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Green Specs / LEED Specs

Sustainable Products, Standards and Guidelines

Which products are green, greener, greenest? LEED specs and green specs are different! Are you conversant with the 15 LEED credits that are heavily dependent on product selection? Did you know the definitions of FSC-certified wood, Green Label Plus carpeting, synthetic gypsum, and commissioning have changed recently? Learn the most effective ways to include LEED requirements in your specifications and when to choose green over LEED. We present lessons learned from specifications prepared for over 125 projects seeking USGBC LEED certification and 40 projects that are already certified. Handouts include a green project checklist and short-form specifications for over 100 green products. Our workshop leader is the author of the original GreenSpec.

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GREEN SPECS / LEED SPECS
by Mark Kalin FAIA FCSI LEED

Early in 1995, Kalin Associates set out to create a standard specification that could be used by design professionals to select and specify a wide range of green products. As a first step, we sent 6,500 letters to building product manufacturers asking them to send product literature on their “green products.” Over 600 manufacturers responded, but primarily with their standard literature. After a long sorting process, 400 products were selected and compiled to create the first *GreenSpec – Specifications for Environmental Sustainability*.

There seemed to be a burgeoning interest in green building products, propelled by environmentalists, green architects, owners, and even President Clinton’s Council on Sustainable Development, which had this mission statement:

“Our vision is of a life-sustaining earth. We are committed to the achievement of a dignified, peaceful, and equitable existence. We believe a sustainable United States will have an economy that equitably provides for satisfying livelihoods and a safe, healthy, high quality life for current and future generations. Our nation will protect its environment, its natural resource base, and the functions and viability of natural systems on which all life depends.”

Nearly eleven years later, what has happened? Truthfully, based on reviewing project specifications for over 1,000 projects, green battles are being won and the press is quick to publicize success, but the war is going poorly. Not enough firms follow up on their green commitment in the specifications and on the jobsite. Improperly performed value engineering limits product selection. Lack of reliable and detailed information on green attributes from product manufacturers is a real problem. Remember, specifications are the neck of the funnel for written communication between the designer and the contractor. The contractor needs to know what products to buy for the project, and the owner and architect are in charge of product selection.

This document provides information to help building design professionals specify green building products. Topics include:

- Building Product Manufacturers and Green Products
- What Are Green Products?
- Who Selects Green Products?
- When Are Green Products Selected?
- Green Product Checklist
- Green Specs
- Greening Your Firm

Building Product Manufacturers & Green Products

Claims by the product manufacturer that their products are environmentally friendly must be carefully evaluated. Several cases in point:

Claim 1: Sheet lead is a green product. When we requested information from product manufacturers, one of the first responses was from the Lead Institute. They maintained that lead was a green product because it was a natural material and had a successful history of long-term performance. They recommended we include lead in our list, but we didn't. Is lead a green product? Do we accept the claims of the supplier, which include that there are very few, if any, EPA regulations against using lead in buildings? Or do we consider that lead content is regulated in commercial and residential paint products, as even small chips of lead paint are believed to cause brain damage in young children? Or that installers are required to regularly have their lead levels checked? Or that lead doesn't migrate in the soil, and its use for hundreds of years verifies the manufacturer's claims?

Our Opinion: Lead is not acceptable in an elementary school or any location where a young child can touch it. As major producers continue to eliminate lead from their product lines, the choice will be made for us, and alternative alloys with tin and zinc will replace lead.

Claim 2: Carpet pad manufactured from virgin urethane is greener than rebonded carpet cushion. Manufacturers of carpet cushion claim less energy is required to manufacture carpet pad from virgin urethane than the energy and adhesives required to fabricate rebonded carpet pads. Should we only recommend the use of virgin urethane pads?

Our Opinion: Virgin urethane pads have more uniform density. Don't feel obligated to use rebonded carpet pads. Depending on your perspective, both may be seen as green.

Claim 3: Latex paints are a greener choice than oil-based paints with higher Volatile Organic Content (VOC) emissions. Water-based latex paints are considered greener than oil-based paints. However, manufacturers of oil-based paint claim longer service life and less repainting over the life cycle of the building. The cleanup of oil-based paints is controlled, while latex paint waste is frequently flushed down drains where the algacides and fungicides in the paint kill the bacteria at the sewage treatment plant. Should we use oil-based paints?

Our Opinion: Zero-VOC and latex formulations have advanced paint technology significantly. Since most commercial repainting is done for new tenants or a new color scheme, longer service life isn't necessarily the determining factor.

Claim 4: Linoleum is green because it is made of natural components. The last linoleum plant in the U.S. closed in the 1930s (as vinyl asbestos tile pushed it from the marketplace), and now linoleum is manufactured primarily in Europe. Should we count the embodied energy in manufacturing as well as the fuel costs of transportation in our product selection? The manufacturing process for linoleum is energy-intensive, and is the extra cost worth higher wear performance?

Our Opinion: Although an increase for the demand in linoleum has instigated manufacturing in the U.S. again, selection based on green criteria should include more than just the use of natural ingredients. It's really the designer's choice.

Claim 5: PVC is a green choice for roofing and waterproofing. Use of PVC for roofing and waterproofing in Europe is considered a hazard, but high-performing PVC systems are readily available in the U.S. PVC

didn't exist 80 years ago, but now each of us has a measurable amount of PVC in our bodies. Do we know the answer?

Our Opinion: PVC roofing and waterproofing performs well, as the intended purpose is to keep the building dry. If your goal is to reduce the amount of PVC in your building, start on the inside rather than the outside with PVC-free computer cases, pens, chairs, and furniture (if you can find them). Without plastics, the planet could not sustain its current population.

Claim 6: Forest Stewardship Council (FSC) certified wood is the green choice for your projects. There's even a USGBC LEED point you can earn for using certified wood. However, certified wood in architectural species has thus far been available only at a premium price. Most of the certified forests are mid-sized, and not all species are readily available. The program is excellent, but critics such as the Canadian Government and others believe they have been managing their forests for decades, and the wood they produce is green without being FSC certified. On a recent LEED project, once it was determined that 50 percent of the wood would not be certified, the requirement was abandoned for the entire project. Future versions of LEED are considering raising the percentage certified wood in order to obtain this credit.

Our Opinion: Why should only one certification agency be included in LEED? The Sustainable Forestry Initiative (SFI), developed by members of the American Forest and Paper Association, is one of several with legitimate credentials. The difference between 'green' and 'LEED' becomes more apparent.

Green Products: Identifying green products, just like defining sustainability, is an exercise in subjectivity. There are many different definitions of green, such as being 100% recycled and recyclable, using less energy in manufacture, improving the building users' health through reduction in toxic materials, or employing more energy-efficient methodologies for heating, cooling, and lighting.

Green is all of the above and more. By our definition, green products are those which maintain or improve the human environment while diminishing the impact of their use on the natural environment—in other words, *sustainable*.

Materials in use for sustainable design run the gamut from cotton insulation, to recycled asphalt paving, to photovoltaic arrays. Many of the products offer a green component that is at best incremental, offering performance or some other characteristic that is only slightly better than the conventional product. Use of these products by a small percentage of designers and contractors results in a positive effect that is barely measurable; common usage can make the effect global and lasting.

In our experience, green products fall into six categories, and many products have benefits in multiple categories. Note that these categories are somewhat subjective, and a product that falls into three categories is not necessarily any more green than a product that falls into only one category.

Green Process: The product is manufactured with consideration for exposure of workers to chemicals, source of materials, energy-efficient production methods, use of recycled materials in packaging, reclaiming manufacturing waste, and prudent use of energy. Since many of these approaches actually save the manufacturer money, these principles are incorporated as manufacturing facilities are upgraded. Even manufacturers of plastics can effectively claim their manufacturing as a green process.

