

**SECTION 01 81 11**  
**SUSTAINABLE CONSTRUCTION REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This Section describes general requirements and procedures to comply with federal mandates and U.S. Department of Veterans Affairs (VA) policies for sustainable construction as summarized in the VA Sustainable Design Manual.
- B. The Design Professional has selected materials and utilized integrated design processes that achieve the Government's objectives. Contractor is responsible to maintain and support these objectives in developing means and methods for performing work and in proposing product substitutions or changes to specified processes. By submitting a change or substitution of materials or processes, contractor must demonstrate its diligence in performing the level of investigation and comparison required under federal mandates and VA policies.

**1.2 RELATED WORK**

- A. Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.
- B. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT.
- C. Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.

**1.3 DEFINITIONS**

- A. Total Materials Cost: A tally of actual material cost from specification divisions 03 through 10, 31 (applicable to foundations) and 32 (applicable to paving, site improvements, and planting). Alternatively, 45 percent of total construction hard costs in those specification divisions.
- B. Recycled Content: Recycled content of materials is defined according to Federal Trade Commission Guides for the Use of Environmental Marketing Claims (16 CFR Part 260). Recycled content value of a material assembly is determined by weight. Recycled fraction of assembly is multiplied by cost of assembly to determine 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 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.

- C. Biobased Products: Biobased products are derived from plants and other renewable agricultural, marine, and forestry materials and provide an alternative to conventional petroleum derived products. Biobased products include diverse categories such as lubricants, cleaning products, inks, fertilizers, and bioplastics.
- D. Low Pollutant-Emitting Materials: Materials and products which are minimally odorous, irritating, or harmful to comfort and well-being of installers and occupants.
- E. Volatile Organic Compounds (VOC): Chemicals that are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects.

#### **1.4 REFERENCE STANDARDS**

- A. Carpet and Rug Institute Green Label Plus program.
- B. U.S. Department of Agriculture BioPreferred program (USDA BioPreferred).
- C. U.S. Environmental Protection Agency Comprehensive Procurement Guidelines (CPG).
- D. U.S. Environmental Protection Agency WaterSense Program (WaterSense).
- E. U.S. Environmental Protection Agency ENERGY STAR Program (ENERGY STAR).
- F. U. S. Department of Energy Federal Energy Management Program (FEMP).
- G. Green Electronic Council EPEAT Program (EPEAT).

#### **1.5 SUBMITTALS**

- A. All submittals to be provided by contractor to COR/Resident Engineer and Architect.
- B. Sustainability Action Plan:
  - 1. Submit documentation as required by this section; provide additional copies of typical submittals required under technical sections when sustainable construction requires copies of record submittals.
  - 2. Within 30 days after Preconstruction Meeting provide a narrative plan for complying with requirements stipulated within this section.
  - 3. Sustainability Action Plan must:

- a. Make reference to sustainable construction submittals defined by this section.
  - b. Address all items listed under PERFORMANCE CRITERIA.
  - c. Indicate individual(s) responsible for implementing the plan.
- C. Project Materials Cost Data Spreadsheet: Within 30 days after the Preconstruction Meeting provide a preliminary Project Materials Cost Data Spreadsheet. The Project Materials Cost Data Spreadsheet must be an electronic file and indicate all materials in Divisions 3 through 10, 31, and 32 used for Project (excluding labor costs and excluding all mechanical, electrical, and plumbing system components), and be organized by specification section. The spreadsheet must include the following:
1. Identify each reused or salvaged material, its cost, and its replacement value.
  2. Identify each recycled-content material, its post-consumer and pre-consumer recycled content as a percentage the product's weight, its cost, its combined recycled content value, defined as the sum of post-consumer recycled content value plus one-half of pre-consumer recycled content value, and total combined recycled content value for all materials as a percentage of total materials costs.
  3. Identify each biobased material, its source, its cost, and total value of biobased materials as a percentage of total materials costs.
  4. Total cost for Project and total cost of building materials used for Project.
- D. Low Pollutant-Emitting Materials Tracking Spreadsheet: Within 30 days after Preconstruction Meeting provide a preliminary Low Pollutant-Emitting Materials Tracking Spreadsheet. The Low Pollutant-Emitting Materials Tracking Spreadsheet must be an electronic file and include all materials on Project in categories described under Low Pollutant-Emitting Materials in 01 81 11.
- E. Construction Indoor Air Quality (IAQ) Management Plan:
1. Not more than 30 days after Preconstruction Meeting provide a Construction IAQ Management Plan as an electronic file including descriptions of the following:

