

This is a guidance document with sample specification language intended to be inserted into project specifications on this subject as appropriate to the agency's environmental goals. Certain provisions, where indicated, are required for U.S. federal agency projects. Sample specification language is numbered to clearly distinguish it from advisory or discussion material. Each sample is preceded by identification of the typical location in a specification section where it would appear using the SectionFormat™ of the Construction Specifications Institute; the six digit section number cited is per CSI Masterformat™ 2004 and the five digit section number cited parenthetically is per CSI Masterformat™ 1995.

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SECTION 07 10 00 (SECTION 07100) – DAMPPROOFING & WATERPROOFING

SPECIFIER NOTE:

resource management: Natural materials such as bentonite clay are available (and have long been used) for waterproofing below grade. Many sheet membrane waterproofing materials contain a small percentage of recycled asphalt or rubber.
Zero VOC, clear penetrating water repellent for masonry, concrete, and stucco are available.

toxicity/IEQ: VOCs may be emitted during the curing process.

performance: Performance is comparable for green methods and standard methods when using below grade. For proper performance of bentonite waterproofing materials, confinement of the material is critical. Bentonite should only be used for below-grade applications, not above-grade applications. Bentonite requires initial exposure to moisture to properly hydrate and function but cannot be exposed to standing or moving water. Bentonite cannot dry out once hydrated.

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Bentonite waterproofing.
 2. [xxxx].

1.2 SUBMITTALS

- A. Product data. Unless otherwise indicated, submit the following for each type of product provided under work of this Section:

SPECIFIER NOTE:

Green building rating systems often include credit for materials of recycled content. USGBC-LEED™ v3, for example, includes credit for materials with recycled content, calculated on the basis of pre-consumer and post-consumer percentage content, and it includes credit for use of salvaged/recovered materials.

Green Globes US also provides points for reused building materials and components and for building materials with recycled content.

1. Recycled Content:
 - a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.

- d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

SPECIFIER NOTE:

Specifying local materials may help minimize transportation impacts; however it may not have a significant impact on reducing the overall embodied energy of a building material because of efficiencies of scale in some modes of transportation.

Green building rating systems frequently include credit for local materials. Transportation impacts include: fossil fuel consumption, air pollution, and labor.

USGBC-LEED™ v3 includes credits for materials extracted/harvested and manufactured within a 500 mile radius from the project site. Green Globes US also provides points for materials that are locally manufactured.

2. Local/Regional Materials:
 - a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

SPECIFIER NOTE:

The Food, Conservation, and Energy Act of 2008 (also known as the 2008 U.S. Farm Bill) largely continues programs of the Farm Security and Rural Investment Act of 2002 ([2002 Farm Bill](http://www.usda.gov/farmbill/)) <http://www.usda.gov/farmbill/> Section 9002 requires each Federal Agency to develop a procurement program which will assure that items composed of biobased products will be purchased to the maximum extent practicable and which is consistent with applicable provisions of Federal procurement law. USDA designates biobased products for preferred Federal procurement and recommends biobased content levels for each designated product.

USGBC-LEED™ v3 includes credits for use of rapidly renewable materials, which USGBC describes as plants harvested within a ten-year cycle.

Green Globes – US, provides credit for integration of materials from renewable sources that have been selected based on life-cycle assessment.

3. Biobased materials:
 - a. Indicate type of biobased material in product.
 - b. Indicate the percentage of biobased content per unit of product.
 - c. Indicate relative dollar value of biobased content product to total dollar value of product included in project.
- B. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

C. Operating And Maintenance Manuals Submittals:

SPECIFIER NOTE:

The marking system indicated below is intended to provide assistance in identification of products for making subsequent decisions as to handling, recycling, or disposal.

Society of Plastic Inc. resin codes are easily recognized by the consumer. These are the numerical designations within chasing arrows. At the present time there is not a separate resin

code for PLA (bio-resins). PLA (bio-resins) are classified as #7 (Other). Nor are there specific indications for additives or blends. The Society of Plastics resin code symbols are common for plastic packaging materials; for example:



ASTM D1972 standard specifies a resin code that provides substantially more information regarding the plastic resin, including blends and additives. ASTM D1972 labeling protocols are not common for packaging materials; however, they are recognized and utilized in the construction industry and other industry sectors. Many construction products are labeled according to ASTM D1972. Such detailed information is anticipated to be necessary data for future deconstruction (and recycling) efforts. Therefore, plastic construction products and plastic components of assemblies should be labeled in accordance with ASTM D1972. Example for a polypropylene containing 30 mass percentage of mineral powder use:

>PP-MD30<

- a. Verify that plastic products, including plastic components in assemblies, to be incorporated into the Project are labeled in accordance with ASTM D1972. Where products are not labeled, provide product data indicating polymeric information in Operation and Maintenance Manual.
 - 1) Products made from compositions containing a single filler, reinforcing, or other modifying material in a concentration of more than one percent by mass shall be marked with the abbreviated term for the polymer, followed by a dash, then the abbreviated term or symbol for the additive, with its percentage by mass, arranged as shown in the example and set off with brackets. For example, a polypropylene containing 30 mass percentage of mineral powder use would be labeled:
>PP-MD30<

