a part of "LEED Version 4 and 4.1 for Building Design and Construction" (LEED v4 and v4.1 BD+C) apply to this Section.
- B. LEED Project Administrator: Responsible for administration of LEED Certification Application.
- C. 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. Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body. A chain-of- custody certification is not required by distributors of a product that is individually labeled with the Forest Stewardship Council logo and manufacturer's chain of custody number. Chain of Custody certification requirements are determined by Forest Stewardship Council Chain of Custody Standard 40-004 v2-1.
- D. Composite Wood (also referred to as 'Engineered Wood'): Examples of Composite Wood are: particleboard; flake-board; plywood; fiberboard; MDF; agrifiber products; millwork substrates; flooring substrates; equipment backboards; door cores.
- E. Forest Stewardship Council (FSC) Certified Content: Permanently installed wood content that has been harvested in accordance from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Recycled wood fiber that qualifies as contributing to MR Credit 4 (Recycled Content) is excluded from FSC Certified Content.
- F. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within **100 miles (160 km)** of Project site. If only a fraction of a product or

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material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

- G. Volatile Organic Compounds (VOC's): A carbon compound that vaporizes at normal room temperatures.

Note that LEED uses the term "preconsumer" rather than "postindustrial." Also note that when manufacturers and trade associations use the term "postindustrial," it often includes spills, scraps, and damaged and surplus materials that are fed back into the same manufacturing process and that these materials are not considered recycled content by the LEED Rating Systems.

- H. 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. "Postconsumer" material is defined as waste 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" 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.

- I. General Emissions Evaluation: To comply with low-emitting material criteria, building products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2–2017mg/, using the applicable exposure scenario. Manufacturers' claims of compliance with the above requirements must also state the range of total VOCs after 14 days (336 hours), measured as specified in the CDPH Standard Method v1.2: 0.5 mg/m<sup>3</sup> or less; between 0.5 and 5.0 mg/m<sup>3</sup>; or 5.0 mg/m<sup>3</sup> or more.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site. Review LEED requirements and action plans for meeting requirements.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Contractor's Responsibilities:

- 1. Respond to questions and requests from Architect and the USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the Project's LEED certification application. Document responses as informational submittals.

- B. LEED Status Meetings:

1. LEED Compliance Officer, Architect and Owner’s Representative will conduct regularly scheduled meetings to review Project Status. These may be conducted concurrently with other Project Meetings required by Division 01 Section “Project Management and Coordination.”

1.6 ACTION SUBMITTALS

Requirements in this article assume that product data and cost information are submitted to Architect who then either fills out the LEED online forms or forwards the submittals to Owner to fill out the forms. Submittals include documentation needed to verify compliance with LEED requirements, so that Architect or Owner can be assured when filling out the online forms that requirements have been met. Although the USGBC's LEED reference guides do not specifically identify who can certify compliance, submittals could be deleted if requirements in this Section are revised to require Contractor to fill out the online forms and to notify Architect or Owner as they are completed.

- A. General: Refer to the LEED scorecard, technical sections of the Specifications and this Section for responsibilities regarding documentation. The Architect/Engineer will review documentation before it is submitted to LEED online.
  1. The Contractor and other LEED team members are responsible for online documentation of construction related information required for LEED compliance.
  2. Submit additional sustainable design submittals required by other Specification Sections.
  3. Maintain copies of LEED compliance submittals for confirmation of compliance at Project completion.

Retain first paragraph below if separate sustainable design submittals are required.

- B. Sustainable design submittals are in addition to other submittals, but shall be processed at the same time as other submittals are processed.
  1. If submitted item(s) are identical to those submitted to comply with other requirements, include separate, additional copy(ies) with other submittal as a record copy of compliance with indicated LEED requirements instead of separate sustainable design submittal. Mark additional copy "sustainable design submittal."

Submittals in "Sustainable Design Documentation Submittals" Paragraph below may be necessary to verify compliance with indicated LEED prerequisites and credits. Additional submittals may be required in other Sections.