- a. Instruction procedures for meeting or exceeding minimum requirements of ANSI/SMACNA 008-2008, Chapter 3, including procedures for HVAC Protection, Source Control, Pathway Interruption, Housekeeping, and Scheduling.
- b. Instruction procedures for protecting absorptive materials stored on-site or installed from moisture damage.
- c. Schedule of submission of photographs of on-site construction IAQ management measures such as protection of ducts and on-site stored oil installed absorptive materials.
- d. Instruction procedures if air handlers must be used during construction, including a description of filtration media to be used at each return air grille.
- e. Instruction procedure for replacing all air-filtration media immediately prior to occupancy after completion of construction, including a description of filtration media to be used at each air handling or air supply unit.
- f. Instruction procedures and schedule for implementing building flush-out.

F. Product Submittals:

1. Recycled Content: Submit product data from manufacturer indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content (excluding MEP systems equipment and components).
2. Biobased Content: Submittals for products to be installed or used included on the USDA BioPreferred program's product category lists. Data to include biobased content and source of biobased material; indicating name of manufacturer, cost of each material.
3. Low Pollutant-Emitting Materials: Submit product data confirming compliance with relevant requirements for all materials on Project in categories described under Low Pollutant-Emitting Materials in 01 81 11.
4. For applicable products and equipment, product documentation confirming Energy Star label and EPEAT certification.

G. Sustainable Construction Progress Reports: Concurrent with each Application for Payment, submit a Sustainable Construction Progress Report to confirm adherence with Sustainability Action Plan.

1. Include narratives of revised strategies for bringing work progress into compliance with plan and product submittal data and calculations to demonstrate compliance with thresholds based on materials costs.
  2. Include updated and current Project Materials Cost Data Spreadsheet.
  3. Include updated and current Low Pollutant-Emitting Materials Tracking Spreadsheet.
  4. Include construction waste tracking, in tons or cubic yards, including waste description, whether diverted or landfilled, hauler, and percent diverted for comingled quantities; and excluding land-clearing debris and soil. Provide haul receipts and documentation of diverted percentages for comingled wastes.
- D. Closeout Submittals: Within 14 days after Substantial Completion provide the following:
1. Final version of Project Material Cost Data Spreadsheet.
  2. Final version of Low Pollutant-Emitting Materials Tracking Spreadsheet.
  3. Manufacturer's cut sheets and product data highlighting the Minimum Efficiency Reporting Value (MERV) for filtration media installed at return air grilles during construction if permanently installed air handling units are used during construction.
  4. Manufacturer's cut sheets and product data highlighting the Minimum Efficiency Reporting Value (MERV) for final filtration media in air handling units.
  5. Minimum 18 construction photographs including six photographs taken on three different occasions during construction of ANSI/SMACNA 008-2008, Chapter 3 approaches employed, along with a brief description of each approach, documenting implementation of IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.
  6. Flush-out Documentation:
    - a. Product data for filtration media used during flush-out.
    - b. Product data for filtration media installed immediately prior to occupancy.
    - c. Signed statement describing building air flush-out procedures including dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.

#### **1.6 QUALITY ASSURANCE**

- A. Preconstruction Meeting: After award of Contract and prior to commencement of Work, schedule and conduct meeting with COR/Resident Engineer and Architect to discuss the Project Sustainable Action Plan content as it applies to submittals, project delivery, required Construction Indoor Air Quality (IAQ) Management Plan, and other Sustainable Construction Requirements. The purpose of this meeting is to develop a mutual understanding of the Sustainable Construction Requirements and coordination of contractor's management of these requirements with the Contracting Officer and the Construction Quality Manager.
- B. Construction Job Conferences: Status of compliance with Sustainable Construction Requirements of these specifications will be an agenda item at regular job meetings conducted during the course of work at the site.

#### **1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. Green Seal Standard GS-11, Paints, 1st Edition, May 20, 1993.
- C. Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997.
- D. Green Seal Standard GC-36, Commercial Adhesives, October 19, 2000.
- E. South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.
- F. South Coast Air Quality Management District (SCAQMD) Rule 1168, July 1, 2005 and rule amendment date of January 7, 2005.
- G. Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd Edition (ANSI/SMACNA 008-2008), Chapter 3.
- H. California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, Emission Testing method for California Specification 01350 (CDPH Standard Method V1.1-2010).