Improved Sustainability: The product is renewable and makes good use of available resources. Use of wood from well-managed forests for building framing is an example of renewable and sustainable product selection. Sustainability considers the whole instead of specifics, emphasizing relationships rather than pieces in isolation. Sustainable design considers environmental and human health and well-being, in addition to the traditional criteria of function, cost, and aesthetics. While environmentalists have focused attention on the degradation of natural systems, advocates of sustainability generally believe in trading destructive behaviors for healthy ones and developing in ways that are beneficial ecologically and economically.

Sustainability can be illustrated by systems as well as individual products, such as those used to improve the energy performance of the building. For example, the recent Energy Code Update to the *Massachusetts State Building Code* requires an air barrier in the exterior wall assembly and insulation located outboard of the metal studs in a brick veneer/steel stud wall assembly. An air barrier can be established simply by taping the joints and perimeter of the exterior gypsum sheathing, but only by using a tape with a very low permeability and a high-performing permanent adhesive. Many architects have chosen to put a continuous air and vapor barrier membrane over the entire wall, again improving the long-term energy performance of the building and reducing the risk of premature failure of the exterior wall. Since the insulation is outside of the membrane, this allows the elimination of fibrous insulation in the metal stud cavity and the vapor barrier behind the interior drywall. Some prefer to limit fibrous insulation, and most acknowledge that an interior vapor barrier is frequently breached during installation or by utility penetrations. (For construction details illustrating the concept, refer to www.pacerepresentatives.com, a manufacturers' collaborative internet site.) The assembly improves the longevity of the exterior wall, decreases the risk of mold in the exterior wall, and improves the energy performance of the building.

Recycled Content: The product is fabricated with post-consumer materials or post-industrial by-products. Many products, ranging from steel, to finish materials, to carpet cushion, are manufactured with recycled content. For example, synthetic gypsum board is manufactured from gypsum deposited on the interior of smokestacks at power plants during scrubbing. This gypsum is chemically the same as naturally occurring gypsum and does not have to be mined. Considering the overall energy consumption and shipping costs of using synthetic gypsum board, it makes most sense to use it within 500 miles of its manufacturing location. One large gypsum manufacturer claims that 30% of its overall production is synthetic gypsum board. The company recommends that designers consider using their standard products if the project location is more than 500 miles from a synthetic gypsum plant, because the cost of shipping will outweigh the advantage of using recycled materials. Other post-consumer materials include items such as plastic wood products fabricated using recycled plastic bottles. Products such as structural steel are always fabricated with both post-industrial (waste scrap) and post-consumer (salvaged steel) content.

Recyclable: The product can be reused or reprocessed after use and refabricated. We are most familiar with recyclable soda cans and bottles, but the same can apply to asphalt paving, masonry, metal framing, insulation, toilet compartments, and even carpet. Extruded polystyrene manufacturers claim their product can be reused in roofing assemblies, since the material is not affected by moisture. Manufacturers of gypsum wallboard provide facilities to recycle construction waste from their products.

Low Toxicity: The product is less toxic than comparable products used for the same purpose. Toxic fumes from site-mixed products, coatings, adhesives, and sealants containing such chemicals as formaldehyde and styrenes are a real threat to health, especially in remodeling projects where the building may be occupied while the work is being performed. Exposure to such products as carpet adhesives and high-performance paints has caused problems ranging from discomfort to long-term disability. All products are now required to have Material Safety Data Sheets (MSDS) listing their components and potential hazards, but most architects have no training in interpreting them. Many hospitals and some computer companies require MSDS submittals before they will allow a product at their construction site or manufacturing facility. Wood particleboard manufactured with resins that do not contain formaldehyde offers a less toxic environment for chemically-sensitive individuals and even for artwork stored in museums.

Biodegradable: The product returns to the earth naturally under exposure to the elements. The abandoned barn in the field eventually collapses and disappears. The subway car is dumped into the ocean as a marine habitat, and over time the steel corrodes. We expect our buildings to last a lifetime, but it is not necessary for products to last thousands of years.

Who Selects Green Building Products?

Product selection is different from specification writing. The specifier may know the method to communicate product selection to the contractor, but cannot complete the specification until a product is selected. A frequent criticism of specifications by contractors is that there are pages and pages of specs, but no product specifics.

Selection of building products is difficult. Considerations of cost, performance, and aesthetics are critical. For a detailed methodology of product selection by performance or prescriptive methods, refer to the *Construction Specifications Institute Manual of Practice* at www.csinet.org. The same methodology applies to green products. Who selects them?

The Owner: Corporate owners and owners of retail chains choose products frequently. Their experience with hundreds of locations gives them the knowledge of what works. One retail chain delivers the carpet adhesive to each of their stores under construction, as lawsuits from tripping hazards are a major concern. Most individual building owners rarely select products and usually allow the architect to make product selections. Institutional projects sometimes come with faculty or student committees who champion green product research and selection.

The Architect: The architect's license addresses the need to protect public health, safety, and welfare. Product selection is largely the architect's responsibility. If a waterproofing material must withstand 50 feet of hydrostatic head, the architect must find a product that complies. If the building code requires fire-retardant treatment for roof sheathing, it is the architect's responsibility to specify a fire-retardant product. The contractor is not responsible for code compliance in product selection. Since many green products are relatively new, the architect must perform significant research or find verification that the product is suitable and code-compliant.

The Specification Writer: There are over 1,700 products in a typical project specification for a building. The design architect generally selects products that meet the most critical performance requirements or products of visual importance. In reality, the specification writer selects many of the other products as

well, based on the materials already researched in their master specifications, recent projects, or field experience. For most manufacturers, it is important to have their name included in the specifications. A specifier who finds a green product that is suitable for use may incorporate that product into the master specification, and use it on every project. In reality, the specification writer shares the responsibility for product selection with the architect.

The Contractor/Subcontractor: Contractors and subcontractors have significant product knowledge. They can assist the architect or specification writer during product selection and specification and frequently suggest substitutions during construction. The value of their contribution to the product selection process should not be underestimated, as one specific product can succeed or fail depending on the situation. A major building product manufacturer indicated that six out of seven product failures they investigate are attributed to inappropriate use of the product. For example, moisture-resistant gypsum board should not be used for ceilings in toilet rooms. The product was researched, specified, bid, purchased, and installed—and then failed because it was the wrong product for that purpose. There are no spec police; experienced professionals should make product selections.

The Product Manufacturer: The product manufacturer is the expert. The architect, specifier, or contractor never know the product as intimately as its manufacturer. The manufacturer should assist in recommending green products based on their knowledge of where and how the product is to be used. For example, a carpet installation on a slab-on-grade will require a vapor barrier, while a carpet installation on an elevated slab may not; a low-odor adhesive may have a more limited installation temperature range than that of a standard adhesive; and water-based epoxies may be suitable for toilet rooms, but not for the food service area.

When are Green Products Selected?

There are five phases in the typical construction project, and selection requirements for green products depend on the phase. The following selection process should be considered for all products, green or not.

1. **Schematic Design:** Prepare outline specifications or a project description. Determine the owner's requirements for green, any budget impact, and possible need for green products to meet industry green evaluation programs, such as the U.S. Green Building Council LEED Certification or GreenGlobes. Green products and alternative mechanical and electrical systems often involve an initial premium price, with justification usually based on life-cycle costs.
2. **Design Development:** Update outline specifications or prepare a draft of full specifications. Verify project requirements, including the essential evaluation of the green products' performance requirements. Explore information on product options and features.
3. **Construction Documents:** Prepare full specifications, illustrating the requirements for green products. Re-evaluate detailed information, compatibility with adjacent materials, and material performance. If the contractor is not familiar with the product, additional details and installation instructions will be needed.

4. Bid and Award: Assist with sourcing green products and answering bidders' questions. The contractor may require phone numbers or sources for green products unfamiliar to them. Bidders must be advised that they are bidding the products specified, which may not be familiar to them.

5. Construction Administration: Enforce your specifications. Be wary of substitutions that, while meeting other performance criteria, cannot meet green requirements. Verify that green products are ordered on time, and that the installers are factory-trained or acceptable to the manufacturer. For a USGBC project, maintain project documentation for final submittal for LEED certification. This will require collection of specific manufacturer information on chemical content limits, usually described in the manufacturer's MSDS (Material Safety Data Sheet). For items where the manufacturing location and source of materials is important, an affidavit from the manufacturer should be required. The subcontractor will be required to separate labor and material costs for LEED calculations.