- C. Sustainable Design Documentation Action Submittals: Review technical Sections of the specifications and provide the following documentation pertinent to the Work of those Sections:
  1. Environmental Product Declarations complying with LEED requirements.
  2. Documentation for products that comply with LEED requirements for multi-attribute optimization.

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- a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
3. Sustainability reports for products that comply with LEED requirements for raw material and source extraction reporting.
4. Documentation for products that comply with LEED requirements for leadership extraction practices. Include the following:
  - a. Product data and certification letter from product manufacturers, indicating participation in an extended producer responsibility program and statement of costs.
  - b. Product data and certification for bio-based materials, indicating that they comply with requirements. Include statement of costs.
  - c. Product data and chain-of-custody certificates for products containing certified wood. Include statement of costs.
  - d. Receipts for salvaged and refurbished materials used for Project, indicating sources and costs.
  - e. Product data and certification letter from product manufacturers, indicating percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement of costs.
  - f. Documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
5. Material ingredient reports for products that comply with LEED requirements for material ingredient reporting.
6. Documentation for products that comply with LEED requirements for material ingredient optimization.
7. Documentation for products that comply with LEED requirements for product manufacturer supply chain optimization.
  - a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
8. Documentation complying with Division 01 Section "Construction Waste Management and Disposal."

First five paragraphs below are based on requiring all materials in a category to comply with the minimum requirements. An alternative is the budget method. If the budget method is used, add a submittal showing calculations.

9. Product data for adhesives and sealants used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
  - a. Laboratory Test Reports: For all wet-applied adhesives and sealants, indicating compliance with requirements for VOC emissions testing in the form of

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GreenGuard Gold certification, SCS Indoor Advantage Gold certification or CDPH Standard Method v1.2 compliance verification

10. Product data for paints and coatings used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
  - a. Indicate compliance with requirements for VOC emissions testing in the form of GreenGuard Fold certification, SCS Indoor Advantage Gold certification or CDPH Standard Method v1.2 compliance verification.
11. Laboratory test reports for flooring, indicating compliance with requirements for low-emitting materials.
  - a. Product Certificates: For carpet tile, documentation indicating compliance with testing and product requirements for CRI's "Green Label Plus" programs of VOC emissions testing certificate verifying compliance with CDPH Standard Method v1.2
  - b. Product Certificates: For hard surface flooring, documentation for from an independent testing agency indicating VOC emissions testing compliance with the FloorScore Standard or CDPH Standard Method v1.2.
12. Laboratory test reports for products containing composite wood or agrifiber products or wood glues, indicating compliance with requirements for low-emitting materials.
13. Laboratory test reports for ceilings, walls, and thermal insulation, indicating compliance with requirements for low-emitting materials.
  - a. Laboratory Testing: For thermal and acoustic insulation, indicating VOC emissions testing compliance in the form of GreenGuard Gold certification, SCS Indoor Advantage Gold certification, or CDPH Standard Method v1.2 compliance verification.
14. Laboratory test reports for furniture, indicating compliance with requirements for low-emitting materials.
15. Construction Indoor-Air-Quality (IAQ) Management:
  - a. Construction IAQ management plan.
  - b. Product data for temporary filtration media.
  - c. Product data for filtration media used during occupancy.
  - d. Construction Documentation: Six photographs at three different times during the construction period, along with a brief description of the SMACNA approach employed, documenting implementation of the IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.

Delete "IAQ Assessment" Subparagraph below if using Owner-engaged IAQ testing.

16. IAQ Assessment:

Retain first two subparagraphs below if using building air flush-out procedures.

- 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 occupancy.

Retain subparagraph below if using Contractor-engaged IAQ testing.

- c. Report from testing and inspecting agency indicating results of IAQ testing and documentation showing compliance with IAQ testing procedures and requirements.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualifications Data: For LEED Compliance Officer.
- B. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project and cost items that comply with sustainable requirements specified, for work included under technical sections of the work. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:
  - 1. Plumbing.
  - 2. Mechanical.
  - 3. Electrical.
  - 4. Specialty items, such as elevators and equipment.
  - 5. Wood-based construction materials excluding components of mechanical, electrical, plumbing or specialty items such as elevators and equipment. Include statement indicating total material cost for all new, permanently-installed wood-based materials used for Project. Material costs exclude labor, equipment, overhead, and profit.