- E. Federal Trade Commission Guides for the Use of Environmental Marketing Claims (16 CFR Part 260).
- F. ASHRAE Standard 52.2-2007.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE CRITERIA**

- A. Construction waste diversion from landfill disposal must comprise at least 50 percent of total construction waste, excluding land clearing debris and soil. Alternative daily cover (ADC) does not qualify as material diverted from disposal.
- B. Low Pollutant-Emitting Materials:
  - 1. Adhesives, sealants and sealant primers applied on site within the weatherproofing membrane must comply with VOC limits of SCAQMD Rule 1168:
    - a. Flooring Adhesives and Sealants:
      - 1) Indoor carpet adhesives: 50 g/L.
      - 2) Wood Flooring Adhesive: 100 g/L.
      - 3) Rubber Floor Adhesives: 60 g/L.
      - 4) Subfloor Adhesives: 50 g/L.
      - 5) Ceramic Tile Adhesives and Grout: 65 g/L.
      - 6) Cove Base Adhesives: 50 g/L.
      - 7) Multipurpose Construction Adhesives: 70 g/L.
      - 8) Porous Material (Except Wood) Substrate: 50 g/L.
      - 9) Wood Substrate: 30 g/L.
      - 10) Architectural Non-Porous Sealant Primer: 250 g/L.
      - 11) Architectural Porous Sealant Primer: 775 g/L.
      - 12) Other Sealant Primer: 750 g/L.
      - 13) Structural Wood Member Adhesive: 140 g/L.
      - 14) Sheet-Applied Rubber Lining Operations: 850 g/L.
      - 15) Top and Trim Adhesive: 250 g/L.
      - 16) Architectural Sealant: 250 g/L.
      - 17) Other Sealant: 420 g/L.
    - b. Non-Flooring Adhesives and Sealants:
      - 1) Drywall and Panel Adhesives: 50 g/L.
      - 2) Multipurpose Construction Adhesives: 70 g/L.
      - 3) Structural Glazing Adhesives: 100 g/L.
      - 4) Metal-to-Metal Substrate Adhesives: 30 g/L.
      - 5) Plastic Foam Substrate Adhesive: 50 g/L.

- 6) Porous Material (Except Wood) Substrate Adhesive: 50 g/L.
  - 7) Wood Substrate Adhesive: 30 g/L.
  - 8) Fiberglass Substrate Adhesive: 80 g/L.
  - 9) Architectural Non-Porous Sealant Primer: 250 g/L.
  - 10) Architectural Porous Sealant Primer: 775 g/L.
  - 11) Other Sealant Primer: 750 g/L.
  - 12) PVC Welding Adhesives: 510 g/L.
  - 13) CPVC Welding Adhesives: 490 g/L.
  - 14) ABS Welding Adhesives: 325 g/L.
  - 15) Plastic Cement Welding Adhesives: 250 g/L.
  - 16) Adhesive Primer for Plastic: 550 g/L.
  - 17) Contact Adhesive: 80 g/L.
  - 18) Special Purpose Contact Adhesive: 250 g/L.
  - 19) Structural Wood Member Adhesive: 140 g/L.
  - 20) Sheet Applied Rubber Lining Operations: 850 g/L.
  - 21) Top and Trim Adhesive: 250 g/L.
  - 22) Architectural Sealants: 250 g/L.
  - 23) Other Sealants: 420 g/L.
2. Aerosol adhesives applied on site within the weatherproofing membrane must comply with the following Green Seal GS-36.
    - a. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent VOCs by weight.
    - b. Aerosol Adhesive, General-Purpose Web Spray: 55 percent VOCs by weight.
    - c. Special-Purpose Aerosol Adhesive (All Types): 70 percent VOCs by weight.
  3. Paints and coatings applied on site within the weatherproofing membrane must comply with the following criteria:
    - a. VOC content limits for paints and coatings established in Green Seal Standard GS-11.
    - b. VOC content limit for anti-corrosive and anti-rust paints applied to interior ferrous metal substrates of 250 g/L established in Green Seal GC-03.
    - c. Clear wood finishes, floor coatings, stains, primers, sealers, and shellacs applied to interior elements must not exceed VOC content limits established in SCAQMD Rule 1113.
    - d. Comply with the following VOC content limits:



