

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.

.....

SECTION 06 90 00 (SECTION 06700) – ALTERNATIVE AGRICULTURAL PRODUCTS

SPECIFIER NOTE:

resource management The number of species of plants and animals upon which society depends is exceptionally small relative to the number of species that are available and adequate to the purpose. By promoting the use of alternative agricultural products, the building industry can not only promote less toxic, renewable resource, carbon sinking products, but revitalize the market interest in a variety of flora and help to preserve the earth's biodiversity. Alternative agricultural products refers to a growing market segment for the building industry (and other industries) that is capitalizing on little known and underutilized species. Consider alternate, non-endangered/non-threatened species. The Convention on International Trade and Endangered Species (CITES) lists wood species that are endangered or threatened.

Alternative agricultural building products include alternative lumber species and non-timber products fabricated from wheat straw, kenaf fibers, soy resins, and bamboo. Starch-based plastics have penetrated the consumer market and are gaining ground in packaging. There are starch based plastics and cellulose aggregate additives in development that might have potential for the construction industry. Alternative fuels and the systems that utilize them should also be considered. EPA promotes and expands the use of environmentally beneficial alternative fuels and vehicles by providing the states with tools, such as benefits models, State Implementation Plan Credits, and the Clean Fuels Fleet program. Refer to www.epa.gov/otaq/consumer/fuels/altfuels/altfuels.htm for additional information.

It should be recognized that agricultural processes are not without potential for environmental impacts, including soil erosion, non-point source pollution, and destruction of habitat. For additional information, refer to the U.S. Department of Agriculture Natural Resources Conservation Service; Conservation Reserve Program which: reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources it encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. <http://www.nrcs.usda.gov/programs/crp/>

Also, refer to the EPA's Draft Report on the Environment, Section 5.3 – What is the Ecological Condition of Farmlands? <http://www.epa.gov/indicate/roe/pdf/tdEco.pdf>

toxicity/IEQ: Most of the alternative agricultural products are designed to replace petroleum and synthetic chemical based products and have been specifically developed to be environmentally friendly.

performance: Typically, only a limited number of wood species (relative to the tremendous diversity available) have approval by governing agencies based upon their documented structural characteristics (bending strength, compression strength, etc.), and by millwork fabricators based upon their physical characteristics (grain, luster, heartwood color, sapwood color, texture, odor, ease of drying, weathering, etc.) and woodworking characteristics (blunting effects, boring, carving, cutting resistance, gluing, mortising, molding, nailing, painting, planning, polishing, sanding, screwing, varnishing, veneering, etc.). Introducing alternative species for structural purposes may require a variance from the building department.

Alternative agricultural products are often based in indigenous materials. Indigenous materials include: straw, wool, coconut fibers, cactus juice, leaves, ice, and sod. Most governing agencies classify

“indigenous” construction as “alternative” construction. Use of alternative or indigenous building materials and methods may require a variance from the building department. Most alternative agricultural products perform adequately to the purpose for which they were designed. In some instances, however, the manufacturer does not have all the testing data typically used to describe performance requirements (ie: compression, screw pull-out, etc). Furthermore, the standard test methods may not be appropriate to the alternative of material. ASTM, ISO, and other standards organizations are beginning to address this need.

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Straw panels.
 - 2. Straw particleboard.
 - 3. Biocomposite.

- B. Related Sections:
 - 1. 06 05 73 (06070) - Wood Treatment.
 - 2. 06 10 00 (06100) – Rough Carpentry.
 - 3. 06 16 00 (06160) – Sheathing.
 - 4. 06 20 00 (06200) – Finish Carpentry.

1.2 DEFINITIONS

- A. Definitions pertaining to sustainable development: As defined in ASTM E2114.

SPECIFIER NOTE:

The terms “alternative agricultural” “biobased” and “rapidly renewable” when used in reference to building products tend to be used interchangeably.

- B. Alternative Agricultural Products: Bio-based industrial products (non-food, non-feed) manufactured from agricultural materials and animal by-products.

- C. Biobased Materials: As defined in the Farm Security and Rural Investment Act, for purposes of Federal procurement of biobased products, “biobased” means a “commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials.” Biobased materials also include fuels, chemicals, building materials, or electric power or heat produced from biomass as defined by The Biomass Research and Development Act of 2000.

SPECIFIER NOTE:

According to the January 11, 2005 U.S. Department of Agriculture (USDA) Guidelines for Designating Biobased Products for Federal Procurement, biobased content is a percentage of the carbon in the product. The USDA will recommend the minimum biobased content of biobased products designated in the Federal Biobased Products Preferred Procurement Program, 7 CFR Part 2902. For current designations under the Federal Biobased Products Preferred Procurement Program (FB4P), refer to www.biobased.oce.usda.gov.

- 1. Biobased content: The amount of biobased carbon in the material or product as a percentage of weight (mass) of the total organic carbon in the material or product.

SPECIFIER NOTE:

A renewable resource can be exhausted if improperly managed. However, a renewable resource can last indefinitely with proper stewardship. Examples include: trees in forests, grasses in grasslands, and fertile soil. USGBC-LEED uses the term in reference to plants.

- D. Renewable resource: a resource that is grown, naturally replenished, or cleansed, at a rate which exceeds depletion of the usable supply of that resource.
 - 1. Rapidly renewable material: Material made from plants that are typically harvested within a ten-year cycle.