A Green Product Checklist

One of the easiest ways to get started selecting green products is to develop a checklist of choices. While a checklist could be dozens of pages long, our list is limited to a smaller number of reasonable choices that can be used in many projects. The checklist is intended to help the design team select green products efficiently for construction projects. The 120 green choices are listed in CSI MasterFormat order. After completion of this checklist, the author (usually the designer or project architect) should circulate it to the project team and specification writer for comments. Since these choices might also be included in your firm's master specifications, refer to the specs for specific products, manufacturers, and telephone numbers for each item.

Greening Your Firm

How do you get to green? The following examples relate the relative success of four theoretical firms as they approach sustainable design and green product selection.

Firm 1: The principals of the architectural firm make a commitment to sustainable design and green products. They decide to internally evaluate all of their projects based on the LEED Rating System of the U.S. Green Building Council or other rating system such as Green Globes. Green review is added to their quality assurance program.

Six Months Later: The firm finds that the LEED criteria for sustainable design closely match their existing designs. Sensitivity to context and energy efficiency have been considered in their projects for many years. The LEED rating system points out some new opportunities, but there are no major changes in the design or document production processes. Green products selected for projects are frequently value-engineered out, and their corporate owners don't seem particularly committed to green, nor to the claims of increased productivity with sustainable design. Green grows slowly in the firm.

Firm 2: A firm specializing in government work notes that their clients are requiring evidence of experience with green design as a selection criterion for architects. The marketing principal convenes a meeting of project managers, and an organized effort is made to achieve LEED certification for a project and green their specifications. Designers and project managers in the firm are encouraged to learn green principles, so they can "talk the talk."

Six Months Later: Several LEED projects are under way, and the engineering disciplines in the firm are pleased to have the opportunity to do more energy modeling and to work with the designers to improve overall performance of the buildings. However, green efforts are generally limited to key people, and the rest of the firm waits for the trickle-down influence of those in senior positions. The firm has established its green credentials, and use of the firm's green specifications gradually increases.

Firm 3: A committee of interior designers in a multidisciplinary firm meets monthly to discuss green topics. Speakers are invited, staff attends green seminars, and a consultant is hired to create a database of green products to be made available on the firm's intranet. Green articles in magazines are constantly circulated to appropriate staff.

Six Months Later: The enthusiasm of the green committee spreads to most of the younger staff in the firm. Individuals contribute to a common database, and even small contributions build the firm's green deliverables. The firm subscribes to over 50 magazines, and the librarian routes articles to the interest areas expressed by individual staff. The green dynamic continues to grow in the firm, and a certain green pride develops.

Firm 4: The principal responsible for maintaining the firm's details on energy performance and exterior wall assemblies expands his long-standing commitment to building technology by adding sustainable design to his criteria. Green products are added to the firm's master specifications. LEED projects accelerate the process. The firm creates a position for a green researcher.

Six Months Later: All projects are reviewed during design for energy performance and green opportunities. The technology principal has much success requiring individual project architects to evaluate their projects for green. During bidding and construction, some contractors object to the special materials and increased inspections during construction, but the firm enforces its policies. Research backs up product selection and detailing. Buildings with improved energy performance and careful product selection are constructed and put into service.

Conclusion

The responsibility for selecting and specifying green building products and systems lies with the entire design team. Owners, architects, engineers, and contractors can all contribute based on their unique views of the project. Owners who make green credentials part of their designer selection process have the most success. Young architects with the energy to investigate and try new products move the green industry forward. Contractors who understand building technology embrace buildings that perform better, and processes such as commissioning improve building performance. The imperative for green increases. Designing, specifying, and building green works with a concerted joint effort.

The construction industry is slow to change because product selection and installation are based on the hands-on knowledge of design professionals and builders struggling to complete their projects on schedule and on budget. One industry researcher indicated that if the ultimate hammer was suddenly introduced into the marketplace, it would still take seventeen years before all carpenters had it on their belts. We are on our way with green products, but it will be a long journey.

The transition to sustainable and green products will be won or lost over the next five years based on the actions of those responsible for the built environment. To quote the scholar, "if we fail to choose, we

choose to fail." Someday, only the sun and wind will be available as power sources; there won't be any more Third World countries to fabricate our most hazardous products; the ozone layer won't offer much protection. Be selfish for your great grandchildren. Specify green.

A Green Product Checklist

DATE: _____
PROJECT NAME: _____
COMPLETED BY: _____

DIVISION 01 - GENERAL

- Certification: Require USGBC LEED-[NC] [EB] [CI] [CS] [H] [ND] certification at [certified] [silver] [gold] [platinum] level.
- Green Globes: Provide [final structure in compliance] [work consistent] with Green Globes – US level [Two Globes] [Three Globes] requirements.
- EPA Rating: Comply with Energy Star [new home] [building label] qualifications.
- EPA Rating: Comply with WaterSense recommendations.
- EPA National Performance Track: Comply with EPA Performance Track criteria and Environmental Management System.
- Healthcare: Comply with Green Guide for Healthcare (GGHC) recommendations.
- Healthcare: Comply with Hospitals for a Healthy Environment H2E Award criteria.
- During Construction: Implement construction pollution and IAQ controls.
- During Construction: Implement a construction waste management system.
- Final Cleaning: Implement green housekeeping practices for final cleaning procedures.
- System Performance After Construction: Implement commissioning.
- Substitutions: Require impact on green design goals for proposed substitutions.

DIVISION 02 – EXISTING CONDITIONS

- Disassemble components and existing structures for reuse.
- Verify hazardous materials are deposited in licensed landfills.

DIVISION 03 - CONCRETE

- Permanent insulating concrete formwork.
- Reusable concrete formwork.
- Rebar supports fabricated from recycled steel.
- Rebar supports fabricated from recycled plastic.
- Cellular concrete.
- Recycled aggregate in concrete mix.
- Coal fly ash or ground granulated furnace slag in concrete mix.
- Low-VOC concrete hardening compounds.

DIVISION 04 - MASONRY

- Glass block fabricated from recycled plastics.
- Glass bricks fabricated from recycled glass.
- Simulated stone fabricated from recycled materials.
- Concrete masonry units with integral insulation.
- Concrete masonry units fabricated from recycled materials.
- Autoclaved aerated concrete masonry units.

- O Brick fabricated from cleaned, petroleum-contaminated soils.
- O Salvaged brick reuse.
- O Rubber blocks fabricated from recycled rubber.
- O Masonry cavity drainage material fabricated from recycled materials.
- O Use locally sourced stone.

DIVISION 05 - METALS

- O Structural steel with recycled content.
- O Cold-formed metal framing with recycled content.
- O Metal fabrications fabricated with recycled content.

DIVISION 06 – WOOD, PLASTICS AND COMPOSITES

- O Certified wood, Forest Stewardship Council (FSC).
- O Arsenic- and chromium-free pressure-treated wood.
- O Engineered framing fabricated from small wood pieces.
- O Sheathing fabricated from recycled waste paper.
- O Sheathing fabricated from recycled waste paper, fire-retardant.
- O Structural insulated panels.
- O Floor decking fabricated from recycled wastepaper.
- O Underlayment fabricated from recycled wastepaper.
- O Underlayment fabricated from recycled materials.
- O Salvaged and reclaimed wood (for timbers and flooring).
- O Medium density fiberboard fabricated with recycled and recovered wood fibers.
- O Particleboard fabricated with recycled and recovered wood fibers.
- O Medium density fiberboard fabricated with no added urea formaldehyde.
- O Particleboard fabricated with no added urea formaldehyde.
- O Rapidly renewable agrifiber board fabricated with no added urea formaldehyde.
- O Rapidly renewable bamboo wall paneling.
- O Wood trim fabricated from veneered finger-jointed wood.
- O Low emitting wood adhesives, interior use.
- O Countertop materials fabricated from recycled materials.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

- O Fiberglass insulation fabricated with recycled glass.
- O Mineral wool insulation manufactured with recycled material.
- O Cellulose insulation with recycled material and borate-based primer.
- O Cotton batt insulation manufactured with recycled material.
- O Biobased spray insulation manufactured with plant based soy content.
- O Spray foam air barrier insulation and sealant.
- O Foamed-in-place insulation.
- O Extruded polystyrene insulation, non-ozone depleting.
- O Polyisocyanurate insulation, non-ozone depleting.
- O Exterior water-repellent sealers with low VOCs.
- O Air and vapor barrier membrane at exterior building envelope.
- O PVC-free waterproofing and roofing membranes.