"Sustainable Design Action Plans" Paragraph below requires Contractor to make early submittals indicating how certain LEED requirements will be met. This action can provide reassurance that Contractor understands the LEED requirements and can help to clear up misunderstandings before they become a bigger problem.

- C. Sustainable Design Action Plans: Provide preliminary submittals within 14 days of date established for **[commencement of the Work]** **[the Notice to Proceed]** **[the Notice of Award]** for products to be incorporated in the work of this project, that comply with the following requirements, indicating how the following requirements will be met:
  - 1. List of proposed products with specific type III Environmental Product Declarations (EPDs), USGBC approved program declaration or products with publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.
  - 2. List of proposed products complying with requirements for multi-attribute optimization.
  - 3. List of proposed products complying with requirements for raw material and source extraction reporting. Submit Raw materials supplier corporate Sustainability Reports (CSRs); documenting responsible extraction; including extraction locations, long term ecologically responsible and use, commitment to reducing environmental harms from

extraction and manufacturing processes and a commitment to meeting applicable standards or programs that address responsible sourcing criteria, as follows:

- a. Submit manufacturers' self-declared reports
  - b. Submit third party verified corporate sustainability reports (CSR) using one of the following frameworks"
    - 1) Global Reporting Initiative (GRI) Sustainability Report
    - 2) Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises
    - 3) UN Global Compact
    - 4) ISO 26000
    - 5) USGBC approved program.
4. List of proposed products complying with requirements for leadership extraction practices.
  5. List of proposed products complying with requirements for material ingredient reporting.
  6. List of proposed products complying with requirements for material ingredient optimization, at least one of the following:
    - a. GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
    - b. Cradle to Cradle: Manufacturer's published literature for the product bearing the Cradle to Cradle logo, with gold or platinum certification.
    - c. International Alternative Compliance Path - REACH Optimization
    - d. Declare: Manufacturer's completed Product Declaration Form
    - e. Other programs approved by USGBC.
  7. List of proposed products complying with requirements for product manufacturer supply chain optimization. Submit documentation from manufacturers for products that go beyond material ingredient optimization as follows:
    - a. Are sourced from product manufacturers who engage in validated and robust safety, health, hazard, and risk programs which at a minimum document at least 99% (by weight) of the ingredients used to make the building product or building material, and
    - b. Are sourced from product manufacturers with independent third party verification of their supply chain that at a minimum verifies:
      - 1) Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
      - 2) Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
      - 3) Processes are in place to implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients



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- 4) Processes are in place to optimize health, safety and environmental impacts when designing and improving chemical ingredients
  - 5) Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain
  - 6) Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain.
8. List of products that comply with diversion goals specified in the Waste management plan complying with Division 01 Section "Construction Waste Management and Disposal."
  9. List of products that are required to comply with the Construction IAQ management plan.
- D. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.

1.8 QUALITY ASSURANCE

- A. Sustainable Design Program: The Contractor shall be responsible for implementing processes, programs, means and methods required to insure compliance with sustainable design requirements and objectives of the Contract Documents, including but not limited to the following:
1. Reviewing and vetting submittals for technical sections with respect to compliance with Sustainable Design Requirements.
  2. Product and Execution requirements specified in various sections of the project specifications.
  3. Proposed LEED credits that specifically address construction execution issues, material reporting requirements, and indoor air quality testing requirements.
- [Requiring that Contractor engage a LEED-accredited professional to coordinate LEED requirements may help avoid inadvertent errors that could jeopardize Project's LEED certification.](#)
- B. LEED Compliance Officer: Engage an experienced LEED-accredited professional to coordinate LEED requirements.
1. Qualifications: The LEED Compliance Officer shall have experience with sustainable design issues related to the design and construction of projects of equal size and scope to this one, with at least two years of experience implementing the LEED rating system on other projects.
  2. Other Duties: The LEED Compliance Officer shall be assigned to manage construction administration of the Sustainable Design program, and may also manage the Waste Management and Construction Indoor Air Quality Programs.
- C. Responsibilities of Subcontractors: Each subcontractor shall coordinate LEED submittal requirements and process delivery of certifications and LEED substantiation documents through the Contractor's LEED Compliance Officer, who in turn will coordinate with the A/E Team.