- 1) Anti-Corrosive/Antirust Paints: 250 g/L.
  - 2) Clear Wood Finish, Lacquer: 550 g/L.
  - 3) Clear Wood Finish, Sanding Sealer: 350 g/L.
  - 4) Clear Wood Finish, Varnish: 350 g/L.
  - 5) Floor Coating: 100 g/L.
  - 6) Interior Flat Paint, Coating or Primer: 50 g/L.
  - 7) Interior Non-Flat Paint, Coating or Primer: 150 g/L.
  - 8) Sealers and Undercoaters: 200 g/L.
  - 9) Shellac, Clear: 730 g/L.
  - 10) Shellac, Pigmented: 550 g/L.
  - 11) Stain: 250 g/L.
  - 12) Clear Brushing Lacquer: 680 g/L.
  - 13) Concrete Curing Compounds: 350 g/L.
  - 14) Japans/Faux Finishing Coatings: 350 g/L.
  - 15) Magnesite Cement Coatings: 450 g/L.
  - 16) Pigmented Lacquer: 550 g/L.
  - 17) Waterproofing Sealers: 250 g/L.
  - 18) Wood Preservatives: 350 g/L.
  - 19) Low-Solids Coatings: 120 g/L.
4. Carpet installed in building interior must comply with one of the following:
    - a. Meet testing and product requirements of the Carpet and Rug Institute Green Label Plus program.
    - b. Maximum VOC concentrations specified in CDPH Standard Method V1.1-2010, using office scenario at the 14 day time point.
  5. Each non-carpet flooring element installed in building interior which is not inherently non-emitting (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring) must comply with one of the following:
    - a. Meet requirements of the FloorScore standard as shown with testing by an independent third-party.
    - b. Maximum VOC concentrations specified in CDPH Standard Method V1.1-2010, using office scenario at 14 day time point.
  6. Composite wood and agrifiber products used within the weatherproofing membrane must contain no added urea-formaldehyde resins.

7. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies must not contain added urea-formaldehyde.

C. Recycled Content:

1. Any product being installed or used that are listed on EPA Comprehensive Procurement Guidelines designated product list must meet or exceed the EPA's recycled content recommendations. The EPA Comprehensive Procurement Guidelines categories include:
  - a. Building insulation.
  - b. Cement and concrete.
  - c. Consolidated and reprocessed latex paint.
  - d. Floor tiles.
  - e. Flowable fill.
  - f. Laminated paperboard.
  - g. Modular threshold ramps.
  - h. Nonpressure pipe.
  - i. Patio blocks.
  - j. Railroad grade crossing surfaces.
  - k. Roofing materials.
  - l. Shower and restroom dividers/partitions.
  - m. Structural fiberboard.
  - n. Nylon carpet and nylon carpet backing.
  - o. Compost and fertilizer made from recovered organic materials.
  - p. Hydraulic mulch.
  - q. Lawn and garden edging.
  - r. Plastic lumber landscaping timbers and posts.
  - s. Park benches and picnic tables.
  - t. Plastic fencing.
  - u. Playground equipment.
  - v. Playground surfaces.
  - w. Bike racks.
2. Provide building materials with recycled content such that post-consumer recycled content value plus half the pre-consumer recycled content value constitutes a minimum of [10] [20] percent of cost of materials used for Project, exclusive of mechanical, electrical and plumbing components, specialty items such as elevators, and labor and delivery costs.

D. Biobased Content:

1. Materials and equipment being installed or used that are listed on the USDA BioPreferred program product category list must meet or exceed USDA's minimum biobased content threshold. Refer to individual specification sections for detailed requirements applicable to that section.

a. USDA BioPreferred program categories include:

- 1) Adhesive and Mastic Removers.
- 2) Carpets.
- 3) Cleaners.
- 4) Composite Panels.
- 5) Corrosion Preventatives.
- 6) Erosion Control Materials.
- 7) Dust Suppressants.
- 8) Fertilizers.
- 9) Floor Cleaners and Protectors.
- 10) Floor Coverings (Non-Carpet).
- 11) Glass Cleaners.
- 12) Hydraulic Fluids.
- 13) Industrial Cleaners.
- 14) Interior Paints and Coatings.
- 15) Mulch and Compost Materials.
- 16) Multipurpose Cleaners.
- 17) Multipurpose Lubricants.
- 18) Packaging Films.
- 19) Paint Removers.
- 20) Plastic Insulating Foam.
- 21) Pneumatic Equipment Lubricants.
- 22) Roof Coatings.
- 23) Wastewater Systems Coatings.
- 24) Water Tank Coatings.
- 25) Wood and Concrete Sealers.
- 26) Wood and Concrete Stains.

- E. Materials, products, and equipment being installed which fall into a category covered by the WaterSense program must be WaterSense-labeled or meet or exceed WaterSense program performance requirements, unless disallowed for infection control reasons.

F. Materials, products, and equipment being installed which fall into a category covered by the Energy Star program must be Energy Star-labeled.

