

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 04 20 00 (SECTION 04200) – UNIT MASONRY**

**SPECIFIER NOTE:**

*resource management:* Mining of clay, shale, soil, sand, limestone, and metal ores can produce soil erosion, pollutant runoff, and habitat loss. Clay masonry firing produces fluorine and chlorine emissions. Manufacturing waste is typically recycled in new units. Salvaged units are available in many communities. Industrial waste by-products can be used for aggregate in concrete block (although documenting this can be difficult) including: air cooled slag, cinders or bottom ash, ground waste glass and concrete, granulated slag, and expanded slag. Refer to Section 03 30 00 (03300) – Cast-in-Place Concrete for information regarding concrete materials.

*toxicity/IEQ:* Masonry is considered to be relatively inert. Refer to Section 03 30 00 (03300) - Cast-In-Place Concrete for information regarding portland cement. VOCs may be emitted due to additives, sealers and coatings. Because oil is commonly added (and burned away) during the production of clay masonry, the manufacturer can use oil contaminated soil that is free from hazardous contaminants. Although radon has been associated with certain soils, bricks do not produce abnormal exposure to radon gas except in rare situations.

*performance:* Performance is comparable for green methods and standard methods. Traditional masonry construction provides thermal mass and durable construction. Masonry construction, when roughly textured, ribbed or fluted, can help reduce noise by dispersing sound waves. Consider interlocking concrete masonry units for landscape retaining walls; interlocking concrete masonry units do not require mortar and are easy to disassemble and reuse. Masonry is reusable and easily recyclable. Light-weight concrete masonry units are available that have superior thermal and fire resistive properties. Segmental retaining walls and interlocking concrete pavement components for earth retention and pavement applications, that do not require the use of mortar are manufactured with similar environmental benefits as concrete masonry units.

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes:
  - 1. Clay masonry.
  - 2. Concrete masonry.
  - 3. Mortar, grout, and masonry accessories.
  
- B. Related Sections:
  - 1. 03 40 00 (03400) – Precast Concrete: Autoclaved Aerated Concrete (AAC) Units.

**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.

- 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. Documentation of manufacturer's take-back program for **[masonry units, full and partial] [packaging] [xxxx]**. Include the following:
  1. Appropriate contact information.
  2. Overview of procedures.
    - a. Indicate manufacturer's commitment to reclaim materials for recycling and/or reuse.
  3. Limitations and conditions, if any, applicable to the project.

## 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](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/mouhighperfsustainfedfac.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.

## 2.1 CLAY MASONRY

### 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.

#### A. Clay Masonry Units:

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.

## 2.2 CONCRETE MASONRY

#### A. Concrete Masonry Units:

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.

## 2.3 MORTARS, GROUTS, ACCESSORIES

#### A. Portland Cement:

1. Fly Ash: Comply with ASTM C593.
  - a. 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.
2. Slag: Comply with ASTM C989; Grade **[80] [100] [120]**.

- a. 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. Plastic Fabrications: As specified in Section 06 60 00 (06600) – Plastic Fabrications.

### PART 3 - EXECUTION

#### 3.X SITE ENVIRONMENTAL PROCEDURES

- A. Waste Management: As specified in Section 01 74 19 (01351) – Construction Waste Management and as follows:
  - 1. Mixing equipment: Minimize water used to wash equipment.
  - 2. Broken, waste masonry units: May be used as non-structural fill **[if approved by Architect/Engineer]**.
  - 3. Cured, crushed waste mortar: May be used as non-structural fill **[if approved by Architect/Engineer]**.
  - 4. Coordinate with manufacturer for **take-back program**. Set aside **[scrap] [packaging] [xxxx]** to be returned to manufacturer for recycling into new product.

END OF SECTION