- D. Responsibilities of the LEED Compliance Officer: The LEED Compliance Officer shall perform the following services:
1. General: Take primary responsibility for organizing and managing the process of compiling requirements of the construction-related LEED credits for which each Subcontractor is responsible, including collecting and organizing the documentation required for the Architect's submission to the USGBC upon completion of the project.
  2. IAQ Program: Develop appropriate and comprehensive Construction Indoor Air Quality (IAQ) Management Plan, as required under the LEED Construction Indoor Air Quality Management Credit. The LEED Compliance Officer shall be responsible for implementing construction activity pollution prevention, verifying compliance, enforcing, and documenting implementation of the Construction IAQ Management Plan. Each Subcontractor shall comply with the requirements of this program.
  3. Construction Waste Management: Develop a Construction Waste Management Plan, as required under the LEED Construction Waste Management credit for diversion of waste from landfill. The Contractor shall be responsible for verifying compliance, enforcing and documenting implementation of the Construction Waste Management Plan.
  4. LEED Compliant Materials: Assist the Subcontractors in identifying and obtaining supporting documentation for products that satisfy the specified sustainable design and specified product requirements (for example, low VOC sealants and adhesives; recycled content; regionally extracted and manufactured materials, and other items listed in this Section). Each Subcontractor shall coordinate with the LEED Compliance Officer and provide documentation in a timely manner as required for filing by the A/E team.
  5. LEED Status Meetings: Assist the Architect in scheduling, conducting and distributing minutes of record the Architect takes at regularly scheduled LEED status meetings consisting of members of the Contractor, Subcontractors, Architect, Commissioning Agent and the Owner.
  6. Schedules and Tracking: Prepare schedules and tracking documentation for circulation to Contractor, Subcontractors, Architect, Commissioning Agent and the Owner for the purposes of organizing the sustainable design compliance responsibilities of each team member.
  7. Observation and Inspection: Perform periodic on site observations and inspections of the work in progress in order to verify conformance with all required sustainable design requirements. These observations shall occur not less than once per week.
  8. Documentation: Provide documentation content for the Architect's formal LEED submission documentation, as required by the US Green Building Council to verify conformance with the LEED rating system.
- E. The services described above (by the LEED Compliance Officer) shall not preclude nor substitute for the requirements of other dedicated sustainable design related services that the Project may require or general construction supervision required on a full or part-time basis to verify.

PART 2 - PRODUCTS

2.1 SUSTAINABLE DESIGN - PERFORMANCE CRITERIA:

- A. Performance criteria listed below represent overall project wide criteria. Individual sections of the Specifications contain specific thresholds selected by the Architect/Engineer in order to comply with LEED credits targeted to achieve the LEED Silver certification level. The Contractor can vary from individually targeted percentages and thresholds stated in individual sections of the Specifications, as long as the overall percentage for the LEED credit is achieved as required to provide a LEED v4 BD+C Silver certification level.
- B. Specific performance criteria for individual products and systems are listed in each of the technical sections. If product specific performance criteria cannot be met, the Contractor shall be responsible for providing alternative products which ensure that the overall project wide performance will still be achieved. All product substitutions must comply with requirements of Division 01 Section "Substitution Procedures".

2.2 MATERIALS

Usually retain first paragraph below when requirements for salvaged and refurbished materials, recycled content, bio-based materials, or certified wood are included in technical Sections. This will help ensure that credit requirements are complied with in the event that costs differ from Architect's estimates.