- D. Test Report: Manufacturer's test report on water samples taken at Project site along with recommendations resulting from these tests.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has specialized in installing waterproofing systems similar to those required for this Project and who is licensed by or otherwise acceptable to manufacturer of primary materials.
- B. Water Samples: Obtain water samples from Project site at approximate locations where waterproofing will be installed and have waterproofing manufacturer test for acids, alkalis, brine, or other contaminants that may inhibit performance of waterproofing materials. Comply with manufacturer's written instructions resulting from these tests.

PART 2 PRODUCTS

SPECIFIER NOTE:

EO 13423 includes requirements for Federal Agencies to use “sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products”

Specifically, under the Sustainable Building requirements per Guiding Principle #5 Reduce Environmental Impact of Materials, EO13423 directs Federal agencies to “use products meeting or exceeding EPA’s recycled content recommendations” for EPA-designated products and for other products to “use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials in the project.”

Executive Order 13514; *Federal Leadership in Environmental, Energy, and Economic Performance*; was signed on October 5, 2009. <http://www.ofee.gov/execorders.asp> It expands upon the environmental performance requirements of EO 13423. http://www1.eere.energy.gov/femp/regulations/printable_versions/eo13423.html

EO 13514 sets numerous federal requirements in several areas, including sustainable buildings and communities. Federal agencies must implement high performance sustainable federal building design, construction, operation and management, maintenance, and deconstruction, including:

- Ensuring all new Federal buildings, entering the design phase in 2020 or later, are designed to achieve zero net energy by 2030.
- Ensuring all new construction, major renovations, or repair or alteration of Federal buildings comply with the Guiding Principles of Federal Leadership in High Performance and Sustainable Buildings <http://www1.eere.energy.gov/femp/pdfs/mouhighperfsustainfedfacs.pdf>
- Ensuring at least 15% of existing agency buildings and leases (above 5,000 gross square feet) meet the Guiding Principles by fiscal year 2015 and that the agency makes annual progress towards 100% compliance across its building inventory.

Additionally, for USDA-designated biobased products, Federal agencies must use products meeting or exceeding USDA’s biobased content recommendations; and for other products, biobased products made from rapidly renewable resources and certified sustainable wood products.

2.1 MATERIALS

A. **[Rubber] [Plastic] [xxxx]:**

SPECIFIER NOTE:

Green building rating systems often include credit for materials of recycled content and may distinguish allowable credit for post-consumer and post-industrial (or pre-consumer) recycled content. USGBC-LEED™ v3, for example, factors 100 percent of post-consumer recycled content but only 50 percent of pre-consumer (post-industrial) recycled content into calculations for its recycled content materials credit. LEED v3 grants one credit to a project for using materials with recycled content such that the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 10 percent of the total value of the materials in the project; 10% (post-consumer + 1/2 post-industrial). It grants an additional point for 20% (post-consumer + 1/2 post-industrial).

Green Globes US also provides points for reused building materials and components and for building materials with recycled content.

Recycled content is typically determined by calculating the weight of the recycled material divided by the total weight of the product and expressed as a percentage by weight. (The recycled content “value” of a product as assessed under LEED is determined by multiplying the recycled content percentage and the cost of the product.)

Verify with manufacturer for product availability and recycled content.

1. Recycled Content: Minimum [5] [10] [xxxx] percent post-consumer recycled content, or minimum [20] [40] [xxxx] percent pre-consumer recycled content at contractor's option.
- B. Bentonite Waterproofing: Provide high-swelling, sodium bentonite containing a minimum of 90 percent montmorillonite and a maximum of 10 percent unaltered volcanic ash or other native sediments.
 1. Free Swell Rating: Two grams of granular bentonite sifted into deionized water shall swell to occupy a minimum volume of 16 cubic centimeters.
 2. Active Ingredient: Hydrous silicate of alumina, composed of the following chemical percentages and their allowable deviations:

Silica	61.0 +/- 3.0
Alumina	19.5 +/- 1.5
Iron oxide	5.0 +/- 1.0
Magnesia	2.8 +/- 0.4
Soda and potash oxides	2.4 +/- 0.7
Calcium oxide	0.6 +/- 0.5
Molecular water	6.1 +/- 0.6
Minor	2.6 +/- 0.6
 3. Bentonite Panels: Provide panels containing bentonite material sealed between two layers of absorbent material, with a minimum of 4.9 kilograms one pound of evenly distributed bentonite per square meter foot. The bentonite panels shall be 1200 mm 48 inches square by a minimum of 5 mm 3/16 inch thick, in dry state.
 4. Bentonite Mineral-Base Jelly: Provide material meeting requirements of ASTM D 217 for a worked penetration range of 215 to 275. Jelly shall contain 45 percent controlled, partially hydrated, high-swelling sodium bentonite by weight with minimum pH. of 8.8, no free water, and 25 percent or more residual swell.
 5. Wall-to-Footing Bentonite Joint Strip: Manufacturer's standard 2-inch-diameter, water-soluble tube containing approximately 1.5 lb/ft. of bentonite, hermetically sealed, designed specifically for placing on wall footings at line of joint with exterior base of wall.
 6. Preformed Waterstop: Flexible strip of bentonite waterproofing compound in cartridge or coil form, designed specifically for vertical and horizontal joints in concrete construction.