- O Fiber-cement roofing shingles.
- O Metal wall and roof panels manufactured with recycled content.
- O Green roof systems.
- O Solar reflective materials for roof surfaces, Energy Star qualified.
- O Roof walkway pads fabricated from recycled materials.
- O Expanding foam sealants.
- O Joint fillers fabricated from recycled materials.
- O Low emitting joint sealers, interior use.

DIVISION 08 - OPENINGS

- O Steel doors and frames with recycled content.
- O Wood doors with certified wood, Forest Stewardship Council.
- O Wood doors fabricated from hardboard.
- O Wood doors fabricated with agrifiber board cores.
- O Wood doors fabricated with no added urea formaldehyde.
- O Plastic doors fabricated from recycled plastic.
- O Aluminum framing systems fabricated with recycled content aluminum.
- O Skylights for daylighting.
- O High-performance wood windows, Energy Star qualified.
- O High-performance vinyl replacement windows, Energy Star qualified.
- O High-performance fiberglass windows, Energy Star qualified.
- O High-performance insulating glass, with low-e coating.

DIVISION 09 - FINISHES

- O Low emitting adhesives, interior use.
- O Gypsum board fabricated with synthetic gypsum.
- O Gypsum board fabricated at local plant.
- O Ceramic tile with recycled content.
- O Terrazzo flooring with recycled content.
- O Acoustical ceiling panels with recycled content.
- O Wood flooring with certified wood, Forest Stewardship Council (FSC).
- O Wood flooring finishes, low emitting.
- O Engineered wood flooring with recycled content and no added urea formaldehyde.
- O Salvaged and reclaimed wood flooring.
- O Rapidly renewable flooring, [cork] [bamboo].
- O Linoleum flooring, [tile] [sheet].
- O Recycled rubber flooring.
- O PVC-free flooring, wall base and accessories.
- O Carpet system with CRI Green Label [Plus] certification.
- O Carpet fabricated with recycled materials.
- O Carpet fabricated with natural materials (wool).
- O Carpet tile fabricated with recycled materials.
- O Carpet cushion fabricated from recycled materials.
- O Cork wallcovering.

- O Recycled fiberboard wall panels.
- O Sisal wallcoverings.
- O Acoustical wall panels with recycled content.
- O Sound control board fabricated from recycled newsprint.
- O Interior paints with zero-VOC content.
- O Interior water-based multi-color paints with zero-VOC content.
- O Latex vapor barrier coating with low VOCs.
- O Exterior paints with zero-VOC content.

DIVISION 10 - SPECIALTIES

- O Bulletin boards fabricated from cork.
- O Toilet compartments fabricated from recycled HDPE plastic.
- O Wall protection systems with PVC-free materials.
- O Lockers fabricated from recycled HDPE plastic.
- O Electric hand dryers in toilet rooms.

DIVISION 11 - EQUIPMENT

- O Dock bumpers fabricated from recycled vehicle tires.
- O Appliances with Energy Star labels.

DIVISION 12 - FURNISHINGS

- O Manufactured casework held to same environmental standards as Division 6.
- O Systems furniture held to same environmental standards as Division 6.
- O Anti-fatigue mats fabricated from recycled materials.
- O Entry mats fabricated from recycled vehicle tires.
- O Entry mats fabricated from cocoa fibers.
- O Permanent entryway systems with drain pans.
- O Window treatment systems with photosensors, automated operation.
- O Window treatment systems with PVC-free materials.

DIVISION 13 - SPECIAL CONSTRUCTION

- O Solar water heaters.
- O Photovoltaic systems, rooftop mounted modular units.
- O Photovoltaic systems, integrated into building envelope.

DIVISION 14 - CONVEYING SYSTEMS

- O Energy-efficient elevators.
- O Interior cab finishes to same environmental finish standards.

DIVISION 22 – PLUMBING

- O Waterless urinals.
- O Composting toilets.
- O Ultra low flow toilets.

- O Gray water recycling system.
- O Heat-sensing flow consumption fittings.
- O Underfloor air distribution system/displacement ventilation system.
- O Commissioning.

DIVISION 23 – HVAC

- O Energy modeling.
- O Commissioning.

DIVISION 26 - ELECTRICAL

- O Energy efficient lighting fixtures and bulbs.
- O Occupancy sensors.
- O Perimeter daylighting controls.
- O Commissioning.

DIVISION 31 – EARTHWORK

- O Recycled subbase materials.
- O Containment structures fabricated from recycled materials.
- O Retaining walls fabricated from recycled plastic.
- O Geomembrane liner fabricated with recycled geotextiles.
- O Geotextiles fabricated from recycled materials.
- O Soil stabilization mat fabricated from recycled plastic.

DIVISION 32 – EXTERIOR IMPROVEMENTS

- O Rubber paving manufactured from recycled tires.
- O Porous paving manufactured from recycled plastic.
- O Rubber paving fabricated from post-consumer recycled rubber.
- O Brick paving fabricated from cleaned oil-contaminated soils.
- O Glass pavers fabricated from recycled glass.
- O Plastic pavers fabricated from recycled glass.
- O Rubber unit pavers fabricated from post-consumer vehicle tires.
- O Stepping stones fabricated from recycled rubber.
- O Hi albedo (solar reflectance) materials for exterior surfacing.
- O Irrigation hosing fabricated from recycled vehicle tires.
- O High efficiency irrigation system design using [gray water] [harvested rainwater].
- O PVC-free pipe material options: HDPE and PEX.
- O Play equipment fabricated from recycled components.
- O Granulated rubber play surfacing fabricated from recycled tires.
- O Fencing fabricated from PVC-free HDPE recycled plastic or composite lumber.
- O Bicycle racks.

- O Site furnishings fabricated with recycled content.
- O Erosion control mats fabricated from recycled fibers.
- O Organic fertilizers.
- O Landscape edging fabricated from recycled plastic.
- O Landscape timbers fabricated from recycled plastic.
- O Mulch fabricated from recycled hardwood blend.
- O Mulch fabricated from recycled newspapers.
- O Root barriers fabricated from recycled polypropylene.
- O Soil amendments composed of recycled or composted materials.
- O Native or adapted climate appropriate planting materials.
- O Xeriscaping, landscaping to minimize the use of water and chemicals.

End

SECTION 011000

GREEN PRODUCTS SHORT-FORM SPECIFICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. The green products included in this Section are provided for example only. No endorsement of individual products is intended. Verify product selections and current availability with the product manufacturer before including this text in a project specification. In a typical specification, these products would be included in the appropriate specification section, and not grouped together in a single section. This is a source list; additional product features and attributes would be listed in a full specification.
- B. For a more comprehensive list of products and manufacturers, we suggest the website www.buildinggreen.com, provided by BuildingGreen Inc., publishers of Environmental Building News, the current GreenSpec, EBN Archives, and Green Building Advisor.
- C. The California Division of the State Architect (DSA) is currently developing an Environmentally Preferable Products (EPP) Database, which can be viewed at www.eppbuildingproducts.org.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
- C. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 CONCRETE CONTAINING POZZOLAN ADMIXTURES

- A. Concrete Containing Coal Fly Ash: Provide coal fly ash in concrete mix, in a percentage acceptable to project structural engineer. Provide coal fly ash from one of the following:
1. Member, American Coal Ash Association, Syracuse, NY; telephone 315/428-2400.
 2. Boral Material Technologies, San Antonio, TX, telephone 210/349-4069.
 3. Hanson Aggregates South Central Region, Dallas, TX, telephone 800/441-0005.
 4. Mineral Solutions, Eagan, MN, telephone 800/437-5980.
 5. The SEFA Group, West Columbia, SC, telephone 800/884-7332.
 6. VFL Technology, Dagsboro, DE, telephone 302/934-8025.
- B. Concrete Containing Ground Granulated Blast Furnace Slag: Provide blast furnace slag in concrete mix, in percentage acceptable to project structural engineer.