- A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to these LEED credits, the Contractor shall provide additional materials and procedures necessary to obtain LEED credits indicated.
- B. At least 20 different products from at least five different manufacturers shall have Environmental Product Declarations that comply with LEED requirements. Industry-wide (generic) Environmental Product Declarations shall be valued as one-half of a product.
- C. At least 50 percent, by cost, of the permanently installed products for the Project shall comply with LEED requirements for multi-attribute optimization.
- D. At least 10 different products from at least three different manufacturers shall have publically released reports that comply with LEED requirements for raw material source and extraction reporting. Self-declared reports by manufacturers shall be valued as one-half of a product.
- E. At least 10 different products from at least three different manufacturers shall comply with LEED requirements for material ingredient reporting.
- F. At least 25 percent, by cost, of the permanently installed products for the Project shall comply with LEED requirements for material ingredient optimization.
- G. At least 25 percent, by cost, of the permanently installed products for the Project shall comply with LEED requirements for product manufacturer supply chain optimization.

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Retain first paragraph below and delete rest of paragraphs in this article if Contractor is responsible for complying with credit requirements for leadership extraction practices.

- H. Not less than 25 percent of building materials, by cost, shall comply with LEED requirements for leadership extraction practices.
  - 1. Structure and enclosure materials shall not be more than 30 percent, by cost, of the materials used to comply with this requirement.

One or more of "Extended Producer Responsibility Program," "Recycled Content," and "Certified Wood" paragraphs below can be retained and possibly supplemented by requirements in other Sections, for bio-based materials to comply with credit requirements for leadership extraction practices.

- I. Extended Producer Responsibility Program: Not less than <Insert number> percent of building materials, by cost, shall be manufactured by a participant in an extended producer responsibility program.

"Recycled Content" Paragraph below is an alternative to requiring recycled content in the Specification Sections where such products are specified.

- J. Recycled Content: Building materials shall have recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content for Project constitutes a minimum of <Insert number> percent of cost of materials used for Project.
  - 1. Cost of postconsumer recycled content plus one-half of preconsumer recycled content of an item shall be determined by dividing weight of postconsumer recycled content plus one-half of preconsumer recycled content in the item by total weight of the item and multiplying by cost of the item.
  - 2. Do not include [furniture,]plumbing, mechanical and electrical components, and specialty items, such as elevators and equipment, in the calculation.

"Certified Wood" Paragraph below is an alternative to requiring certified wood in the Specification Sections where wood products are specified.

- K. Certified Wood: Not less than [50] <Insert number> percent, by cost, of wood-based materials shall be 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." Organizations involved in manufacture of wood based products, shall comply with FSC-STD-40-004 for product classification.
  - 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. Wood veneers.
- i. Architectural woodwork.
- j. Plywood.
- k. Composite boards.
- l. Packing crates, pallets, and boxes.
- m. Wood paneling.
- n. Wood doors **[and windows]**.
- o. Wood veneer wall covering.
- p. Wood flooring.
- q. Wood lockers.
- r. Wood cabinets.

Furniture may be included, providing it is included as part of the Architect's scope of work.

- s. Furniture.

### 2.3 LOW-EMITTING MATERIALS

- A. Insulations/Paints and Coatings/Adhesives and Sealants/Flooring shall comply with California Department of Public Health (CDPH) Standard Method V1.2-2017, using applicable exposure scenario.
  - 1. Manufacturer or 3rd party certification shall state the exposure scenario used to determine compliance.
  - 2. Claims of compliance for wet applied products shall state the amount applied in mass per surface area, also state the range of total VOCs after 14 days measured as specified in CDPH Standard method V1.2: 0.5mg/cubic meter or less; between 0.5 and 5 mg/cubic meter; or 5 mg/cu meter or more.
- B. Paints and Coatings: For field applications that are inside the weatherproofing system, paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," v1.2-2017.
  - 1. VOC Limits for Architectural Coatings: Thinned to manufacturer's maximum thinning recommendation, excluding colorant added to tint bases. Per California Air Resources Board (ARB) "Suggested Control Measure for Architectural Coatings", approved Feb 8, 2007 and Rule 1113 "Architectural Coatings" amended 6/3/2011:
    - a. Flat Paints and Coatings: 50 g/L.
    - b. Non-flat Paints and Coatings: 50 g/L.
    - c. Dry-Fog Coatings: 150 g/L.
    - d. Primers, Sealers, and Undercoaters: 100 g/L.
    - e. Rust-Preventive Coatings: 100 g/L.
    - f. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
    - g. Pretreatment Wash Primers: 420 g/L.
    - h. Clear Wood Finishes, Varnishes: 275 g/L.
    - i. Clear Wood Finishes, Lacquers: 275 g/L.