2.2 ACCESSORIES

SPECIFIER NOTE:

For current designations under the Federal Biobased Products Preferred Procurement Program (FB4P), refer to www.biobased.oce.usda.gov. As of January 4, 2010, the Federal Register includes designations for approximately 60 product types. The requirements for purchasing biobased items apply to those items directly purchased by the federal agency. Under a construction contract, the contractor's use of hydraulic fluid in its bulldozers and backhoes is incidental to the purpose of its contract, so the contractor is not required to use biobased hydraulic fluids. The Office of the Federal Environmental Executive (OFEE) recommends that agencies encourage the use of these items, however.

Currently designated items that affect construction include:

- Roof Coatings
- Water Tank Coatings
- Adhesive and Mastic Removers
- Composite Panels
- Fertilizers
- Plastic Insulating Foam

- Carpet and Upholstery Cleaners
- Carpets
- Dust Suppressants
- Packaging Films
- Glass Cleaners
- Hydraulic Fluids – Stationary Equipment
- Wood and Concrete Sealers
- Cleaners

The USDA currently has identified about 150 items for which it is collecting test data needed for the additional designations of items that will extend preferred procurement status to include all qualifying biobased products.

Proposed minimums for biobased content of building materials include the following:

- Composite Panels (non-structural): 26 percent

- A. Protection Board: As recommended by waterproofing manufacturer. Coordinate with requirements of Section 07 20 00 (07200) – Thermal Protection.
 - 1. Biobased Content: Minimum **[26] [xxxx]** percent biobased material.
- B. Termination Bar: Extruded- or formed-aluminum bars with upper flange to receive sealant.
 - 1. Recycled Content: Minimum **[5] [10] [xxxx]** percent post-consumer recycled content, or minimum **[20] [40] [xxxx]** percent pre-consumer recycled content at contractor's option.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate preparations affecting performance of bentonite waterproofing.
 - 1. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Verify that substrate is complete and that all work that will penetrate waterproofing is complete and rigidly installed. Verify locations of waterproofing termination.

3.2 PREPARATION

- A. Coordinate work in the vicinity of waterproofing to ensure proper conditions for installing the waterproofing system and to prevent damage to the waterproofing after installation.
- B. Formed Concrete Surfaces: Remove fins and projections. Fill voids, rock pockets, form-tie holes, and other defects with bentonite mastic or cementitious patching material according to manufacturer's written instructions.
- C. Excavation Retention System or Stable Excavation: If water is seeping, use plastic sheets or other suitable means to prevent wetting the bentonite waterproofing. Fill minor gaps and spaces **1/8 inch** wide or wider with wood, metal, concrete, or other appropriate filling material. Cover or fill large voids and crevices with cement mortar according to manufacturer's written instructions.

3.3 INSTALLATION

- A. Install waterproofing and accessories according to manufacturer's written instructions, standard details, and recommended practices.
- B. Apply sealants to comply with requirements specified in Section 07 92 00 (07900) - Joint Sealants and bentonite panel manufacturer's written instructions.
- C. Bentonite: Apply bentonite waterproofing **[on exterior surfaces of below grade [masonry] [and] [concrete] walls [and wall footings] [and] [under concrete slabs,] [pile caps,] [grade beams,] [footings,] [elevator pits] [and] [against bulkhead walls] [where indicated]**. Securely fasten panels over all construction joints and all expansion joints. Thoroughly pack all through-wall openings and penetrations with bentonite gel or granular bentonite, or both, prior to placement of bentonite panels.
 - 1. Unless otherwise indicated, install bentonite waterproofing panels with ends and edges lapped a minimum of **1-1/2 inches**. Stagger joints in adjoining panel rows.
 - 2. Apply panels starting at bottom of wall; lap ends and edges with vertical joints staggered. Secure with fasteners or adhesive recommended in writing by manufacturer. Extend to bottom of footing, grade beam, or wall.

3.4 PROTECTION

- A. Protect waterproofing from damage and wetting before and during subsequent construction operations. Repair punctures, tears, and cuts according to manufacturer's written instructions.
- B. If backfill is not immediately applied, protect panels against precipitation by covering temporarily with polyethylene. Replace damaged panels with new panels before and during backfilling and compaction.
- C. Compact backfill to at least 85 percent of ASTM D1557 maximum density.

END OF SECTION