2.2 CONCRETE MASONRY UNITS

- A. Autoclaved Aerated Concrete Masonry Units: Provide lightweight insulating autoclaved concrete masonry by one of the following:
1. ACCO Aerated Concrete Systems, Inc., Apopka, FL, telephone 888/901-2226; www.accoaac.com.
 2. SafeCrete AAC, Ringgold, GA; telephone 706/965-4587; www.satecrete.com.
 3. E-Crete, Tempe, AZ; telephone 480/596-3819; www.e-crete.com.
 4. Texas Contec, Inc., San Antonio, TX; telephone 877/926-6832; www.texascontec.com.
- B. Concrete Masonry Units with Recycled Content: Provide units with structural grade expanded shale, clay or slate content, equal to SmartWall Systems, manufactured by one of the following producers, certified by the Expanded Shale Clay and Slate Institute:
1. Camosse Masonry Supply, Worcester, MA 01604-1597, telephone 508/755-6193.
 2. A. Jandris & Sons, Inc., Gardner, MA 01201, telephone 978/632-0089.
 3. Medway Block Co., Inc., Medway, MA 02053, telephone 508/533-6701.
- C. Concrete Masonry Units with Integral Insulation: Provide units by one of the following:
1. IMSI System, as manufactured by Insulated Masonry Systems, Inc., Scottsdale, AZ, telephone 602/970-0711.
 2. Sparfil Wall System II, as manufactured by Sparfil Blok Florida, Inc., Tampa, FL, telephone 813/963-3794.
 3. ThermaLock Concrete Block, as manufactured by ThermaLock Products, North Tonawanda, NY, telephone 716/695-6000.

2.3 Recycled Content in Metals

- A. Recycled Content of Steel (2005) according to the Steel Recycling Institute:
 - 1. Basic Oxygen Furnace (BOF), for manufacturing steel studs: 31.6% total recycled content = 24.6% post consumer and 6.6% post industrial.
 - 2. Electric Arc Furnace (EAF), for manufacturing structural steel and rebars: 94.7% total recycled content = 56.6% post consumer and 32.7% post industrial.
- B. Stainless Steel: Stainless steel for building products includes approximately 60% recycled content, both post-industrial and post-consumer, according to the Specialty Steel Industry of North America.
- C. Aluminum: Post-industrial aluminum is commonly available at approximately 50-75% at little or no additional cost. Post-consumer aluminum may not be readily available to the building industry.
- D. Copper: Copper for building products (except copper wire) includes approximately 50-75% recycled content, both post-industrial and post-consumer. The three major producers of copper sheet products in the U.S. are Hussey Copper Ltd., Leetsdale, PA; Luvata (formerly Outokumpu American Brass Co.), Buffalo, NY; and Revere Copper Products Inc., Rome, NY.
- E. Zinc: Zinc for building products includes approximately 30% recycled content, both post-industrial and post-consumer. The two major producers of zinc sheet products in the U.S. are Rheinzink and VM Zinc.

2.4 WOOD AND LUMBER MATERIALS

- A. Certified Wood: Provide wood products from managed forests complying with requirements of the Forest Stewardship Council Principles and Guidelines for certified wood building components; Forest Stewardship Council, Washington, DC, telephone 877/372-5646; www.fscus.org.
- B. Salvaged and Reclaimed Wood Suppliers: Subject to compliance with requirements, and unless noted otherwise, give preference to products manufactured within a 500 mile radius of the project site.
 - 1. Benson Woodworking Engineered Timber Structures, Walpole, NH 03608, telephone 603/756-3600, www.bensonwood.com.
 - 2. Carlisle Wood Plank Floors, Stoddard, NH 03464, telephone 800/595-9663, www.wideplankflooring.com.
 - 3. Longleaf Lumber LLC, Somerville, MA 02143, telephone 617/625-3659, www.longleaflumber.com.
 - 4. Old Wood Workshop LLC, Pomfret Center, CT 06259, telephone 860/974-3622, www.oldwoodworkshop.com.

- C. Hardwood Veneer Plywood Fabricated without Urea Formaldehyde: Provide Purebond, by Columbia Forest Products. Portland, OR 97201; telephone 800/547-4261; www.cfpwood.com.
- D. Medium Density Fiberboard (MDF) Fabricated from Wood Residuals and without Formaldehyde: Provide Medite II for interior applications, Medex for use in high moisture applications, as manufactured by SierraPine Ltd, Roseville, CA, telephone 800/676-3339; www.sierrapine.com.
- E. Agrifiber Board: Industrial grade particleboard fabricated from agricultural residue, including harvested wheat straw and sunflower hulls, and non-formaldehyde-based resin, complying with ANSI A208.1, Grade M3. Acceptable products are as follows:
 - 1. PrimeBoard, as manufactured by PrimeBoard, Inc., Wahpeton, ND 58075; tel. 701/642-3286; www.primeboard.com.

2.5 WOOD PRESERVATIVE TREATMENTS

- A. Pressure-Treated Wood, Arsenic- and Chromium-Free: Provide pressure-treated wood produced in accordance with AWWA standards as applicable, C1, C2, C4, C5, C9, C15, C17, C22, P5 and the following:
 - 1. Standard Product: Preserve Brand treated wood products with ACQ treatment.
 - 2. Water-Repellent Product: Preserve Plus, water-repellent, retention of 0.31 pounds per cubic foot.
 - 3. Manufacturer: CSI Chemical Products; telephone 704/522-0825; www.treatedwood.com.
 - 4. Retention Rate:
 - a. Above Ground Deck Support: 0.40 pounds per cubic foot for decking, fence boards, handrails, and similar items.
 - b. Ground Contact Fresh Water: 0.40 pounds per cubic foot for fence posts, landscaping, piers, docks, and similar items.
 - c. Permanent Wood Foundations: 0.60 pounds per cubic foot for wood foundations and crawl spaces.
 - d. Poles: 0.60 pounds per cubic foot for building and distribution poles.

2.6 FIBERGLASS INSULATION

- A. Fiberglass Insulation Manufactured with Recycled Glass: Provide one of the following:
 - 1. CertainTeed Corporation, Valley Forge, PA, telephone 800/233-8990, www.certainteed.com; 20-25% recycled glass content.
 - 2. Johns Manville Corporation, Denver, CO, telephone 800/654-3103, www.jm.com; 25% recycled glass content.
 - 3. Fiberglass Building Insulation by Guardian Fiberglass, Inc., Albion, MI; 20-25% recycled glass content.
 - 4. Fiberglass Insulation by Ottawa Fibre, Inc., Ottawa, Ontario, Canada, telephone 613/736-1215, www.ofigroup.com; 60-80% recycled glass content.

5. Pink Fiberglass Building Insulation by Owens Corning, Toledo, OH, 800/438-7465, www.owenscorning.com; 30% recycled glass content.

2.7 MINERAL WOOL INSULATION

- A. Mineral Wool Batt Insulation Manufactured with Recycled Material: Provide one of the following:
 1. ThermaFiber LLC, Wabash, IN, telephone 888/834-2371; 75% recycled content.
 2. Rock Wool Manufacturing Company, Leeds, AL; 75% recycled content.
 3. Roxul Inc., Milton, Ontario, Canada, telephone 800/265-6878; 75% recycled content.
- B. Mineral Wool Spray-Applied Insulation Manufactured with Recycled Material: Provide one of the following:
 1. ThermaTech by ThermaFiber LLC, Wabash, IN, telephone 888/834-2371; 75% recycled content.
 2. Thermal-Pruf, Dendamix, and Sound-Pruf by American Sprayed Fibers, Inc., Merrillville, IN, telephone 800/824-2997; 100% recycled content.
 3. Sloss Blowing Wool by Sloss Industries Corp., Alexandria, IN, telephone 800/428-6404.