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- j. Floor Coatings: 50 g/L.
- k. Shellacs, Clear: 730 g/L.
- l. Shellacs, Pigmented: 550 g/L.
- m. Stains: 100 g/L.

C. Paints and Coatings: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings by volume for emissions and 100% VOC content shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

Adhesives and sealants are required in many Specification Sections where, without being specifically mentioned, they may be specified only by the requirement to install products according to manufacturer's written instructions. For this reason, it is probably best to retain both "Adhesives and Sealants" paragraphs below if this credit is required. Delete option in first paragraph below for LEED v4 BD+C Schools and LEED v4 BD+C Healthcare credit for exterior applied products.

D. Adhesives and Sealants: For field applications that are inside the weatherproofing system, adhesives and sealants shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," v1.2-2017.

E. Adhesives and Sealants: For field applications that are inside the weatherproofing system, 90 percent of adhesives and sealants (by volume) shall comply with the emissions requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

Flooring adhesives are not covered here. Coordinate with flooring system sections for installation materials that need to comply with emission requirements that will be equivalent to the LEED rating systems (IEQ 4.3). Carpet products need to comply with Carpet and Rug Institute Green Label Plus. Carpet Pad needs to comply with Carpet and Rug Institute Green Label. All hardsurface flooring needs to comply with FloorScore.

F. Exterior Applied Products: For field applications that are outside the weatherproofing system, applied products shall comply with the following VOC content limits of the California Air Resources Board (CARB) 2007 Suggested Control Measure (SCM) for Architectural Coatings and South Coast Air Quality Management District.

G. Flooring: 100% of Flooring shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," v1.2-2017.

If retaining "Composite Wood" Paragraph below, coordinate with Sections where composite wood products are specified to avoid conflicting requirements in those Sections.

H. Composite Wood: Composite wood, agrifiber products, and adhesives shall be made using ultra-low-emitting formaldehyde (ULEF) resins as defined in the California Air Resources Board's (CARB) "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite

Wood Products" to meet the CARB ATCM for formaldehyde requirements of Ultra-low emitting formaldehyde (ULEF) resins or shall be made with no added formaldehyde.

- I. Ceilings, Walls, and Thermal Insulation: Ceilings, walls, and thermal insulation shall comply with the requirements of the California Department of Public Health's (CDPH) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," v1.2-2017, using the applicable exposure scenario.
  - 1. Manufacturer or 3rd party certification shall state the exposure scenario used to determine compliance.
  - 2. Claims of compliance for wet applied products shall state the amount applied in mass per surface area, also state the range of total VOCs after 14 days measured as specified in CDPH Standard:
    - a. 0.5mg/cubic meter or less;
    - b. Between 0.5 and 5 mg/cubic meter; or
    - c. 5 mg/cu meter or more.

PART 3 - EXECUTION

3.1 NONSMOKING BUILDING AND CAMPUS

- A. Smoking is not permitted within the building or anywhere on the University of Houston campus.

3.2 CONSTRUCTION WASTE MANAGEMENT

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

3.3 CONSTRUCTION IAQ MANAGEMENT

- A. Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."

Coordinate first subparagraph below with Division 01 Section "Temporary Facilities and Controls." Identify air handlers and associated return-air inlets authorized by Owner for use during construction period.