1.3 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:

Green building rating systems may include credit for low emitting materials. USGBC-LEED™ v3, for example, includes credits for low-emitting materials, including: adhesives and sealants, paints and coatings, carpets, and composite wood and agrifiber products. Under LEED™ v3, adhesives and

sealants are to comply with California's South Coast Air Quality Management District (SCAQMD) #1168; aerosol adhesives are to comply with Green Seal GS-36; interior architectural paints are to comply with Green Seal GS-11; anti-corrosive paints are to comply with Green Seal GS-03 (note – Green Seal has withdrawn GS-03; as of November 2008, anti-corrosive paints are included in a revised GS-11); clear wood finishes are to comply with SCAQMD #1113; carpet with the Carpet and Rug Institute (CRI) Green Label Plus; carpet cushion with CRI Green Label program; and, composite wood and agrifiber products are to contain no added urea-formaldehyde.

As per USGBC published Credit Interpretations, the credits for low-emitting materials are directed towards interior, site-installed (i.e. not prefabricated) products. Verify project requirements for low VOC roofing products.

Both the Adhesive and Sealant Council (ASC) and the SCAQMD have indicated that low VOC adhesives may have performance difficulties in extreme temperature and humidity conditions.

ANSI A208.1, the Composite Panel Association's Standard for Particleboard, includes maximum formaldehyde emissions for different grades of particleboard; ANSI A208.2, the Composite Panel Association's Standard for MDF, covers MDF for interior applications and includes maximum formaldehyde emission level for different grades of MDF.

3. VOC data:

a. Adhesives:

- 1) Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
- 2) Submit Green Seal Certification to GS-36 and description of the basis for certification.
- 3) **[Submit manufacturer's certification that products comply with SCAQMD #1168.] [Submit manufacturer's certification that products comply with SCAQMD Rule 1168 in areas where exposure to freeze/thaw conditions and direct exposure to moisture will not occur. In areas where freeze/thaw conditions do exist or direct exposure to moisture can occur, submit manufacturer's certification that products comply with Bay Area AQMD Reg. 8, Rule 51 for containers larger than 16 oz and with California Air Resources Board (CARB) for containers 16 oz or less.]**

- b. Prefabricated Composite Panels and Sheathing: Provide documentation that composite products **[are third-party certified as meeting ANSI standard requirements for formaldehyde emissions] [contain no added urea-formaldehyde resins.]**

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/farbill/)) <http://www.usda.gov/farbill/> 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.

4. 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.

1.4 QUALITY ASSURANCE

- A. VOC emissions: Provide low VOC products.
1. Adhesives and sealants: Comply with California's South Coast Air Quality Management District (SCAQMD) #1168
 2. Aerosol adhesives: Comply with Green Seal GS-36
 3. Clear wood finishes: Comply with SCAQMD #1113

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."

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.

And, under the Sustainable Building requirements per Guiding Principle #4 Enhance Indoor Environmental Quality, EO13423 directs Federal agencies to use "materials and products with low pollutant emissions, including adhesives, sealants, paints, carpet systems, and furnishings."

2.1 MATERIALS

SPECIFIER NOTE:

For current designations under the Federal Biobased Products Preferred Procurement Program (FB4P), refer to www.biobased.ocs.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.

- A. Strawboard Sheathing:
 - 1. Biobased Content: As specified for engineered wood products in Section 06 16 00 (06160), Sheathing.

- B. Compressed Straw Wall Panels: Solid straw panels compressed with heat and pressure for interior partitions, surfaced with **[paper to receive finish] [other surface finish as specified]**. Panels are to be pre-cored their entire length with two 3/4" holes at 12" on center for electrical utilities.
 - 1. Biobased content: As specified for engineered wood products in Section 06 16 00 (06160), Sheathing.

- C. Biocomposite: Product shall be **[Class I] [Class II]** fire-rated. Color and style as selected by Architect from manufacturer's standards.
 - 1. Biobased Content: As specified for engineered wood products in Section 06 16 00 (06160), Sheathing.

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.

- 2. 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.

- D. Landscaping materials, including mulch: As specified in Division 29 (2).

- E. Soy-based form release agent: As specified in Division 03 (3).

- F. Furniture with biobased adhesive: As specified in Division 12 (12).

- G. Ceiling Tile: As specified in Division 09 (9).

2.2 ACCESSORIES

- A. As specified in Section 06 10 00 (06100) – Rough Carpentry.

PART 3 - EXECUTION

3.1 INSTALLATION OF SHEATHING

- A. Install in accordance with manufacturer's printed instructions and as specified in Section 06 16 00 (06160) - Sheathing.

3.2 INSTALLATION OF COMPRESSED STRAW WALL PANELS

- A. Install in accordance with manufacturer's printed instructions and as follows:
 1. Verify that receiving surface is clean, dry, and ready to receive panels.
 2. Layout and secure metal channel track to floor and ceiling.
 3. Slide compressed straw wall panels into track, securing with **[self tapping screws]** at **[12"]** on center, both sides.
 4. Panel Joints: Join with **[manufacturer's prefabricated joint clips]** **[gypsum board tape and mud compound]** **[other as specified]** and prep to receive finish material.

3.3 INSTALLATION OF BIOCOMPOSITE

- A. Install in accordance with manufacturer's printed instructions and as follows:
 1. Provide clear, water-resistant sealer on exposed surfaces.

3.X SITE ENVIRONMENTAL PROCEDURES

- A. As specified in Section 06 10 00 (06100) – Rough Carpentry.

END OF SECTION