2.8 CELLULOSE INSULATION

- A. Cellulose Insulation Manufactured with Recycled Material: Provide K-13 and SonaSpray 'fc' Insulation by International Cellulose Corporation, Houston, TX, telephone 800/444-1252; or Cellulose Insulation by members of the Cellulose Insulation Manufacturers Association, Dayton, OH, telephone 888/881-2462.

2.9 FOAMED-IN-PLACE INSULATION

- A. Foamed-In-Place Insulation: Provide one of the following:
 1. "Pur Fill 1G" by Todol Products, Natick, MA; tel. 508/651-3818; www.todol.com; containing no urea-formaldehyde and no CFCs.
 2. "SuperGreen Foam" by Foam-Tech, Div. of H.C. Fennell, N. Thetford, VT; tel. 802/333-4333; www.foam-tech.com; containing no formaldehyde, CFCs or HCFCs.
 3. "Zerodraft Z1-24 Foam Sealant" by Zerodraft, div. of Canam Building Envelope Specialists, Inc., Mississauga, Ontario, Canada; tel. 877/272-2626; www.canambuildingenvelope.com; containing no added urea-formaldehyde and no CFCs.
- B. Spray-Applied Bio-Based Insulation: Provide low-density, open-cell polyurethane foam insulation, containing 20-25% soy content, equal to one of the following:

1. BioBase 501, by BioBased Systems, Spring Valley, IL 61362; telephone 800/803-5189; www.biobased.net.
2. HealthySeal 500, by BioPolymers, LLC; www.healthyseal.com.
3. Sealection 500, by Demilec USA, LLC, Arlington, TX 76011; telephone 817/640-4900; www.sealection500.com.

C. Spray-Applied Air Barrier Foam Insulation: Provide one of the following:

1. WALLTITE by BASF Polyurethane Foam Enterprises LLC; www.basf.com.
2. Heatlok, by Demilec USA, LLC, Arlington, TX 76011; telephone 817/640-4900; www.sealection500.com.

2.10 RIGID INSULATION

A. Extruded Polystyrene Insulation, Non-Ozone Depleting Substances:

1. Styrofoam High Performance by Dow Chemical Co., Midland, MI, telephone 800/441-4369; 15% recycled glass content, no HCFC or CFC content.
2. Foamular by Owens Corning, Toledo, OH, 800/438-7465, www.owenscorning.com; 20% recycled glass content, no HCFC or CFC content.

B. Polyisocyanurate Foam Insulation, Non-Ozone Depleting Substances: ACFoam, as manufactured by Atlas Roofing Corp., Atlanta, GA, telephone 770/952-1442.

2.11 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING SYSTEMS

A. Thermoplastic Polyolefin (TPO) Roofing Systems: Provide one of the following:

1. Sure-Weld TPO, by Carlisle SynTec Inc., Carlisle, PA 17013; telephone 800/4-syntec; www.carlisle-syntec.com.
2. UltraPly TPO, by Firestone Building Products Company, Indianapolis, IN 46240; telephone 800/428-4442; www.firestonbpc.com.
3. Stevens EP, by Stevens Roofing Systems; Div. of JPS Elastomerics, Holyoke, MA 01040; telephone 800/621-7663; www.stevensroofing.com.
4. VersiWeld, by Versico Inc., Carlisle, PA 17013; telephone 800/992-7663; www.versico.com.

2.12 GREEN ROOF SYSTEMS

A. Green Roof Systems: Provide green roof system by one of the following:

1. Garden Roof Assembly by American Hydrotech, Inc., Chicago, IL, telephone 800/877-6125.
2. Green Roof-Roofscape by Barrett Company, Millington, NJ, telephone 800/647-0100.
3. SopraNature by Soprema USA, Inc., Wadsworth, OH, telephone 800/356-3521.

4. Green Shield Green Roof System, by The Garland Company, Cleveland, OH, telephone 800/321-9336.

2.13 HIGH-PERFORMANCE WINDOWS

- A. High-Performance Wood Windows: Provide high-performance windows as manufactured by one of the following:
 1. Heat Smart, as manufactured by Loewen Windows, Steinbach, Canada; telephone 800/563-9367; www.loewen.com.
 2. High-Performance Wood Windows, as manufactured by Marvin Windows and Doors, Fargo, ND; telephone 800/346-5128; www.marvin.com.
 3. Designer Series SmartSash, as manufactured by Pella Corporation, Pella, IA, telephone 800/847-3552; www.pella.com.
 4. High-Performance Wood Windows, as manufactured by Weathershield Manufacturing Inc., Medford, WI, telephone 800/477-6808; www.weathershield.com.
- B. High-Performance Vinyl Replacement Windows: Provide high-performance windows as manufactured by one of the following:
 1. Gilkey Window Company, Cincinnati, OH, telephone 513/769-4527; www.gilkey.com.
 2. Kensington Windows, Vandergrift, PA, telephone 800/444-4972.
 3. Stanek Vinyl Windows Corp., Cuyahoga Heights, OH, telephone 216/341-7700; www.stanekwindows.com.
 4. Thermal Industries, Inc., Pittsburgh, PA, telephone 800/245-1540; www.thermalindustries.com.
- C. High-Performance Fiberglass Windows: Provide high-performance windows as manufactured by one of the following:
 1. Accurate Dorwin, Winnipeg, Canada; telephone 204/982-8370; www accuratedorwin.com.
 2. Fibertec Window Mfg. Ltd., Concord, Canada, telephone 905/660-7102; www.fibertec.com.
 3. Integrity, from Marvin Windows and Doors, Fargo, ND, telephone 800/346-5128; www.integritywindows.com.
 4. Thermotech Fiberglass Fenestration, Carp, ON, Canada; telephone 888/930-9445; www.thermotechfiberglass.com.

2.14 HIGH-PERFORMANCE INSULATING GLASS

- A. High-Performance Insulating Glass: Provide products by the following:
 1. Comfort E2, Comfort T1 and Solar Glass by AFG Industries, Kingsport, TN, telephone 800/251-0441.
 2. INE Neutral Low-E Glass by Interpane, Clinton, NC, telephone 800/334-1797.

3. Pilkington Energy Advantage by Pilkington NA, Toledo, OH, telephone 800/526-6557.
4. Sungate 500, Solarban 60, Solarban 70, and Azurlite by PPG Industries, Pittsburgh, PA, telephone 800/377-5267.
5. VE1-2M and Superwindow by Viracon, Owatonna, MN, telephone 800/533-2080.
6. Superglass with Heat Mirror by Southwall Technologies, Palo Alto, CA, telephone 800/365-8794.

2.15 SYNTHETIC GYPSUM BOARD

- A. Synthetic Gypsum Board: Provide synthetic gypsum board fabricated from gypsum reclaimed from manufacturing processes and recycled paper facings, manufactured by one of the following:
1. Gypsum Wallboard, as manufactured by G-P Gypsum Corp. (Wheatfield, IN and Savannah, GA plants), Atlanta, GA, telephone 404/65204000.
 2. Gold Bond Gypsum Wallboard, as manufactured by National Gypsum Company. (Shippingport, PA or Baltimore, MD plants), Charlotte, NC; telephone 800/628-4662.
 3. Sheetrock Brand Gypsum Panels, as manufactured by United States Gypsum Co. (Baltimore, MD and 5 other plants), Chicago, IL, telephone 800/606-4476.