- 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 MERV 8 filter media at each return-air inlet for the air-handling system used during construction.
- 2. Remove temporary filter media before commencing HVAC system testing and balancing and before occupancy. Sequence Work for occupancy and HVAC system testing and balancing to occur after dust and dirt generating construction activities are complete.
- 3. Replace air filters installed in HVAC ductwork and equipment with filters indicated, immediately prior to occupancy.

3.4 IAQ ASSESSMENT

A. Flush-Out:

Project's mechanical engineer of record should verify that HVAC system design and equipment indicated are capable of delivering flush-out indicated. Provide HVAC system and equipment operating information necessary to achieve credit. If Project HVAC systems and equipment cannot suit requirement, consider requiring temporary systems and equipment.

1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14,000 cu. ft. (4 300 000 L) of outdoor air per sq. ft. (sq. m) of floor area while maintaining an internal temperature of at least 60 deg F (16 deg C) and a relative humidity no higher than 60 percent.

In first subparagraph below, indicate operating procedure for each HVAC system and piece of equipment and the operating duration required for flush-out.

a. <Insert operating requirements>.

2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. (1 070 000 L) of outdoor air per sq. ft. (sq. m) of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq. ft. (1.52 L/s per sq. m) of outside air or the design minimum outside-air rate, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cu. ft./sq. ft. (4 300 000 L/sq. m) of outside air has been delivered to the space, with internal temperature of at least 60 def F and no higher than 80 deg F and relative humidity at occupied controlled relative humidity level and no higher than 60%.

In subparagraph below, indicate operating procedure for each HVAC system and piece of equipment and the operating duration required for flush-out.

- a. <Insert operating requirements>.
- b. Begin flushout 3 hours before daily occupancy and continue throughout the occupied portion of the day.
- c. Volume: To be determined at LEED Conference.
- d. Duration of Flushout: To be determined at LEED Conference.
- e. If permanent filers are in place, replace used HVAC filtration media with new media. Remove any temporary filters or duct coverings installed as part of the construction indoor air quality management plan.

B. Air-Quality Testing: [Engage] [Owner will engage] testing agency to perform the following:

The EPA standard referenced in first subparagraph below is available from Department of Commerce, National Technical Information Service.

1. Conduct baseline IAQ 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 Reference Guide for Building Design and Construction v4."
2. Demonstrate that the contaminant maximum concentrations listed below are not exceeded:

Note that it may be necessary to comply with all requirements in Credit EQ 112 to comply with the limits specified in subparagraphs below.

- a. Formaldehyde: 27 ppb.
- b. Particulates (PM10): 50 micrograms/cu. m.
- c. Ozone: 0.075 ppm, according to ASTM D5149.
- d. Total Volatile Organic Compounds: 500 micrograms/cu. m.
- e. 4-Phenylcyclohexene (4-PH): 6.5 micrograms/cu. m.
- f. Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.
- g. Target Chemicals in California Department of Public Health "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Table 4-1 (except formaldehyde): Allowable concentrations in California Department of Public Health "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Table 4-1.

First subparagraph below is part of LEED credit requirements but creates requirements that are contingent on field conditions that are unknown at time of bid and could influence bids. Also, requirements may result in claims for extra payment and time. Revise to suit office practice.

3. For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outdoor air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until requirements have been met. When retesting noncomplying building areas, take samples from same locations as in the initial test. Take corrective action until requirements have been met.
4. Air-sample testing shall be conducted as follows:
  - a. 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.
  - b. Building shall have all interior finishes installed, including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings, such as workstations and partitions, are encouraged, but not required, to be in place for the testing.
  - c. Number of sampling locations varies 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 **5000 sq. ft. (465 sq. m).** [ **For large open spaces, one sampling point per 50,000 sq. ft. (4654 sq. m) may be used.** ]

**University of Houston Master Specification**

<Insert Project Name>  
<Insert U of H Proj #>

<Insert Issue Name>  
<Insert Issue Date>

- d. Air samples shall be collected between **3 and 6 feet** (900 and 1800 mm) from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

END OF SECTION 01 8114