1. Energy Star product categories as of 05/19/2015 include:

a. Appliances:

- 1) Air Purifiers and Cleaners.
- 2) Clothes Dryers (Residential).
- 3) Clothes Washers (Commercial).
- 4) Clothes Washers (Residential).
- 5) Dehumidifiers.
- 6) Dishwashers (Residential).
- 7) Freezers (Residential).

b. Electronics and Information Technology:

- 1) Audio/Video Equipment.
- 2) Computers: Desktops, Workstations, and Thin Clients.
- 3) Computers: Notebooks and Integrated Computers.
- 5) Small-Scale Servers.
- 6) Data Center Storage.
- 7) Displays.
- 8) Enterprise Servers.
- 9) Imaging Equipment.
- 10) Set-Top and Cable Boxes.
- 11) Telephones.
- 12) Televisions.
- 13) Uninterruptible Power Supplies.

c. Food Service Equipment (Commercial):

- 1) Dishwashers.
- 2) Fryers.
- 3) Griddles.
- 4) Hot Food Holding Cabinets.
- 5) Ice Machines, Air-Cooled.
- 6) Ovens.
- 7) Refrigerated Beverage Vending Machines.
- 8) Refrigerators and Freezers.
- 9) Steam Cookers.

d. Heating and Cooling Equipment:

- 1) Air-Source Heat Pumps (Residential).

- 2) Boilers (Residential).
- 3) Ceiling Fans (Residential).
- 4) Central Air Conditioners (Residential).
- 5) Gas Furnaces (Residential)
- 6) Gas Storage Water Heaters (Residential).
- 7) Gas Water Heaters (Commercial).
- 8) Geothermal Heat Pumps (Residential).
- 9) Heat Pump Water Heaters (Residential).
- 10) Light Commercial Heating and Cooling Equipment.
- 11) Room Air Conditioners (Residential).
- 12) Solar Water Heaters (Residential).
- 13) Ventilation Fans (Residential).
- 14) Whole-Home Tankless Water Heaters (Residential).

e. Other:

- 1) Cool Roof Products.
- 2) Decorative Light Strings.
- 3) Pool Pumps.
- 4) Water Coolers.
- 5) Windows, Doors, and Skylights.

G. Materials, products, and equipment being installed which fall into a category covered by the FEMP program must be FEMP-designated. FEMP-designated product categories as of 05/19/2015 include:

1. Food Service Equipment (Commercial):
  - a. Ice Machines, Water-Cooled.
2. Heating and Cooling Equipment:
  - a. Boilers (Commercial).
  - b. Electric Chillers, Air-Cooled (Commercial).
  - c. Electric Chillers, Water-Cooled (Commercial).
  - d. Electric Resistance Water Heaters (Residential).
3. Lighting Equipment:
  - a. Exterior Lighting.
  - b. Fluorescent Ballasts.
  - c. Fluorescent Luminaires.
  - d. Industrial Lighting (High/Low Bay).
  - e. Suspended Luminaires.
4. Other Equipment:
  - a. Pre-Rinse Spray Valves.

H. Electronic products and equipment being installed which fall into a category covered by EPEAT program must be EPEAT registered.

1. Electronic products and equipment covered by EPEAT program as of 05/19/2015 include:
  - a. Computers: Desktops, Workstations, and Thin Clients.
  - b. Computers: Notebooks and Integrated Computers.
  - c. Displays.
  - d. Imaging Equipment.
  - e. Televisions.

### **PART 3 - EXECUTION**

#### **3.1 FIELD QUALITY CONTROL**

- A. Irrigation professionals must be certified under a WaterSense labeled certification program.
- B. Construction Indoor Air Quality Management:
  1. During construction, meet or exceed recommended control measures of ANSI/SMACNA 008-2008, Chapter 3.
  2. Protect stored on-site and installed absorptive materials from moisture damage.
  3. If permanently installed air handlers are used during construction, filtration media with a minimum efficiency reporting value (MERV) of 8 must be used at each return air grille, as determined by ASHRAE Standard 52.2-1999 (with errata but without addenda). Replace all filtration media immediately prior to occupancy.
  4. Perform building flush-out as follows:
    - a. After construction ends, prior to occupancy and with interior finishes installed, perform a building flush-out by supplying a total volume of 14000 cu. ft. of outdoor air per sq. ft. of floor area while maintaining an internal temperature of at least 60 degrees Fahrenheit and a relative humidity no higher than 60 percent. OR

- b. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. of outdoor air per sq. ft. of floor area to the space. Once a space is occupied, it must be ventilated at a minimum rate of 0.30 cfm per sq. ft. of outside air or design minimum outside air rate determined in Prerequisite EQ 1, whichever is greater. During each day of flush-out period, ventilation must begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions must be maintained until a total of 14000 cu. ft./sq. ft. of outside air has been delivered to the space.
5. Provide construction dust control to comply with SCAQMD Rule 403.

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