2.16 TILE WITH RECYCLED CONTENT

- A. Ceramic and Porcelain Tile with Recycled Content: Provide one of the following:
1. Eco-Cycle Ceramic Tiles, as manufactured by Crossville Ceramics, Crossville, TN, telephone 615/484-2110.
 2. Armstone Confetti, as manufactured by PermaGrain Products, Inc., Newtown Square, PA, telephone 610/353-8801; 90% recycled content.
 3. Terra Classic and Terra Traffic Tiles, as manufactured by Terra Green Ceramics, Richmond, IN, telephone 317/935-4760.
- B. Glass-Silicate Tile with Recycled Content: Provide one of the following:
1. Aurora Glass, Eugene, OR 97402. [100% recycled glass, 86% post-consumer.] [A charitable endeavor of St. Vincent de Paul society. All profits are returned to the community through housing, education, and other social programs.]
 2. Bedrock Industries, Seattle, WA 98119. [100% recycled glass, 50% post-consumer and 50% post-industrial.]
 3. Environmental Stone Products, Allentown, WI 888/629-1969. [Glass tile made from recycled glass and silica.]
 4. Futuristic Tile, Allenton, WI 800/558-7800. [Glass-silicate tile from 100% post-consumer recycled glass.]
 5. Oceanside Glass Tile, Carlsbad, CA 92008. [85% post-consumer recycled glass.]
 6. Sandhill Industries, Boise, ID 83716. [100% post industrial plate glass.]

2.17 ACOUSTICAL CEILINGS

A. Acoustical Ceiling Panels with Recycled Content: Provide acoustical ceiling tiles with percentage recycled content listed for mineral wool, cellulose fiber, and glass fiber:

1. Manufacturer: Armstrong World Industries; telephone 877/276-7871; www.armstrong.com.
 - a. Product: Stratus, 76% recycled content, reclaimable.
 - b. Product: Cirrus, 73 - 76% recycled content, reclaimable.
 - c. Product: Sanserra, 73% recycled content, reclaimable.
 - d. Product: Crossgate, 72% recycled content, reclaimable.
 - e. Product: Ultima, 66 - 78% recycled content, reclaimable.
 - f. Product: Graphis, 45% recycled content, reclaimable.
 - g. Product: Ceramaguard, 42% recycled content.
 - h. Product: Clean Room Mylar, 42% recycled content.
 - i. Product: Fine Fissured, 35 - 55% recycled content, reclaimable.
 - j. Product: Steel Suspension Systems, 25% recycled steel content.
 - k. Product: Aluminum Suspension Systems, 50% recycled aluminum content.
2. Manufacturer: USG Corporation, Chicago, IL, telephone 312/606-4000; www.usg.com.
 - a. Product: ClimaPlus Ceilings (X-Technology), 62 - 78% recycled content.
 - b. Product: Frost, 67% recycled content.
 - c. Product: Glacier, 67% recycled content.
 - d. Product: Fissured, 30 - 46% recycled content.
 - e. Product: Radar, 30 - 46% recycled content.
3. Manufacturer: BPB Celotex Corp., Tampa, FL, telephone 866/427-2872; www.us.bpb-na.com.
 - a. Products: Softone Cashmere High CAC, 90 - 96% recycled content.
 - b. Products: Celotone (cast), 60 - 75% recycled content.
 - c. Products: Softone Cashmere (nodulated), 55 - 70% recycled content.
 - d. Products: Hytone, 54 - 65% recycled content.
 - e. Products: Baroque, 52 - 63% recycled content.
 - f. Products: Fissured, 52 - 63% recycled content.
 - g. Products: Sand, 52 - 63% recycled content.

2.18 LINOLEUM FLOORING

A. Linoleum Tile Flooring: ASTM F 2195. Provide linoleum tile in color and pattern selected by the Architect and as follows:

1. Manufacturer: Armstrong World Industries, Lancaster, PA; telephone 877/276-7871; www.armstrong.com.

2. Manufacturer: Marmoleum Dual as manufactured by Forbo Industries, Hazleton, PA, telephone 800/842-7839; www.forbo-industries.com.
 3. Manufacturer: Linosom as manufactured by Tarkett, Houston, TX, telephone 800/366-2689; www.tarkett.com.
- B. Linoleum Sheet Flooring: ASTM F 2034. Provide linoleum sheet in color and pattern selected by the Architect and as follows:
1. Manufacturer: Armstrong World Industries, Inc., Lancaster, PA; telephone 877/276-7876; www.armstrong.com.
 2. Manufacturer: Marmoleum and Artoleum as manufactured by Forbo Industries, Hazleton, PA, telephone 800/842-7839; www.forbo-industries.com.
 3. Manufacturer: Linosom as manufactured by Tarkett, Houston, TX, telephone 800/366-2689; www.tarkett.com.

2.19 RAPIDLY RENEWABLE FLOORING

- A. Bamboo Flooring: Provide one of the following:
1. MOSO Bamboo Flooring, MOSO International NA, Ltd., Seattle, WA 98112; www.moso.com.
 2. Plyboo Bamboo, Smith & Fong Company, S. San Francisco, CA 94080; www.plyboo.com.
 3. Teragren Bamboo, Teragren LLC, Bainbridge Island, WA 98110; www.teragren.com.
- B. Cork Flooring: Provide one of the following:
1. Dodge Cork Tile, Dodge-Regupol, Inc., Lancaster, PA 17601; telephone 866/883-7780; www.regupol.com.
 2. Expanko Cork Co., Parkesburg, PA 19365; telephone 610/436-8300; www.expanko.com.
 3. Wicanders Natural Cork, by Amorim Flooring North America, Inc., Hanover, MD 21076; telephone 800/828-2675; www.wicanders.com.

2.20 WOOD FLOORING FINISHES

- A. Wood Flooring Finishes, Low-Emitting Types: Provide one of the following:
1. Polyureseal BP, by American Formulating & Manufacturing Co., San Diego, CA, telephone 800/239-0321; www.afmsafecoat.com.
 2. Bona Series waterborne polyurethane wood floor finishes, by BonaKemi USA, Aurora, CO 80011; telephone 800/872-5515; www.bonakemi.com.

2.21 FLOORING ADHESIVES

- A. Adhesive for [Ceramic Tile, Resilient Tile, Linoleum, Carpet, and Other Flooring Materials], Low-Emitting and Low-Odor without Solvents: Provide tile adhesive recommended by flooring manufacturer, or one of the following:
1. Ad-vanced Air Tech Adhesives, by Advanced Adhesive Technology Inc., Dalton, GA, telephone 706/226-0610.
 2. SAF-T Series, by Capitol USA, Dalton, GA, telephone 800/831-8381, www.capitolusa.com.
 3. Safe-Set Series, by Chicago Adhesive Products Co., Romeoville, IL, telephone 800/621-0220; www.chapco-adhesives.com.
 4. Safe-Coat Series, by American Formulating & Manufacturing Co., San Diego, CA, telephone 800/239-0321; www.afmsafecoat.com.
 5. Envirotec Healthguard Adhesives, by W.F. Taylor Co., Inc., Fontana, CA, telephone 800/868-4583; www.wftaylor.com.
 6. GreenLine Series, by The W.W. Henry Co., Aliquippa, PA 15001, telephone 800/232-4832; www.wwhenry.com.
 7. Ultra/Bond ECO Series, by Mapei Corporation, Deerfield Beach, FL 33442, telephone 800/426-273; www.mapei.com.

2.22 CARPET

- A. Carpet Fabricated with Recycled Materials: Provide one of the following:
1. BPS High Recycled Content Broadloom, by Bentley Prince Street, City of Industry, CA 91746; telephone 800/423-4709; www.bentleyprincestreet.com.
 2. Carpet with Encore SD Ultima and Karakul, by J&J/Invision, Dalton, GA 30722; telephone 800/241-4586; www.jj-invision.com.
 3. Commercial Carpet with ColorStrand by Mohawk Industries, Calhoun, GA, telephone 800/622-6227.
 4. Carpet with EcoTec 6 Backing, by Shaw Contract Group, Dalton, GA 30722; telephone 800/257-7429; www.shawcontractgroup.com.
- B. Wool Carpet: Provide wool carpet by one of the following:
1. Classic Weavers, Dalton, GA, telephone 706/277-7767.
 2. Dresso USA, Inc., Wayne, PA, telephone 215/526-9517.
 3. Floorgraphix Inc., Cartersville, GA, telephone 404/386-0310.
 4. Louis De Poortere, Atlanta, GA, telephone 404/688-6331.
 5. U.S. Axminster, Greenville, MS, telephone 601/332-1581.
- C. Carpet Tile Fabricated with Recycled Materials: Provide one of the following:
1. BPX Carpet Tile with GlasBac RE, by Bentley Prince Street, City of Industry, CA 91746; telephone 800/423-4709; www.bentleyprincestreet.com.
 2. ER3 RS Modular Tile, by Collins & Aikman Floorcoverings, a Tandus Company, Dalton, GA; telephone 800/248-2878; www.tandus.com.
 3. Earth Square, by Milliken Carpet, LaGrange, GA, telephone 877/327-3639.

4. i2 Cool Carpet Tile, Carpet Tile with GlasBac RE, and FLOR Terra with Ingeo PLA Fiber, by Interface Flooring Systems, Atlanta, GA; telephone 866/281-3567; www.interfaceinc.com.
 5. EcoSolution Q and EcoWorx, by Shaw Contract Group, Dalton, GA 30722; telephone 800/257-7429; www.shawcontractgroup.com.
- D. Natural Fiber Carpets: Provide sisal, coir, hemp, jute, and reed carpets from one of the following:
1. Design Materials, Inc., Kansas City, KS 66106; telephone 800/654-6451; www.dmikc.com.
 2. Earth Weave Carpet Mills, Inc., Dalton, GA 30722; telephone 706/278-8200; www.earthweave.com.
 3. Sisal Rugs Direct, Excelsior, MN 55331; telephone 888/613-1335; www.sisalrugs.com.

2.23 CARPET CUSHION

- A. Carpet Cushion Fabricated from Recycled Materials: Provide one of the following:
1. EcoSoft Carpet Cushion, by Invista Commercial Flooring, Kennesaw, GA, 30144; telephone 800/438-7668; www.antron.invista.com.
 2. Ethos, by Collins & Aikman Floorcoverings, a Tandus Company, Dalton, GA; telephone 800/248-2878; www.tandus.com.
 2. Syntex, Hartex, PL and DublBac Series, by Leggett & Platt, Inc., Nashville, TN 37202, telephone 615/634-1600; www.leggett.com.
 3. Endurance II, by Shaw Contract Group, Dalton, GA 30722; telephone 800/257-7429; www.shawcontractgroup.com.

2.24 INTERIOR PAINTS

- A. Interior Latex Paints with Zero-VOC Content: Provide one of the following:
1. Pristine Eco-Spec, by Benjamin Moore & Co., Montvale, NJ, telephone 800/344-0400, www.benjaminmoore.com.
 2. Pure Performance, by PPG Architectural Finishes, Pittsburgh, PA; telephone 888/774-7732, www.ppg.com.
 3. Harmony, by Sherwin-Williams, Cleveland OH, telephone 800/321-8194, www.sherwin-williams.com.
 4. Safecoat, by American Formulating & Manufacturing Co., San Diego, CA, telephone 800/239-0321; www.afmsafecoat.com.
 5. Enviro-Cote, by Kelly-Moore Paint Co., Sacramento, CA 95838; telephone 800/874-4436; www.kellymoore.com.
- B. Interior Transparent Finishes with Low-VOC Content: Provide one of the following:
1. Safecoat Clear Finishes, by American Formulating & Manufacturing Co., San Diego, CA, telephone 800/239-0321; www.afmsafecoat.com.

- C. Interior Water-Based Multi-Color Paints: Provide one of the following:
 - 1. Polomyx All Acrylic (previously Zolatone Waterbase), by Surface Protection Industries International, North Billerica, MA, telephone 888/765-6699.
 - 2. Aquafleck, by California Paints, Cambridge, MA.

2.25 TOILET PARTITIONS

- A. Toilet Partitions with Recycled Content Solid Plastic: Provide one of the following:
 - 1. Poly-Pro Plus Solid Resin, Capitol Partitions, Inc., Columbia, MD, telephone 410/740-8870, www.capitolpartitions.com.
 - 2. Sanypoly Solid Resin, Santana, Scranton, PA, telephone 800/368-5002, www.hinyhider.com.
 - 3. Yemm & Hart, Marquand, MO, telephone 573/783-5434, www.yemmhart.com.

2.26 LOCKERS

- A. Lockers with Recycled Content Solid Plastic: Provide one of the following:
 - 1. The Mills Company, a subsidiary of Bradley Corporation, Menomonee Falls, WI 53052. 800/272-3539, www.bradleycorp.com.
 - 2. Sanypoly Solid Resin, Santana, Scranton, PA, telephone 800/368-5002, www.hinyhider.com.
 - 3. Yemm & Hart, Marquand, MO, telephone 573/783-5434, www.yemmhart.com.

2.27 HAND DRYERS

- A. Electric Hand Dryers: Provide electric hand dryers by one of the following:
 - 1. XLerator Electric Hand Dryer by Excel Dryer, Inc., East Longmeadow, MA, telephone 413/525-4531.
 - 2. Electric Hand Dryer by World Dryer, Berkeley, IL, telephone 800/323-0701.

2.28 MANUFACTURED CASEWORK

- A. Manufactured Casework with Agrifiber Board Cores: Provide one of the following:
 - 1. Case Systems Inc., Midland, MI.
 - 2. LSI Corporation of America, Inc., Minneapolis, MN; www.lsi-casework.com.

2.29 GRAY WATER SYSTEM

- A. Graywater Recycling System: System shall recycle gray water from non-toilet bathroom and laundry waste water for exterior below-grade irrigation system. Provide system by one of the following:

1. M-1000, M-100, as manufactured by Agwa Systems Inc., Burbank, CA, telephone 818/562-1449.
2. ReWater System, as manufactured by ReWater Systems, Inc., Palo Alto, CA, telephone 415/324-1307.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.
- B. Restore damaged components. Clean and protect work from damage.

END OF SECTION

Green Resources

www.greenformat.com	GreenFormat
www.csinet.org	The Construction Specifications Institute
www.wbdg.org	Whole Building Design Guide
www.usgbc.org	The US Green Building Council
www.buildinggreen.com	Environmental Building News
www.rsmeans.com	Cost Info for Green
www.arcata.com	ARCAT, formatted specifications, wizards
www.nibs.org	National Institute of Building Sciences, CCB
www.sweets.com	McGraw-Hill, Sweet's compendium website
www.pacerepresentatives.com	Manufacturer's collaborative website
www.kalinassociates.com	Kalin Associates Short-Form Specs
www.google.com	More than anyone needs to know

LEED Reviews:	Green Specifications:
RM Environmental Consulting	Kalin Associates Inc.
Richard Moore AIA LEED	Mark Kalin FAIA FCSI LEED
T: 617 566 7567	T: 617 964 5477
E: rm.architect@verizon.net	E: mkalin@kalinassociates.com

LEED Reference Guide, LEED Excel Templates, Credit Interpretation Rulings (CIR's):
US Green Building Council T: 202 828 7422
www.usgbc.org

Mileage Calculator for cities in US & Canada: How Far Is It?
www.indo.com/distance/

CRI Identification number confirmation for carpets & adhesives:
Carpet & Rug Institute's Green Label Program
<http://www.carpet-rug.org>

FSC Certification number confirmation for certified wood:
Forest Stewardship Council's Certification Wood program
<http://www.fsc-info.org>

Green Seal VOC limits for paints & Coatings:
Green Seal's Standard GS-11 program
www.greenseal.org

SCAQMD Rule #1168 VOC limits for adhesives & sealants:
South Coast Air Quality Management District program
<http://www.aqmd.gov> Quality Management District program

BAAQMD Regulation 8, Rule 51 VOC limit's for sealants & sealant primers:
Bay Area Air Quality Management District program
www.baaqmd.gov
End